Appendix A Consultation Letters

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Jane Dee Hull Governor

State Parks Board Members

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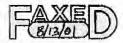
> Arizona State Parke 1300 W. Washington Phoenik, AZ 85007

Tal & TTY: 602.542.4174

800.285.3703 From (520) area code

> General Fax: 602,542,4180

Director's Office Fax: 602.542.4188 "Managing and conserving natural, cultural, and recreational resources"



In reply, please refer to SHPO-2001-2129 (7456) more information requested

August 13, 2001

Laurie A. Woodall, Chairperson, Power Plant and Transmission Line Siting Committee Assistant Attorney General, Environmental Enforcement Section Office of the Attorney General 1275 West Washington Phoenix, Arizona 85007

RE: Certificate of Environmental Compatibility Case No. 111: The Proposed Tucson Electric Power Company (TEP) South Substation to Nogales Transmission Line, Pima and Santa Cruz Counties, Arizona

Dear Ms. Woodall:

Thank you for having the committee's applicant (i.e., TEP) initiate consultation with this office regarding the above-mentioned state plan and associated certificate of environmental compatibility. The proposed plan includes three possible routes or alignments between the Sahuarita and Nogales areas that cross various federal, state, and private lands; the preferred route follows Ruby Road and the westerns slope of the Tumacacori Mountains, and the two alternative routes roughly parallel Interstate-19. Historian Bill Collins and I have reviewed the documents submitted and offer the following comments pursuant to the State Historic Preservation Act (i.e., A.R.S. § 41-861 to 41-864) and the committee's factors to be considered (i.e., A.R.S. § 40-360.06.A.5).

This plan also represents a federal undertaking, and the U.S. Department of Energy, as the lead federal agency, will consult directly with this office in regards to the National Historic Preservation Act. Our advice to the committee should not be interpreted or construed to infringe upon role of the lead federal agency regarding the scope and adequacy of identification efforts, eligibility determinations, effect findings, and treatment options.

Please inform the committee's applicants that this office normally has 30 working days in which to review state plans as stated in A.R.S. § 41-864. At the applicant's request, we have expeditiously reviewed the documents submitted on August 3, 2001.

The analysis of potential impacts to known historic properties (i.e., any prehistoric or historic district, site, building, structure traditional cultural place, or object included in, or eligible for inclusion in the National or State Registers of Historic Places) resulted in a archaeological sensitivity map that also shows the general location of historic-period properties in relation to the proposed corridors. The map is a good visual tool for conveying the information that was gathered. However, the cultural assessment would have been greatly aided by having the archaeological consultant discuss the map's underlying assumptions and limitations discuss the results, and provide conclusions and recommendations in relation to the proposed routes; My technical comments on the analysis and the map are presented on the attached page; we are not requesting revisions at this time.

The preferred route completely avoids two important historic properties, Tumacacori National Historic Landmark and Tubac Presidio State Historic Park. The two other

Letter to Siting Committee, 8/13/01, Page 2
Certificate of Environmental Compatibility Case No. 111; The Proposed Tucson Electric Power Company South Substation to Nogales Transmission Line, Pima and Santa Cruz Counties, Arizona

alternative routes occur near enough to one or both of these properties to raise concerns about potential impacts, especially visual ones. Tumacacori, which was founded in 1753, was a Pima community organized around a Spanish mission; the first mission building at the site was built in 1757. Tubac Presidio was constructed in 1752 to protect Spanish colonists and the Pima attending the Missions at Tubac and Tumacacori. Both park managers have expressed concerns to this office about proposed nearby transmission lines. Furthermore, National Historic Landmarks, such as Tumacacori, showcase the very best properties listed in the National Register of Historic Places.

However, less is apparently known about the presence or absence of historic properties situated within or near the preferred route, relative to the two alternative routes. Thus, the absence of archaeologically sensitive areas on the map along the preferred route is likely due to the lack of previous archaeological survey and Native American consultation in this area and not necessarily the absence of such properties. For example, I would expect rock art sites, Archaic-period camp sites, and shrines to occur in settings such as those along the preferred route. In contrast, many historic building surveys and archaeological surveys have occurred as part of other state plans and federal undertakings located along the two alternative routes.

We agree in principle that avoidance and preservation-in-place is an appropriate treatment; in fact, the transmission line may help protect historic properties by inhibiting other kinds of development within the proposed corridor. However, the location of the poles and access roads is unknown at this time, and thus it is unclear if avoidance of all eligible properties present is feasible. Avoidance of archaeological sites usually entails the taking positive steps, such as erecting temporary fences and establishing buffer zones, to insure that plan-related, ground-disturbing activities, such as trench excavation and vehicular movement on unpaved roads, do not occur within the external boundaries of sites. Avoidance of historic-period resources generally entails taking precautions to ensure that the characteristics that contribute to property's eligibility are not impacted.

Given the identification effort to date and current planning stage, this office recommends that the preferred route be selected, because it will minimize and/or lessen impacts to known historic properties. We cannot complete the assessment the plan's effects and cannot concur with determination of impact until further studies and planning stages are completed. Unless all historic properties can be avoided, a determination of negative impacts is likely.

We offer the following stipulations for the committee's consideration:

- 1) The applicant will participate as a consulting party, on committee's behalf, with the lead federal agency, the State Historic Preservation Office (SHPO), and the state and federal land-managing agencies in the federal compliance process (i.e., 36 C.F.R. 800) to reach a finding of effect and to resolve adverse effects, if any.
- 2) Should federal involvement in any part or all of this plan be removed or not occur, the applicant will continue to consult, on committee's behalf, with SHPO in the state compliance process to reach a determination of impact and resolve impacts, if any

Letter to Siting Committee, 8/13/01, Page 3 Certificate of Environmental Compatibility Case No. 111: The Proposed Tucson Electric Power Company South Substation to Nogales Transmission Line, Pima and Santa Cruz Counties, Arizona

- 3) The lead federal agency and/or the applicant on behalf of the committee, will consult with Indian tribes regarding the potential impacts to historic properties, particularly traditional cultural places, that may be present within or adjacent to the proposed consider, and resolve adverse effects, if any. Such consultation should be done in a sensitive manner respectful of tribal sovereignty and concerns regarding confidentiality.
- 4) The applicant will include in the geographic area affected by the plan (i.e., area of potential effect), the final right-of-way and buffer zone, new and existing access roads, material source pits (if any), and equipment staging areas.
- 5) The applicant will sponsor the necessary studies to complete the identification effort as part of the federal or state compliance process. This may include a cultural resources survey, archaeological testing, or ethnographic study performed under the direction of professional that meets the Secretary of the Interior's qualification standards and permitting requirements of the appropriate land-managing entities.
- 6) If a historic property, cannot be avoided, the applicant will sponsor the necessary studies or take the appropriate actions to lessen or mitigate the impacts as part of the federal or state compliance process. This may include archaeological data recovery (i.e., excavations), archival research and structure documentation.
- 7) After construction, the applicant, in conjunction with the land-managing agency, if any, will allow Arizona Site Stewards, a volunteer-staffed SHPO program, to periodically inspect the sites present within the corridor for vandalism or damage.

We look forward to the lead federal agency initiating consultation regarding this undertaking and appreciate the committee's cooperation with this office in considering the effects of state plans on cultural resources situated in Arizona. If you have any questions, please contact me at (602) 542-7137 or electronically via mbilsbarrow@pr.state.az.us

Sincerely,

Matthew H. Bilsbarrow, RPA

Compliance Specialist Archaeologist State Historic Preservation Office

attachment

cc. w/attachment Bill Collins, SHPO

Daniel R. Elder, DRE & Associates; 8765 East Bear Place; Tucson, Arizona 85749

Ellen Russell, NEPA Document Manager, Office of Fossil Energy (FE-27), U.s. Department of Energy, 1000 Independence Ave, SW; Washington, DC 20585

Letter to Siting Committee, 8/13/01, Page 4
Certificate of Environmental Compatibility Case No. 111: The Proposed Tucson Electric Power Company
South Substation to Nogales Transmission Line, Pima and Santa Cruz Counties, Arizona

General and Technical Comments on "Exhibit E-1: Historical and Archaeological Map for the TEP-Citizens Interconnect Project" prepared by Professional Archaeological Services and Technologies and DRE & Associates, dated February 2001

General Comments

- 1) Overall the map is a wonderful way of presenting the information gathered.
- 2) The method of assessing significance (i.e., site worth) based on site value, arbitrarily assigned from one and 10, multiplied by site area, which ranges from 0.1 to 438 acres, gives too much weight to size and is somewhat redundant. Site size is often related to site function, which is already included when considering site value. For example, habitation sites are usually larger that field house sites, and habitation sites were already valued higher the field house sites. Furthermore, small sites dating to the Paleo-Indian or Archaic-periods are more or equal in importance as a large Hohokam babitation site.
- 3) The separation of archaeological sites from historic-period buildings as shown on the map is not completely clear. It appears the some historical buildings, such as Canoa Ranch, that may also have archaeological site numbers were treated as archaeological sites rather than as historic sites.
- 4) The lack of information on an area is not represented on the map and not discussed in the document. The archaeological sensitivity of areas that have not been surveyed or otherwise inventoried should be clearly marked as being of unknown sensitivity on the map.
- 5) The documentation lacks the consulting archaeologist's conclusions and recommendations regarding the individual routes. A summary of properties situated within or adjacent to each route would have been helpful.

Technical Comments

- Two historic sites numbered 36 are present on the map in the vicinity of Nogales; The one situated in Nogales marks the Grimm House location.
- The Titan II missile silo, which is a National Historic Landmark and situated north of Green Valley, is not marked on the map.



November 15, 2001

Mr. Gayle Koeninger El Paso Natural Gas 7776 South Pointe Parkway West, Suite 185 Phoenix, AZ 85044

Subject:

Proposed Tucson Electric Power Transmission Line Adjacent to an El

Paso Natural Gas Company Pipeline

Dear Mr. Koeninger:

We are currently preparing an Environmental Impact Statement under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power Company 345-kV transmission line in southern Arizona that overlaps approximately 50 miles with an El Paso Natural Gas pipeline right-of-way. Our environmental analysis will include a description of any particular environmental health and safety concerns that will be encountered in the area of overlap with the natural gas pipeline.

As such, your input in this area would be most helpful. We would be happy to provide you with additional design information as needed for your analysis. In addition, a description of any past experience you have with overlapping transmission line and gas pipeline right-of-ways would be helpful. For example, was cathodic protection for the pipeline required in the past? What specific construction or maintenance practices were required for the pipeline and/or transmission lines? What distance was maintained between the pipeline and the transmission lines?

To help identify the proposed right-of-way overlap, the referenced gas pipeline runs from approximately 8 miles west of Sahuarita, Arizona, extending south through a portion of the Coronado National Forest and continuing to just west of Nogales, Arizona. The proposed area of overlap is within Pima and Santa Cruz Counties.

I look forward to hearing from you in the near future and thank you for your response. If you have any questions, please call me at (315) 682-3268 or (703) 931-9301 or email me at hmblauer@erols.com. If you prefer to mail information to me, please use:

4640 Ringnecked Path Manlius, NY 13104-9603

Sincerely,

Erica Rohl for

Dr. H. Mark Blauer Deputy Project Manager

cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, DOE

O01-408 HMB.er

TETRA TECH, INC.



December 5, 2001

Attn: Duty Agent
Phoenix Division
Drug Enforcement Administration
3010 North Second Street, Suite 301
Phoenix, Arizona 85012

Subject: Proposed Tucson Electric Power Transmission Line near Nogales, Arizona

Dear Sir or Madam:

Tetra Tech is preparing an Environmental Impact Statement under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from the U.S. Drug Enforcement Administration regarding potential impacts of the proposed transmission line on illegal immigration and drug related activities. We have provided below a basic description of the project, and would be happy to provide additional details as needed for your consideration.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. The border crossing is within Santa Cruz County, a few miles west of Interstate 19. The double-circuit 345-kV line would be strung on a single set of support structures approximately 125 feet high. Upon completion of construction, a right-of-way (ROW) up to 150 feet wide would be maintained below the length of the line to provide maintenance access to TEP.

Specifically, could the proposed ROW from the project impact illegal immigration and drug related activities? We are also contacting the U.S. Immigration and Naturalization Service and other Federal and state agencies for input on this proposed project. If you have any questions, please call me at (315) 682-3268 or (703) 931-9301 or email me at

hmblauer@erols.com. If you prefer to mail information to me, please use the address below.

Sincerely,

Dr. H. Mark Blauer Deputy Project Manager 4640 Ringnecked Path Manlius, NY 13104-9603

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Cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

NO1-432



December 5, 2001

Mr. William N. Johnston Officer-in-Charge U.S. Immigration and Naturalization Service Tucson Sub Office 6431 South Country Club Road Tucson, AZ 85706-5907

Subject: Proposed Tucson Electric Power Transmission Line near Nogales, Arizona

Dear Mr. Johnston:

Tetra Tech is preparing an Environmental Impact Statement under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from the U.S. Immigration and Naturalization Service regarding potential impacts of the proposed transmission line on illegal immigration and drug related activities. We have provided below a basic description of the project, and would be happy to provide additional details as needed for your consideration.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. The border crossing is within Santa Cruz County, a few miles west of Interstate 19. The double-circuit 345-kV line would be strung on a single set of support structures approximately 125 feet high. Upon completion of construction, a right-of-way (ROW) up to 150 feet wide would be maintained below the length of the line to provide maintenance access to TEP.

Specifically, could the proposed ROW from the project impact illegal immigration and drug related activities? We are also contacting the U.S. Drug Enforcement Administration and other Federal and state agencies for input on this proposed project. If you have any questions, please call me at (315) 682-3268 or (703) 931-9301 or email me

One Skyline Place, 5205 Leesburg Pike, Suite 1400, Falls Church, VA 22041 Tel 703.931.9301 Fax 703.931.9222 at hmblauer@erols.com. If you prefer to mail information to me, please use the address below.

Sincerely,

Dr. H. Mark Blauer Deputy Project Manager 4640 Ringnecked Path Manlius, NY 13104-9603

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Cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

NO1-431



U.S. Department of Justice Drug Enforcement Administration 3010 North Second Street Phoenix, Arizona 85012-3055

DEC 1 8 2001

Dr. H. Mark Blauer Deputy Project Manager 4640 Ringnecked Path Manlius, New York 13104-9603

Dear Dr. Blauer:

With reference to your December 5, 2001 letter regarding the proposed Tucson Electric Power Transmission Line near Nogales, Arizona, the Drug Enforcement Administration defers all comments to the U.S. Immigration and Naturalization Service and the U.S. Customs Service in regards to intrusions between ports of entry by illegal immigrants.

DEA currently doesn't have enough information regarding the extent of this project to give a credible response. If however, Tetra Tech proposes to excavate this proposed land site so it is less obtrusive by removing plants and flattening the land, then this would be a concern of DEA, in that it would help facilitate border crossings by drug traffickers and illegal immigrants..

If further assistance is needed in this matter, please call me at 602-664

THANKS FOR CONSULTING W/US.

CAll W/QUESTIANS

Thomas W. Raffanel Special Agent in Char

cc: Ed Beck, Tucson Electron Power Company Mr. Jerry Pell, U.S. Department of Energy

TEP-2001-38



January 16, 2002

Mr. Rusty Arbeit Air Space Manager Air Space Management Office Davis Monthan Air Force Base Tucson, AZ 85707

Subject: Proposed Tucson Electric Power Transmission Line south of Tucson, Arizona

Dear Mr. Arbeit:

Tetra Tech is preparing an Environmental Impact Statement under the National Environmental Policy Act (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would originate in Sahuarita, Arizona and extend south to cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from Davis Monthan Air Force Base regarding potential impacts of the proposed transmission line on military flight operations. We have provided below a basic description of the project and will provide additional details if needed.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. The enclosed map shows the three routes currently under consideration for the proposed transmission line. The double-circuit 345-kV line would be strung on a single set of support structures approximately 125 feet high, with a maximum height of 150 feet as necessary for ground clearance requirements. Upon completion of construction, a right-of-way (ROW) up to 150 feet wide would be maintained below the length of the line to provide maintenance access to TEP.

Would there be any impacts on military flight operations from the proposed project? Would visual markers or lights be required on the support structures or transmission lines? We are also contacting the Federal Aviation Administration and other Federal and state agencies for input on this proposed project. If you have any questions, please call

One Skyline Place, 5205 Leesburg Pike, Suite 1400, Falls Church, VA 22041 Tel 703,931,9301 Fax 703,931,9222 me at (315) 682-3268 or (703) 931-9301 or email me at hmblauer@erols.com. If you prefer to mail information to me, please use the address below.

Sincerely,

Erica Rote for

Dr. H. Mark Blauer Deputy Project Manager 4640 Ringnecked Path Manlius, NY 13104-9603

cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

Atch

NO2-008



January 16, 2002

Mr. Chuck Pearman Airways Facilities Technician Supervisor Federal Aviation Administration 7081 South Plumer Ave. Tucson, AZ 85706

Subject: Proposed Tucson Electric Power Transmission Line south of Tucson, Arizona

Dear Mr. Pearman:

Tetra Tech is preparing an Environmental Impact Statement under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would originate in Sahuarita, Arizona and extend south to cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from the FAA regarding potential impacts of the proposed transmission line on flight operations. We have provided below a basic description of the project and will provide additional details if needed.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. The enclosed map shows the three routes currently under consideration for the proposed transmission line. The double-circuit 345-kV line would be strung on a single set of support structures approximately 125 feet high, with a maximum height of 150 feet as necessary for ground clearance requirements. Upon completion of construction, a right-of-way (ROW) up to 150 feet wide would be maintained below the length of the line to provide maintenance access to TEP.

Would there be any impacts on flight operations from the proposed project? Would visual markers or lights be required on the support structures or transmission lines? We are also contacting Davis Monthan Air Force Base and other Federal and state agencies

for input on this proposed project. If you have any questions, please call me at (315) 682-3268 or (703) 931-9301 or email me at hmblauer@erols.com. If you prefer to mail information to me, please use the address below.

Sincerely,

Erica Robl you

Dr. H. Mark Blauer Deputy Project Manager 4640 Ringnecked Path Manlius, NY 13104-9603

cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

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NO2-007



U.S. Department Transportation Southern Arizona System Support Unit 7081 S. PLUMER Tucson, AZ 85706

Federal Aviation Administration

January 28, 2002

Dr. H. Mark Blauer Deputy Project Manager 4640 Ringnecked Path Manilus, NY 13104-9603

Subject: Proposed Tucson Power Transmission Line

Dr. Blauer:

The Air Traffic Control manager at Tucson Airport and myself has reviewed the plans, which you submitted to me in regards to above subject. To the best of our knowledge, your plans would not affect air traffic due to location and height of towers. The closest airport to them would be the Nogales international and their pattern would in no way conflict with the transmission line. The only requirements would be to adhere to Arizona State statutes in regard to tower construction.

Sincerely

Mark by carmon

Charles W. Pearman AF Coordinator Federal Aviation Admin. 7081 S. Plumer

Tucson, Az. 85708

Subject: [Fwd: Proposed Tucson Electric Power Transmission Line]

From: "H. Mark Blauer" hmblauer@erols.com

Date: Mon, 18 Feb 2002 07:41:50 -0500

To: hmbinc@erols.com

----- Original Message ------

Subject:Proposed Tucson Electric Power Transmission Line

Date: Thu, 14 Feb 2002 15:07:35 -0700

From: Von Brock David C Maj 355 OSS/OSTT < David. Vonbrock@dm.af.mil>

To:"hmblauer@erols.com" <hmblauer@erols.com>

CC:Von Brock David C Maj 355 OSS/OSTT <David.Vonbrock@dm.af.mil>, "'alan.steffes@aztucs.ang.af.mil" <alan.steffes@aztucs.ang.af.mil>

Dr. Blauer,

Thanks for soliciting inputs for the proposed TEP Transmission Line.

I have solicited inputs on behalf of the 355th Wing at Davis-Monthan AFB. We can't comment on the visual marker or light requirements (I would refer to Title 14 CFR Part 77 and Federal Aviation Regulation 7400.2), but we can comment on potential impacts to local military flight operations.

Davis-Monthan does not have any relevant issues with any of the three power 14ne routes proposed in you letter of 16 Jan 2002. The proposed westerly te could impact the FUZZY Military Operating Area (MOA) that allows flight operations down to 100ft. The 162nd Fighter Group at Tucson International is responsible for the FUZZY MOA. I have passed on your proposal to the 162nd FG Airspace Manager but cannot comment in regard to their area of responsibility. I recommend contacting them directly.

162FG Airspace Manager: Lt Col Allan Steffes (520) 295-6894, Fax 295-6293

email:

alan.steffes@aztucs.ang.af.mil

Please contact me if you have any further questions.

DAVID VON BROCK, Major, USAF 355 OSS/OSOA Davis-Monthan Airspace Manager (520) 228-5868

--

Mark Blauer 315-682-3268

information contained in this transmission, which may be confidential and proprietary, is only for the intended recipients. Unauthorized use is strictly prohibited. If you receive this transmission in error, please notify me immediately by telephone or electronic mail and confirm that you deleted this transmission and the reply from your electronic mail system.



March 20, 2002

Lieutenant Colonel Allan Steffes 162nd Fighter Wing 1660 East El Tigre Way Tucson, AZ 85734

Subject: Proposed Tucson Electric Power Transmission Line south of Tucson, Arizona

Dear Lieutenant Colonel Steffes:

As we discussed on March 19, 2002, Tetra Tech is preparing an Environmental Impact Statement (EIS) under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would originate in Sahuarita, Arizona and extend south to cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from the U.S. Air Force regarding potential impacts of the proposed transmission line on military flight operations, specifically on the FUZZY Military Operating Area (MOA) in the proposed project area. We have provided below a basic description of the project and will provide additional details if needed. As we discussed, the Arizona Corporation Commission (ACC) has only granted TEP permission for the Western Corridor. However, under the direction of the lead Federal agency, the Department of Energy, the EIS will analyze potential impacts from all three corridors.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. Project information, including depictions of the support structures being proposed, can be found on DOE's project website, on the Fact Sheet at http://www.ttclients.com/tep. The website also includes a map of the three 2-mile wide study corridors that will be analyzed in the EIS as potential routes for the 150 to 200-feet wide transmission line right-of-way (ROW). The double-circuit 345-kV line would be strung on a single set of support structures approximately 125 feet high, with a maximum height of 150 feet as necessary for ground clearance requirements. A majority of the support structures would be single monopoles, with lattice support structures used as dictated by terrain or geology. Upon completion of construction, a ROW up to 200-feet wide would be maintained along the length of the transmission line to provide maintenance access to TEP.

We would like to understand if there would be impacts on military flight operations from the proposed project. Would visual markers, lights, or other mitigation be required on the support structures or transmission lines? Please provide input as soon as possible for analyses before public issuance of the Draft EIS, tentatively scheduled for June 2002. As discussed, we will add you to the mailing list to receive a copy of the Draft EIS. Two public meetings will be held in the proposed project area during the 45-day Draft EIS public comment period as an additional forum for comments. If you have any questions, please call me at (315) 682-3268 or (703) 931-9301 or email me at hmblauer@erols.com. If you prefer to mail information to me, please use the address below.

Sincerely,

Dr. H. Mark Blauer

Hufak Kane

Deputy Project Manager 4640 Ringnecked Path

Manlius, NY 13104-9603

cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

NO2-065



April 3, 2002

Mr. Rob Daniels Public Information Officer, U.S. Border Patrol U.S. Immigration and Naturalization Service 1970 West Ajo Way Tucson, AZ 85713

Subject: Proposed Tucson Electric Power Transmission Line near Nogales, Arizona

Dear Mr. Daniels:

Tetra Tech is preparing an Environmental Impact Statement under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from the U.S. Immigration and Naturalization Service (INS) regarding potential impacts of the proposed transmission line on illegal immigration and drug related activities. We were referred to you as the proper contact by Kathy Williams in the INS Tucson sub-office. We have provided below a basic description of the project, and would be happy to provide additional details as needed for your consideration.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. The border crossing is within Santa Cruz County, a few miles west of Interstate 19. The double-circuit 345-kV line would be strung on a single set of support structures approximately 125 feet high. Upon completion of construction, a right-of-way (ROW) up to 150 feet wide would be maintained below the length of the line as needed to provide maintenance access to TEP. Locked gates and fences would be installed at specified ROW locations as required to limit access. Project information, including depictions of the support structures being proposed, can be found on DOE's project website, on the Fact Sheet at http://www.ttclients.com/tep. The website also includes a map of the three 2-mile wide study corridors that will be analyzed in the EIS as potential routes for the 150 to 200-feet wide transmission line right-of-way (ROW).

Specifically, could the proposed ROW from the project impact illegal immigration and drug-related activities? What type of mitigation measures, if any, such as limiting ROW access, would be suggested? We have also contacted the U.S. Drug Enforcement Administration, who referred us to the INS, along with other Federal and state agencies. If you have any questions, please call me at (703) 931-9301, or email me at erica.ruhl@tetratech.com. Your prompt input would be appreciated, as it would be preferable to include it in the Draft EIS to be issued for public review, tentatively scheduled for June 2002.

Sincerely,

Erica Ruhl

Environmental Engineer

Erica Rothl

cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

NO2-071



5 April 2002

Mr. David Harlow Field Supervisor Arizona Ecological Services Field Office U.S. Fish and Wildlife Service 2321 West Palm Road, Suite 103 Phoenix, AZ 85701

RE: Preparation of an Environmental Impact Statement, Tucson Electric Power Company (TEP)

Dear Mr. Harlow:

Tucson Electric Power Company (TEP) has applied to the Department of Energy (DOE) for a Presidential Permit to construct a double-circuit, 345,000 volt (345 kV), transmission line that would originate in Sahuarita, Arizona, and extend for approximately 60 miles within one of three alternative corridors to cross the U.S.-Mexico border near Nogales, Arizona.

DOE has determined that the issuance of a Presidential permit for this project would constitute a major Federal action that could have significant impacts upon the human environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). Accordingly, on 10 July 2001 DOE published in the *Federal Register* a "Notice of Intent to Prepare an Environmental Impact Statement (EIS) and to Conduct Public Scoping Meetings and Notice of Floodplain and Wetlands Involvement" (66 FR 35950). Public scoping meetings were held in Sahuarita and Rio Rico, Arizona, on July 30 and 31, 2001, respectively; the public comment period closed on Friday 31 August 2001.

As defined by 40 CFR 1501.5, DOE is the lead Federal Agency in preparation of the EIS, and the U.S. Department of Agriculture Forest Service (USFS), the Bureau of Land Management (BLM), and the United States Section of the International Boundary and Water Commission, U.S. and Mexico (USIBWC), are Cooperating Agencies.

I am writing to you now in order to officially initiate consultation with the U.S. Fish and Wildlife Service in accordance with the Interagency Cooperation on the Endangered Species Act of 1973 (50 CFR 402.07), which states that, "When a particular action involves more than one Federal agency, the consultation and conference responsibilities may be fulfilled through a lead agency ... The Director shall be notified of the designation in writing by the lead agency."

Under DOE direction, Tetra Tech, Inc., is providing EIS preparation support and will be involved in ongoing consultations on this project. The Tetra Tech Project Manager is Dr. Mark Blauer; team members include Dan Elder and Erica Ruhl.

The TEP application, including associated maps and drawings, can be viewed and downloaded in its entirety from the Fossil Energy web site (http://www.fe.doe.gov; choose "Electricity Regulation," then "Pending Procedures," then scroll down to Pending Presidential Permit Application PP-229). Additional project information, including depictions of the support structures being proposed, can be found on the project web site, maintained for us by Tetra Tech at http://www.ttclients.com/tep.

TEP contracted with the Harris Environmental Group, Inc., (Harris) to conduct a preliminary biological evaluation of the three corridors that were originally proposed. I believe that this evaluation included correspondence with you in October 2000, and also contacts with the Arizona Game and Fish Department and the USDA Forest Service, Coronado National Forest. The preliminary biological evaluation conclusion states that, "Based on our correspondence with these agencies, photo-interpretation, and our professional knowledge of the area, we believe potential habitat for 65 rare and endangered species may exist within the project area." I am asking Tetra Tech to provide you with a copy of this Harris document under separate cover.

We are seeking input from the U.S. Fish and Wildlife Service on the process required for analysis of potential impacts to biological resources in the proposed project area, and with regard to any other concerns of the Service with regard to this proposed project. A Tetra Tech representative will contact you to follow up on this consultation letter.

Also, please note that I am convening an informal working meeting with the cooperating agencies, the applicant, and the support contractors in Tucson on 23-25 April. If you like, you or your staff are cordially invited to attend. (If so, please advise, and location, etc., information will be provided.)

At any time, please feel free to contact me directly by e-mail at <u>Jerry Pell@hq.doe.gov</u>, by phone at 202-586-3362, or by fax at 202-318-7761.

Very truly yours,

Dr. Jerry Pell

Manager, Electric Power Regulation
Office of Coal & Power Import and Export

Office of Fossil Energy, FE-27 U.S. Department of Energy

Washington, D.C. 20585

cc: Tetra Tech



June 27, 2002

Mr. Shawn M. Palmer U.S. Border Patrol, Tucson Sector 1500 W. La Quinta Road Nogales, AZ 85621

Subject: Proposed Tucson Electric Power Transmission Line near Nogales, Arizona

Dear Mr. Palmer:

Tetra Tech is preparing an Environmental Impact Statement under the *National Environmental Policy Act* (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would cross the U.S.-Mexico border near Nogales, Arizona. As part of our analysis, we are seeking input from the U.S. Border Patrol regarding potential impacts of the proposed transmission line on illegal immigration and drug related activities. Keith Graves, Coronado National Forest District Ranger, provided basic information on U.S. Border Patrol operations in this area in a recent interview, as reflected in the attached notes, and referred us to contact you. We have provided below a basic description of the project, and would be happy to provide additional details as needed for your consideration.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing approximately 60 miles into the Sonoran region of Mexico. The border crossing is a few miles west of Interstate 19, in the vicinity of an El Paso Natural Gas Company pipeline within Section 24, Township 24 South, Range 13 East. The double-circuit 345-kV line would be strung on a single set of support structures approximately 140 feet high. During construction, new access roads will be built where no access currently exists and some existing roads and trails may be closed in an effort to mitigate overall project impacts on forest land. Upon completion of construction, a 125 to 200-feet wide right-of-way (ROW) would be maintained below the length of the line, as needed, to provide maintenance access for TEP Locked gates and fences would be installed at specified ROW locations as required to limit access. Project information, including depictions of the support structures being proposed, can be found on DOE's project website, on the Fact Sheet at http://www.ttclients.com/tep. The website also includes a map of the study corridors that will be analyzed in the EIS as potential routes for the transmission line ROW. Note that each alternative has the same location for crossing the U.S.-Mexico border, as described above.

One Skyline Piace, 5205 Leesburg Pike, Suite 1400, Falls Church, VA 22041

Tel 703.931,9301 Fax 703.931,9222

Specifically, please provide any corrections or additions to the attached interview notes with Mr. Graves regarding potential project impacts on illegal immigration and drug-related activities. Also, please indicate what type of mitigation measures, if any, the U.S. Border Patrol would recommend. We have also contacted the U.S. Drug Enforcement Administration, who referred us to the INS, along with other Federal and state agencies. If you have any questions, please call me at (315) 682-3268, or email me at hmblauer@erols.com. Your prompt attention to this matter is appreciated, as we will include your comments in the Draft EIS to be issued for public review, tentatively scheduled for September 2002.

Sincerely,

H. Mark Blauer Ph.D.

Erica Ruthl for

Project Manager

cc: Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

NO2-149



Department of Energy Washington, DC 20585

21 September 2004

Mr. Steven L. Spangle
Field Supervisor
Arizona Ecological Services Field Office
U.S. Fish and Wildlife Service
U.S. Department of the Interior
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951

SUBJECT: Second request for formal consultation under §7 of the Endangered Species Act for potential impacts relating to the proposed TEP Sahuarita-Nogales transmission line project.

Dear Mr. Spangle:

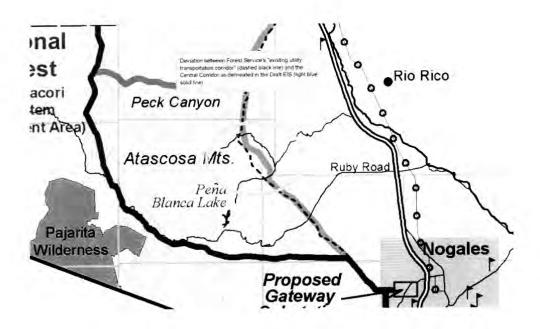
On 26 April 2004, you provided the Department of Energy (DOE) with a Biological Opinion (your reference number AESO/SE; 02-21-00-F-0427) with regard to the "Tucson Electric Power Company (TEP) Sahuarita-Nogales Transmission Line Draft Environmental Impact Statement (DEIS)," DOE/EIS-0336. DOE is the lead agency in the preparation of the EIS, and the U.S. Forest Service, the Bureau of Land Management, and the U.S. Section of the International Boundary and Water Commission are cooperating agencies.

Three alternative routes were analyzed in the DEIS: the Western, Central, and Crossover Corridors. DOE has designated the Western Corridor as its preferred alternative. Accordingly, on 18 November 2003, we requested formal consultation under §7 of the Endangered Species Act of 1972, as amended, for your determination of potential impacts to Federally listed threatened and endangered species for DOE's preferred Western Corridor alternative identified in the DEIS.

However, on 19 July 2004, Ms. Jeanine A. Derby, Forest Supervisor, Coronado National Forest, Forest Service, U.S. Department of Agriculture, advised DOE that the Forest Service has selected two preferred alternatives that differ from the Western Corridor, as follows:

- The route crossing National Forest System lands follows the existing utility transportation corridor mapped in the Land and Resource Management Plan for the Coronado National Forest, and
- The route crossing National Forest System lands follows the path designated in the Draft EIS as the Central Corridor.

It is important to note that these two alternatives are essentially identical, except for a single minor deviation as depicted in the graphical enlargement provided below.



As was noted in our letter of 18 November 2003, for all three alternate routes, TEP is proposing to build a new, double-circuit, 345,000-volt transmission line from TEP's South Substation in the vicinity of Sahuarita, Arizona, to the site of the proposed Gateway Substation to be located west of Nogales, Arizona. From the Gateway Substation, the proposed transmission line would continue south across the United States-Mexico border for approximately 60 miles (98 kilometers) into Sonora, Mexico, where it would connect with the Comisión Federal de Electricidad at the Santa Ana Substation. Please refer to Chapter 2 of the DEIS for additional information regarding the proposed action and details regarding each alternative.

TEP contracted with the Harris Environmental Group (HEG) to prepare separate Biological Assessments (BAs) for each of the three action alternatives (alternate routes). These BAs were prepared to satisfy regulations contained in 50 C.F.R. § 402.12 and § 402.14 (c)(1) - (6) and to establish a foundation to support the requested §7 consultation. A BA for each of the three alternate corridors analyzed in the DEIS is contained on the CD-ROM that was sent to you with the DEIS. All of the species listed by the FWS as potentially occurring in Pima and Santa Cruz Counties were considered in each BA. A detailed evaluation was completed in each BA for those species potentially occurring within the proposed corridors and rationale for the above effects determinations was documented in each of the BAs. The table below summarizes the effects determinations for the federally listed species that would be affected for the Forest Service's preferred alternatives (Central Corridor and existing utility transportation corridor variant):

SPECIES	POTENTIAL EFFECT
Cactus ferruginous pygmy-owl	The proposed action may affect and is likely to adversely affect this species.
Southwestern willow flycatcher	The proposed action may affect but is not likely to adversely affect this species.
Lesser long-nosed bat	The proposed action may affect and is likely to adversely affect this species.
Pima pineapple cactus	The proposed action may affect and is likely to adversely affect this species.
Jaguar	The proposed action may affect but is not likely to adversely affect this species.
Gila topminnow	The proposed action may affect but is not likely to adversely affect this species.
Mexican gray wolf	The proposed action may affect but is not likely to adversely affect this species.

Accordingly, for these Central Corridor alternatives, DOE is now requesting formal consultation on the following three species that this alternative may affect, and is likely to adversely affect:

- I. Pima pineapple cactus
- II. Lesser long-nosed bat, and
- III. Cactus ferruginous pygmy-owl.

DOE is also requesting concurrence that this alternative may affect, but is not likely to adversely affect, the following four species:

- IV. Jaguar
- V. Mexican gray wolf
- VI. Southwestern willow flycatcher, and
- VII. Gila top minnow

Furthermore, by virtue of the fact that the three cooperating agencies (DOE, Forest Service, and BLM) have not yet documented their respective Records of Decision, such that a single preferred route satisfactory to all of the federal parties remains to be determined, we are hereby formally requesting that the earlier Biological Opinion of 26 April 2004 for the Western Corridor remain active and effective, and hence available to the agencies for reference and use in their deliberations.

Thank you for your kind consideration. If you have, or if your staff has, any questions or concerns, please contact me at 202-586-3362, by e-mail at jerry.pell@hq.doe.gov, or by fax at 202-318-7761.

Very truly yours,

Jerry Pell, Ph.D., CCM TEP Project Manager

cc: Jeanine A. Derby, Coronado National Forest Keith Moon, Bureau of Land Management



March 8, 2004

Mr. David Aguilar U.S. Border Patrol, Tucson Sector 1970 West Ajo Way Tucson, AZ 85713

Subject: Proposed Tucson Electric Power Transmission Line near Nogales, Arizona

Dear Mr. Aguilar:

Tetra Tech is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) for a proposed Tucson Electric Power (TEP) transmission line that would cross the U.S.-Mexico border near Nogales, Arizona. The EIS is being prepared for the U.S. Department of Energy, in coordination with the U.S. Forest Service, U.S. Bureau of Land Management, and U.S. Section of the International Boundary and Water Commission. As part of our analysis, we are seeking input from the U.S. Border Patrol regarding ongoing and planned future activities, and potential impacts of the proposed transmission line. We previously sent letters to Rob Daniels of the U.S. Border Patrol (April 3, 2002) and Shawn Palmer (June 27, 2002) but have not received any response. We have been provided your name as an additional point of contact by the Coronado National Forest. Below is a basic description of TEP's proposed project, and a list of specific questions for the U.S. Border Patrol. We would be happy to provide additional details as needed for your consideration.

The transmission line would extend south from Sahuarita, Arizona for approximately 60 miles, crossing the U.S.-Mexico border west of Nogales, Arizona and continuing into Mexico. The proposed transmission line border crossing is approximately 3,300 ft west of Arizona State Highway 189, in the vicinity of an El Paso Natural Gas Company pipeline within Section 24, Township 24 South, Range 13 East. The double-circuit 345-kV line would be strung on a single set of support structures approximately 140 feet high, within a 125-ft wide right-of-way. During construction, new access roads would be built where no access currently exists and some existing roads would be closed in an effort to mitigate overall project impacts on National Forest land. Upon completion of construction, roads that would not be used for ongoing maintenance would be closed. Remnants of closed roadways would not provide a single continuous pathway from the U.S.-Mexico border. To restrict access to maintenance roads, TEP would place barriers, boulders, fences, or locked gates across the maintenance roads as needed to meet the requirements of the Coronado National Forest or private landowners.

5205 Leesourg Fixe, Suite 1400, Falls Church, v.A. 22041; Tel. 703.931,9301, Fax 703.931,9222 Project information, including a copy of the Draft EIS, can be found on DOE's project website, at http://www.ttclients.com/tep. The website also includes a map of the study corridors that are analyzed in the Draft EIS as potential locations for the transmission line ROW. Note that each alternative has the same location for crossing the U.S.-Mexico border, as described above.

Specifically, please provide answers to the following:

- Describe in general terms the ongoing operations of the U.S. Border Patrol in the area between Interstate 19 (I-19) and Sycamore Canyon (west of I-19) in the Coronado National Forest.
- Describe any future changes in activities or other projects that the U.S. Border Patrol has
 planned in the project area.
- State whether the proposed project is likely to affect illegal immigration, drug-related activities, and/or your operations.

Please provide responses to the specific questions above by March 22, 2004. If you have other additional comments on the Draft EIS (attached), those could be provided to DOE at a later date, if necessary, and those comments will also be considered to the extent feasible in preparation of the Final EIS. Your prompt attention to this matter is appreciated, as publishing of a Final EIS is scheduled for mid-2004. If you have any questions, please call me at (703) 931-9301, or e-mail me at mark.blauer@tetratech.com.

Sincerely,

H. Mark Blauer Ph.D. EIS Project Manager

cc: Gilbert Estrada, U.S. Border Patrol Ed Beck, Tucson Electric Power Company Dr. Jerry Pell, U.S. Department of Energy

NO4-016

Department of Homeland Security Bureau of Customs and Border Protection Office of Border Patrol OBP 10/9.2.6

Office of the Chief Patrol Agent 1970 W. Ajo Way Tucson, AZ 85713

March 29, 2004

Mr. H. Mark Blauer Tetra Tech, INC. 5205 Leesburg Pike, Suite 1400 Church Falls, VA 220415

Dear Mr. Bauer,

The Tucson Sector Office of Border Patrol submits the following comments in reference to Tetra Techs questions to the proposed Tucson Electric Power Sahuarita-Nogales Transmission Line:

- 1) Typical operations on the Coronado National Forest between Interstate 19 and Sycamore Canyon (west) are comprised of normal patrol operations and traffic operations on Ruby Road. The Nogales station traditionally patrolled to the area known as Bear Valley. The majority of the traffic in this area is foot traffic with limited vehicular traffic that loads out on Ruby Road and travels either east to Interstate 19 or west to the town of Ruby and on to Arivaca. An increase in vehicular traffic is anticipated with the introduction of a North-South roadway system in this area.
- 2) The Border Patrol is expecting an increase in the amount of patrol operations in this area. There are currently plans to expand the current Remote Video Surveillance System (RVSS) to the west of Nogales. The current plans will expand onto U.S. Forest Service property. The preliminary planning stages for a road project are underway to construct an East-West road out toward the Pena Blanca Lake area. Without knowing exactly where the proposed power line will be constructed, I am concerned that the proposed power line will conflict with our proposed RVSS sites on the West side of Nogales. I am assuming that the proposed power line will be on top of one of the ridgelines that cross the international border. The Border Patrol currently has two proposed RVSS sites on top of the ridgelines just west of the Mariposa Commercial Truck Gate. Looking at pages S-4 of the July 2003 Draft EIS, it appears as the power line will be constructed on a proposed RVSS site.
- 3) This project will have an impact on smuggling tends and affect Border Patrol operations. There will be an increase in the amount of illegal traffic through the West side of Nogales. This is expected as a result of road construction necessary for the proposed power line and the increase of Border Patrol resources in the West Desert. As Border

Patrol increases it's resources on the West Desert, it is expected that smugglers will move their operations to other areas, with the west side of Nogales expected to be one of those areas. The construction of roads to install and maintain the power lines will be a major draw to alien and narcotic smugglers. These roads, even if access is secured with gates, will provide egress away from the border to the smugglers. This will in fact, will cause an increase in the amount of illegal traffic through the Coronado National Forest.

Whether or not a single route of egress is created, the construction of the power line will create a roadway system that will be utilized by smugglers. The smugglers may use short portions of the power line maintenance road to access an existing road or drive cross country to access an existing road.

4) The proposed construction of the power line might also be in the immediate vicinity of the Nogales station firing range or actually be constructed over the firing range.

I am confident that illegal alien and narcotic smuggling will increase with the construction of the power line maintenance road. Even if this is not a single continuous road leading north, this route of egress will necessitate the Border Patrol to increase it's presence in the Coronado National Forest. When the power line maintenance road is constructed, the Border Patrol is requesting access to the road for operational needs.

If further discussion on this matter is needed, please feel free to contract Gilbert Estrada, Senior Tactical Coordinator at (520) 584-4006 or Field Operations Supervisor Todd Jewell at (520) 377-6017

Appendix B

Electric and Magnetic Fields Background Information

Electric and Magnetic Fields

Extensive research has been conducted to determine if exposure to electric or magnetic fields may cause or promote adverse health effects. Much of this research has focused on determining whether or not electric and magnetic fields (EMF) exposure at some level has adverse health effects, rather than on identifying the specific exposure level at which such effects may occur. The National Institute of Environmental Health Sciences (NIEHS) was mandated by Congress to conduct a research program, literature review, and health assessment on EMF effects, including an extensive scientific and public review processes. Following 6 years of research, the NIEHS released its report in June 1999 entitled Health Effects from Exposure to Power-line Frequency Electric and Magnetic Fields (NIEHS 1999). The report studied the effects of the extremely low frequency range (ELF) fields generated by the power lines in the United States.

The NIEHS report's Executive Summary concludes that "The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak." The report continues, "The probability that EMF exposure is truly a health hazard is currently small." The report also states that ELF-EMF exposure "cannot be recognized as entirely safe," given that epidemiological studies (studies of disease patterns in people) demonstrate a fairly consistent pattern of small increased risk with increasing exposures for chronic lymphocytic and childhood leukemia. On the other hand, the report explains that the results of laboratory experiments fail to demonstrate any consistent pattern supporting the epidemiological findings. The report continues that the epidemiological findings are weakened by this lack of support from laboratory data, though the epidemiological findings cannot be completely discounted.

The most significant source for the NIEHS report was the NIEHS Working Group Report, which resulted from a 9-day meeting in June 1998. The Working Group considered all literature relevant to the potential effects of power-frequency EMF on health, including cancers of several types, adverse pregnancy outcomes, chronic illnesses (for example, Alzheimer's disease and amyotrophic lateral sclerosis also known as Lou Gehrig's disease), and neurobehavioral changes (for example, depression, learning, and performance). The Working Group found limited support for a causal relationship between childhood leukemia and residential exposure to EMF, and between adult chronic lymphocytic leukemia and employment with potentially high-magnetic field exposure. Based on this assessment and charged with ranking EMF, according to the International Agency for Research on Cancer criteria, the Working Group assigned EMF a 2B ranking, which translates to "possible human carcinogen." For all other health outcomes, the Working Group concluded that the evidence was inadequate.

The NIEHS report included an assessment of EMF exposures measured in the United States from home and office appliances. Based on data from 24-hour personal monitors worn by individuals, exposures measured within the home averaged 0.8 milligauss (mG) for time not in bed and 0.5 mG for time spent in bed. Personal exposures at work averaged 1.0 mG. A number of common household appliances generate EMF, with the highest fields typically coming from microwave ovens, toaster ovens, ceiling heaters, and refrigerators. While this exposure information may provide a basis of comparison for evaluating EMF exposure associated with power lines, uncertainty exists on whether long-term, lower exposures (typically associated with appliances) are comparable in their potential effects on human health (NIEHS 1999).

An independent paper by Dr. Sander Greenland (University of California, Los Angeles) and colleagues, entitled "A Pooled Analysis of Magnetic Fields, Wire Codes, and Childhood Leukemia," (Greenland et al. 2000) has been published in the journal *Epidemiology*. The work was funded by NIEHS. The authors concluded: (1) an effect of magnetic fields below 3.0 mG is unlikely or too small to be detected in epidemiological studies; and (2) there is suggestive evidence that an association between magnetic fields greater than 3.0 mG and childhood leukemia exists.

Another paper describing the results of a pooled analysis of magnetic fields and childhood leukemia was published in the September 2000 issue of *British Journal of Cancer*. Dr. Anders Ahlbom (Karolinska Institute, Sweden) and colleagues conducted the analysis funded by the European Union (Ahlbom 2000). This pooled analysis is based on original, individual-level data rather than a review of existing studies. The study examined whether there is an association between magnetic fields and leukemia. The authors concluded "We did not find any evidence of an increased risk of childhood leukemia at residential magnetic field levels less than 4.0 mG. We did, however, find a statistically significant relative risk estimate of two for childhood leukemia in children with residential exposure to EMF greater than 4.0 mG during the year prior to diagnosis. Less than one percent of subjects were in this highest exposure category." The report also states that the explanation for the elevated risk is unknown but suggests that selection bias may have accounted for some of the increase.

In light of the literature review and studies conducted by NIEHS and presented in its summary report, the NIEHS encourages passive regulatory action on EMF. This includes a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS states that the power industry should continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

An additional comprehensive review of existing studies, which included review and comment by the public, was recently completed on behalf of the California Public Utilities Commission led by three scientists who work for the California Department of Health Services (DHS). This Risk Evaluation, available in its entirety on the Internet at http://www.dhs.ca.gov/ehib/emf/RiskEvaluation/riskeval.html, provides an evaluation of the animal, laboratory and human evidence that shows how exposure to 50/60 Hz magnetic fields may or may not increase human health risks. Like many other evaluations, the focus was on determining whether or not EMF exposure at some level has adverse human health effects, rather than on identifying the specific exposure level at which such potential health effects may occur. Three DHS scientists reviewed studies covering EMFs from power lines, wiring in buildings, some jobs, and appliances. The DHS study Executive Summary states, "With the exception of miscarriage, which is common, the other diseases for which EMFs may be a contributing cause (childhood leukemia, adult brain cancer, Lou Gehrig's Disease) have low incidence... The vast majority (99% to 99.9%) of highly exposed (EMF) people would still not contract these diseases... However, if EMFs do contribute to the cause of these conditions, even the low fractions of attributable cases and the size of accumulated lifetime risk of highly-exposed individuals could be of concern to regulators" (DHS 2002).

Appendix C Floodplain/Wetlands Assessment

Appendix C – Floodplain/Wetlands Assessment

Floodplains and wetlands are protected from adverse Federal actions by a variety of laws, regulations, and orders. This Floodplain/Wetlands Assessment identifies the floodplains and wetlands potentially affected under each of the alternatives addressed in the Tucson Electric Power Company (TEP) Sahuarita-Nogales Transmission Line Draft Environmental Impact Statement (EIS) to the extent floodplains and wetlands in the project area have been delineated. A detailed description of the proposed project, including project purpose and need, is provided in Chapter 1. The alternatives identified in this assessment are the same corridor alternatives described in detail in Chapter 2. Because the final siting and engineering of the transmission line has not been determined, measures to avoid and minimize wetland impacts can only be discussed in general terms (see Section C. 3. Impact Avoidance).

C.1 Introduction and Methods

This assessment was prepared to comply with Executive Order (E.O.) 11988, *Floodplain Management*, and E.O. 11990, *Protection of Wetlands*. Under E.O. 11988, Federal agencies must "...provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains..." Furthermore, "If an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains." Under E.O. 11990, Federal agencies "...shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities..."

The U.S. Department of Energy (DOE) requirements for compliance with Executive Orders 11988 and 11990 are found in Title 10, *Code of Federal Regulations* (CFR), Part 1022, "Compliance with Floodplain/Wetlands Environmental Review Requirements." A floodplain/wetlands assessment consists of a description of the proposed action, a discussion of its effects on the floodplain and wetlands, and consideration of the alternatives. The Executive Orders direct Federal agencies to implement floodplain and wetland requirements through existing procedures, such as those established to implement the *National Environmental Policy Act of 1969* (NEPA) to the extent practicable.

If DOE determines that there is no alternative to implementing a proposed project in a floodplain, a brief statement of findings must be prepared. This statement of findings would include a description of the proposed action, an explanation indicating why the project must be located in a floodplain, a list of alternatives considered, measures that will be taken to comply with state and local floodplain protection standards, and a description of the steps to be taken to minimize adverse impacts to the floodplain.

For the purposes of this assessment, the 500-year and 100-year floodplains along the Santa Cruz River and its tributaries were taken from Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), which are based on 2002 digital FIRM files for Pima and Santa Cruz counties. The FIRM files for Pima and Santa Cruz counties do not cover tribal or U.S. Forest Service (USFS) lands, and do not include delineations for a large portion of the "Southlands" area of Pima County¹. In an attempt to address these deficiencies in coverage, DOE, through SWCA, contacted the Coronado National Forest (CNF) and requested information regarding the location of any floodplains and wetlands on USFS lands within any of the alternative corridors; there are no tribal lands in the project area. According to B. Lefevre, CNF Watershed Specialist, the CNF has not mapped any floodplains and wetlands on CNF lands (pers. comm. w/T. Furgason, SWCA, 2 May 2003). SWCA also reviewed soil survey maps of Pima and

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¹ "Southlands" refer to recently annexed lands in Pima County located south of Interstate-10 and east of Interstate-19.

Santa Cruz counties in an attempt to find any useful floodplain information². However, these maps proved unsatisfactory because the material is dated, the soil information was mapped at a scale that was inadequate for the purposes of this project, and there was a weak correlation between soils that are associated with floodplains and floodplain boundaries as defined by FEMA.

C.1.1 Floodplains Potentially Affected

The FIRM maps indicate that the following tributaries occurring in the project area could have associated 100-year floodplains: Santa Cruz River, Sopori, Toros, Diablo, Las Chivas, Mariposa Canyon Wash, and several unnamed washes (Figures 1-5). Delineated 500-year floodplains within the study areas are associated with the Santa Cruz River, Sopori, and Mariposa Canyon Wash. Additional unmapped 100-year and 500-year floodplains may also occur in the project area. Each of the proposed corridor alternatives crosses numerous ephemeral watercourses (an ephemeral watercourse flows briefly in direct response to precipitation in the immediate vicinity). A portion of the Sycamore Canyon contains a perennial stream (a stream that flows throughout the year; a permanent stream), but none of the proposed corridor alternatives cross the perennial stream. In those areas where the 100- or 500-year floodplains have not been delineated, the county engineer or Federal agency may require the project proponent to establish the regulatory floodplain and floodway limits through a hydrologic and hydraulic study prepared by an Arizona registered professional civil engineer.

² U.S.D.A Soil Conservation Service and Forest Service. 1979. Soil survey of Santa Cruz and parts of Cochise and Pima Counties, Arizona. Prepared in cooperation with Arizona Agricultural Experiment Station.

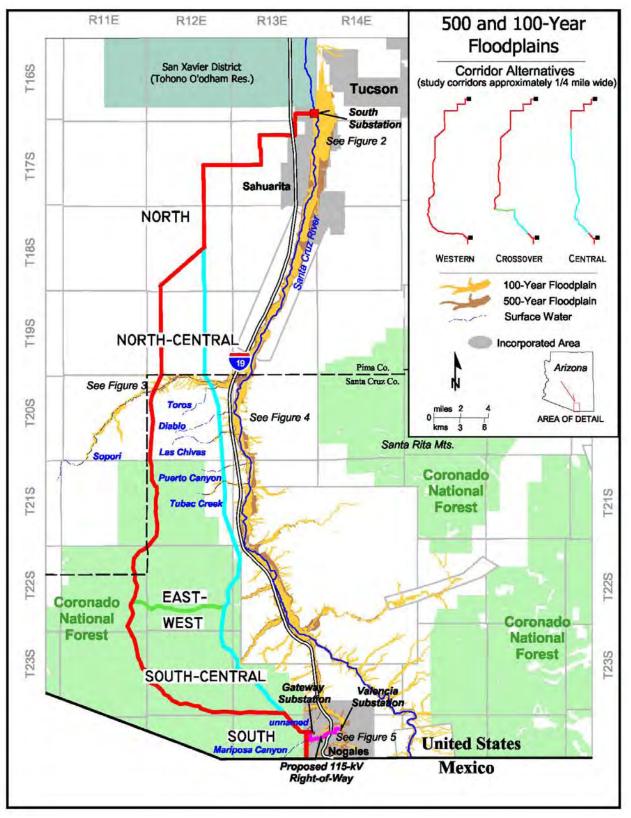


Figure 1. 100-year and 500-year Delineated Floodplains and Associated Surface Waters Crossed by the Corridor Alternatives.

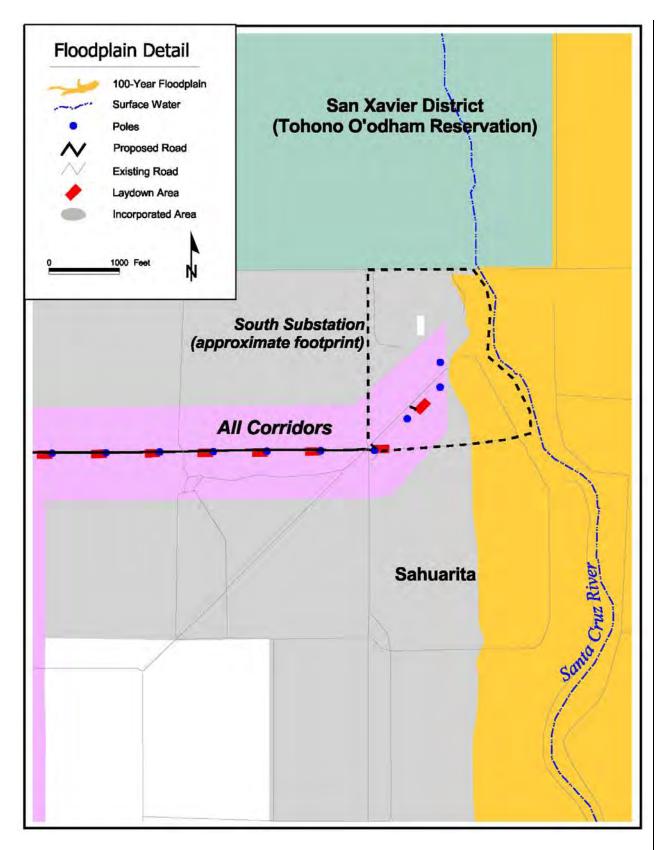


Figure 2. Detailed View of Corridor Alternative Relative to Delineated 100-year Floodplains.

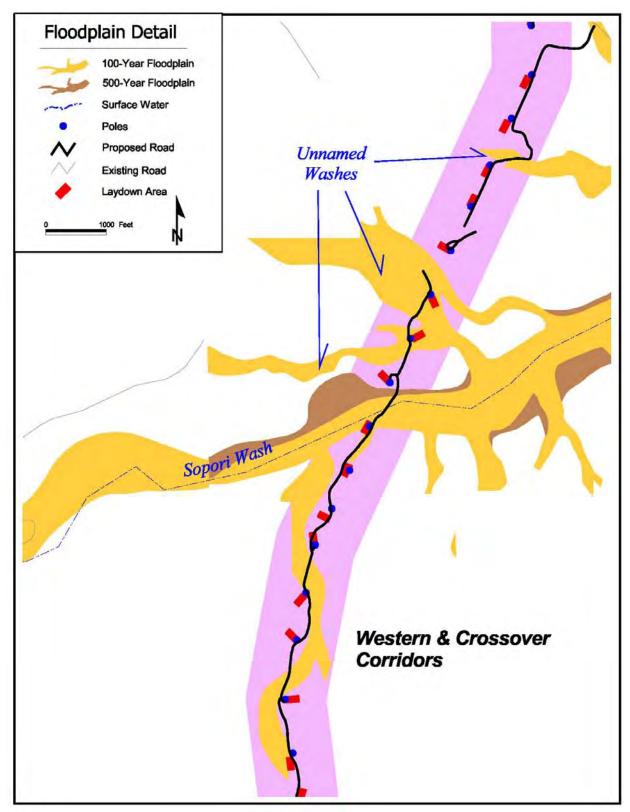


Figure 3. Detailed View of Corridor Alternative Relative to Delineated 100-year and 500-year Floodplains.

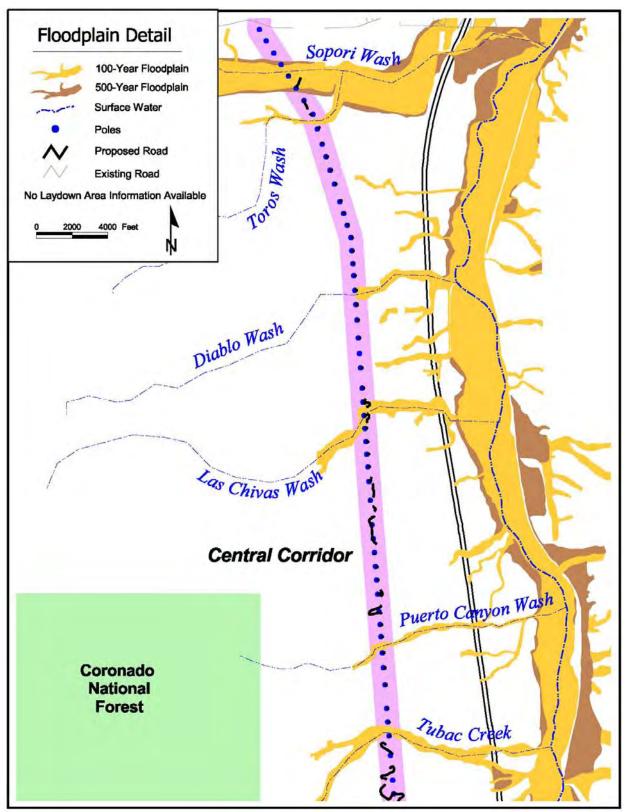


Figure 4. Detailed View of Corridor Alternative Relative to Delineated 100-year and 500-year Floodplains.

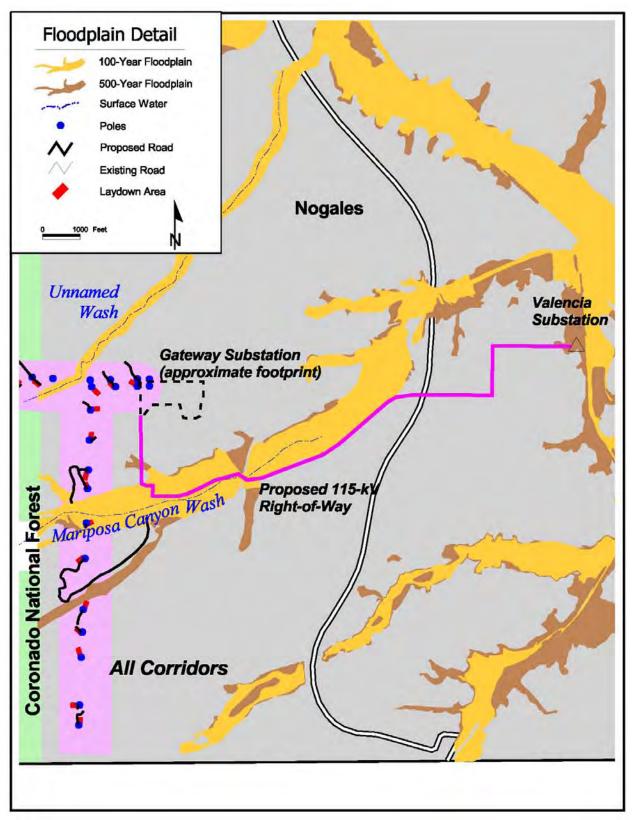


Figure 5. Detailed View of Corridor Alternative Relative to Delineated 100-year and 500-year Floodplains.

C.1.2 Wetlands Potentially Affected

Wetlands are a subset of waters of the United States. Waters of the United States are defined in the *Clean Water Act* (CWA) as "surface waters, including streams, streambeds, rivers, lakes, reservoirs, arroyos, washes, and other ephemeral watercourses and wetlands" (33 CFR Part 328). Waters of the United States on the project area are under the jurisdiction of the U.S. Army Corps of Engineers (USACE), and activities that result in impacts to waters of the United States must be permitted by USACE under Section 404 of the CWA. A Section 404 Permit must be obtained by any person, agency, or entity, either public or private, proposing a project that will result in a discharge of dredged or fill material into waters of the United States, including wetlands.

C.1.2.1 Watercourses.

Each of the proposed corridor alternatives crosses numerous ephemeral watercourses (an ephemeral watercourse flows briefly in direct response to precipitation in the immediate vicinity). Portions of the Peck Canyon contain a perennial stream (a stream that flows throughout the year; a permanent stream) and is within the east-west segment of the Crossover Corridor.

C.1.2.2 Wetlands.

Wetlands are defined in E.O 11990 as "areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds."

To be a jurisdictional wetland (one subject to regulation by USACE), an area must meet three criteria according to the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*: presence of hydric soils, hydrophytic vegetation, and wetland hydrology. Hydric soils are soils with the seasonal highwater table within one inch (2.5 cm) of the surface of the ground for at least one week of the growing season. Hydrophytic vegetation may grow in soils at least periodically depleted of oxygen as a result of water saturation. Hydrophytic vegetation might be able to grow only in wetlands (obligate wetlands vegetation) or may be found in upland environments as well (facultative wetlands vegetation). Wetlands hydrology requires permanent or temporary inundation of soils for at least one week during the growing season and the resultant depletion of oxygen.

Wetlands serve a variety of functions within the ecosystem. Consideration of these functions is essential in the evaluation of potential impacts. Wetland functions and values include water quality preservation, flood protection, erosion control, biological productivity, fish and wildlife habitat, cultural values, aesthetic values, economic values, and scientific values.

No potential wetlands were found in the proposed project corridors during field surveys to identify habitat for wetland-dependent plant and animal species. The majority of potential wetlands are located outside the proposed corridors, and are associated with manmade stock ponds and impoundments.

C.2 Potential Impacts on Floodplains and Wetlands

The following discussion evaluates the potential impacts of each alternative to delineated floodplains in the project area. There are no delineated wetlands in the proposed corridors, and therefore no wetlands are expected to be impacted by the proposed project. The discussion of impacts to floodplains is organized by geographic area in order to take advantage of geographic overlap between the three corridor

alternatives: Western, Crossover, and Central. These geographic areas are the North Segment, North Central Segment, South Central Segment, East-West Segment, and South Segment (Figure 1). Common to all three corridor alternatives are the North Segment and the South Segment.

All of the corridor alternatives involve some construction in floodplains. The four activities to be conducted in floodplains are pole placement, and the construction of pole laydown areas, access roads, and the South Substation expansion (located in the North Segment of all three corridor alternatives). For the purposes of this assessment, the following assumptions were made regarding these potential impacts: (1) the impact of individual pole placement would be 25 ft² (m²) (see Table 4.1-1 for overall pole footprints); (2) pole laydown areas would each require about 1,850 ft² (m²); (3) access roads would be 12 ft (m) wide; and (4) the South Substation expansion would require 58,500 ft² (m²). Projected impacts to floodplains were based on maps provided by Electrical Consultants Inc. showing locations of poles, pole laydown areas, and access roads (ECI 2003). Figure 2 shows the approximate footprint of the South Substation expansion as a small white rectangle. The boundary of TEP's substation property is indicated by a dashed line.

As permanent structures in floodplains, the South Substation expansion and corridor access roads could directly impact floodplain values by increasing flood elevation and frequency. An increase in flood elevation could result in an increase in downstream flood loss and a long-term negative impact on lives and property.

Impacts resulting from pole placement and construction of laydown areas would be negligible. Neither activity would negatively impact flood elevation or flood frequency. Consequently, there would be no direct or long-term effects on floodplain values or lives and properties.

C.2.1 No Action Alternative

Under the No Action Alternative, there would be no immediate change in potential impacts to floodplains in the proposed corridors. However, future proposals to develop land parcels in the project area could affect floodplains.

C.2.2 Western Corridor

Based on FEMA flood maps, the Western Corridor and Crossover Corridor alternatives would have the greatest potential impact on floodplains in the project area. For these two alternative corridor routes, total potential impact within the delineated 100-year floodplains is estimated at about 1.97 acres (0.80 ha). The total impact estimated within the delineated 500-year floodplains is 1,614 ft² (150 m²) of new access roads.

North Segment. There would be no poles, pole laydown areas, or new access roads in the delineated 100-year floodplain. The South Substation property includes approximately 13 ha (32 acres) of delineated 100-year floodplains associated with the Santa Cruz River. The South Substation expansion would occupy approximately 58,500 ft² (1.3 acres) on the property, in an area outside the delineated 100-year floodplain. The 500-year floodplain has not been delineated in the vicinity of the South Substation, but based on topography it is conservatively assumed that the facility and expansion could be impacted by the 500-year flood and possibly subject to more frequent flooding.

North Central Segment. There would be three poles confirmed and one pole probable, four pole laydown areas, and 1,327 ft (404 m) of new access roads [total area of 15,924 ft² (1480 m²)] in the delineated 100-year floodplain. No poles and approximately 1,614 ft (150 m) of new access roads would be placed in the delineated 500-year floodplain in this segment.

South Central Segment. There would be no poles, pole laydown areas, or new access roads in the delineated 100- year or 500-year floodplains.

South Segment. There would be one pole confirmed, one pole laydown area, and 184 ft (56 m) of new access roads [total area of 2,208 ft² (205 m²)] in the delineated 100-year floodplain. The 500-year floodplain has not been delineated for this segment of the transmission lines. The 115-kV Interconnection is discussed in C.2.5 below.

C.2.3 Central Corridor

The Central Corridor Alternative would have the least impact to the delineated floodplains, approximately 1.58 acres (0.64 ha).

North Segment. There would be no poles, pole laydown areas, or new access roads in the delineated 100-year floodplain. The South Substation property includes approximately 13 ha (32 acres) of delineated 100-year floodplains associated with the Santa Cruz River. The South Substation expansion would occupy approximately 58,500 ft² (1.3 acres) on the property, in an area outside the delineated 100-year floodplain. The 500-year floodplain has not been delineated in the vicinity of the South Substation, but based on topography it is conservatively assumed that the facility and expansion could be impacted by the 500-year flood and possibly subject to more frequent flooding.

North Central Segment. There would be five poles confirmed and two poles probable, no laydown areas, and 543 ft (166 m) of new access roads [total area of 6,500 ft² (605 m²) in the delineated 100-year floodplain. No poles and approximately 1,614 ft (150 m) of new access roads would be placed in the delineated 500-year floodplain in this segment.

South Central Segment. There would be no poles, pole laydown areas, or new access roads in the delineated 100- year floodplain or 500-year floodplains.

South Segment. There would be one pole confirmed, one pole laydown area, and 184 ft (56 m) of new access roads [total area of 2,208 ft² (205 m²)] in the delineated 100-year floodplain. The 500-year floodplain has not been delineated for this segment of the transmission lines. The 115-kV Interconnection is discussed in C.2.5 below.

C.2.4 Crossover Corridor

North Segment. There would be no poles, pole laydown areas, or new access roads in the delineated 100-year floodplain. The South Substation property includes approximately 13 ha (32 acres) of delineated 100-year floodplains associated with the Santa Cruz River. The South Substation expansion would occupy approximately 58,500 ft² (1.3 acres) on the property, in an area outside the delineated 100-year floodplain. The 500-year floodplain has not been delineated in the vicinity of the South Substation, but based on topography it is conservatively assumed that the facility and expansion could be impacted by the 500-year flood and possibly subject to more frequent flooding.

North Central Segment. There would be three poles confirmed and one pole probable, four pole laydown areas, and 1,327 ft (404 m) of new access roads [total area of 15,924 ft² (1479 m²)] in the delineated 100-year floodplain. No poles and approximately 1,614 ft (150 m) of new access roads would be placed in the delineated 500-year floodplain in this segment.

East-West Segment. Floodplain has not been delineated within the Coronado National Forest. Thus, there would be no poles, pole laydown areas, or new access roads in delineated 100-year or 500-year

floodplains in this segment. However, some pole locations and laydown areas in the Peck Canyon area may be subject to flooding. Assuming that construction in the floodplain is limited to the two pole locations in the bottom of the canyon and the two associated laydown areas, the potentially affected floodplain area would be $3750 \text{ ft}^2 (347 \text{ m}^2)$.

South Central Segment. There would be no poles, pole laydown areas, or new access roads in the delineated 100- year or 500-year floodplains.

South Segment. There would be one pole confirmed, one pole laydown area, and 184 ft (56 m) of new access roads [total area of 2,208 ft² (205 m²)] in the delineated 100-year floodplain. The 500-year floodplain has not been delineated for this segment of the transmission lines. The 115-kV Interconnection is discussed in C.2.5 below.

C.2.5 115-kV Interconnection of the Gateway and Valencia Substations

As shown on Figure 5, the 115-kV interconnection route would cross 100- and 500-year floodplains. Depending upon specific siting decisions, it is possible that poles could be located in the floodplains. Additionally, it is possible that laydown areas and access roads could also be located in the floodplains. The existing Valencia Substation is located outside the delineated 100-year floodplain, but within the delineated 500-year floodplain. At the existing Valencia Substation, TEP would install the following additional equipment: two 115-kV terminations, three 115-kV power circuit breakers and associated switches, bus, fittings, relay metering, and communication equipment. However, because TEP would not expand the facility beyond the existing footprint, no additional impacts associated with flooding are expected. To the extent possible, impacts to floodplains would be avoided as discussed in the following section.

C.3 Impact Avoidance

Some corridor access roads would be within 100-year floodplains and the South Substation expansion is conservatively assumed to be in the 500-year floodplain of the Santa Cruz River and could result in increases in flood elevation, potentially leading to an increase in downstream flood loss and a long-term negative impact on lives and property. Where structures must be located in a floodplain, TEP would be required to comply with the floodplain protection standards of Pima and Santa Cruz County, the Arizona Department of Environmental Quality, and the USFS. These standards require that all structures associated with the power line installation be flood-proofed or elevated at least 1 ft (0.3 m) above the base flood elevation. In the project area, this would apply to the South Substation expansion and corridor access roads. Poles, though permanent structures, would not require any specific mitigation because they would not have an effect on flood elevations. Similarly, the pole laydown areas would not affect flood elevations because they would be temporary. Finally, getting a Floodplain Permit for this project would be contingent on concurrent acquisition of any CWA Section 401 and 402 permits that may be necessary.

Any effects to floodplains resulting from the South Substation expansion would be unavoidable, however, because the South Substation was originally constructed in the 100-year floodplain, and the proposed project is designed to connect to the existing electrical grid at this location. Impacts resulting from pole placement and construction of laydown areas would be negligible. Impacts to floodplains would be avoided to the extent possible by siting access roads and laydown areas outside floodplains, spanning floodplains where feasible and floodproofing measures at the South Substation. The Western and Crossover Corridors would have the greatest potential to impact floodplains in the project area.

Historical flooding of the Santa Cruz River in the vicinity of the South Substation has resulted in lateral migration of the river channel. TEP commissioned a study to determine engineering measures that could

be implemented to protect the South Substation from erosion during floods, including effects of channel migration (TEP 2002c). The results of that study indicate a variety of protective measures (ranging from reducing erosion with soil cement to building a structural concrete retaining wall) that can be implemented to better protect the South Substation from flooding-related erosion. These measures should prevent adverse effects on public health and safety from locating this critical facility in an area subject to flooding. Although the study did not explicitly examine the potential impacts of a flood event larger than the 100-year flood, because potential erosion impacts were not correlated with flood magnitude, the recommended flood-protection measures should be protective in larger flood events, including the 500-year flood. A detailed hydrologic analysis will be completed prior to expansion as part of the local permitting process.

Appendix D, Part 1

Harris Environmental Group, Inc. Final Biological Assessment TEP Proposed Sahuarita-Nogales Transmission Line Project Western Corridor (HEG 2004a)

FINAL BIOLOGICAL ASSESSMENT OF THE

TUCSON ELECTRIC POWER SAHUARITA – NOGALES TRANSMISSION LINE WESTERN CORRIDOR

20 November 2003

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EXECUTIVE SUMMARY

Tucson Electric Power (TEP) and Citizens Communications (Citizens) are proposing to build a new, dual-circuit, 345,000-volt (345-kV) transmission line from the TEP South Substation in the vicinity of Sahuarita, Arizona to interconnect with Citizens system at a Gateway Substation that TEP will construct west of Nogales, Arizona. From the Gateway Substation, the proposed transmission line will continue south across the United States – Mexico border for approximately 60 miles (mi) (98 kilometers [km]) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at the Santa Ana Substation. The proposed transmission line will improve Citizens' service in Nogales and allow for the transfer of blocks of electrical energy between the United States and Mexico. Southern Arizona and Sonora, Mexico have experienced rapid growth, and forecasts predict this growth will Citizens' customers have already experienced outages due to limited transmission facilities into the region. TEP recognizes the need to improve transmission into the southern Arizona region and proposes to assist Citizens in meeting an Arizona Corporation Commission (ACC) mandate to improve the reliability and service of its Nogales electrical system. The ACC has ordered Citizens to improve its system by the end of 2003. The TEP Sahuarita – Nogales Transmission Line, a double-circuit 345-kV transmission line will provide the additional reliability that Citizens requires while providing additional capacity into the southern Arizona region for future needs.

This Biological Assessment (BA) was prepared to meet the requirements of Section 7 of the Endangered Species Act (ESA) of 1973, 16 U.S.C. Section 1536(a)(2). Section 7 requires all federal agencies to consult with the United States Fish and Wildlife Service (USFWS) if an action may affect listed species or their designated critical habitat. Section 7 consultation is required for any project that requires a federal permit or receives federal funding. Action is defined broadly to include funding, permitting and other regulatory actions. All activities associated with construction of the TEP Sahuarita - Nogales Transmission Line are included in the proposed action being evaluated for this BA. Because TEP has applied for a Presidential Permit to construct the transmission line across the international border, the Department of Energy (DOE) is preparing an Environmental Impact Statement (DEIS) (Tetra Tech 2003) concurrently with this document.

Federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This is accomplished through consultation with the USFWS. If such species may be present, the applicant must conduct a BA to determine if a proposed action is likely to adversely affect listed species, or designated critical habitat. The USFWS will review this BA and issue a biological opinion (BO). DOE is the permitting agency for this proposed action, and therefore the lead federal agency on Section 7 consultation with USFWS.

The proposed action crosses a variety of land jurisdictions: including private, Arizona State Land Department (ASLD), Bureau of Land Management (BLM), and United States Department of Agriculture Forest Service (USFS). Because each jurisdiction has different requirements for environmental review of the proposed action, this document is subdivided by agency. Section 2 addresses species that receive protection under the ESA. Section 3 reviews the potential effects of the proposed action on those species classified as "Sensitive" by the USFS. Section 4 reviews the potential effects of the proposed action on those species classified as "Sensitive" by the BLM. Section 5 addresses those species that are considered "Wildlife of Special Concern" by the Arizona Game and Fish Department (AGFD). Because habitats often overlap different jurisdictions, many species have classifications within each agency. In these instances, the species is evaluated under the jurisdiction which affords the highest level of protection.

We contacted federal (USFWS) and state (AGFD) natural resource agencies to request information on possible special status species (sensitive, threatened, and endangered) that may exist on or near the proposed Western Corridor of the TEP Sahuarita – Nogales Transmission Line. Agency correspondence is presented in Appendix A.

SUMMARY OF DETERMINATIONS FOR FEDERALLY LISTED SPECIES

Based on contact with USFWS, USFS, BLM, and AGFD, 10 federally listed species may be affected by the proposed action. Upon review of the current status of these species, the environmental baseline of the project area, the effects of the proposed actions on the species as well as cumulative effects, the following determinations are made for the 10 affected species (Table 1).

Table 1. Effects of the proposed action on federally-listed species.

Species	Potential Effect	
Mexican spotted owl	The proposed action may affect, but is not likely	
	to adversely affect this species.	
	The proposed action may affect, but is not likely	
	to adversely affect proposed critical habitat for	
	this species.	
Cactus ferruginous pygmy-owl	The proposed action may affect, and is likely to	
	adversely affect this species.	
Southwestern willow flycatcher	The proposed action may affect, but is not likely	
	to adversely affect this species.	
Lesser long-nosed bat	The proposed action may affect, and is likely to	
	adversely affect this species.	
Chiricahua leopard frog	The proposed action may affect, and is likely to	
	adversely affect this species.	
Pima pineapple cactus	The proposed action may affect, and is likely to	
	adversely affect this species.	

Table 1. (continued) Effects of proposed action on federally listed species.

Species	Potential Effect
Sonora chub	The proposed action may affect, and is likely to adversely affect this species. The proposed action may affect, but is not likely to adversely modify critical habitat for this
Jaguar	species. The proposed action may affect, but is not likely to adversely affect this species.
Gila topminnow	The proposed action may affect, but is not likely to adversely affect this species.
Mexican gray wolf	The proposed action may affect, but is not likely to adversely affect this species.

1.0 PROJECT DESCRIPTION

1.1 Proposed Action

The proposed TEP Western Corridor Sahuarita – Nogales Transmission Line will consist of twelve transmission line wires, or conductors, and two neutral ground wires that will provide lightning protection and fiber optic communication, on a single set of support structures. The transmission line will originate at TEP's existing South Substation, in the vicinity of Sahuarita, Arizona, and interconnect with Citizens system at a Gateway Substation that TEP will construct west of Nogales, Arizona. The double-circuit transmission line will continue from the Gateway Substation south to cross the United States – Mexico border and extend approximately 60 mi (98 km) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at the Santa Ana Substation. Figure 1 shows the overall proposed project location.

The South Substation in Sahuarita will be upgraded and expanded to provide interconnection between a new TEP 345-kV transmission line and the new Gateway Substation west of Nogales. The South Substation will be expanded by approximately 1.3 acres (0.53 ha) to add a switching device that will connect to the proposed transmission line, with a 100 ft (30 m) expansion of the existing fence line for the addition of the second 345-kV circuit. The new Gateway Substation will include a 345kV to 115-kV power transformer to provide power to the local area. The new Gateway Substation will be constructed within a developed industrial park north of Mariposa Road (State Route 189), approximately 0.5 mi (0.8 km) east of the Coronado National Forest (CNF) boundary (Northeast ¼ of Section 12, Township 24 South, Range 13 East). The TEP portion of the site is approximately 18 acres (7.3 ha) and is within the City of Nogales, Arizona. TEP has purchased the substation site and preliminary construction activities have been completed. TEP is flexible in the placement of a fiber-optic regeneration site, but it will likely be located in the area of Township 18 South, Range 12 East, approximately 10 mi (16 km) southwest of Sahuarita on private land. The fiber optic regeneration site will consist of an approximate 0.5-acre (0.2-ha) fenced yard, containing a 10 ft (3 m) by 20 ft (6 m) concrete pad with an equipment house. The cleared area for the equipment house will be approximately 20 ft (6 m) by 30 ft (9 m). There will be three 3 acre (1.2 ha) construction staging areas (located near the South and Gateway Substations and the Interstate 19 [I-19]/Arivaca Road interchange) and an 80 acre (32 ha) temporary laydown yard (also near the I-19/Arivaca Road interchange) used during construction of the proposed line.

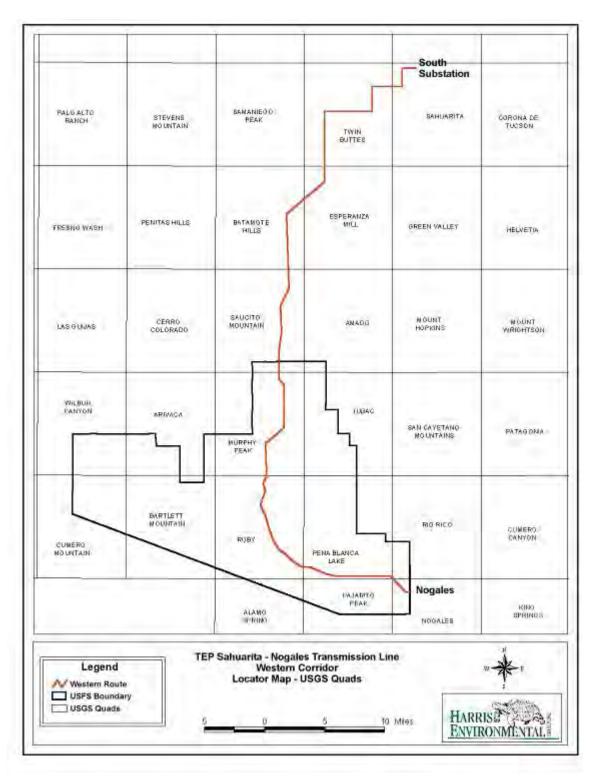
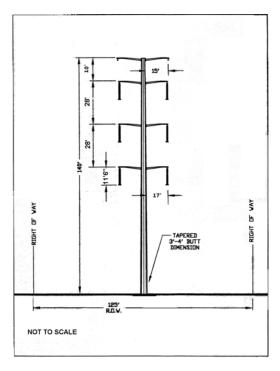


Figure 1. Map of TEP Sahuarita – Nogales Transmission Line Western

The primary support structures to be used for the transmission line are self-weathering steel single structures, or monopoles (Figure 2). Dulled, galvanized steel lattice towers (Figure 3) will be used in locations where their use will minimize overall environmental impacts, in accordance with Arizona Corporation Commission (ACC) Decision No. 64356 (ACC 2001).



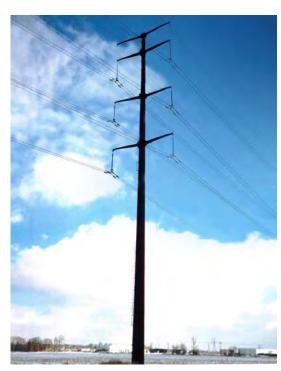


Figure 2. Monopole Transmission Line Structure Drawing and Photo.

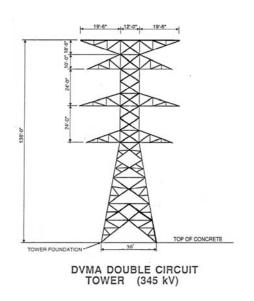




Figure 3. Lattice Tower Transmission Line Structure Drawing and Photo.

1.2 PROJECT LOCATION

The Western Corridor extends for approximately 65.7 mi (105 km), from the South Substation to the United States – Mexico border, including 9.3 mi (15 km) along the El Paso Natural Gas Company (EPNG) gasline right-of-way (ROW). The length of the Western Corridor is 29.5 mi (47.5 km) within the CNF, and approximately 1.25 mi (2.01 km) on BLM land. The Western Corridor will require approximately 446 support structures, including approximately 191 within the CNF and 9 on BLM land.

The Western Corridor exits the TEP South Substation located within the incorporated area of the Town of Sahuarita and proceeds westerly for approximately 1.0 mi (1.6 km) before turning south for 1.5 mi (2.4 km). The corridor turns west across I-19 and continues through Pima County to the southwest, crossing approximately 1.25 mi (2.01 km) of federal land managed by BLM parallel to two existing TEP transmission lines (138-kV and 345-kV). The Western Corridor turns south to parallel the EPNG gasline ROW for approximately 5.8 mi (9.3 km) and passes just east of the existing TEP Cyprus Sierrita Substation.

The Western Corridor continues past the Cyprus Sierrita Substation to the southwest, then turns south and enters Santa Cruz County after 6.3 mi (10 km). The Western Corridor enters the CNF 6.0 mi (9.7 km) south of the Santa Cruz County line. The Western Corridor passes south along the west side of the Tumacacori and Atascosa mountains, then meets and runs along the south side of Ruby Road as it turns gradually east, north of the Pajarita Wilderness. The Western Corridor continues south of Ruby Road then intersects the EPNG gasline ROW.

The Western Corridor continues through USFS land, paralleling the EPNG gasline ROW to the southeast for several miles to the CNF boundary. The proposed corridor exits USFS land onto private land and proceed 0.5 mi (0.8 km) east to the Gateway Substation. From the Gateway Substation, the proposed corridor returns to the west through private land and then turns south to parallel the CNF boundary. The proposed corridor meets the United States – Mexico border approximately 3,300 ft (1,006 m) west of Arizona State Highway 189 in Nogales, Arizona.

TEP will use existing utility maintenance roads and ranch access roads, where feasible, and new access ways where no access currently exists. Approximately 20 mi (32 km) of new temporary roads will be built for construction of the Western Corridor on the CNF (URS 2003a); spur roads off existing access roads adjacent to TEP transmission lines will provide project access on BLM land. On the CNF, transmission line tensioning and pulling and fiber-optic splicing sites will also disturb land.

The total new temporary area of disturbance on the CNF during construction of the Western Corridor will be approximately 197 acres (79.7 ha) (URS 2003a). Following construction, TEP will close roads not required for project maintenance and will limit access to maintenance roads, in accordance with agreements with land owners or managers (e.g., BLM or USFS). On USFS land, TEP will close existing road mileage

equal to that required for project maintenance, to avoid impacting the current road density. The maintenance access required by TEP will be limited to roads to selected structures, rather than a single cleared ROW leading to the United States – Mexico border. Transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yard areas will be obliterated within six months of the project becoming fully operational (URS 2003a).

1.3 PROJECT AREA

The project area includes the location where all construction and associated activities will occur along the ROW. Action areas are locations affected directly or indirectly by these activities and often include sites outside the immediate area of construction. Action areas are unique for each listed species and are outlined in SECTION 2.0 of this document.

Between Sahuarita and Nogales, the proposed action crosses four distinct biotic communities, or biomes (Brown 1994). A complete list of plant species documented during field surveys in 2002 is presented in Appendix B.



Figure 4. Sonoran desertscrub.

The northern end of the corridor contains vegetation characteristic of the Sonoran desertscrub biome (Figure 4). This biome is typically represented by saguaro (Carnegiea gigantea), cholla and prickly pear (Opuntia spp.) cacti, ocotillo (Fouquieria splendens), mesquite velutina), acacia (Prosopis (Acacia spp.) paloverde (Parkinsonia spp.), (Larrea tridentata), triangle-leaf bursage (Ambrosia deltoidea), and brittlebush (Encelia farinosa).

Vegetation south of the ASARCO mine transitions into the semidesert grassland biome (Figure 5). This area is dominated by grama (*Bouteloua* spp.), lovegrass (*Eragrostis* spp.), and three-awn (*Aristida* spp.) grasses, with low shrubs such as mesquite and acacia locally co-dominant. Agave (*Agave* spp.) and yucca (*Yucca* spp.) are also common in this biome. These grasslands are transected by desert riparian scrub dominated by mesquite and netleaf hackberry (*Celtis reticulata*).



Figure 5. Semidesert grassland.



Figure 6. Madrean oak woodland.

The higher elevations (above 3,500 ft [1,067 m]) of the project area are within the madrean oak woodland biome (Figure 6). Representative plants of this biome within the project area include Mexican blue oak (*Quercus oblongifolia*) and emory oak (*Q. emoryi*) trees, side-oats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), and fluffgrass (*Erioneuron pulchellum*).

The 4th biome represented within the project area is the Sonoran deciduous riparian forest (Figure 7), which is located south of Arivaca Road in Sopori Wash, Peck Canyon, and Sycamore Canyon. The high water table in these areas supports stands of cottonwood (*Populus fremontii*), ash (*Fraxinus pennsylvanica* ssp. *velutina*), sycamore (*Platanus wrightii*), walnut (*Juglans major*), and willow (*Salix* spp.) trees.

The proposed ROW begins at an elevation of approximately 2,674 ft (815 m) at the TEP South Substation and reaches its maximum elevation of approximately 4,500 ft (1,372 m) south of Atascosa Peak. Much of the northern portion of the proposed



Figure 7. Sonoran deciduous riparian forest.

ROW consists of gently rolling hills and bajadas. The most significant topographical feature crossed by the proposed ROW in Pima County is Tinaja Peak (4,321 ft [1,317 m]) located southwest of the ASARCO Mine complex. The southern portion of the proposed ROW passes near the Tumacacori and Atascosa Mountains, both of which contain steep, rugged terrain. The maximum elevation within these ranges is Atascosa Peak (6,440 ft [1,963 m]).

The Tumacacori Ecosystem Management Area (EMA) contains the following Special Management Areas: Pajarita Wilderness Area, Sycamore Canyon, Goodding Research Natural Area (RNA), Chiltepine Botanical Area, and Inventoried Roadless Areas.

The Pajarita Wilderness Area (designated in 1984) encompasses 7,448 acres (3,014 ha) southwest of the Western Corridor and north of the international border. More than 660 plant species have been documented in this area, including 17 species not found anywhere else on earth. This area is valued for its nearly pristine nature and remoteness, with little disturbance resulting from human access. To maintain this landscape, motorized access in this area is prohibited; however, livestock grazing is permitted within Pajarito Wilderness outside of the Goodding RNA.

Sycamore Canyon, which runs through the Pajarita Wilderness Area, contains unique habitats of many plants and animals that are not found in the surrounding areas or are at the periphery of their natural environment. Sycamore Creek, one of the few perennial streams in southern Arizona, runs along the floor of Sycamore Canyon. A 1,759 acre (712-ha) section of Sycamore Creek and its immediate environment was nominated in 1993 as a Wild and Scenic River under the National Wild and Scenic Rivers System Act of 1968. This nomination is in recognition of the exceptional scenic, recreational, ecological, and social values supported by Sycamore Creek.

The Goodding RNA (established in July 1970) encompasses 2,207 acres (893 ha) primarily within the Pajarita Wilderness Area and along Sycamore Canyon. This special designation was placed on the area because it is characterized by Mexican floral and faunal elements that did not otherwise occur, or were elsewhere rare, in the United States.

The Chiltepine Botanical Area is a 2,836 acre (1,148 ha) reserve located approximately 2 mi (1.2 km) west of the Western Corridor, in the northern portion of the Tumacacori EMA. This area was established in June 1999 for the purpose of protecting and facilitating the study of chiltepines. These wild chiles typically are found in tropical environments between Mexico and South America. This area has been noted as the northernmost occurrence of chiltepine in the world.

Inventoried Roadless Areas have been identified within the Tumacacori EMA, encompassing 21,363 ha (52,788 acres). These areas were established by a Record of Decision on 12 January 2001 on the Roadless Area Conservation Final DEIS.

1.4 Conservation Measures

PROJECT-WIDE CONSERVATION MEASURES

- 1. Environmental Training All construction supervisors will be required to attend environmental training, which will outline their obligation to obey applicable laws and regulations regarding wildlife and habitats (Appendix C).
- 2. Erosion Control Measures TEP is in consultation with CNF regarding development of Best Management Practices (BMPs) for minimizing project impacts on geologic, soil, and water resources on national forest land, in accordance with the USFS "Soil and Water Conservation Practices Handbook" (USFS 1990). Specific BMPs will be identified after coordination with Arizona Department of Environmental Quality (ADEQ) and before implementation of the project, for the entire length of the selected corridor.
- 3. Fire Prevention Plan A Fire Prevention Plan is under development to minimize the risk of accidental wildfire. All construction activities will adhere to this plan and fire suppression equipment will be available to all work crews. On CNF lands, the Fire Prevention Plan will comply with Forest Service Manual 5100.
- 4. Hazardous Material Spill Response Plan A Hazardous Material Spill Response Plan is under development which will describe the measures and practices to prevent, control, cleanup, and report spills of fuels, lubricants, and other hazardous substances during construction operations. This plan will ensure that no hazardous materials are stored, dispensed, or transferred in streams, watercourses, or dry washes, and vehicles are regularly inspected and maintained to prevent leaks.
- 5. Invasive Species Control An Invasive Species Management Plan in accordance with Executive Order 13112 is under development in coordination with CNF, ASLD, and BLM to identify problem areas and mitigation measures.
- 6. Road Closure/Obliteration TEP has committed to obliterate and permanently close 1 mi (1.6 km) of existing road on the CNF (to be identified by CNF) for every 1 mi (1.6 km) of proposed new road used in the construction, operation, or long-term maintenance of the proposed action. TEP will monitor road closures during regularly scheduled inspection flights and/or ground inspections, and repair or replace road-closure structures as necessary following construction. Furthermore, TEP will cooperate with land owners on all reseeding and ongoing road closure maintenance.

The following selective criteria and techniques for closing roads are taken from Section 1.3.2 of the RA (URS 2003) and applies to access roads on CNF. Administrative roads will be closed to the general public but made available to TEP and its assigned contractors for the evaluation, maintenance, or upgrading of existing facilities.

Closure methods for administrative roads will include the following:

- a. Placement of heavy pipe posts with an attached, locked chain in a manner that blocks entrance on the road.
- b. Placement of heavy pipe posts with an attached, locked gate in a manner that blocks entrance on the road.
- c. Placement of a pipe barricade across the roadbed, locked in place in multiple locations in concrete sleeves.

The following methods may be used for the long-term closure of transmission line access roads used during construction and those roads required to be closed by the CNF. These roads may be reopened for emergency repair of transmission facilities, but will not be used intermittently as with administrative roads. Techniques include:

- a. Placement of boulders or other natural impediments across the road.
- b. Placement of a berm or trench across the road.
- c. Rip, obliterate, and reseed/revegetate portions of roadbed as needed. This effort could be applied to the initial visual portion of roadway (e.g., first 100 ft [30 m]) to effectively obscure the roadway. This could be accomplished by transplanting native species of medium and large vegetation from the general area and reseeding with native grasses. By obscuring visible portions of roadway, future vehicular travel could be more effectively discouraged than by placing berms or other unnatural impediments to an otherwise visually inviting roadway.
- 7. Additional mitigation measures are outlined in Table 2.2-2 of the DEIS (Tetra Tech 2003).

SPECIES-SPECIFIC CONSERVATION MEASURES

Mexican spotted owl (MSO)

- 1. Breeding season restriction no construction activity will occur between Structures #24 and #45 of Segment 4 from 1 March to 31 August.
- 2. Protocol surveys will be conducted in the year immediately before construction in Sycamore Canyon north of Ruby Road to determine the presence /absence of MSO in this area. If MSO are detected, USFWS will be consulted for further guidance.
- 3. No trees over 9 in (22.8 cm) diameter breast height (DBH) in MSO habitat will be removed.

Cactus ferruginous pygmy-owl (CFPO)

1. Protocol surveys – Two consecutive years of protocol surveys will be conducted before construction activities can be begin within 1,969 ft (600 m) of designated habitat. If a CFPO is detected, USFWS has determined that certain continued construction activities will not harm or harass a CFPO as defined by ESA regulations. In areas where two consecutive years of protocol surveys cannot be completed, construction will occur outside of the breeding season.

Four zones are described (Zone I through Zone IV) that are based upon the distance of construction activity from a known nest or activity center. Certain levels of construction can occur within each zone without resulting in harm or harassment of the species. Situations that do not comply with the restrictions provided for each zone will require USFWS authorization before construction continues. Specific development restrictions that apply to each of the four zones are described in the sections below:

Zone I: 0 to 328 ft (100 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. Construction-related activities may continue on land that has been cleared of vegetation provided that they do not exceed the level and/or intensity of activity that was occurring during the period of time that the territory was established.
- 3. Activities that will be more intense or cause more noise disturbance than was occurring during the period of time that the territory was established cannot proceed without authorization from USFWS and relevant land management agencies.

Zone II: 328 ft (100 m) to 1,312 ft (400 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. No restrictions on the nature or type of construction activity (excluding the clearing of vegetation) from 1 August through 31 January of the following calendar year.
- 3. Construction activities during the breeding season (1 February to 31 July) cannot exceed the levels or intensity of activities that occurred at the time the territory was established.

Zone III. 1,312 ft (400 m) to 1,969 ft (600) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. No restrictions on the levels or intensity of construction activity (excluding the clearing of vegetation) at any time of the year.

Zone IV: Greater than 1,969 ft (600 m) from the CFPO Activity Center

- 1. No restrictions any activity consistent with the project description provided to USFWS (as amended by the supplemental reports) is allowed. For the purposes of this consultation, USFWS assumes that all construction or construction-related activities referred to under each zone description will be limited to those described in the project description in this BA.
- 2. All saguaros within construction areas will be transplanted or mitigated with minimum 6.5 ft (2 m) specimens. Within riparian desertscrub and deciduous riparian areas, tree and shrub removal will be minimized to the greatest extent possible.

Southwestern willow flycatcher (SWFL)

1. Damaged deciduous riparian vegetation will be mitigated with structure plantings of willow or cottonwood at a 2:1 ratio by species.

Lesser long-nosed bat (LLNB)

1. Agave within construction areas will be transplanted or replaced with similar age and size class individuals.

Chiricahua leopard frog (CLF)

1. To prevent the spread of disease, equipment-cleaning stations will be established at sites to be determined in consultation with CNF and USFWS.

Pima pineapple cactus (PPC)

1. Purchase of 36.45 credits in a USFWS-approved conservation bank for PPC.

<u>Jaguar</u>

1. Five remote cameras will be donated to the Jaguar Conservation Team to assist with monitoring of jaguar movements across the Arizona-Mexico border. These cameras will be placed within the Tumacacori EMA under permit from CNF. If female jaguar or cubs are documented by the Jaguar Management Team within the Tumacacori EMA, consultation with USFWS will be reinitiated.

2.0 FEDERALLY LISTED SPECIES

Special status species are plant and wildlife species that are of concern because their populations are either in jeopardy of extinction or are declining in number. AGFD and USFWS were contacted concerning information on possible threatened and endangered species that may exist on or near the proposed action. In a letter dated 14 May 2002, USFWS listed 18 endangered species, seven threatened species, and two proposed species that occur in Pima and Santa Cruz counties, Arizona (Table 2). Since that time, 2 additional species have been listed (Chiricahua leopard frog [Rana chiricahuensis] and jaguar [Panthera onca]), both of which are addressed in this document. A review of the species list for Pima and Santa Cruz Counties on the USFWS Arizona Ecological Field Services web page on 10 November 2003 indicated no further changes to the species list. Agency correspondence is presented in Appendix A. Species included in USFWS correspondence, but excluded from evaluation are addressed in Appendix D.

Meetings with USFWS and USFS personnel were held on 9 April, 13 May, 3 December 2002, and 28 March 2003 to discuss the potential effects of the proposed action on special status species. BLM personnel also attended the 3 December 2002 meeting. A meeting with AGFD was held on 19 April 2002. Additional meetings were held with USFWS on 30 May, 6 November, and 10 December 2002, and 19 March, 16 May, 11 June, 14 July, and 11 September 2003.

Table 2. Federally listed species that may occur near the proposed action.				
		EFFECTS		
SPECIES	STATUS	DETERMINATION		
Canelo Hills ladies' tresses	Endangered	No Effect		
Cactus ferruginous pygmy-owl	Endangered	May affect, likely to adversely affect		
Desert pupfish	Endangered	No Effect		
Gila topminnow	Endangered	May affect, not likely to adversely affect		
Huachuca water umbel	Endangered	No Effect		
Jaguar	Endangered	May affect, not likely to adversely affect		
Jaguarundi	Endangered	No Effect		
Kearney's blue star	Endangered	No Effect		
Lesser long-nosed bat	Endangered	May affect, likely to adversely affect		
Masked bobwhite	Endangered	No Effect		
Mexican gray wolf	Endangered	May affect, not likely to adversely affect		
Nichols turk's head cactus	Endangered	No Effect		
Northern aplomado falcon	Endangered	No Effect		
Ocelot	Endangered	No Effect		
Pima pineapple cactus	Endangered	May affect, likely to adversely affect		
Sonoran pronghorn	Endangered	No Effect		
Sonoran tiger salamander	Endangered	No Effect		
Southwestern willow flycatcher	Endangered	May affect, not likely to adversely affect		
Bald eagle	Threatened	No Effect		
California brown pelican	Threatened	No Effect		
Chiricahua leopard frog	Threatened	May affect, likely to adversely affect		
Loach minnow	Threatened	No Effect		
Mexican spotted owl	Threatened	May affect, not likely to adversely affect		
Sonora chub	Threatened	May affect, likely to adversely affect		
Spikedace	Threatened	No Effect		
Mountain plover	Proposed	No Effect		
Gila chub	Proposed	No Effect		

2.1 MEXICAN SPOTTED OWL (*Strix occidentalis lucida*) (Threatened)

2.1a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the MSO includes those areas of MSO habitat that may be directly impacted by construction as well as protected activity centers (PAC) within 1 mi (1.6 km) of the proposed action that may be subject to noise disturbance during construction. The entire action area for this species is within the Tumacacori EMA.

2.1b Natural History and Distribution

The MSO is one of three subspecies of spotted owl currently recognized by the American Ornithologists' Union in their most recent treatise on subspecies (A.O.U. 1957). However, Dickerman (1997), in a recent taxonomic review of *S. o. lucida*, has identified

three subspecies throughout the species' range, including resurrecting the use of *S. o. huachucae* as the subspecies in the southwestern United States and northern Mexico. Although this new revision is probably valid, the currently accepted taxonomy was followed. The MSO (Figure 8) is a medium-sized owl with a round head lacking ear tufts; light brown to dark brown plumage, and dark eyes. It has white spots on the head and nape, and white mottling on the breast and abdomen; thus, the name spotted owl (Pyle 1997). All three subspecies of spotted owl inhabit mountainous, forested regions of western North America.



Figure 8. Mexican spotted owl.

A detailed account of the spotted owl, inclusive of the three currently recognized subspecies, is given by Gutiérrez et al. (1995). Ganey (1998) presents a synthesis of what is presently known about the MSO, particularly in Arizona. The MSO Recovery Plan (USFWS 1995a) and technical supporting chapters on distribution and abundance (Ward et al. 1995), population biology (White et al. 1995), landscape analysis and metapopulation structure (Keitt et al. 1995), habitat relationships (Ganey and Dick 1995), and prey ecology (Ward and Block 1995) also are important summary documents. The following brief species account was obtained from these and other more current references.

The MSO is widely but patchily distributed in forested mountains and canyons from southern Utah and central Colorado, south into Arizona, New Mexico, extreme western Texas, and into Mexico to near Mexico City (McDonald et al. 1991, Gutiérrez et al. 1995, Ward et al. 1995, Dickerman 1997). The MSO nests, roosts, forages, and disperses in a variety of habitats in Arizona from about 3,770 ft (1,236 m) to 9,600 ft (3,150 m). Nest and roost habitats include forests and woodlands that are structurally complex, unevenly aged and multistoried, with mature or old-growth stands containing trees older than 200 years with a high (>70 percent) canopy closure, including many snags and fallen logs (Ganey and Dick 1995). According to Ganey (1998), they appear to be most common in mature and old growth forests in steep canyons, but also are found in canyons that include prominent cliffs with little forested habitat. The MSO preys on small mammals,

birds, reptiles, and insects, with woodrats (*Neotoma* spp.) and white-footed mice (*Peromyscus* spp.) constituting the bulk of its diet by biomass (Ward and Block 1995, Ganey et al. 1992, Reichenbacher and Duncan 1992).

Adult MSO are considered to have a relatively high survival rate, with an estimated probability of adult survival rate of 0.8 to 0.9 from one year to the next (White et al. 1995). Juveniles on the other hand, have a much lower survival probability rate, ranging from 0.06 to 0.29 (Ganey et al. 1998, White et al. 1995). There is a great deal of spatial and temporal variation in reproductive output, but one estimate places the general reproductive rate at 1.001 fledglings per pair (White et al. 1995). Typical of *K*-selected species (Ricklefs 1990), the MSO is long-lived with low reproductive output and generally maintains population densities near carrying capacity. The high survival rate of *K*-selected species enables MSO to maintain stable populations over time despite variable recruitment rates (White et al. 1995).

In 1993, the MSO was federally listed as a threatened species by the USFWS. The listing was based primarily on historical and ongoing habitat alteration due to timber management practices, specifically the use of even-aged silviculture, the threat of these practices continuing as prescribed in National Forest Plans, and the threat of additional habitat loss from catastrophic wildfire (USFWS 1993a).

The primary administrator of lands supporting MSO in the United States is the USFS. According to the recovery plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on land administered by USFS (USFWS 1995a). The majority of known MSO have been found within Region 3 of the USFS, which includes 11 National Forests in New Mexico and Arizona. USFS Regions 2 and 4, including two National Forests in Colorado and three in Utah, support fewer MSO.

2.1c Critical Habitat

Critical habitat was designated for the MSO in 1995 (USFWS 1995b). However, it was revoked by court order in 1998 for failing to complete the National Environmental Policy Act process (USFWS 1998a). USFWS (USFWS 2000a) again proposed to designate 13.5 million acres (5.6 million ha), mostly on USFS land, as critical habitat for the species in 2000. The final rule published in the Federal Register on 1 February 2001 designated approximately 4.6 million acres (1.9 million ha) in Arizona, Colorado, New Mexico, and Utah on federal land outside of the USFS system (USFWS 2001a). The reason given for not designating critical habitat on USFS land was that current Forest Plans conform to management guidelines outlined in the recovery plan, which have undergone consultation with the USFWS, whereas other federal agencies have yet to formally adopt these guidelines.

On 13 January 2003, a federal judge stated that the USFWS final rule designating critical habitat for the MSO violated the ESA. On 18 November 2003, the USFWS again redesignated proposed critical habitat for the MSO, including unit BR-W-13 in the

Atascosa/Pajarito Mountains. The proposed action crosses this unit of proposed critical habitat.

2.1d Current Status Statewide

In Arizona, MSO have been documented throughout much of the state except for the arid southwestern portion. The greatest concentration of owls occurs along the Mogollon Rim from the White Mountains region to the peaks near Flagstaff and Williams (Ward et al. 1995, Ganey 1998). The majority of owls are located on federal lands managed by the USFS (USFWS 1995a).

There are three Recovery Units (RU) identified in Arizona. From north to south they are the Colorado Plateau, Upper Gila Mountains, and Basin and Range-West. No current estimate of the number of MSO within its entire range is available, but between 1990 and 1993, 103 MSO sites were recorded during planned surveys and incidental observations in the Basin and Range-West RU in Arizona (USFWS 1995a).

2.1e Environmental Baseline

The proposed action occurs in the Basin and Range - West RU. Within this RU, MSO are mainly associated with steep, rocky canyons containing cliffs and stands of oak, Mexican pine, and broad-leaved riparian vegetation (Ganey and Balda 1989). Most MSO habitat in this RU occurs on the CNF.

The proposed action passes through the Tumacacori EMA of the CNF, which currently contains five PACs. The majority of the EMA crossed by the proposed action is madrean evergreen woodland; however, much of it lacks the features typically associated with MSO habitat. Range condition in areas crossed by the proposed action is moderately high with a stable or unknown trend. Native grasses dominate groundcover throughout the action area, but some non-native species, such as Lehmann's lovegrass (*Eragrostis lehmanniana*), tree of heaven (*Ailanthus altissima*), and salt cedar (*Tamarix* spp.) occur within the EMA (USFS 2002). Lehmann's lovegrass was seeded in many areas to prevent erosion (Cox et. al. 1984) but has extended in range far beyond the seeded areas (Cox and Ruyle 1986).

Livestock stocking rates for the allotments within the Tumacacori EMA range from 1,320 Animal Unit Months (AUM) in the Peña Blanca Allotment to 2,400 AUMs in the Bear Valley Allotment. Allotment Management Plans for Bear Valley and Sardinia Allotments are currently being revised.

The proposed action passes within 1 mi (1.6 km) of PAC #0502015 and #0502016, which are immediately adjacent to each other and south of Ruby Road. PAC #0502015 contains portions of USFS roads 4195 and 4196, as well as small segments of unclassified roads. Additionally, numerous roads and campgrounds, both designated and user-created, occur within 1.6 km (1 mi) of this PAC. Multiple unclassified roads created by the U.S. Border Patrol also occur throughout the area south of Ruby Road and east of the Pajarito Wilderness Area (URS 2003).



Figure 9. Area burned in Walker fire.

The Walker Fire, a human-caused fire, burned 16,369 acres (6,624 ha) along the United States-Mexico border between 12 June and 22 June 2002. The majority of PAC #0502016 and the western portion of PAC #0502015 were within the Walker Fire perimeter. Portions of the Walker fire were very hot, especially near the international border, and the upper slopes of ridges, while areas like Walker Canyon burned relatively cool (T. Newman, CNF, pers. comm., 26 November 2002). While vegetation has begun to recover in some areas, other areas are highly susceptible to erosion due to lost groundcover (Figure 9).

The following MSO survey information was provided by CNF. PAC #0502015 has been surveyed or informally monitored twice (1999 and 2001) over the past five years, with MSO pair occupancy inferred or confirmed in 1999. No response was detected in 2001. Since 1998, PAC #0502016 was only informally monitored in 2001, with no response by MSO. Additionally, CNF personnel received reports of MSO calling in Sycamore Canyon north of Ruby Road in 2001. Following similar reports, the presence of an MSO in Rock Corral Canyon could not be confirmed after informal monitoring by CNF personnel.

2.1f Effects of Proposed Action on the MSO and Proposed Critical Habitat

Direct Effects

Vehicle and Powerline Collisions

Because MSO are primarily nocturnal and likely will not be active during daylight when construction occurs, the probability of MSO collisions with construction related vehicles is extremely low. To minimize the risk of powerline collisions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested practices for raptor protection on powerlines: the state of the art in 1996" (APLIC 1996). While there is always some risk of a MSO collision with powerlines, raptors have lower rates of collision with powerlines than passerine birds (McNeil et al. 1985). This reduced collision rate may be due to visual acuity, maneuverability, and non-flocking tendencies (Nobel 1995). The risk of bird collisions with towers has been associated with birds being attracted to red lights used for aircraft avoidance (Kerlinger 2000). The towers used in the proposed action will not contain any lighting. No guy wires will be used in the construction of the proposed action, further reducing the potential for collisions.

Electrocution

Because power structures and towers are attractive perching and nesting sites for some raptor species, significant raptor mortality from electrocution has been reported in North America (Harness and Wilson 2000). Electrocution occurs when a bird simultaneously

touches two phase conductors or a conductor and a ground wire (Bevanger 1994). Most electrocutions occur on distribution lines (34-kV or less) rather than on transmission lines (69-kV or more). This occurs because clearance between wires on distribution lines are less, and distribution lines have an array of uninsulated, structure-mounted equipment (Marti 2002). To minimize the risk of raptor electrocutions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested practices for raptor protection on powerlines: the state of the art in 1996" (APLIC 1996). Furthermore, on the structures to be used in the proposed action, the distance between the powerlines is at least 18 ft (5.5 m). Because the average wingspan of an adult MSO is 3.3 ft (1 m), there is no foreseeable risk of electrocution.

Construction Noise and Activity

Human activity within breeding and nesting territories may affect some raptors by altering home range movements (Anderson et al. 1990) and causing nest abandonment (Postovit and Postovit 1987). Disturbance from construction activities may discourage MSO from foraging or nesting in suitable habitat. The greatest noise disturbance will result from the use of helicopters during installation of transmission lines; however, Delaney et al. (1999) found that MSO were disturbed more by ground-based disturbance, such as chain saws, than by helicopter overflights. Ground-based disturbance could result from heavy machinery or large groups of construction personnel working near MSO habitat.

To prevent the disturbance of breeding MSO, no construction activities will occur within 1.6 km (1 mi) of PAC #0502015 (Figure 10) and #0502016 during the breeding season (1 March to 31 August), as outlined in the conservation measures (SECTION 1.4). Construction during non-breeding season will be short term in duration. Furthermore, protocol surveys in the area of reported MSOs in Sycamore Canyon north of Ruby Road will prevent disturbance of MSOs outside of known PACs. If MSO are detected during the future surveys in this area, USFWS will be consulted for guidance regarding the implementation of construction restrictions.

Indirect Effects

Habitat Modification and Fragmentation

Because much of the ROW lacks the features typically associated with MSO habitat, no habitat modification directly attributed to construction or maintenance is anticipated.

Increased Legal and Unauthorized Access to MSO Habitat

Incidental encounters between MSO and non-motorized recreationists are relatively insignificant in most cases (USFWS 1995a). Most MSO appear to be relatively undisturbed by small groups (< 12 people) passing nearby (USFWS 1995a) as long as the disturbance is not for an extended period of time. The potential for hikers to disturb MSOs is greatest where hiking is concentrated in narrow canyon bottoms occupied by nesting or roosting MSOs. Noise from recreationists using off-highway vehicles (OHV) on closed access roads are much more likely to disturb MSOs, especially if their activity occurs over an extended period of time in occupied MSO habitat. Increased access to MSO habitat may subject the species to poaching or other harassment.

The road closure techniques outlined in the RA (URS 2003) should minimize unintended use of temporary construction roads but probably will not prevent it entirely. However, because only a small segment of a construction road will occur within a PAC, and forest service roads already exist within the PAC, no significant increase in unauthorized vehicular access by recreationists into occupied MSO habitat is anticipated.

Accidental Wildfire

Because of their mobility, MSO will not likely be directly impacted by wildfires. However, fire suppression efforts over the past century have created a situation that may encourage catastrophic, large-scale fires. Efforts to limit such fires are of great importance to MSO conservation. Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). The short-term effects of wildfires may affect MSO prey species through direct mortality from the fire or habitat destruction. Herbaceous plant species that serve as cover and forage for small mammals could be drastically reduced. However, because of reduced groundcover, predation upon surviving small mammals by MSO may actually increase in the short term. Furthermore, increased herbaceous production in the years following a fire may improve habitat for small mammals.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak efficacy in southern California came to similar conclusions (Green 1977).

If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of down woody material, which is capable of carrying wildfires across the landscape. Furthermore, the measures being developed for the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in MSO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates

Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

Effects to Proposed Critical Habitat

While the proposed action passes through the boundaries of proposed critical habitat unit #BR-W-13, the vast majority of the area where the project is located does not contain constituent elements as outlined in the 2001 critical habitat designation (USFWS 2001a). The single exception is the construction of a 0.07 mi (0.113 km) of access road within PAC #0502015. Because all vegetation and other organic material with PACs are considered constituent elements of critical habitat, some impact to proposed critical habitat will occur. However, the habitat in the area of this proposed access road contains only manzanita (*Arctostaphylos* sp.) and small oak trees that are of insufficient size to function as MSO breeding or foraging habitat. As outlined in SECTION 1.4, no trees greater than 9 in (22.8 cm) DBH will be removed from the PAC. Furthermore, the conservation measures outlined above also will minimize the impacts from accidental wildfire, invasive species and unauthorized access on proposed critical habitat. Therefore, the impacts from the proposed action will not appreciably diminish the value of the proposed critical habitat to the survival and recovery of MSO.

2.1g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Because the action area for this species lies entirely on USFS land, all activities are managed according to the MSO recovery plan guidelines, and future actions will be subject to the consultation requirements established under Section 7, and are not considered cumulative to the proposed action.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the MSO action area, an increase in population in Nogales, and other regional population centers may translate into an increased demand for outdoor recreation, and therefore more recreational use of USFS land.

An undetermined level of border crossings by undocumented immigrants (UDI) occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

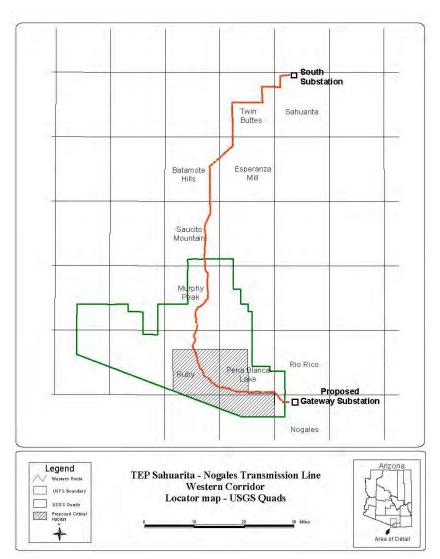


Figure 10. Location of proposed critical habitat for Mexican spotted owl as of 18 November 2003.

2.1h Effects Determination and Incidental Take

Effects to the Species

Construction noise and activities may affect MSO but is not likely to adversely affect the species, because construction will occur during a non-critical life stage and will be short term in duration.

Because the proposed action is not likely to adversely affect the MSO, no take is anticipated.

Effects to Critical Habitat

Removal of some vegetation in PAC #0502015 may affect, but is not likely to adversely modify proposed critical habitat for the MSO.

2.2 CACTUS FERRUGINOUS PYGMY-OWL (*Glaucidium brasilianum cactorum*) (Endangered)

2.2a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the CFPO includes those areas of habitat below 4,000 ft (1,219 m) in elevation that may be directly impacted by construction as well as potential nesting sites within 1,312 ft (400 m) of the proposed action (USFWS 2000b.) that may be subject to noise disturbance during construction. In addition, a 7.08 mi (11.4 km) buffer area surrounding the project area is included in the action area because juvenile CFPO have been documented traveling up to 7.08 mi (11.4 km) during dispersal (M. Wrigley, USFWS, pers. comm., May 2001).

2.1b Natural History and Distribution:

USFWS listed CFPO in Arizona on 10 March 1997 (USFWS 1997a) as endangered. Listing was based on historical and current evidence that suggested a significant population decline of this subspecies had occurred in Arizona. USFWS considered the loss and alteration of habitat as the primary threat to the remaining population. A recovery plan for the species is currently in development by the CFPO recovery team.

CFPO (Figure 11) are small brown birds with a cream-colored belly streaked with paler brown (Pyle 1997). The *cactorum* race; however, is described as "a well-marked, pale grayish extreme for the species" (Phillips et al. 1964). The call for this mostly diurnal

owl is heard chiefly near dawn and dusk. The best field identification features are its small size, eyespots on the nape of the neck, and long reddish-barred tail, which is often nervously wagged or twitched (Monson 1998).

Originally CFPO were described as a separate subspecies based on specimens from Arizona and Sonora, Mexico. CFPO were first documented in the United States from a collection by Lieutenant Charles E. Bendire on 24 January 1872 in the "heavy mesquite thickets along creek" near the present day site of historic Camp Lowell, Tucson (Coues 1872, Bendire 1892).



Figure 11. Cactus ferruginous pygmy-owl.

Very little is known about the life history of CFPO in Arizona (Cartron et al. 2000a). Little or no literature currently exists concerning life history variables such as longevity, age distribution, and recruitment. Current studies undertaken by AGFD, USFWS, and The University of Arizona are examining these variables.

The diet of CFPO is not well understood, but they are believed to be prey generalists (Cartron et al. 2000a). Observations, stomach content analysis, and records of Texas

pygmy-owls suggest that these owls have a diverse diet that includes mammals, birds, reptiles, and insects (Proudfoot and Beasom 1997).

CFPO nest in cavities of larger trees (typically defined as a tree with a trunk at least 6 in [15 cm] diameter at breast height [DBH]) or large columnar cactus. Cavities may be naturally formed (e.g. knotholes) or excavated by woodpeckers. CFPO do not construct their own nest holes. All currently known CFPO nest sites in Arizona are in woodpecker excavated cavities in saguaros. Historically, the species also has been documented nesting in cottonwood, paloverde, and mesquite trees in Arizona.

Nesting activity for this owl species in Arizona begins in late winter to early spring (Lesh and Corman 1995, Abbate et al. 1996). Little is known about its courtship flight behavior. Egg laying begins by late April with three to four eggs typically laid. It is uncertain if only one brood is hatched per year. Nestlings have been observed through the end of July. During nesting, the male brings food to the female and young (Glinski 1998).

Historically, CFPO occurred from the lowlands of central Arizona, south through western Mexico to the states of Colima and Michoacan, and from southern Texas south through the Mexican states of Tamaulipas and Nuevo Leon. In Arizona, the species was documented as far north as New River and Cave Creek in northern Maricopa County (Harris and Duncan 1999). Elsewhere in Maricopa County, the species has been found near the Yuma County line along the Gila River at Agua Caliente, along the Salt River at Phoenix, and near the Verde River confluence. The eastern most verifiable record was along the Gila River at Old Fort Goodwin, located approximately 2 mi (1.2 km) southwest of present day Geronimo, Graham County, Arizona (Aiken 1937). In the southeastern part of the state, the species has been documented in recent times near Dudleyville along the lower San Pedro River between 1985 and 1987 (Harris and Duncan 1999), and probably also along lower Aravaipa Creek in 1987 (Monson 1987). Other localities in south central Arizona include historical records in Pinal County near Sacaton and Blackwater on the Gila River Indian Reservation, and at Casa Grande (Harris and Duncan 1999). Near the Mexican border, the species has been found in Santa Cruz County near Patagonia and in Sycamore Canyon west of Nogales. A likely accidental sighting was documented once on 10 April 1955 in eastern Yuma County near the Mexican border at Cabeza Prieta Tanks on the Cabeza Prieta National Wildlife Refuge (Monson and Phillips 1981, Harris and Duncan 1998).

Surveys conducted by University of Arizona biologists in Sonora, Mexico found 280 CFPO during the 2000 survey season. CFPO within Sonora, Mexico and Arizona may have been the same population prior to agricultural expansion within the last 75 years. However, due to isolation, the genetic connection of the Arizona population to owls in the nearby state of Sonora, Mexico may be tenuous (USFWS 2002a).

CFPO have been documented in several habitat types in the northern portion of its range in Arizona and adjacent Mexico. In Arizona, these include streamside Sonoran riparian deciduous forest and woodland associations and Sonoran desertscrub. CFPO also inhabit

Sinaloan deciduous forest and thornscrub in Mexico (not discussed here). The streamside associations include such species as cottonwood, ash, netleaf hackberry, willows, velvet mesquite, and others. The Sonoran desertscrub associations are composed of relatively dense saguaro cactus stands associated with short trees such as paloverde, mesquite, and ironwood (*Olneya tesota*), and an open understory of triangle-leaf bursage, creosote, and various other cacti and shrubs. Throughout its range, CFPO occur at low elevations, generally below 4,000 ft (1,219 m).

CFPO found in Sonoran desertscrub habitats are typically associated with structurally diverse stands of desert riparian scrub with saguaros along washes (Wilcox et al. 2000). Such habitat is often referred to as xeroriparian vegetation (Johnson and Haight 1985). These washes have no permanent water flow. Instead, flow is intermittent and based on seasonal rainfall as well as strength and duration of individual storms. Desert riparian scrub vegetation is easily recognizable by the presence of a linear assemblage of trees and shrubs that grow along the wash. Density is higher and taller than the sparse desertscrub vegetation that typically exists in the adjacent uplands. Before listing the species as endangered, all known CFPO were documented in such Sonoran desertscrub habitat (Lesh and Corman 1995, Abbate et al. 1996).

At the northern periphery of the subspecies range in southern Arizona, CFPO distribution and preferred habitat is not well understood. It is believed CFPO require the cover of denser wooded areas with understory thickets, like riparian habitat, for nesting, foraging, and predator avoidance (Abbate et al. 2000). Riparian habitat also is known for its high density and diversity of animal species that constitute the prey base of CFPO.

A significant decline in the Arizona population has occurred over the past several decades (USFWS 1997a, Richardson et al. 2000). Loss or modification of habitat from woodcutting, agriculture, groundwater pumping, and related human activities has presumably contributed to the population decline (USFWS 1997a).

2.1c Critical Habitat

On 12 July 1999, USFWS designated approximately 731,712 ac (296,113 ha) of critical habitat supporting riverine, riparian, and upland vegetation in seven critical habitat units, located in Pima, Cochise, Pinal, and Maricopa counties of Arizona (USFWS 1999). However, on 21 September 2001, the U.S. District Court for the State of Arizona vacated this final rule designating critical habitat for CFPO, and remanded its designation back to the USFWS for further consideration. On 27 November 2002, USFWS proposed designating 1.2 million ac (485,000 ha) of critical habitat for CFPO in southern Arizona (Federal Register Vol. 67, No 229:71031-71064). The proposed action does not enter any areas proposed as critical habitat.

2.1d Current Status Statewide

USFWS determined that CFPO in Arizona were endangered because of the following factors (USFWS 1997a):

- present or threatened destruction, modification, or curtailment of its habitat or range;
- inadequacy of existing regulatory mechanisms;
- other natural and manmade factors, which include low genetic viability.

Surveys conducted statewide during the 2002 season confirmed a total of 18 adult CFPO and three nests in Arizona. Similar to the previous four years, there was greater than 50 percent fledgling mortality documented in 2002, with only one juvenile confirmed surviving dispersal (S. Richardson, USFWS, pers. comm., 3 December 2002).

One of most urgent threats to CFPO in Arizona is thought to be the loss and fragmentation of habitat (USFWS 1997a, Abbate et al. 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments directly and indirectly impacts CFPO survival and recovery (Abbate et al. 1999). In recent decades, CFPO riparian habitat has continually been modified and destroyed by agricultural development, woodcutting, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Bahre 1991, Stromberg et al. 1992, Stromberg 1993a and 1993b). Sonoran desertscrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991). Pumping of groundwater and the diversion and channelization of natural watercourses are also likely to have reduced CFPO habitat.

Proudfoot and Slack (2001) found that CFPO in northwestern Tucson may be isolated from other populations in Arizona and Mexico. Low genetic variability can lead to a reduction in reproductive success and environmental adaptability. In 1998 and 1999, two cases of sibling CFPO pairing and breeding were documented (Abbate et al. 1999). In both cases, young were fledged from the nesting attempts. These unusual pairings may have resulted from extremely low numbers of available mates within dispersal range, and/or from barriers (including fragmentation of habitat) that have influenced dispersal and limited the movement of young owls (Abbate et al. 1999).

Soule (1986) notes that very small populations are in extreme jeopardy due to their susceptibility to a variety of factors, including variations in birth and death rates that can result in extinction. In small populations such as with CFPO, each individual is important for its contribution to the genetic variability of that population.

2.1e Environmental Baseline

CFPO habitat north of Sahuarita Road consists of Sonoran desertscrub with relatively high species diversity and structural diversity, including scattered saguaro cacti containing potential nesting cavities. This area is within Survey Zone 1 (USFWS 2000) and has the highest potential for occupancy of the entire action area. Land status in this area is a mixture of private and state land. The Mission Mine Complex also is located within this section of the proposed action and grazing occurs on much of the state lands in the area.

CFPO habitat south of Sahuarita Road consists primarily of semi-desert grassland dominated by mesquite and acacia trees, mixed-cacti, ocotillo, yucca, and grasses,

including non-native Lehmann's lovegrass (*Eragrostis lehmanniana*). The area is primarily undeveloped, but does contain some existing electrical distribution lines and associated roads (Figure 12) as well as low density housing developments. These grasslands are transected by desert riparian scrub dominated by mesquite and netleaf hackberry trees. Some areas of deciduous riparian forests are also found south of Arivaca Road in Sopori Wash and Peck Canyon. Land jurisdictions in this area include private, state, BLM, and USFS.



Figure 12. Example of existing disturbance within corridor.

CFPO surveys were conducted by Harris Environmental Group, Inc. (HEG) biologists in 2001 and 2002 (data previously submitted to USFWS) in accordance with the approved protocol (USFWS 2000b). Surveys were conducted in Sonoran desertscrub habitat where saguaros were present and in desert riparian scrub and deciduous riparian habitat that contained large trees (over 15.2 cm [6 in] DBH). However, no surveys were conducted in deciduous riparian habitat within Sopori Wash. Surveys were conducted at 142 call points in 2001 and 140 call points in 2002. No CFPOs were detected during either survey year.

The only historical records of CFPO within the Nogales Ranger District (RD) of the CNF are in Sycamore Canyon (CNF 2000) and a dispersing juvenile in the Jarillas Alloment. USFS surveys in Sycamore Canyon in 1997 and 1998 did not locate CFPO. Additionally, USFS personnel surveyed 2,300 ac (930 ha) in 1999 with negative results and conducted 58 habitat assessments for CFPO habitat (CNF 2000). The habitat assessments identified four areas that ranked high enough to warrant CFPO surveys. No CFPO have been detected during surveys of these four areas (T. Newman, CNF, pers. comm., 9 October 2002).

2.1f Effects of Proposed Action on the CFPO

Direct Effects

Vehicle and Powerline Collisions

CFPO collisions with windows and fences have been documented in the Tucson area (USFWS 2002a), and observations of low flying CFPO across roadways indicate vehicle collisions are a realistic hazard (Abbate et al. 1999). While CFPO may be active during daylight, no CFPO have been detected within the action area, therefore, CFPO collisions with construction related vehicles are unlikely.

There is a small risk of a CFPO collision with power lines, however, raptors have lower rates of collision with power lines than passerine birds (McNeil et al. 1985). This reduced collision rate may be due to visual acuity, maneuverability, and non-flocking tendencies (Nobel 1995). To minimize the risk of powerline collisions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996).

Electrocution

Because power structures and towers are attractive perching and nesting sites for some raptor species, significant raptor mortality from electrocution has been reported in North America (Harness and Wilson 2000). Electrocution occurs when a bird simultaneously touches two phase conductors or a conductor and a ground wire (Bevanger 1994). Most electrocutions occur on distribution lines (34-kV or less) rather than on transmission lines (69-kV or more), primarily because clearances between wires on distribution lines are less and distribution lines have an array of uninsulated, structure-mounted equipment (Marti 2002). To minimize the risk of raptor electrocutions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996). Furthermore, on the structures to be used in the proposed action, the distance between the power lines is at least 18 ft (5.5 m). Because the average wingspan of an adult CFPO is 15 in (38 cm), there is no foreseeable risk of electrocution.

Construction Noise and Activity

Although no CFPO have been detected in the project area, short term noise disturbance and human activity associated with construction may discourage CFPO from using habitat within and adjacent to the proposed ROW. Human activity near nest sites at critical periods of the nesting cycle may cause CFPO to abandon their nests (USFWS 2002a). While CFPO may tolerate low level noise disturbances, such as those in low density residential areas (Cartron et al. 2000b), they will probably not tolerate noise levels associated with construction activities in close proximity to a nest. The greatest likelihood of noise disturbance will result from the use of helicopters during the installation of the transmission lines, but also could result from the presence of heavy machinery or large groups of construction personnel. If CFPO are not detected during the two consecutive years of protocol surveys, the potential for direct impacts to this species is minimal.

Indirect Effects

Habitat Modification and Fragmentation

The proposed action will result in the disturbance of areas that could provide potential nesting, foraging, and dispersal habitat for CFPO. Because many access roads will be closed and restored and all disturbed areas will be reseeded, this disturbance will be temporary. The proposed action could potentially result in temporary disturbance to habitat from access roads and structure installations in the following amounts: 34 acres (13.76 ha) in Sonoran desertscrub, 41.27 acres (16.70 ha) in desert riparian scrub, and 0.05 acres (0.02 ha) in deciduous riparian.

While all large saguaros within construction sites will be transplanted, construction could temporarily degrade CFPO habitat by removing vegetation that provides forage and shelter. Elimination of groundcover plant species, rodent burrows, and native soils, as well as loss of trees and shrubs, may impact local reptile and bird populations that are important to the pygmy-owl diet. Loss of complex vegetation structure increases energy demands on owls that must forage at greater distances and risk exposure to a variety of hazards (Abbate et al. 1999). Because of the linear nature of the proposed action, these impacts will be widely distributed and relatively minor in any single area.

Increased Legal and Unauthorized Access to CFPO Habitat

Although CFPO have not been detected in the project area, recreationists may access potential CFPO habitat using temporary construction roads associated with the proposed action. While hikers and other non-motorized recreationists will create minimal disturbance, noise from Off Highway Vehicle (OHV) users are much more likely to disturb CFPO, especially if the activity occurs over an extended period of time in or near a CFPO nesting territory. Increased access to CFPO habitat may subject the species to poaching or other harassment. While TEP will prevent unauthorized access to the ROW across private land, closure of the ROW on public land, particularly state land, is not feasible. Therefore, some increase in access to potential CFPO habitat is anticipated.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, CFPO will not likely be directly impacted by wildfires. However, wildfires may destroy columnar cacti and trees that provide nesting cavities as well as affect CFPO prey species through direct mortality from the fire or habitat destruction. Herbaceous plant species that serve as cover and forage for small mammals could be drastically reduced. Because of reduced groundcover, predation upon surviving small mammals by CFPO may actually increase in the short term. Furthermore, increased herbaceous production in the years following a fire may improve habitat for small mammals in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977).

The measures outlined in the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and

Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.1g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species crosses private, state, and federal lands, the habitat with the highest potential for occupancy by CFPO occurs on state and private lands in Pima County. Future federal actions on these lands will be subject to Section 7 consultation. These actions will not be considered cumulative.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). Because of the growth rate and the development pressures from nearby Tucson and Sahuarita, it is foreseeable that land adjacent to the proposed ROW will be developed. These developments will likely include increases in associated infrastructure such as roads, groundwater use, and commercial services, all resulting in the degradation of CFPO habitat.

An undetermined level of border crossings by undocumented immigrants occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase. Additionally, agriculture, recreation, OHV use, grazing, and other activities continue to occur on private and state land and adversely affect CFPO and their habitats.

2.1h Effects Determination and Incidental Take

While CFPO are not currently known to occupy the action area, the disturbance of potential habitat from construction activities and increased access may affect, and are likely to adversely affect, this species.

Take of CFPO is not anticipated because construction activities during breeding season will only occur following protocol surveys and the Conservation Measures outlined in SECTION 1.4 will minimize disturbance to potential habitat and prevent disturbance to nesting CFPO within the action area should any be detected in the future.

2.2a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential migratory habitat for the SWFL includes those areas of Sopori Wash with riparian habitat similar to that described by Sogge et al. (1997). The action area for this species consists of the Sopori Wash both within the proposed ROW as well as the surrounding Sopori Wash watershed.

2.2b Natural History and Distribution

SWFL (Figure 13) are small passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 5.75 in (14.6 cm) in length from the tip of the bill to the tip of the tail and weighing 0.4 ounces (11.34 grams). This species has a grayish-green back



and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark and the lower is light yellow grading to black at the tip. SWFL are riparian obligate species, nesting along rivers, streams, and other wetlands where dense growths of willow, seepwillow (*Baccharis* sp.), buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix chinensis*), carrizo (*Phragmites australis*) or other plants are present, often with a scattered overstory of cottonwood and/or willow.

Figure 13. Southwestern willow flycatcher.

One of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), SWFL are neotropical migratory species that breed in the southwestern U.S. from approximately 15 May to 1 September. This species migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical range of SWFL included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

SWFL breed in dense riparian habitats from sea level in California to just over 7,000 ft (2,134 m) in Arizona and southwestern Colorado. Historic egg/nest collections and species descriptions throughout SWFL range describe the widespread use of willow for nesting (Phillips 1948, Phillips et al. 1964, Hubbard 1987, Unitt 1987, San Diego Natural History Museum 1995). Currently, SWFL primarily use Geyer willow (Salix geyeriana), Goodding willow (Salix gooddingii), boxelder, saltcedar, Russian olive (Elaeagnus angustifolio), and live oak (Quercus agrifolia) for nesting. Other plant species less commonly used for nesting include: buttonbush, black twinberry (Lonicera involucrata), cottonwood, white alder (Alnus rhombifolia), blackberry (Rubus ursinus), carrizo, and stinging nettle (Urtica spp.). Nesting SWFL exhibit a strong preference for dense

vegetation at the nest site, but high variation and density of vegetation at the patch scale (Hatten et al. 2000). Nesting sites are typically close to the edge of the vegetation patch and close to water (Allison et al. 2000). Based on the diversity of plant species composition and complexity of habitat structure, four basic nesting habitat types can be described for SWFL: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge et al. 1997).

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of SWFL territories and nests; SWFL sometimes nest in areas where nesting substrates are in standing water (Maynard 1995, Sferra et al. 1995, 1997). Hydrological conditions at a particular site can vary remarkably in the arid southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g. creation of pilot channels), where modification of subsurface flows has occurred (e.g. agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer et al. 1996). Throughout their range, SWFL arrive on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Maynard 1995, Sferra et al. 1995, 1997). Nesting begins in late May and early June, and young fledge from late June typically through mid August, but as late as early September.

SWFL are insectivores, foraging in dense shrub and tree vegetation along rivers, streams, and other wetlands. Flying insects are the most important SWFL prey item; however, they will also glean larvae of non-flying insects from vegetation (Drost et al. 1998). Drost et al. (1998) found that the major prey items of SWFL (in Arizona and Colorado), consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera), and true bugs (Hemiptera). Other insect prey taxa include leafhoppers (Homoptera: Cicadellidae), dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey include spiders (Araneae), sowbugs (Isopoda), and fragments of plant material.

2.2c Critical Habitat

Critical habitat for SWFL was originally designated on 22 July 1997 (USFWS 1997b), but on 11 May 2001, the 10th Circuit Court of Appeals set aside the critical habitat designation and instructed USFWS to issue a new designation in compliance with the court ruling. USFWS is currently soliciting information regarding areas important for the conservation of this species in order to re-propose critical habitat.

2.2d Current Status Statewide

The following status of SWFL in Arizona was summarized from Smith et al. (2002). In 2001, 177 sites covering approximately 139 mi (225 km) of riparian habitat were surveyed for SWFL in Arizona. Sites range from 98 ft (30 m) to 8,802 ft (2,683 m) in elevation and 98.5 ft (30 m) to 10 mi (16.1 km) in length. The mean site length was 1 mi (1.6 km). Fifty-two of the 177 sites were not surveyed according to protocol. This was due to time or funding limitations or because unsuitable SWFL habitat was found during the first survey. Of the 177 sites, 20 had not been previously surveyed. Most new survey

sites were located along the Colorado River (n = 9) and Gila River (n = 4). Six hundred thirty-five resident SWFL were documented within 346 territories at 46 sites. AGFD personnel and statewide cooperators recorded 311 pairs.

SWFL were documented along 11 drainages. The greatest concentrations of SWFL were found at Roosevelt Lake (40 percent) and the Winkelman Study Area (35 percent). Resident SWFL were detected at five sites that had been surveyed at least once in previous years. Resident SWFL were documented in two drainages (Virgin River and Cienega Creek) for the first time since protocol surveys began. No historical occurrence record exists for SWFL along the Virgin River and SWFL have not been reported at Cienega Creek since 1964. These colonizations yield evidence of habitat restoration potential in these drainages that can aid in recovery of the SWFL.

2.2e Environmental Baseline

The section of Sopori Wash crossed by the proposed action supports a mixed riparian assemblage with mature but discontinuous Fremont cottonwood and netleaf hackberry along the banks and a midstory of large mesquite (HEG Field Notes, C. Hisler, AGFD, pers. comm., 18 July 2002) (Figure 14). Understory density is relatively low. Uplands surrounding Sopori Wash are characterized by semidesert grassland and are subject to grazing.



Figure 14. Riparian habitat in Sopori Wash

This reach of Sopori Wash is ephemeral, and water is probably present only for short periods of time following precipitation events. Because of the patchy habitat and lack of

surface water, this area will likely be used only by migratory SWFL. The nearest recent (1999) reports of SWFL are from the Santa Cruz River between Tubac and Rio Rico, approximately 6 mi (10 km) to 12 mi (20 km) away (McCarthey et al. 1998, Paradzick et al. 1999, Paradzick et al. 2000). All of these reports were of migrant SWFL.

2.2f Effects of Proposed Action on the SWFL

Direct Effects

Because the proposed action does not impact suitable breeding habitat, no direct impacts to SWFL are anticipated.

Indirect Effects

Habitat Modification and Fragmentation

Some indirect impacts to SWFL may result from modifications to potential migratory habitat associated with the installation of structures within the Sopori Wash floodplain. Roads in this area will be limited to a width of 12 ft (4 m), resulting in the disturbance of 0.14 acres (0.06 ha) of deciduous riparian habitat. Because disturbed cottonwood and willow specimens will be mitigated at a 2:1 ratio, and riparian vegetation can recover quickly following minimal disturbance, any adverse effects to SWFL habitat will be temporary.

Increased Legal and Unauthorized Access to SWFL Habitat

Because this section of Sopori Wash is on a private ranch, unauthorized recreational access to this section of Sopori Wash via the temporary construction roads associated with the proposed action should not occur. Therefore, no disturbance of SWFL or habitat modification from increased access is anticipated.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). However, because new roads in this area will not be open to the public, increased risk of wildfire because of increased access will be negligible. The measures outlined in the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the

fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.3g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Most land within the action area consists primarily of ASLD land with blocks of private parcels on either side of Arivaca Road. Federal actions will, on these lands, be subject to Section 7 consultation; these actions will not be considered cumulative.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Pima County grew by 26.5 percent and Santa Cruz County by 29.3 percent (U.S. Census Bureau 2000). Because of these growth rates and the trend of rural development to occur in areas with some existing infrastructure, it is foreseeable that the private ranches adjacent to Arivaca Road could be sold and subdivided for residential homes and ranchettes. Any substantial population increase in the area also could increase demands for access to recreational lands, increase groundwater pumping, and foster development of commercial services. These impacts to the watershed could degrade the value of habitat within Sopori Wash, thereby preventing its use by SWFL.

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.3h Effects Determination and Incidental Take

The disturbance of potential migratory habitat may affect the SWFL, but it is not likely to adversely affect the species, because the disturbance is temporary and relatively small in area.

Because the proposed action is not likely to adversely affect the species, no take of SWFL is anticipated.

2.4a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential roosting habitat occurs in the Tumacacori and Atascosa/Pajarito mountains, and foraging habitat occurs through those portions of the proposed ROW that contain agave and saguaro cacti. Because LLNB have been documented foraging up to 40 mi (64 km) from roost sites, the action area for the LLNB consists of all potential foraging and roosting habitat within a 40 mi (64 km) buffer surrounding the proposed action.

2.4b Natural History and Distribution

The LLNB (formerly Sanborn's long-nosed bat) is one of three members of American leaf-nosed bats (Family Phyllostomidae) in Arizona (Hoffmeister 1986). The LLNB (Figure 15) is one of the larger Arizona bats, and gray to reddish-brown in color. This bat has an erect triangular flap of skin (nose leaf) at the end of a long slender nose. The LLNB can be distinguished from *Macrotus* by its much longer nose, greatly reduced tail membrane, and smaller ears; and from *Choeronycteris*, which has a shorter tail, larger tail membrane, and longer, narrower nose.



Figure 15. Lesser long-nosed bat.

LLNB occur from the southern United States to northern South America, including several islands and the adjacent mainland of Venezuela and Colombia. LLNB occurs between 4 degrees to 32 degrees N latitude, typically in semiarid to arid regions (Nowak 1994). This bat is typically associated with their primary food source, flower nectar and fruit of columnar cacti and certain agave species. Because of the seasonal nature of the food source, LLNB migrate to follow flowering and fruiting plants. In addition to food availability, there must be suitable roosting within commuting distance of the food source. Currently, the longest known commute distance is about 30 mi (48 km).

The primary range of this bat lies in Mexico and Central America. Occurrences in Arizona probably represent range expansion. Prior to the 1930s, there are no records of LLNB in Arizona (Cockrum 1991). Colossal Cave and the Old Mammon Mine are the most northern sites known to house colonies of these bats. However, these sites support colonies of about 5,000 individuals, versus sites in Mexico, which are as large as 150,000 individuals.

LLNB have a bi-seasonal occurrence in Arizona. The maternity season, when bats migrate to southwestern Arizona, represents a United States population of about 30,000

individuals. The fall agave flowering season, located in southeastern Arizona, which attracts about 70,000 bats. Each of these areas contains three known primary roosts and some number of secondary/transient or night roosts (sheltering tens to a few hundred individuals/site).

With the exception of a small bachelor roost located in the Chiricahua Mountains, all remaining records represent very small numbers (usually single individuals) at hummingbird feeders, caught in mist nets, or chance findings in residential areas. Constantine (1966) reported two immature females from Maricopa County, one in Phoenix on 30 August 1963 and the other in Glendale on 16 September 1963. The Glendale specimen was found dead. The other was hanging on a screen door (not a normal place) indicating something was likely wrong with that bat. He also reported two males from southern California: one was taken alive on 3 October 1993 outside a home in Yucaipa, the other was taken on 18 October 1996 from the outside of a building in Oceanside (Constantine 1998). LLNB also have been reported from the Aravaipa Canyon area (Cockrum 1991). Hoffmeister (1986) has a record in the Santa Catalina Mountains, but Cockrum (1991) states it was probably a transcription error because the nectar-feeding bats found there belong to the genus *Choeronycteris*. However, Cockrum (1991) does report LLNB from the Santa Catalina Mountains but only once in a mist net set in Sabino Canyon (a female in June).

The diet of LLNB in Arizona consists primarily of the nectar, pollen, and ripe fruit of columnar cacti (particularly saguaro) and agave (e.g., *Agave chrysantha*, *A. deserti*, *A. palmeri*, and *A. parryi*). The LLNB has been demonstrated to be a significant pollinator of saguaros, organpipe cacti (*Stenocereus thurberi*), and agaves (Howell and Roth 1981, Alcorn et al. 1962, and McGregor et al. 1962). Generally, LLNB in Arizona forage after dusk to nearly dawn during the months of May through September. In a single night, LLNB will forage well away from daytime roost sites. In Sonora, Mexico, bats feed on the mainland by night at Bahia Kino and roost by day on Isla Tiburon, 15 mi (24 km) to 20 mi (32 km) away. The closest sizable densities of columnar cacti to LLNB roosts in the Sierra Pinacate, Sonora, Mexico, are found in Organpipe Cactus National Monument in Arizona, about 25 mi (40 km) to 30 mi (48 km) away (Fleming 1991).

In Arizona, females arrive in late March and early April, then migrate northward through Mexico along a "nectar corridor" provided by columnar cacti such as saguaro and organpipe (Fleming 1991). Female LLNB usually arrive in Arizona pregnant and congregate in traditional maternity roosts at lower elevations, feeding primarily on saguaro nectar (Cockrum 1991). Later in the summer the adult males arrive and along with dispersing members of the maternity roosts, roost at higher elevations, especially within proximity to significant stands of flowering agave.

LLNB are gregarious and form large maternity colonies that number in the thousands (Hayward and Cockrum 1971, Hoffmeister 1986). All four of the verified maternity roosts of LLNB in the United States are found in Arizona (Cockrum 1991). The largest and most important of the four is found in a mine located in Organpipe Cactus National

Monument. About 15,000 LLNB use this mine as a maternity roost. Young are typically born between mid-May and early June (Cockrum 1991, Hayward and Cockrum 1971).

While in the roost during the day, LLNB engage in various activities such as flying, suckling of young, grooming, resting, and interacting with neighbors. LLNB are particularly active during the day and any disturbance, such as aircraft fly-overs or other human activities, may cause an expenditure of extra energy (Dalton and Dalton 1993, Dalton et al. 1994). Female LLNB gathered in large maternity colonies are particularly vulnerable to disturbances. Maternity colonies are more sensitive because of the vulnerability of nonvolant young, whose recruitment into the population is essential to maintain a viable population.

2.4c Critical Habitat

No critical habitat has been designated for this species.

2.4d Current Status Statewide

USFWS listed this species as endangered throughout its range in the southwestern United States and Mexico on 30 September 1988 (USFWS 1988). Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. All available information on the species through 1994 was summarized in the Lesser Long-nosed Bat Recovery Plan approved in 1997 (Fleming 1994). The Plan indicates that the species is not in danger of extinction in Arizona or Mexico. The species still warrants some protection, as it is vulnerable to human disturbance at roost sites. There also is particular concern for the protection of forage plants from disturbance or destruction, particularly near roost sites.

Primary threats to LLNB populations are agave harvesting and human disturbance of roosting and maternity colonies. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the LLNB (Fleming 1995). The USFWS determined that the LLNB was endangered because of the following factors (USFWS 1988):

- A long-term decline in population
- Reports of absence from previously occupied sites
- Decline in the pollination of certain agaves

In Arizona and Mexico, there are 16 large known roosts (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. Disturbance of these roosts or removal of the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

2.4e Environmental Baseline

No LLNB roosts are known from the proposed corridor, but field surveys did locate small caves and crevices nearby that could serve as LLNB day roosts (HEG 2002, unpublished data). Furthermore, unsurveyed caves, mineshafts, and adits, which may provide suitable roost sites, occur within the Tumacacori-Atascosa mountains. The two closest known LLNB roost sites are the Cave of the Bells in the Santa Rita Mountains, approximately 20 mi (32 km) to the west, and a cave in the Patagonia Mountains, approximately 35 mi (56 km) to the west. Both of these roost sites are within the known flight distance to the proposed action and LLNB may utilize the proposed corridor for foraging.

Saguaro cacti occur within proposed corridor north of Duval Mine Road, and agaves are present in varying densities south of Arivaca Road. While the exact densities of agaves and saguaro cacti were not determined for this BA, CNF estimates that Palmer's agave is widely scattered over 1 million acres (400,000 ha) at densities of 10 to 200 per acre, generally between the elevations of 3,000 ft (914 m) and 6,000 ft (1,829 m) (USFWS 2002b). Parry's agave is found between 5,000 ft (1,524 m) and 8,200 ft (2,500 m) and begins blooming in mid-spring.

The northern portion of the proposed action is primarily undeveloped but contains some existing electrical distribution lines as well as low-density housing developments near Sahuarita Road. The Mission Mine Complex also is located within this section of the project area. The proposed action passes through the Tumacacori EMA of the CNF. Range condition in areas crossed by the proposed action is moderately high with a stable or unknown trend. While agaves have persisted in areas grazed for more that 100 years, mortality through direct herbivory and trampling is known to occur. There is a forest-wide study to determine the effects of livestock grazing on agaves currently underway (USFWS 2001b). Livestock stocking rates for the allotments within the Tumacacori EMA range from 1,320 AUMs in the Peña Blanca Allotment to 2,400 AUMs in the Bear Valley Allotment. Allotment Management Plans for Bear Valley and Sardinia Allotments are currently being revised.

2.4f Effects of Proposed Action on the LLNB

Direct Effects

Construction Noise and Activity

Although no LLNB roosts have been detected within the proposed corridor, short-term noise disturbance and human activity associated with construction activities may disturb LLNB if they are present in undetected roosts adjacent to the proposed corridor. The greatest likelihood of noise disturbance will result from the use of helicopters during the installation of the transmission lines, but could also result from the presence of heavy machinery or large groups of construction personnel in close proximity to an undetected roost. The consequences of disturbance to small numbers of LLNB in day roost will be less serious than disturbance of large aggregations of bats at one location.

Indirect Effects

Habitat Modification

Indirect effects to LLNB may result from the potential reduction in forage resources (agave and saguaro) during construction of temporary access roads or the installation of transmission structures. Because agave and saguaro are unevenly distributed and the nectar they provide is seasonally and geographically separated, the loss of significant numbers of either species may alter LLNB foraging patterns and roost selection within the action area. Even if the loss of a high-density patch of flowering agaves does not cause the abandonment of a roost, bat survivorship may be reduced through increased foraging flight distances and related energy expenditures, and increased exposure to predators. Because of the linear nature of the proposed action, however, these impacts will be widely distributed and relatively minor in any single area.

Although all agave and saguaro cacti disturbed as a result of the proposed action will be transplanted immediately outside of the construction zone, the long-term survival and future flowering of these specimens is uncertain. Agaves are typically easy to cultivate in warm climates with well-drained soils (Gentry 1982), but no long-term studies of agave transplant survival have been conducted. Transplantation of saguaro cacti is a common practice within Pima County, but preliminary results from a 10-year study of saguaro indicate that smaller saguaros (< 16 ft [5 m] tall) are more successfully transplanted than larger saguaros (HEG, unpublished data). It may take several years for saguaro cacti to die from a mortal injury, and so it is necessary to monitor transplants for many years in order to evaluate success.

Even in areas where no agaves or saguaro cacti presently exist, dormant seeds may be present in the soil. Construction activities associated with the proposed action may compact soil and alter water infiltration, which may prohibit seeds germination.

Increased Legal and Unauthorized Access to LLNB Habitat

Because LLNB are sensitive to human disturbance (to the point of temporarily abandoning a day roost after a single human intrusion) increased human access to roost sites could negatively impact LLNB. New roads on state land will not likely result in disturbance to undetected roosts because few areas in this area the support rock outcroppings, caves, and mine shafts necessary for LLNB roosts. The greatest potential for undetected roosts occurs on CNF land. The road closures on CNF land outlined in Section 1.4 and in the RA (URS 2003) will minimize the probability of increased human access and disturbance of LLNB in undetected roosts in these areas.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Agave in desert grasslands have evolved with fire, but unnaturally high fire frequency and intensity can lead to decline or elimination of agave populations. Furthermore, agave mortality from fire may affect the abundance and distribution of blooming agaves for a number of years, especially if there is high mortality within certain age and size classes.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.4g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. The action area for this species crosses private, state, and federal lands. Future federal actions on USFS land will be subject to Section 7 consultation but these actions will not be considered cumulative. Because the action area for this species includes a 40 mi (64 km) buffer, some of the future planned actions on private and state lands in southern Pima County and much of Santa Cruz County may be considered cumulative.

Although the amount of this future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). In the same time period, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000).

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase

into the foreseeable future. Additionally, agricultural, recreation, OHV use, grazing, and other activities continue to occur on private and state land and adversely affect LLNB and their habitats.

2.4h Effects Determination and Incidental Take

The potential disturbance of LLNB in undetected roosts from construction noise and potential mortality of transplanted forage species may affect, and is likely to adversely affect, this species.

No take of LLNB is anticipated as a result of the proposed action. First, noise disturbance will likely impact small numbers of individuals and will be short term in duration. Secondly, changes in agave and saguaro cacti distribution will be not be significant in any single location.

2.5a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the CLF consists of all cienegas, pools, livestock tanks, and streams at elevations above 3,200 ft (975 m) in the Tumacacori and Atascosa/Pajarito mountains. The action area also includes the entire watersheds of these aquatic systems and lies almost entirely on CNF land. That portion of the action area not on CNF land is a considerable distance downstream of the proposed action.

2.5b Natural History and Distribution

CLF (Figure 16) are distinguished from other members of the leopard frog (*Rana pipiens*) complex by a combination of characters, including a distinctive pattern on the rear of the

thigh consisting of small, raised, cream-colored spots or tubercles on a dark background, dorsolateral folds that were interrupted and deflected medially, stocky body proportions, relatively rough skin on the back and sides, and often green coloration on the head and back (Platz and Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of one to two seconds in duration (Davidson 1996, Platz and Mecham 1979).



Figure 16. Chiricahua leopard frog.

CLF are riparian habitat generalists, occupying springs, cienegas, canals, small creeks, mainstem rivers, lakes and livestock tanks at elevations of 3,281 ft (1,000 m) to 8,890 ft (2,710 m) in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of Chihuahua, northern Durango and northern Sinaloa (Platz and Mecham 1984, Degenhardt et al. 1996, Sredl et al. 1997). Adult CLF are the most aquatic of all Arizona leopard frogs, requiring aquatic habitats for larval forms and semi-aquatic habitats for adult forms. CLF may breed anytime, but breeding in late spring and early summer is most common. Eggs are oviposited in shallow water attached to vegetation, or on bottom substrate. Tadpoles can metamorphose in as few as three months, but may overwinter and metamorphose the following spring. Because time from hatching to metamorphosis is shorter in warm water than cold water, water permanency is probably more important at higher elevations.

Heterogeneous habitat is important for leopard frog populations; shallow water with emergent vegetation is important for breeding and deeper water provides escape cover for adults. In Arizona, slightly more than half of known historic localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl et al. 1997). Sixty-three percent of extant populations in Arizona occupy stock tanks (Sredl and Saylor 1998). Although stock tanks provide refugia for frog populations and are important for this species in many areas, such tanks support only small populations and these habitats are very dynamic. Tanks often dry out during drought, and

flooding may destroy downstream impoundments or cause siltation, either of which may result in loss of aquatic communities and extirpation of frog populations. Periodic maintenance to remove silt from tanks also may cause a temporary loss of habitat and mortality of frogs.

CLF are rarely found in aquatic sites inhabited by non-native fish, bullfrogs (*Rana catesbiana*), and/or crayfish (*Oronectes virilis*). However, in complex systems or large aquatic sites, CLF may coexist with low densities of non-native predators (Bloomquist et al. 2002).

Where the species is extant, sometimes several small populations are found in close proximity, suggesting metapopulations are important for preventing regional extirpation (Sredl et al. 1997). Disruption of metapopulation dynamics is likely an important factor in regional loss of populations (Sredl et al. 1997, Sredl and Howland 1994). CLF populations are often small and their habitats are dynamic, resulting in a relatively low probability of long-term population persistence. However, if populations are relatively close together and numerous, extirpated sites can be recolonized.

The range of the species is divided into two parts, including: (1) a southern group of populations (the majority of the range) located in mountains and valleys south of the Gila River in southeastern Arizona, extreme southwestern New Mexico, and Mexico; and (2) northern montane populations in west central New Mexico and along the Mogollon Rim in central and eastern Arizona (Platz and Mecham 1979). Historical records exist for Pima, Santa Cruz, Cochise, Graham, Apache, Greenlee, Gila, Coconino, Navajo, and Yavapai counties in Arizona, and Catron, Grant, Hidalgo, Luna, Soccoro, and Sierra counties in New Mexico (Sredl et al. 1997, Degenhardt et al. 1996). The distribution of the CLF in Mexico is unclear. The species has been reported from northern Sonora, Chihuahua, and Durango (Hillis et al. 1983, Platz and Mecham 1979, 1984) and, more recently, from Aguascalientes. However, Webb and Baker (1984) concluded that frogs from southern Chihuahua were not CLF. The taxonomic status of *chiricahuensis*-like frogs in Mexico from southern Chihuahua to Aguascalientes is unclear and in this region another leopard frog, *Rana montezumae*, may be mistaken for the CLF.

Recent evidence suggests a chytridiomycete skin fungi is responsible for observed declines of frogs, toads, and salamanders in portions of Central America (Panama and Costa Rica), South America (Atlantic coast of Brazil, Ecuador, and Uruguay), Australia (eastern and western states), New Zealand (South Island), Europe (Spain and Germany), Africa (South Africa, "western Africa", and Kenya), Mexico (Sonora), and the United States (8 states) (Speare and Berger 2000, Longcore et al. 1999, Berger et al. 1998). Ninety-four species of amphibians have been diagnosed as infected with the chytrid Batrachochytrium dendrobatidis. In Arizona, chytrid infections have been reported from four populations of CLF, as well as populations of Rio Grande leopard frog (Rana berlandieri), Plains leopard frog (Rana blairi), lowland leopard frog (Rana yavapaiensis), Tarahumara frog (Rana tarahumarae), canyon treefrog (Hyla arenicolor), and Sonora tiger salamander (Ambystoma tigrinum stebbinsi) (Davidson et al. 2000, Sredl and Caldwell 2000, Morell 1999). The disease was recently reported from a

metapopulation of CLF from New Mexico; that metapopulation may have been extirpated.

The role of the fungi in the population dynamics of the CLF is undefined; however, it may well prove to be an important contributing factor in observed population decline. Rapid death of recently metamorphosed frogs in stock tank populations of CLF in New Mexico was attributed to post-metamorphic death syndrome (Declining Amphibian Populations Task Force 1993). Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and CLF in Arizona and Sonora. However, in both cases, symptoms of moribund frogs matched those of chytridiomycosis. Chytrids were recently found in a specimen of Tarahumara frog collected during a die off in 1974 in Arizona. This earliest record for chytridiomycosis corresponds to the first observed mass die-offs of ranid frogs in Arizona (USFWS 2002c).

2.5c Critical Habitat

No critical habitat has been designated for this species.

2.5d Current Status Statewide

USFWS listed this species as threatened throughout its range in the southwestern United States and in Mexico on 13 June 2002 (USFWS 2002c). Potential threats to the species include disease, predation and possibly competition by non-native organisms, including fishes in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs, tiger salamanders (*Ambystoma tigrinum stebbinsi*), crayfish, and several other species of fishes, including, in particular, catfishes (*Ictalurus* spp. and *Pylodictus oliveris*) and trout (*Oncorhynchus* spp. (=*Salmo*) and *Salvelinus* spp.) (USFWS 2002c). For instance, in the Chiricahua region of southeastern Arizona, Rosen et al. (1996a) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported CLF. All waters, except three that supported introduced vertebrate predators, lacked CLF.

Human factors affecting the species include modification or destruction of habitat through water dams, water diversions, groundwater pumping, introduction of non-native organisms, woodcutting, mining, contaminants, urban and agricultural development, road construction, overgrazing and altered fire regimes. Additional human factors include over-collection for commercial and scientific purposes.

In Arizona, the species is extant in seven of eight major drainages of historical occurrence (Salt, Verde, Gila, San Pedro, Santa Cruz, Yaqui/Bavispe, and Magdalena river drainages), but appears to be extirpated from the Little Colorado River drainage on the northern edge of the range. Within the extant drainages, the species was not found recently in some major tributaries and/or from river mainstems. For instance, the species was not reported from 1995 to the present from the following drainages or river mainstems where it historically occurred: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River

mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek.

USFWS reports that CLF were observed at 87 sites in Arizona from 1994 to 2001, including 21 northern sites and 66 southern sites (USFWS 2002c). Many of these sites have not been revisited in recent years; however, evidence suggests some populations have been extirpated in the Galiuro and Chiricahua mountains. In 2000, the species was also documented for the first time in the Baboquivari Mountains, Pima County, Arizona (USFWS 2002c).

Intensive and extensive surveys were conducted by AGFD in Arizona from 1990 to 1997 (Sredl et al. 1997). Included were 656 surveys for ranid frogs within the range of the CLF in southeastern Arizona. Rosen et al. (1994, 1996a, 1996b), Hale (1992), Wood (1991), Clarkson and Rorabaugh (1989), and others have also extensively surveyed wetlands in southeastern Arizona. It is unlikely that many additional populations will be found there. A greater potential exists for locating frogs at additional sites in the northern region of Arizona, as several new populations have been discovered on the Coconino National Forest in 2000 and 2001 (USFWS 2002c).

The latest information for Arizona (USFWS 2002c) indicates the species is extant in all major drainages in Arizona and New Mexico where it occurred historically. However, it has not been found recently in many rivers, valleys, and mountains ranges, including the following in Arizona: White River, East Clear Creek, West Clear Creek, Silver Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, Sonoita Creek, Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. In many of these regions CLF were not found for a decade or more despite repeated surveys.

2.5e Environmental Baseline

The action area for this species lies within the Tumacacori EMA of the CNF. Within this EMA, CLF are present in Sycamore Canyon, Peña Blanca Spring, Hank & Yank Tank, and Bear Valley Tank (J. Rorabaugh, USFWS, pers. comm., 1 October 2002). Of these, Peña Blanca Spring and portions of Sycamore Canyon are downstream or near construction areas of the proposed action. Watershed condition is a function of percent groundcover present to dissipate rain and prevent excess erosion. Along the proposed ROW, watershed condition is satisfactory on the Sycamore Canyon watershed and the watershed immediately to the east, but unsatisfactory on the Peck Canyon watershed and the watershed on the northern boundary of the Tumacacori EMA. Peña Blanca Spring is not within a grazing allotment but is adjacent to Ruby Road. The spring is downstream of the Walker fire, a 16,369 acre (6,624 ha) human-caused fire along the international border. Portions of the Walker fire were very hot (especially near the international border and the upper slopes of ridges) while other areas (like Walker Canyon) burned relatively cool (T. Newman, CNF, pers. comm., 26 November 2002). While vegetation has begun to recover in some areas, other areas are highly susceptible to erosion due to lost groundcover (Figure 11).

The population in Sycamore Canyon is probably a source of immigrants to other suitable areas within the EMA (USFWS 2001b). Sycamore Canyon also is the only aquatic habitat within the EMA confirmed to contain the chytrid fungus (J. Rorabaugh, USFWS, pers. comm., 1 October 2002). While there are 17 historical records of CLF in the Atascosa and Pajarito mountains (USFWS 2001b), there are currently no plans for reintroducing CLF into any aquatic habitats in CNF (J. Rorabaugh, USFWS, pers. comm., 1 October 2002).

2.5f Effects of Proposed Action on the CLF

Direct Effects

Vehicle Collisions

No construction activities will occur within stock tanks, or other aquatic habitats; however, CLF may be present on land some distance away from these areas and construction traffic could result in vehicle collisions with individual CLF.

Indirect Effects

Habitat Modification

Some indirect impacts to CLF may result from modifications to its habitat caused by the construction of temporary access roads. The removal of vegetative cover for these roads will increase surface runoff and sediment transport and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997). The use of both existing and new roads by heavy equipment makes them less permeable because of compaction and crusting (Rostagno 1989). Compaction leads to reduced infiltration and an increase in the force of overland flow, which in turn leads to increased erosion. Increased erosion can accelerate sedimentation of deep pools used by CLF (Gunderson 1968). Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). Because alignment of the structures is approximately 1 mi (1.6 km) from Sycamore Canyon, impacts from road erosion are expected to be insignificant in that area, and BMPs will minimize erosion into other aquatic systems closer to the proposed alignment. However, unusually large precipitation events may temporarily overwhelm BMPs and result in some increase in sediment transport.

Transport of Disease Agents

The construction of temporary roads will provide construction vehicles and personnel access to remote areas and potential CLF habitats not currently accessible by vehicles. Because these same construction vehicles and personnel will be used along the entire proposed ROW, there may be an increased possibility for the introduction of the chytrid fungus into aquatic habitats that do not presently contain the fungus. Chytrid fungus could be carried inadvertently in mud clinging to wheels, boots, or other equipment. The use of a diluted-bleach wash station when equipment and personnel move between wet zones will significantly reduce the potential for unintentional introduction of the disease to new aquatic habitats.

Increased Legal and Unauthorized Access to CLF Habitat

Recreationists may access CLF habitat, using roads constructed for the proposed action, even after the roads have been closed and revegetated. Unmanaged OHVs can damage riparian vegetation, increase siltation in pools, compact soils, disturb the water in stream channels, and crush CLF. Increased human access to these aquatic habitats also may lead to the introduction of non-native predators to streams and stock tanks or illegal killing or collection of CLF. Long-term monitoring and maintenance of road closures will minimize the probability of unauthorized access and thereby minimize any adverse effects associated with such access.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Roads constructed for the proposed action may allow the establishment or increased density of non-native grasses, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Wildfires could remove groundcover that is important in dissipating rainfall energy and reducing erosion.

However, new roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.5g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. The action area for this species crosses private, state, and federal lands. Future federal actions on USFS lands will be subject to Section 7 consultation but these actions will not be considered cumulative. Because the action area for this species includes the entire watersheds of the aquatic habitats on the CNF, some of the future planned actions on private and state lands in Santa Cruz County may be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew 29.3 percent (U.S. Census Bureau 2000). Despite being downstream of occupied and potential CLF habitat, an increase in regional population translates into an increased demand for recreational use of USFS lands.

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.5h Effects Determination and Incidental Take

Potential vehicle impacts to dispersing CLF and increased transport of sediments into aquatic habitats may affect, and will likely adversely affect, this species.

No take of CLF is anticipated for the following reasons: (1) no construction activities will occur within occupied streams, stock tanks, or other CLF habitat; (2) implementation of BMPs will minimize erosion.

2.6 PIMA PINEAPPLE CACTUS (*Coryphantha scheeri* var. *robustispina*) (Endangered)

2.6a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for the PPC includes those areas of the proposed ROW from the TEP South Substation to an elevation of 4,600 ft (1,402 m) in the foothills of the Tumacacori Mountains.

2.6b Natural History and Distribution

The PPC (Figure 17) is small and round with finger-like projections. Adult cactus range in size from 1.8 in (4.6 cm) to 18 in (46 cm) in height. At the tip of each projection or tubercle is a rosette of 10–15 straw-colored spines with one central hooked spine. Plants can be single or multi-stemmed and produce bright yellow flowers after summer rains (Roller 1996).

Populations of PPC are known to occur south of Tucson, in Pima and Santa Cruz counties, Arizona and adjacent northern Sonora, Mexico. It is distributed at low densities within the Altar and Santa Cruz Valleys, as well as in low-lying areas connecting these valleys.



Figure 17. Pima pineapple cactus.

PPC populations are generally found in open patches within semidesert grassland and Sonoran desertscrub plant communities (Brown 1994). They are typically found on flat alluvial bajadas that are comprised of granitic material and are most abundant within the ecotone between the grassland and desertscrub biomes (Roller 1996). This plant is found at elevations between 2,362 ft (720 m) and 4,593 ft (1,400 m). PPC are not typically found in washes or riparian areas.

2.6c Critical Habitat

No critical habitat has been designated for this species.

2.6d Current Status Statewide

USFWS listed PPC as endangered throughout its range on 25 October 1993 (58 FR 49875). Habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution, plant species rareness, illegal collection and difficulties in protecting areas large enough to maintain functioning populations are factors that contributed to the current endangered status of this species. PPC densities vary throughout its range with the highest densities occurring south of Tucson through the Santa Cruz Valley (to the town of Amado and surrounding developed parts of Green Valley and Sahuarita, and parts of the San Xavier District of the Tohono O'odham

Nation). Continued urbanization, farm and crop development, mine expansion, and invasion of non-native species are primary threats to PPC populations. Overgrazing by livestock, illegal plant collection, and fire-related interactions involving non-native Lehmann's lovegrass may also have negative impacts on PPC (USFWS 1993b).

2.6e Environmental Baseline

The environmental baseline for PPC evaluates the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. Due to the limited information on PPC population distributions under current habitat conditions, it is difficult to determine the current status of the plant statewide. USFWS has insufficient data to determine if the majority of populations of PPC can be sustained under current reduced and fragmented conditions.

Based on monitoring results, the range-wide status of PPC appears to have been recently affected by threats that completely alter or considerably modify more than a third of the surveyed habitat and have caused the elimination of nearly 60 percent of documented locations (USFWS 2001c). Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to detrimentally impact PPC habitat.

The proposed project area is primarily undeveloped, contains existing electrical distribution lines and associated roads (Figure 14) and is in close proximity to low-density housing developments and the Mission Mine Complex.

Surveys for PPC were conducted using an approved survey protocol (Roller 1996) that established a belt transect across identified potential habitat with each surveyor covering a 16 ft (5 m) to 23 ft (7 m) swath. One survey pass of the entire corridor was conducted, with intensive searches around detected PPC individuals. Surveys on state, private, and BLM land covered a 200-ft (61 m) wide area centered on the proposed structure alignment. On the CNF, the coverage was expanded to 750 ft (229 m) wide. During surveys conducted between July 2002 and March 2003, 52 PPC were detected within the 125-ft (38.1 m) ROW between the TEP South Substation and the CNF boundary (HEG 2003, unpublished data). All detected PPC locations were recorded using a Global Positioning System (GPS) unit.

2.6f Effects of Proposed Action on the PPC

Direct Effects

Because the precise locations of structures and access roads can be modified to avoid sensitive resources, the proposed action will not result in the loss of any individual PPC. All known individuals of PPC near construction areas and along main access routes will be clearly marked and protected to avoid impacts.

Indirect Effects

Modification of Habitat

The construction of new access roads and the installation of structures will alter PPC seed sources in unoccupied, but potential, PPC habitat. Construction vehicles will compact soil, changing water infiltration rates, and road construction will dramatically alter soil structure and seed source depth. Disturbance of structure installation sites and many access roads will be temporary and will regenerate as potential PPC habitat in the future. Some recent observations indicate that PPC may readily establish in recently disturbed habitats (USFWS 2002d), but these areas must be allowed to recover for many years, even decades.

To determine the extent of proposed disturbance to PPC habitat, recent aerial photography was used to eliminate areas not suitable for PPC, including slopes over 15 percent, washes, and previously disturbed areas such as roads, buildings, mining disturbance, etc. Based on this analysis, the ROW was divided into habitat classes based upon density of PPC in each area. The habitat classes are as follows: Class A = 0.3 PPC/acre; Class B = 0.1 - 0.3 PPC/acre; Class $C = 0^* - 0.09$ PPC/acre.

The amount of permanent disturbance from access roads and pole locations was calculated for each habitat class and are presented below in Table 3. To mitigate for this potential loss of PPC habitat, TEP will purchase 36.45 credits in a USFWS-approved conservation bank for PPC.

Increased Legal and Unauthorized Access to PPC Habitat

Much of the proposed corridor through PPC habitat parallels existing electrical distribution lines with existing utility access roads; however, new access roads will be constructed, potentially resulting in unintended access into previously undisturbed PPC habitat, especially by OHV users. Off-road travel could directly impact additional PPC or impede seedling establishment through changes in soil characteristics.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). It is widely regarded that most succulent species are negatively impacted by fire and are not fire-adapted (Rogers and Steele 1980, McLaughlin and Bowers 1982). Plants die by direct heating of the fire, or later through indirect fire effects such as grazing of spineless plants, post-fire increase in plant tissue temperature, or the introduction of disease or infestation into weakened plants (Thomas 1991). The sparse distribution of this species across the landscape, however, can mean that loss of a few individuals to fire can greatly affect the range and density of local PPC populations.

However, new roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban

Table 3. Amount of PPC habitat disturbance and proposed mitigation for TEP's Sahuarita to Nogales Transmission Line - Western Corridor

Corridor										
		PPC Da	ta					Disturban	c e	
PPC Area as shown on map	Potential PPC habitat (acres) within each area	Total # PPC found during survey	# PPC in 125' ROW	Density (# in ROW/acres of potential habitat)	Habitat Quality Class	Length of new roads in each area	Acresof	# of structures in each area	A cres of disturbance from structures	Total Disturbance in each area
1	110.2	116	30	0.27	В	5.47 m i	7.96	59	0.034	7.994
2	37.9	12	4	0.11	В	2.02 m i	2.94	17	0.01	2.95
3	59.1	3	0	0 *	C	0.5 m i	0.73	30	0.017	0.747
4	48.1	0	0	0	D	0.42 m i	0.61	38	0.022	0.632
5	9.2	21	11	1.2	A	0.9 m i	1.31	5	0.002	1.312
6	68.8	11	6	0.09	C	5.26 m i	7.65	30	0.017	7.667
7	62.6	5	1	0.02	C	5.27 m i	7.67	38	0.022	7.692

Proposed Mitigation

1 10 po oca imitigation				
PPC Density	H abitat Q uality C lass	M itigation Ratio	Total acres of disturbance in category	Total mitigation bank credits
>0.31/acre	A	3:1	1.31	3.93
0.1 - 0.3/acre	В	1.5:1	10.94	16.41
0* - 0.09/acre	C	1:1	16.11	16.11
0/acre	D	0	0.632	N/A

TOTAL 36.45

^{* =} These areas have a 0/acre density, but PPC were found in the vicinity of the ROW .

1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.6g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Under Section 9 of the ESA, the taking of listed animals is specifically prohibited, regardless of land ownership status. For listed plants, these prohibitions and the protection they afford do not apply. Listed plant species are protected only from deliberate removal from federal lands. There is no protection against removal from, or destruction of, plants on private land under the ESA by a landowner.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). Because of growth rates and the development pressures of nearby Tucson and Sahuarita, Arizona, it is foreseeable that some lands adjacent to the proposed ROW will be developed. These developments will likely include increases in associated infrastructure such as roads, groundwater use, and commercial services, all resulting in the degradation of PPC habitat.

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase. Additionally, agricultural, recreation, OHV use, grazing, and other activities continue to occur on private and state lands and adversely affect PPC and its habitat.

2.6h Effects Determination

The disturbance of potential PPC habitat may affect, and is likely to adversely affect the species through hindering seedling establishment. The adverse affects to the species will be mitigated through the purchase of mitigation bank credits.

2.7a Action Area

The action area means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. In streams, the action area is often much larger than the area of the proposed action because impacts in the watershed may be concentrated in the stream and actions within the stream may be carried downstream well outside of the immediate project area. The action area for the Sonora chub is the entire Sycamore Canyon watershed.

2.7b Natural History and Distribution

The Sonora chub (Figure 18) is a stream-dwelling member of the minnow family (Cyprinidae) and can achieve total lengths of 7.8 in (200 mm) (Hendrickson and Juarez-Romero 1990). In the United States, it typically does not exceed 5 in (125 mm) (Minckley 1973), although specimens up to 6 in (150 mm) have been measured. The Sonora chub has 63 to 75 scales in the lateral line, and the scales bear radii in all fields. The mouth is inferior and almost horizontal. There typically are eight rays in the dorsal,



anal, and pelvic fins, although the dorsal fin can have nine (Miller 1945), and the anal and pelvic fins seven (Rinne 1976). The body is moderately chubby and dark-colored, with two prominent black bands above the lateral line and a dark, oval basicaudal spot. Breeding individuals are brilliantly colored (Miller 1945).

Figure 18. Sonora chub.

Sonora chub spawn at multiple times from spring through summer, most likely in response to flooding during the spring and summer rains (Henderickson and Juarez-Romero 1990). Although Sonora chub is regularly confined to pools during arid periods, it prefers riverine habitats. In lotic waters in Mexico, Henderickson and Juarez-Romero (1990) commonly found Sonora chub in pools less than 2 ft (0.61 m) deep, adjacent to or near areas with a fairly swift current, and over sand and gravel substrates. It was less common in reaches that were predominately pools with low velocities and organic sediments. Sonora chub are adept in exploiting small marginal habitats and can survive under severe environmental conditions. They can maneuver upstream past small waterfalls and other obstructions to colonize newly-formed habitats (Carpenter and Maughan 1993).

Based on collection dates of young-of-the-year (YOY), spawning occurs in early spring (Minckley 1973). Larval and juvenile Sonora chub were found in Sycamore Creek and in a tributary to Rio Altar in November, which indicated breeding was apparently not limited by season. Adults with breeding coloration were also taken during these periods (Hendrickson and Juarez-Romero 1990). In Sycamore Creek, adults with breeding colors were seen from April through September in 1990 and 1991. Larvae and juveniles 0.6 in (15mm) to 0.7 in (18 mm) were seen in April, May, and September (Carpenter 1992), suggesting that spawning occurred after the spring and summer rains. Bell (1984) also

noted young after heavy flooding and suggested that post-flood spawning is a survival mechanis. During spawning, Sonora chub broadcast eggs onto fine gravel substrates in slowly flowing water for hatching and development. There are no nests built, and no parental care given. Larvae use shallow habitats at pool margins where they feed on microscopic organisms and algae. As adults they can exploit shallow to deep pools, runs, and riffles as available. In 2000, multiple spawning in California Gulch was documented (USFS 2000).

Sonora chub respond to wet and dry cycles by expanding into riffles, runs, and pools during wet periods, and then shrinking back to deep pools as the stream dries. A substantial number of Sonora chub die when they become trapped in habitats that do not sustain perennial water during arid periods (Carpenter and Maughan 1993). Recolonization is dependent on individuals that survived the dry period. The species has an amazing capacity for reproduction and recruitment as its habitat expands. It can explode from a small number of individuals occupying a few pools to a population numbering in the thousands and occupying newly-wetted habitats in just a few weeks or months. The capability of the population to increase by several orders of magnitude within a few months is most likely an adaptation to the harsh climate and intermittent nature of southwestern riparian systems, which has allowed the Sonora chub to survive until present (Bell 1984).

2.7c Critical Habitat

Critical habitat was designated at the time of federal listing to include Sycamore Creek, extending downstream from and including Hank and Yank Spring, to the United Staes-Mexico border. Also designated was the lower 1.2 mi (2 km) of Peñasco Creek, and the lower 0.25 mi (0.4 km) of an unnamed stream entering Sycamore Creek from the west, about 1.5 mi (2.4 km) downstream from Hank and Yank Spring. In addition to the aquatic environment, critical habitat includes a 39.3 ft (12 m) wide riparian area along each side of Sycamore and Peñasco creeks. This riparian zone is essential to maintain the creek ecosystem and stream channels and the conservation of the species (USFWS 1986). The proposed action does not pass through designated Sonora chub critical habitat but is located approximately 1 mi (1.6 km) upstream of critical habitat.

2.7d Current Status Statewide

The Sonora chub was listed in the United States as threatened on 30 April 1986 (51 FR 16042) with critical habitat. The species is also listed by Arizona as a "species of special concern" (AGFD 1996), as a threatened species by the Republic of Mexico (Secretaria de Desarrollo Social 1994), and included on the Regional Forester's list of sensitive species (USFS 1999).

Sonora chub is locally abundant in Sycamore Canyon and has been found as far north in the canyon as Casita Spring (T. Newman, CNF, pers. comm. 13 May 2002), although the habitat is limited in extent (Minckley and Deacon 1968). In Mexico, it is found in the Magdalena and Altar rivers, where it is considered relatively secure (Henderickson and Juarez-Romero 1990). In 1995, Sonora chub were found in California Gulch (AGFD 1995a). The overall estimated current chub habitat is 10 mi (16.1 km) length of

Sycamore Creek and California Gulch, including a 39 ft (12 m) wide riparian area along each side of Sycamore and Peñasco creeks. A recovery plan was written in October 1992 (USFWS 1992).

Potential threats to Sonora chub are related to additional watershed developments, such as grazing, mining, road construction, and agricultural development, as well as predation by non-native vertebrates such as green sunfish (Minckley 1973) and bullfrogs (AGFD 1988). The green sunfish was the last non-native fish recorded in Sycamore Creek prior to 1989 (USFWS 1999b)

2.7e Environmental Baseline

The action area for this species lies within the Tumacacori EMA of the CNF. There is no authorized livestock grazing immediately adjacent to Sycamore Creek from the United Satates - Mexico border to the corrals north of Ruby Road. A livestock exclosure encompassing approximately 2,175 acres (880 ha) was completed around this area in 1998. Furthermore, roadways in Sycamore Canyon south of Ruby Road are closed to all vehicles, and Casita Spring, north of the corrals, is also fenced to exclude livestock. Both exclosures are periodically checked and maintained by CNF personnel. Violations of the road closure were recorded in 1999 and 2000 (CNF 2000).

The Sycamore Creek Watershed consists of 16,645 acres (6,737 ha) within the Tumacacori EMA and is in satisfactory condition. The Sycamore Canyon watershed lies within the Bear Valley allotment. This allotment is permitted for 350 cattle, but use of the area in 2002 was projected to be only 200 cattle. The range condition on the Bear Valley allotment is moderately high, but with an unknown trend.

CNF personnel have conducted 6 years of pool surveys in Sycamore Canyon to document trends that may indicate whether habitat for the Sonora chub is increasing, decreasing, or remaining static. These surveys record pool area index (surface area of pools per run) and presence/absence of Sonora chub within runs. In 2002 the pool index showed a 50 percent decrease from the previous five year average. The pool area index in 2001 was more than double the previous five year average.

Between 1997-2001, Sonora chub occupied most of the available pools. In 2002, the number of occupied pools was the lowest recorded during the six year period. This reduced occupancy may be because of smaller, shallower pools being available in 2002, and, thus, Sonora chub may have been killed by predation or some other factor, such as low oxygen levels, prior to the survey (T. Newman, CNF, pers. comm., 9 August 2002). Newman believes there are sufficient numbers of Sonora chub surviving in available pools to fill the available habitat once rains occur. Once pools are connected, Sonora chub move into the newly available habitat. The effect of movement can be most easily seen in the information on the Ruby Road upstream segment. Even though this is a short stream segment and only has a few pools, it has been occupied four of the six years covered by these surveys. Despite having no occupied pools for two years (1999 and 2000), when conditions improved in 2001, the majority of the pools were occupied.

2.7f Effects of Proposed Action on the Sonora Chub and Critical Habitat

Direct Effects

No direct effects to the Sonora chub are anticipated as a result of the proposed action because construction activities will not occur within occupied or potential Sonora chub habitat.

Indirect Effects

Modification of habitat

Indirect impacts to Sonora chub may result from modifications to habitat from the construction of access roads and installation of structures. The removal of vegetation for roads and structures will increase surface runoff and sediment transport, and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997). The use of roads by heavy equipment makes them less permeable because of compaction and crusting (Rostagno 1989). Compaction leads to reduced infiltration and an increase in the force of overland flow, which in turn leads to increased erosion.

Increased erosion could accelerate sedimentation of deep pools. As pools become shallower, water temperature rises. Warmer water temperatures may increase the impact of parasites or diseases within the chub population (USFWS 2001b). Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). High-energy overland water flow increases erosion and downcutting of streams, and can create damaging debris flows. While BMPs will minimize impacts, some increase in erosion into Casita Spring may occur during unusually large precipitation events because of the spring's proximity to construction areas.

Increased Legal and Unauthorized Access to Sonora Chub Habitat

No new roads are proposed within the Sycamore Canyon exclosure; however, new roads are proposed near potential Sonora chub habitat upstream of Ruby Road, including a road proposed 656 ft (200 m) north of Casita Spring. Future unauthorized access to closed roads in this area could damage riparian vegetation, compact soils, and increase siltation in pools and stream channels. Increased human access to these aquatic habitats also may lead to the introduction of non-native predators to streams and stock tanks or illegal killing or collection of Sonora chub. The monitoring and maintenance of road closures will minimize the probability of unauthorized access and thereby minimize any adverse effects associated with such access.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Roads constructed for the proposed action also may allow the establishment or increased density of non-native grasses, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Wildfires could remove groundcover that is important in dissipating rainfall energy and reducing erosion.

However, new roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.7g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Because the action area for this species is entirely on USFS land, all activities are subject to the consultation requirements established under Section 7 of the ESA, and, therefore, are not considered cumulative to the proposed action.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite being outside of occupied and potential chub habitat, an increase in regional population translates into an increased demand for recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.7h Effects Determination and Incidental Take

Effects to Species

The transport of sediments into Casita Spring and upper Sycamore Canyon may affect the Sonora Chub, and is likely to adversely affect the species.

No take of Sonora chub is anticipated for the following reasons: (1) no construction activities will occur within occupied streams, and (2) BMP erosion control measures will minimize sediment transport.

Effects to Critical Habitat

The proposed action may affect, but is not likely to adversely modify Sonora chub critical habitat because BMPs will be in place to minimize erosion and because alignment of the structures is approximately 1 mi (1.6 km) from Sycamore Creek and Hank and Yank Spring.

2.8a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Because of the large movements possible by the jaguar and historical records for the species in a variety of habitats, the action area for the jaguar considered for the proposed action includes most of western Santa Cruz and southern Pima counties.

2.8b Natural History and Distribution

Jaguars (Figure 19) are the largest species of cat now native to the Western Hemisphere. Jaguars are large muscular cats with relatively short massive limbs, a deep-chested body, and cinnamon-buff in color with many black spots. Its range in North America includes Mexico and portions of the southwestern United States (Hall 1981). A number of jaguar records are known for Arizona, New Mexico, and Texas. Additional reports exist for California and Louisiana. Records of the jaguar in Arizona and New Mexico have been attributed to the subspecies *Panthera onca arizonensis*. The type specimen of this subspecies was collected in Navajo County, Arizona, in 1924 (Goldman 1932). Nelson

and Goldman (1933) described the distribution of this subspecies as the mountainous parts of eastern Arizona north to the Grand Canyon, the southern half of western New Mexico, northeastern Sonora, and, formerly, southeastern California. The records for Texas have been attributed to another subspecies *P. o. veraecrucis*. Distribution of this subspecies was described by Nelson and Goldman (1933) as the Gulf slope of eastern and southeastern Mexico from the coast region of Tabasco, north through Vera Cruz and Tamaulipas, to central Texas. Swank and Teer (1989) indicated the historical range of the jaguar included portions of Arizona, New Mexico, and Texas. These authors consider the current range to be central Mexico through Central America and into South America as far as northern Argentina.



Figure 19. Jaguar.

Swank and Teer (1989) stated the United States no longer contains established breeding populations of jaguar, which probably disappeared from the United States in the 1960s. According to these authors, the jaguar prefers a warm tropical climate and is usually associated with water, and rarely found in extensive arid areas. Goldman (1932) believed the jaguar was a regular, but not abundant, resident in southeastern Arizona. Hoffmeister (1986) considered the jaguar an uncommon resident species in Arizona. He concluded that the reports of jaguars between 1885 and 1965 indicated a small but resident population once occurred in southeastern Arizona. Brown (1983a) suggested the jaguar in Arizona ranged widely throughout a variety of habitats from Sonoran desert scrub through subalpine conifer forest. Most of the records were from Madrean evergreen-woodland, shrub-invaded semidesert grassland, and along rivers.

Brown (1983a) presented an analysis suggesting there was a resident breeding population of jaguars in the southwestern United States at least into the 20th century. USFWS (1990) recognized that the jaguar continues to occur in the American southwest as an occasional wanderer from Mexico. Currently, breeding population of jaguar are unknown in the United States.

In Arizona, the gradual decline of the jaguar appeared to be concurrent with predator control associated with land settlement and the development of the cattle industry (Brown 1983a, USFWS 1990). Lange (1960) summarized the jaguar records from Arizona, and between 1885 and 1959 the reports consisted of 45 jaguars killed, six sighted, and two recorded by sign. Brown (1991) related that the accumulation of all known records indicated a minimum of 64 jaguars were killed in Arizona after 1900.

2.8c Critical Habitat

No critical habitat has been designated for this species.

2.8d Current Status Statewide

The jaguar was initially listed as endangered from the United States. - Mexico border southward to include Mexico and Central and South America (37 FR 6476, 1972; 50 CFR 17.11, August 1994). As a result of a petition, the jaguar was proposed as endangered in the United States (59 FR 35674; July 13, 1994). In a Federal Register notice dated 22 July 1997, the jaguar was listed as an endangered species in the United States (62 FR 39147).

The most recent records of jaguars in the United States are from Arizona. In 1971, a jaguar was taken east of Nogales and in 1986 one was taken from the Dos Cabezas Mountains. The latter reportedly had been in the area for about a year before it was killed. AGFD (1988) cited two recent reports of jaguars in Arizona. The individuals were considered to be transients from Mexico. One report (1987) was from an undisclosed location. The other report was from 1988, when tracks were observed for several days prior to the treeing of a jaguar by hounds in the Altar Valley, Pima County. An unconfirmed report of a jaguar at the Coronado National Memorial was made in 1991. In 1993, an unconfirmed sighting of a jaguar was reported for Buenos Aires National Wildlife Refuge. In March 1996, the presence of a jaguar was confirmed through photographs made in the Peloncillo Mountains of Arizona and New Mexico (Glenn 1996). AGFD reported a jaguar sighting in the Baboquívari Mountains in 1996, and in the fall of 1997, one was reported from the Cerro Colorado Mountains of southern A jaguar was recently documented (December 2001) in the Atascosa Mountains within about 2 mi (3 km) of the proposed action.

2.8e Environmental Baseline

The Tumacacori EMA is the location of recent reports of jaguars in the United States. This area continues to include the most likely habitat that will support the existence of jaguars in the United States. Many of the larger canyon bottoms in the Tumacacori EMA contain substantial cover and could act as travel corridors for dispersing jaguars. It is believed that all recent sightings of jaguars in Arizona are males dispersing north from

the northern most breeding population in Mexico in an effort to find unoccupied habitat (B. VanPelt, AGFD, pers. comm., 3 October 2002). Because no breeding pairs are thought to exist north of the United Sates-Mexico border, conservation of the Mexican population is vital to the future presence of jaguars in Arizona.

Under the leadership of AGFD and New Mexico Department of Game and Fish, a conservation agreement and strategy has been prepared to address the conservation of the jaguar in Arizona and New Mexico. This agreement established an interstate/intergovernmental Jaguar Conservation Team under a Memorandum of Agreement (MOA). This MOA has been signed by various state and federal cooperators and local and tribal governments with land and wildlife management responsibilities in the geographic area of concern. The Jaguar Conservation Agreement and Strategy serves as a mechanism for implementation of actions for the protection and conservation of the jaguar, while providing a template for the recovery of the species until a recovery plan is prepared and adopted.

The Conservation Agreement established procedures for reporting and evaluating jaguar sightings and compiling distribution and occurrence information, investigation of livestock depredation, evaluation of habitat suitability, development of education materials, and other activities. The Jaguar Conservation Agreement also provides for participation by interested private citizens and organizations. CNF grazing allotment permitees are participating in this process.

The December 2001 sighting mentioned earlier came from a remote camera operated under the direction of the Jaguar Conservation Team (S. Schwartz, AGFD, pers. comm., 17 September 2002). Currently, 14 remote cameras are positioned along the United States-Mexico border in an attempt to document movement of jaguars in and out of Arizona (J. Childs, Jaguar Conservation Team, pers. comm., 3 October 2002).

2.8f Effects of Proposed Action on the Jaguar

Direct Effects

Construction Noise and Activity

Because jaguars are primarily nocturnal, disturbance from construction activities, even in suitable dispersal habitat, is unlikely. The greatest likelihood of noise disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise disturbance will be widely distributed and relatively short term in any location. Any jaguar within the action area will likely avoid construction sites. The use of additional remote cameras to monitor the United States-Mexico border south of the proposed action also will minimize the possibility of construction activities affecting breeding jaguars.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Some studies have shown that a few large areas of low road density, even in a landscape of high average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Because construction activities within riparian corridors or other major canyons will be minimal and widely distributed, no adverse impacts to the composition or structure of jaguar movement corridors or fragmentation of habitat is anticipated. Furthermore, access and construction roads for the proposed action commonly are spurs off existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches.

While access roads and structure site construction could degrade the habitats of jaguar prey species, effects on the prey base are difficult to quantify. The primary jaguar prey species in Arizona is deer (*Odocoileus* spp.), which have relatively large home ranges. Road-avoidance behavior (up to distances of 300 ft [90 m] to 600 ft [180 m]) is common in large mammals (Lyon 1983), including those species that may serve as prey for jaguars. Because of the linear nature of the proposed action, impacts to deer habitat will be widely distributed and relatively minor in any single area.

Increased Legal and Unauthorized Access to Jaguar Habitat

Jaguars appear to be relatively tolerant of some level of human activity (B. VanPelt, AGFD, pers. comm., 3 October 2002) and have been documented using areas that have recreational and agricultural activities occurring on a regular basis. However, increased human access to potential jaguar habitat through the use of temporary proposed construction roads could reduce the quality of the habitat. The road closure techniques outlined in the SECTION 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, jaguars will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. The fire

prevention measures being developed for the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.8g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by jaguars occurs on USFS land in Santa Cruz County. Future federal actions on these lands will be subject to Section 7 consultation; these actions will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.8h Effects Determination and Incidental Take

Construction noise and activity associated with the proposed action may affect the jaguar, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration.

Because the proposed action is not likely to adversely affect the jaguar, no take is anticipated.

2.9a Action Area

The action area includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. In streams, the action area is often much larger than the area of the proposed action because impacts in the watershed may be concentrated in the stream and actions within the stream may be carried downstream well outside of the immediate project area. The action area for the Gila topminnow is the entire Santa Cruz River watershed.

2.9b Natural History and Distribution

The Gila topminnow (Figure 20) was originally described by Baird and Girard (1853) as *Heterandria occidentalis* from a specimen collected in 1851 from the Santa Cruz River near Tucson. It was redescribed by Hubbs and Miller (1941) as *Poeciliopsis occidentalis*. As with all species in the family Poeciliidae, the Gila topminnow exhibits sexual dimorphism. Both males and females are tan to olive-bodied and usually white on the belly. Scales of the dorsum are darkly outlined and the fin rays contain melanophores, although lacking in dark spots. Dominant sexually mature males are often blackened,



Figure 20. Gila topminnow

with some gold on the pre-dorsal midline, orange at the base of the gonopodium, and exhibits bright yellow pelvic, pectoral, and caudal fins (Minckley 1973). Females remain drab in coloration upon reaching maturity and throughout their life. All male poeciliids have a modified anal fin (gonopodium) used to fertilize the female internally.

Habitat requirements of *P. o. occidentalis* are broad. The species prefers shallow, warm, fairly quiet water; however, they can become acclimated to a much wider range of conditions. Both lentic habitats and lotic habitats with moderate current are easily tolerated. Temperatures from near freezing under ice to 98.6 degrees F (37 degrees C) have been reported, with a maximum tolerance of 109.4 degrees F (43 degrees C) for brief periods (Heath 1962). Gila topminnows can live in a wide range of water chemistries, with recorded pH values from 6.6 to 8.9, dissolved oxygen readings from 2.2 to 11 milligrams/liter (Meffe et al. 1983), and salinities from very dilute to sea water (Schoenherr 1974). The widespread historic distribution of Gila topminnows throughout rivers, streams, marshes, and springs of the Gila River Basin is evidence for their tolerance of these environmental extremes. One reestablished population (Mud Springs) survived for 16 years in a simple cement-watering trough before being moved.

Meffe et al. (1983) reported that topminnows can tolerate almost total loss of water by burrowing into the mud for 1-2 days. Preferred habitats contain dense mats of algae and debris, usually along stream margins or below riffles, with sandy substrates sometimes covered with organic mud and debris (Minckley 1973). Topminnows are usually found in the upper third of the water column and young show a preference for the warmest and shallowest areas (Forrest 1992). Simms and Simms (1992) found topminnows occupying pools, glides, and backwaters more frequently than marshes or areas of fast flow.

According to Schoenherr (1974), the spring-heads presently occupied by Gila topminnows are questionable as preferred habitat. Destruction of historically occupied habitats such as the marshes, sloughs, backwaters, and edgewaters of larger rivers and presence of non-native fish in such habitats that remain has undoubtedly forced Gila topminnow out of their preferred historic habitats and into the spring-heads and smaller erosive creeks we see them in today. Their tolerance of conditions in these habitats has allowed them to maintain populations with less impact from non-native fishes.

Gila topminnows are viviparous fish, meaning embryos grow and mature within the female and are born living. Eggs are fertilized internally through deposition of spermatophores (packets of sperm) into the female genital pore by the male gonopodium. Female Gila topminnow can store spermatozoa for several months, and may produce up to 10 broods after being isolated from males (Schultz 1961). Female Gila topminnows also exhibit superfetation in which 2 or more groups of embryos at different stages develop simultaneously. Females of the genus *Poeciliopsis* generally carry only 2 stages, although some P. o. occidentalis females have been shown to carry 3 stages for a few days when population densities are low. The mean interval between broods is 21.5 days (Schoenherr 1974). Brood size ranges from 1-31 dependent upon female standard length (SL) (Constantz 1974; Schoenherr 1974, 1977). Under optimum laboratory conditions, *Poeciliopsis* can produce 10 broods per year at intervals of 7 to 14 days (Schultz 1961). Sexual maturity can be attained as early as 2 months or as late as 11 months following birth, dependent upon the season of birth (Schultz 1961; Constantz 1976, 1979; Schoenherr 1974).

Breeding occurs primarily during January through August, but in thermally constant springs, young may be produced throughout the year (Heath 1962; Minckley 1973; Schoenherr 1974). During the peak of the breeding season up to 98 percent of mature females are pregnant (Minckley 1973). Dominant males turn black, defend territories, and court females. Smaller subordinate males do not turn black or defend territories. Instead, they take on a "sneaking" mating strategy where they attempt to mate with uncooperative females while the dominant male is busy elsewhere. Subordinate males have a longer gonopodium, which may have an adaptive benefit for this type of mating strategy (Constantz 1989). However, if the larger territorial males are removed, smaller males will become dominant, take on breeding coloration, and defend territories (Constantz 1975; Schoenherr 1977). Brood size and the onset of breeding in topminnows can be influenced by several factors including food abundance, photoperiod, temperature, predation upon the population, and female size. Increased food supply and larger female size are believed to contribute to the greater fecundity seen in topminnows from Monkey Spring canal compared with topminnows from Monkey Spring headspring (Constantz 1974, 1979; Schoenherr 1974, 1977). Sex ratios in stabilized populations nearly always favor females, varying from 1.5 to 6.3 per male (Schoenherr 1974).

Gila topminnows are opportunistic omnivorous feeders, having a gut length 1.5 to 2 times SL of the individual (Schoenherr 1974). They have weakly spatulate dentition characteristic of an omnivorous diet. Primary food items include detritus, vegetation,

amphipods, ostracods, insect larvae, and rarely, other fish (Schoenherr 1974; Gerking and Plantz 1980; Meffe et al. 1983; Meffe 1984).

Gerking and Plantz (1980) noted that Gila topminnows prefer to eat large prey, but prey sizes are limited by mouth size. Schoenherr (1974) observed that individual fishes in complex habitats with several food resources present will select and focus on different items. He suggested that variation in feeding among individuals prevents over-utilization of a single resource, thus enhancing survival potential of the species.

In the United States, this species currently occurs in the Gila River drainage, Arizona, particularly in the upper Santa Cruz River, Sonoita and Cienega creeks, and the middle Gila River. The Gila topminnow is restricted to 14 natural localities in Arizona. In Mexico, the species occurs in the Río Sonora, Río de la Concepción, and Santa Cruz River but are not listed under the ESA. Gila topminnows occupy a variety of habitats, including: springs, cienegas, permanent and interrupted streams, and margins of large rivers. Habitat alteration and destruction, and introduction of predatory non-native fish, (principally western mosquitofish [Gambusia affini]) is the main reason for decline of the Gila topminnow.

2.9c Critical Habitat

No critical habitat has been designated for this species.

2.9d Current Status Statewide

The United States population of the Gila topminnow was federally listed as an endangered species in 1967 (USDOI 1967). The original recovery plan for Gila topminnow listed 10 extant natural populations: Monkey Spring, Cottonwood Spring, Sheehy Spring, Sharp Spring, Santa Cruz River near Lochiel, Redrock Canyon, Cienega Creek, Sonoita Creek (presumably including localities above and below Patagonia Lake), Salt Creek, and Bylas Springs (USFWS 1984). Gila topminnows were also known from Middle Spring (also known as SII or Second Spring) on the San Carlos Apache Indian Reservation (Meffe et al. 1983). Middle Spring was considered part of the Bylas Springs complex in the earlier recovery plan.

Since 1984, Gila topminnows have been discovered or rediscovered at 4 additional locations: North Fork of Ash Creek in 1985 (Jennings 1987), Fresno Canyon in 1992, Santa Cruz River north of Nogales in 1994, and Coal Mine Canyon in 1996 (Weedman and Young 1997). However, Gila topminnow were last collected from the North Fork of Ash Creek in 1985 and from Sheehy Spring in 1987. They have also been very rare or absent during recent surveys (last 5 years) of Sonoita Creek above Patagonia Lake and Santa Cruz River near Lochiel. Mosquitofish are quite common in both areas. Topminnows were extirpated from 1 of the original 10 localities, Salt Creek, by mosquitofish (Marsh and Minckley 1990), but the stream was renovated and restocked with Gila topminnows from Middle Spring. Subsequently, mosquitofish were found in the stream and it was again renovated and restocked with topminnows from Bylas Spring. Thus, there are 14 naturally occurring localities (considering Sonoita Creek above and

below Patagonia Lake as 2 separate localities) currently known to support Gila topminnows in the United States.

Eleven of the naturally occurring locations currently supporting Gila topminnows are in the Santa Cruz River system: Redrock Canyon, Cottonwood Spring, Monkey Spring, upper Sonoita Creek, Fresno Canyon, Coal Mine Canyon, lower Sonoita Creek, Santa Cruz River north of Nogales, Cienega Creek, Sharp Spring, and the upper Santa Cruz River. The 2 remaining localities (Bylas Springs and Middle Spring) and Salt Creek are next to the Gila River on the San Carlos Apache Indian Reservation. Bylas Springs has been unsuccessfully poisoned twice to remove mosquitofish (Meffe et al. 1983; Brooks 1985; Marsh and Minckley 1990). Another attempt at renovation of Bylas Springs was done by USFWS Arizona Fishery Resource Office and has so far been successful. The population at Middle Spring was eliminated by lack of water during the summer of 1989, but was recently reestablished (following construction of additional pool habitat) with Gila topminnows from the original Middle Spring population held at Roper Lake State Park. Salt Creek has also been renovated and restocked with topminnows originally from Bylas Spring.

As part of past recovery actions, more than 200 Gila topminnow reintroductions or natural dispersals from reintroductions have occurred at 175 wild locations. For this count, a wild location refers to an area that does not have a mailing address, in contrast with a captive population that does (following Simons 1987). Eighteen wild populations remained in 1997, 17 of which are in historic range (Weedman and Young 1997). Seven of these populations are secure enough that they should persist into the foreseeable future. Minckley and Brooks (1985), Brooks (1985, 1986), Simons (1987), Bagley et al. (1991), Brown and Abarca (1992), and Weedman and Young (1997) describe the plight of reestablished and captive populations of Gila topminnows.

Gila topminnows also have been stocked into many captive locations for propagation or conservation. Twelve captive populations were known to persist in 1997. The following publicly maintained populations are large enough to provide individuals for reintroductions, although one is known to be mixed with topminnows from more than one natural population (Arizona-Sonora Desert Museum, Boyce-Thompson Arboretum (mixed), Dexter National Fish Hatchery and Technology Center, Roper Lake State Park, Arizona State University, and Hassayampa River Preserve).

2.9e Environmental Baseline

Gila topminnow currently occupy the Santa Cruz River in its perennial reaches, as far north as Chavez Siding Road. This reach of the river was also occupied by longfin dace (*Agosia chrysogaster*), desert sucker (*Catostomus clarki*), Sonora sucker (*Catostomus insignis*), green sunfish (*Lepomis cyanellus*), and mosquitofish as recently as 1997 (USFWS 2001d). No Gila topminnows occur on the Tumacacori EMA and there are currently no plans for reintroductions in any locations (CNF 2000; D. Duncan, USFWS, pers. comm., 1 October 2002).

2.9f Effects of Proposed Action on the Gila topminnow

Direct Effects

The effects of the proposed action on this species are not anticipated to include direct effects to individual Gila topminnow because no construction will occur within occupied habitat.

Indirect Effects

Habitat Modification

Some indirect impacts to Gila topminnow habitat from erosion are possible from the construction of the proposed action. While the removal of vegetation for construction of access roads will increase surface runoff and sediment transport, and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997), the implementation of BMPs will help control erosion. However, unusually large precipitation events may temporarily overwhelm BMPs and result in some increase in sediment transport. Nevertheless, the distance of the proposed action from the Santa Cruz River will minimize the amount of sediments reaching Gila topminnow habitat.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Roads constructed for the proposed action also may allow the establishment or increased density of non-native grasses, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Wildfires could remove groundcover that is important in dissipating rainfall energy and reducing erosion.

However, new roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action. Measures outlined in the Invasive Species Management Plan also will minimize the introduction or spread of invasive species that may facilitate fires.

2.9g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal land, the habitat with the

highest potential for occupancy by Gila topminnow occurs on private land in Santa Cruz County. Most future actions on private land will not be subject to Section 7 consultation.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of USFS lands.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.9h Effects Determination and Incidental Take

The transport of sediments into the Santa Cruz River may affect the Gila topminnow; however, any increase in sediments will be relatively small because of the distance of the proposed action from occupied habitat. Therefore, it is not likely to adversely affect the species.

Because the proposed action is not likely to adversely affect the species, no take of Gila topminnow is anticipated.

2.10 MEXICAN GRAY WOLF (Canis lupus baileyi) (Endangered)

2.10a. Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for Mexican gray wolf is found within portions of Santa Cruz County containing oak and pine/juniper savannas above 4,000 ft (1,200 m). Wolves may travel long distances during hunting expeditions, typically in an irregular circle 20 mi (34 km) to 60 mi (68 km) in diameter. The action area for the Mexican gray wolf considered for the proposed action includes all potential habitat and travel corridors in western Santa Cruz and southern Pima County.

2.10b. Natural History and Distribution

Mexican gray wolves (Figure 21) are the smallest and southernmost of the 5 subspecies of gray wolf in North America. The Mexican gray wolf is a large dog-like carnivore with a mixed brown, rust, black, gray, and white. This species has a distinct white lip line, chin, and throat. Adults weigh between 50-90 lbs (23-41 kg) (Hoffmeister 1986). The historic range was from southeastern Arizona, southwestern New Mexico, southwestern



Texas, and south through the Sierra Madre of Mexico. The Mexican gray wolf is the southernmost occurring most endangered subspecies in North America. This wolf is the last subspecies of gray wolf known to occur in the Arizona-New Mexico area. The last known naturally occurring specimen in the United States was found in New Mexico in 1970 (USFWS 2001d).

Figure 21. Mexican gray wolf.

Historically, Mexican gray wolf habitat was montane woodlands, presumably because of the favorable combination of cover, water, and prey availability. Most wolf collections came from pine, oak, and pinyon-juniper woodlands, and intervening or adjacent grasslands above 1,372 m (4,500 ft) (Brown 1983b). Wolves avoided desertscrub and semidesert grasslands, but wooded riparian corridors were probably used for travelling and hunting (Parsons 1996).

These are social animals in the dog family that live and travel in packs of 7 to 30 animals depending upon prey size and availability. Mexican gray wolves prey upon a variety of animals from mice and squirrels to deer and elk. Territory size can range from 30 (78 km²) to 500 mi² (1,295 km²) or more. Packs are led by a pair of dominant animals that control most of the breeding. Breeding season lasts from late winter to early spring, and the dominant female produces up to 6 pups for the pack. The wolves care for the pups communally.

During the late 1800s through the mid 1900s, extensive hunting, trapping, and poisoning efforts at local, state, and federal levels resulted in the extirpation of this species from the United States portion of its range. Reintroduction efforts of captive bred wolves are under way in the Blue Range Recovery Area of eastern Arizona and New Mexico. Fourteen packs have been released to date.

2.10c Critical Habitat

No critical habitat has been designated for this species.

2.10d Current Status Statewide

Mexican gray wolves were listed as endangered by the USFWS in 1976 (41 FR 17736) without critical habitat. In 1998, an experimental, non-essential population was designated for the southwest (63 FR 1763) and a reintroduction program was initiated. Eleven wolves from captive breed stock were reintroduced into the Apache National Forest in southeastern Arizona under the experimental, non-essential designation in an effort to re-establish the subspecies to a portion of its historic range. A Recovery Plan for this subspecies was completed in 1982 and revisions are currently in progress (USFWS 2001d).

Mexican gray wolf populations steadily declined in Arizona because of predator control programs and conflicts with livestock interests. Pressure to control wolves became a priority beginning in the 1920s when this subspecies was nearly eliminated from the state and prevention of wolves from entering from Mexico was undertaken. In 1921 and 1922, a reported 58 wolves were taken by trapping or poisoning in Arizona. By 1924, reported takings dropped to 29 and by 1936, to 5. After 1952, only 2 wolves were reported taken in Arizona, 1 in 1958 and another in 1960 (Hoffmeister 1986). Reports of Mexican gray wolves living in the wild in Arizona continued into the early 1970s (USFWS 1982).

Similar predator control programs in Mexico reduced populations and may have eliminated the wolf by the 1980s. Surveys conducted in Mexico in the early 1990s did not confirm Mexican gray wolf populations in the wild (Parsons 1996).

2.10e Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consideration.

The Tumacacori EMA contains some areas of montane and riparian woodlands that may serve as dispersal corridors for Mexican gray wolves. If wolf populations exist in the mountains of Sonora, these corridors may be used as hunting and dispersal corridors. There are currently no plans to reintroduce the Mexican gray wolf into southern Arizona and, because of the distance and fragmentation of intervening habitat, it is unlikely that current experimental populations in northern Arizona could disperse into Santa Cruz County.

2.10f Effects of Proposed Action on the Mexican Gray Wolf

Direct Effects

Construction Noise and Activity

Because the only wild populations of Mexican gray wolves in Arizona occur in the Apache National Forest, disturbance from construction of the proposed action, even in suitable dispersal habitat, is highly unlikely. In the event that populations of wolves exist in Mexico and could disperse into southern Arizona, the greatest likelihood of disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise or construction disturbance will be widely distributed and relatively minor in any single area.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Gray wolves (*Canis lupus*) in Wisconsin are limited to places with pack-area mean road densities of 0.7 mi/1 mi² (1.1 km/1 km²) or less (Mladenoff et al. 1995). Some studies have shown that a few large areas of low road density, even in a landscape of high average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Access and construction roads for the proposed action commonly are spurs from existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches. Furthermore, construction activities within montane woodlands, riparian corridors or major canyons will be minimal and widely distributed, resulting in negligible impacts to the composition or structure of Mexican gray wolf habitat.

Increased Legal and Unauthorized Access to Mexican Gray Wolf Habitat

Gray wolves experience negative interactions with humans and roads are a key facilitator (Thiel 1985). Increased human access to potential wolf habitat through the use of temporary proposed construction roads could reduce the quality of the habitat and human interactions may increase mortality (Mech 1973). The road closure techniques outlined in the SECTION 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, wolves will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining suppression strategies were used, both in firefighter access and because roads were

widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. Fire prevention measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.10g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by Mexican gray wolf occurs on USFS land in Santa Cruz County. Future federal actions will be subject to Section 7 consultation and will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area and results in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.10h Effects Determination and Incidental Take

Construction noise and activity associated with the proposed action may affect the Mexican gray wolf, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration.

Because the proposed action is not likely to adversely affect the Mexican gray wolf, no take is anticipated.

3.0 USFS SENSITIVE SPECIES

USFS special status species are plant and wildlife species that are of concern because their populations are declining in size. In a letter dated 25 April 2002, AGFD listed 40 USFS Sensitive species that are known to occur in the vicinity of the proposed corridor or may be expected to occur along the corridor if suitable habitat exists. The information listed in the letter was based on AGFD Heritage Data Management System. AGFD species abstracts and other literature also were reviewed for species' historical ranges and habitat preferences. While field reconnaissance surveys were conducted along the entire corridor, species-specific surveys were impractical because of ongoing drought conditions in the project area, therefore the potential presence of sensitive species was assumed in all areas containing potential habitat. The 40 USFS Sensitive species that may occur on or near the proposed Western Corridor are listed in Table 4.

TABLE 4. SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.				
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION		
Alamos Deer Vetch Lotus alamosanus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Arid Throne Fleabane Erigeron arisolis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Arizona Giant Sedge Carex ultra	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Arizona Metalmark Calephelis rawsoni arizonensis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Mitigation plantings of host species will reduce impacts. 		
American Peregrine Falcon Falco peregrinus anatum	No Impacts	Seasonal restriction will prevent disturbance to species within project area.		
Bartram's Stonecrop Graptopetalum bartramii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Beardless Chinch Weed Pectis imberbis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Species is adapted to disturbances. 		

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.				
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION		
Catalina Beardtongue Penstemon discolor	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Cave Myotis Myotis velifer	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona. 		
Chiltepine Capsicum annuum var.glabriusculum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Chihuahuan Sedge Carex chihuahuensis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Chiricahua Mountain Brookweed Samolus vagans	No Impacts.	No construction in perennial aquatic habitats.		
Five-Stripped Sparrow Aimophila quinquestriata	No Impacts.	Potential habitat and know occurrences are outside project area.		
Foetid Passionflower Passiflora foetida	No Impacts.	Known populations occur outside project area.		
Gentry Indigo Bush Dalea tentaculoides	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population may be impacted. Other viable populations occur outside of project area. 		
Giant Spotted Whiptail Cnemidophorus burti strictogrammus	No Impacts.	Known populations occur outside project area.		

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.				
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION		
Large-Flowered Blue Star Amsonia grandiflora	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Lowland Leopard Frog Rana yavapaiensis	No Impacts.	Known populations occur outside project area.No construction in perennial aquatic habitats.		
Lumholtz Nightshade Solanum lumholtzianum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Mexican Garter Snake Thamnophis eques megalops	No Impacts.	No construction in perennial aquatic habitats.Minimal impacts to riparian habitat.		
Mock-Pennyroyal Hedeoma dentatum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Nodding Blue-eyed Grass Sisyrinchium cernuum	No Impacts.	Known populations occur outside project area.		
Northern Gray Hawk Asturina nitida maxima	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Mitigation of riparian vegetation. Populations within Arizona appear stable. 		
Santa Cruz Beehive Cactus Coryphantha recurvata	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Santa Cruz Star Leaf Choisya mollis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Santa Cruz Striped Agave Agave parviflora ssp. parviflora	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Plants occur throughout Nogales Ranger District. Mitigation plantings of agave will reduce impacts. 		

COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION		
Seeman Groundsel Senecio carlomasonii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Sonoran Noseburn Tragia laciniata	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Southern Pocket Gopher Thomomys umbrinus intermedius	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Superb Beardtongue Penstemon superbus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Supine Bean Macroptilium supinum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	Pre-construction surveys will be conducted and, if necessary, mitigation measures will be coordinated with USFS personnel.		
Sweet Acacia Acacia smallii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Thurber Hoary Pea Tephrosia thurberi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Thurber's Morning-glory Ipomoea thurberi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Virlet Paspalum Paspalum virletti	No Impacts.	Known populations occur outside project area.		

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.				
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION		
Weeping Muhly Muhlenbergia xerophila	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Western Barking Frog Eleutherodactylus augusti cactorum	No Impacts.	Known populations occur outside project area.		
Western Yellow-billed Cuckoo Coccyzus americanus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		
Wiggins Milkweed Vine Metastelma mexicanum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Populations within Arizona appear stable. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. 		
Wooly Fleabane Laennecia eriophylla	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 		

3.1 PLANTS

Alamos deer vetch (*Lotus alamosanus*)

Alamos deer vetch is a perennial herb found in southern Arizona, and Sonora, Chihuahua, and Durango, Mexico. Within Arizona, this plant is found in Sycamore Canyon and the Pajarito Mountains of Santa Cruz County, and near Garden Valley in Maricopa County. This plant is considered a wetland obligate species that is restricted to stream banks in canyons at elevations ranging from 3,500 ft (1,067 m) to 5,500 ft (1,676 m) (AGFD 1999a). Within the Nogales RD, this plant occurs in the Sycamore Canyon and Peña Blanca Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

Population trends for Alamos deer vetch are unknown (AGFD 199a). The proposed transmission line may cross potential Alamos deer vetch habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, viable populations occur outside of the project area, including the Gooding RNA. There may be an impact to individual plants during development of the line; however, disturbance will be limited to a few individuals and is not likely to result in a trend toward federal listing or loss of viability.

Arid throne fleabane (*Erigeron arisolis*)

Arid throne fleabane is an annual to short-lived perennial forb that occurs in Arizona, southwestern New Mexico and Sonora, Mexico. Within Arizona, this plant is found in Apache, Cochise, Pima, and Santa Cruz counties. This species is typically found on moist rocky soils in grasslands, grassy openings within oak woodlands, and roadsides at elevations between 4,200 ft (1,280 m) and 5,500 ft (1,676 m) (AGFD 2000a). On the CNF Nogales RD, it has been documented from Box Canyon and Ruby Roads (T. Newman, CNF, pers. comm., 20 August 2002).

Arid throne fleabane favors moist areas in grasslands and grassy openings in oak woodlands, areas also favored by livestock for grazing (AGFD 2000a). The proposed transmission line parallels Ruby Road, a known location for this species. Placement of the transmission line may impact individual arid throne fleabane, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Arizona giant sedge (*Carex ultra*)

Arizona giant sedge is the largest sedge found in Arizona. Its range includes southeast Arizona, extreme southwest New Mexico (Hidalgo County, Indian Springs in the Pelocillos) and Mexico (Sonora and Coahila). Within Arizona, this sedge is found in Cochise, Graham, Pinal, Yavapai, Pima (Santa Rita Mountains and the Rincon Valley), and Santa Cruz counties (Santa Rita and Atascosa mountains). Typically only 1 patch per mountain has been found. Like other sedges, this plant is associated with moist soil

near perennial wet springs and streams and undulating rocky-gravelly terrain at elevations ranging from 2,040 ft (622 m) to 6,000 ft (1,829 m) (AGFD 2000b). Within the Nogales RD, Arizona giant sedge is found in Sycamore Canyon and Mule Ridge in the Atascosa Mountains, and at Deering Spring and Big Casa Blanca Canyon in the Santa Rita Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

Small populations of this sedge are vulnerable to local disturbance of aquatic or riparian habitat (AGFD 2000b). The proposed transmission line may cross potential Arizona giant sedge habitat; however, no construction will occur in perennial aquatic habitats and construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Bartram's stonecrop (*Graptopetalum bartramii*)

Bartram's stonecrop is a small succulent perennial found in southern Arizona and Chihuahua, Mexico (one record). In Arizona, this plant occurs in Santa Cruz County within the Patagonia, Santa Rita, and Tumacacori Mountains, in Pima County within the Baboquivari, Dragoon, and Rincon mountains, and in Cochise County within the Chiricahua Mountains. Habitat for Bartram's stonecrop consists of cracks in rocky outcrops within shrub live oak-grassland communities located on the sides of rugged canyons. This plant is usually found in heavy litter cover and shade where moisture drips from rocks at elevations ranging from 3,900 ft (1,189 m) to 6,700 ft (2,042 m) (AGFD 1997a). Bartram's stonecrop plants are found on the west side of the Nogales RD in Tres Amigos Gulch; Sycamore, Peña Blanca, Alamo, and Peñasco canyons; in the vicinity of Montana Peak and Peña Blanca Lake (T. Newman, CNF, pers. comm., 20 August 2002).

Bartram's stonecrop populations are typically small and isolated. Illegal collection of the plant is the main management issue at this time. Other factors that may affect populations include mining and mineral exploration, habitat alteration due to livestock grazing, trampling by cattle and recreationists, and road construction and maintenance. The proposed transmission line crosses over known Bartram's stonecrop populations within the Nogales RD. Placement of the transmission line may impact individual Bartram's stonecrop, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to Bartram's stonecrop are not likely to result in a trend toward federal listing or loss of viability.

Beardless chinch weed (*Pectis imberbis*)

Beardless chinch weed is a perennial herb that is found in southern Arizona, western Chihuahua and eastern Sonora, Mexico. Within Arizona, this plant can be found in Cochise, Pima, and Santa Cruz counties (within Santa Cruz County it is found along Ruby Road in the Atascosa Mountains and in the Red Rock area of Canelo Hills). Habitat for this species consists of open areas in grassland and oak-grassland

communities. Beardless chinch weed has an extremely broad habitat range and can be found at elevations from 4,000 ft (1,219 m) to 5,000 ft (1,524 m) (AGFD 1998a).

Populations of beardless chinch weed may be susceptible to impacts from grazing and road maintenance activities but the species is adapted to disturbances and grows along road cuts (AGFD 1998a). The proposed transmission line crosses over known beardless chinch weed populations within the Nogales RD. Placement of the transmission line may impact individual beardless chinch weed, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to beardless chinch weed are not likely to result in a trend toward federal listing or loss of viability.

Catalina beardtongue (Penstemon discolor)

Catalina beardtongue is a perennial herbaceous sub-shrub found in southern Arizona. This shrub is found in Cochise, Graham, Pinal, Pima (within the Santa Catalina Mountains), and Santa Cruz counties (within the Atascosa and Tumacacori mountains). Habitat for Catalina beardtongue consists of bare rock outcrops, barren soil outcrops, and bedrock openings in chapparal or pine-oak woodlands at elevations ranging from 4,120 ft (1,256 m) to 7,600 ft (2,316) (AGFD 1999b). On the Nogales RD, this shrub occurs in the upper end of Peck Canyon, Corral Nuevo, and the adjacent Bartalo Mountain (Cedar Canyon), typically on whitish volcanic ash (T. Newman, CNF, pers. comm., 20 August 2002).

Rock climbers threaten some populations of this plant but few other threats exist (AGFD 1999b). The proposed transmission line crosses over known Catalina beardtongue populations within the Nogales RD. Placement of the transmission line may impact individual Catalina beardtongue, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to Catalina beardtongue are not likely to result in a trend toward federal listing or loss of viability.

Chiltepine (*Capsicum annuum* var.*glabriusculum*)

Chiltepine is an herbaceous to woody perennial shrub that is found in south Texas, southern New Mexico, southern Arizona, and south to tropical America. Within Arizona, a few populations of this plant are found in the Chiricahua, Tumacacori, Baboquivari, and Ajo Mountains. This plant occurs in protected, frost-free canyons in oak woodlands of slopes at less than 4,500 ft (1,372 m) elevation (typically found at elevations ranging from 3,600 ft [1,097 m] to 4,400 ft [1,341 m]). Chiltepine plants grow under nurse shrubs and usually are associated with rock ledges and outcrops. Within the Nogales RD, there are populations in the Tumacacori Mountains and Cobre Ridge area, and there are suspected populations on the west side of the RD (AGFD 1991a; T. Newman, CNF, pers. comm., 20 August 2002).

This plant is declining in some areas because of drought, overgrazing, and local over-collection of berries (AGFD 1991a). Placement of the transmission line may impact individual chiltepine plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to chiltepine are not likely to result in a trend toward federal listing or loss of viability.

Chihuahuan sedge (*Carex chihuahuensis*)

Chihuahuan sedge is a grass-like perennial plant that occurs in southeastern Arizona, New Mexico (Hidalgo County), and Mexico (Sonora and Chihuahua). Within Arizona, this plant ranges from Cochise, Graham, Gila, Pima (Santa Catalina, San Luis, and Rincon mountains), and Santa Cruz counties (Atascosa and Santa Rita mountains, and the Santa Cruz River). Chihuahuan sedge can be found in wet soils along streambeds and in shallower draws of pine-oak forests and riparian woodlands. It also is found in wet meadows, cienegas, marshy areas, and canyon bottoms from 1,100 ft (335 m) to 8,000 ft) (AGFD 1999c). Within the Nogales RD, this plant has been found near Arivaca Lake (on private land), Sycamore Canyon, and south of Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement on the population status of Chihuahuan sedge (AGFD 1999c). The proposed transmission line may cross potential Chihuahuan sedge habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Chiricahua Mountain brookweed (Samolus vagans)

Chiricahua Mountain brookweed is a perennial herb found in southeastern Arizona, western Chihuahua, and eastern Sonora, Mexico. This plant apparently reaches its southern limit in southern Sonora, Mexico. Within Arizona, this species is found in the Huachuca Mountains of Cochise County, the Rincon, Santa Catalina, and Santa Rita mountains of Pima County, and the Canelo Hills and Pajarito mountains of Santa Cruz County. The Chiricahua Mountain brookweed is confined to areas with permanent water, such as springs, seeps, and in and along streams at elevations ranging from 1,219 to 2,195 m (4,000 – 7,200 ft) (AGFD 1999d). Within the Nogales RD, this plant occurs in Florida Canyon of the Santa Rita Mountains and in Sycamore Canyon of the Atascosa Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Chiricahua Mountain brookweed (AGFD 1999d). Because no construction will occur within perennial aquatic habitats, the proposed action will have no effect on the population status of the Chiricahua Mountain brookweed.

Foetid passionflower (Passiflora foetida)

The foetid passionflower is a herbaceous vine found in southeastern Texas and the Rio Grande Valley, southern Arizona, and southward throughout Mexico, Central and South America, and the West Indies. Within Arizona, this species is found in the Baboquivari Mountains, Arivaca, and Las Guijas Mountains of Pima County and in California Gulch and the Bartlett Mountains of Santa Cruz County. In Arizona, this plant occurs on hillsides and canyons of the Lower Sonoran zone from 1,067 to 1,707 m (3,500 – 5,600 ft) in elevation (AGFD 2000c). Within the Nogales RD, foetid passionflowers have been recorded in the California Gulch and Holden Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of foetid passionflower (AGFD 2000c). Because the known populations of this plant occur outside of the proposed TEP transmission line corridor, there will be no effect on the population status of the foetid passionflower.

Gentry indigo bush (*Dalea tentaculoides*)

The Gentry indigo bush is an herbaceous perennial shrub found primarily in southern Arizona, but its range may extend into Mexico. Within Arizona, this shrub was historically found in the Sycamore Canyon drainage of the Atascosa Mountains, in the Pajarito Mountains of Santa Cruz County, and within the Baboquivari Mountains (1930s record) and Mendoza Canyon (1965 record) of Pima County. A population currently exists in the Gooding Natural Area approximately 1 mile from the proposed action. Gentry indigo bush is typically found along canyon bottoms on cobble terraces subject to occasional flooding and seems to prefer disturbance-prone environments at elevations ranging from 1,097 to 1,341 m (3,600 – 4,400 ft) (AGFD 1998b). Historic collection records indicate that this plant may grow on rocky hillsides. Within the Nogales RD, this plant has been recorded in Sycamore Canyon, in the vicinity of Peñasco Canyon, Kaiser Canyon, and north of Manzanita Mountain (T. Newman, CNF, pers. comm., 20 August 2002).

Potential threats to Gentry indigo bush populations are cattle grazing (Gori et al. 1991), recreational foot traffic, and flooding events that eliminate terraces occupied by this species (AGFD 1998b). No direct impacts from the proposed TEP transmission line on Gentry indigo bush are anticipated. Indirect effects from increased erosion, increased risk of wildfire, or the introduction of nonnative species may impact individual plants, however, because of the distance of the project and the conservation measures (invasive species control, fire prevention plan, erosion control), only a small percentage of the population within the project area may be subject to potential impacts. Furthermore, populations of this species occur well outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Large-flowered blue star (*Amsonia grandiflora*)

The large-flowered blue star is an herbaceous perennial that is found in northern Sonora and Durango, Mexico, and southern Arizona. Within Arizona, this plant is found in the Patagonia, Atascosa/Pajarito mountains of Santa Cruz and Pima counties. Habitat for this

species consists of canyon bottoms in oak woodlands typically dominated by Emory oak and Mexican blue oak; however, site-specific qualities are inconsistent. Large-flowered blue star plants have adapted to rock fall disturbance and are typically found at elevations ranging from 1,189 to 1,372 m (3,900 4,500 ft) (AGFD 1998c). Within the west side of the Nogales RD, this plant occurs at Peña Blanca and Arivaca Lakes, Sycamore Canyon, Chiminea Canyon, California Gulch, and near Ruby (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of large-flowered blue star are rare, with only 15 to 20 populations within 2 mountain ranges as the total world distribution, but populations seem to be stable. This plant is highly susceptible to disturbance, and expanding development in the Nogales area (AGFD 1998c) may impact populations. The proposed TEP transmission line crosses near a known large-flowered blue star population in Peña Blanca Canyon, and some individual plants, comprising a small percentage of the total population, may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Lumholtz nightshade (Solanum lumholtzianum)

The Lumholtz nightshade is an herbaceous annual that is found in southern Arizona and northern Mexico. Within Arizona, this plant is found in the Arivaca and San Luis Mountains of Pima County and the Patagonia, Atascosa, and Santa Rita Mountains of Santa Cruz County. Lumholtz nightshade plants are typically found in washes and low ground near wet depressions and along stream banks from 914 to 1,402 m (3,000 – 4,600 ft) elevation in desert grassland plant communities. This plant is also often found in disturbed, weedy areas (AGFD 2000d). Within the Nogales RD, this nightshade is found in the vicinity of Arivaca, Ruby, California Gulch, Nogales, Cobre Ridge, and Oro Blanco Wash (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Lumholtz nightshade (AGFD 2000d). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mock-pennyroyal (*Hedeoma dentatum*)

The mock-pennyroyal is an herbaceous perennial plant found in southeastern Arizona and northern Sonora, Mexico. Within Arizona, this plant is found in the Chiricahua, Huachuca, Mule, Whetstone, and Winchester mountains of Cochise County, the Pinaleno Mountains of Graham County, the Baboquivari, Rincon, and Santa Cruz mountains of Pima County, and the Atascosa, Mustang, Pajarito, and Santa Rita mountains of Santa Cruz County. Habitat for this plant consists of oak woodland, oak-pine forest, and pine forest. It can be found on open roadcuts, steep rocky outcrops, and gravelly slopes in

wooded canyons with open to full sunlight at elevations ranging from 1,173 to 2,500 m (3,850 – 8,200 ft) (AGFD 2000e).

Populations of mock-pennyroyal seem to be restricted to a relatively small geographic area, and populations are apparently small. Because habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Nodding blue-eyed grass (Sisyrinchium cernuum)

Nodding blue-eyed grass is a perennial forb with grass-like leaves that occurs in southeastern Arizona, west Texas, and Mexico. Within Pima and Santa Cruz counties, Arizona it occurs in the Pajarito, Santa Rita, Atascosa, and Rincon mountains as well as Sycamore Canyon. This species can be found in desert grassland and pine-oak woodlands from 1,006 to 2,438 m (3,300 – 8,000 ft) in elevation along streams in partial shade and in canyon bottoms. It grows in wet soil by seeps, pools, or springs in desert scrub. It has also been found on sandy stream banks. On the Nogales RD, this plant has been found at 1,189 m (3,900 ft) in Sycamore Canyon on the west side and at 1,402 m (4,600 ft) in Big Casa Blanca Canyon in the Santa Rita Mountains (AGFD 1999e). The known location of this plant in Sycamore Canyon is within the Goodding RNA, located approximately 1.6 km (1 mi) west of the proposed ROW (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of nodding blue-eyed grass (AGFD 1999e). However, this species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD. The proposed transmission line will not cross over or near known locations of this plant within the Goodding RNA. Therefore, placement of the TEP transmission line from Sahuarita to Nogales will have no impact on the nodding blue-eyed grass.

Santa Cruz beehive cactus (*Coryphantha recurvata*)

The Santa Cruz beehive cactus is a succulent perennial that occurs in southern Arizona and northern Sonora (about 20 km [12.4 mi] south of the international border), Mexico. Within Arizona, this species occurs in western Santa Cruz County from Nogales and the Tumacacori Mountains west to the Atascosa/Pajarito mountains. Santa Cruz beehive cacti are found in alluvial soils of valleys and foothills in grassland and oak woodland habitats from 1,219 to 1,829 m (4,000 – 6,000 ft). These plants are either on rocky hillsides with high grass cover or in rock crevices where runoff accumulates and provides a more favorable moisture relationship than the surrounding soils (AGFD 1998d). Within the Nogales RD known plant locations have increased since 1997 (813 plant clumps in 1997, 807 plant clumps in 1998, and 175 in 1999) (T. Newman, CNF, pers. comm., 20 August 2002).

Accessible populations of the Santa Cruz beehive cactus have declined due to collection, but the status of populations beyond accessible areas is unknown (AGFD 1998d). The proposed TEP transmission line crosses over several known Santa Cruz beehive cactus populations within the Nogales RD. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz star leaf (Choisya mollis)

The Santa Cruz star leaf is a perennial shrub that occurs in southern Arizona within the Atascosa, Pajarito, and Tumacacori mountains of Santa Cruz County. Santa Cruz star leaf plants are found primarily within madrean evergreen woodland communities from 1,067 to 1,524 m (3,500 – 5,000 ft) in elevation. This plant is usually found in canyon bottoms and slopes, usually in the shade of oaks and other trees, or rock outcrops (AGFD 1999f). Santa Cruz star leaf plants have been found throughout the eastern portion of the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Santa Cruz star leaf are typically found in rugged and remote mountainous areas where human activity is low and the likelihood of disturbance or removal of plants is minimal. However, the species population trend is unknown and existing populations are relatively rare, have a restricted range, and are only found within specific habitats (AGFD 1999f). The proposed TEP transmission line will cross areas with known populations of Santa Cruz star leaf. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz striped agave (*Agave parviflora* ssp. *parviflora*)

Santa Cruz striped agave is a small perennial succulent found in southern Arizona and northern Mexico. Within Arizona, this species is found near Arivaca in Pima County, and in the Las Guijas, Pajarito, Patagonia, Santa Rita, and Atascosa mountains of Santa Cruz County. Habitat for this agave consists of rocky or gravelly slopes of middle elevation mountains, in desert grassland or oak woodlands. This plant appears to prefer soils on rounded ridge-tops where grasses and shrubs are sparse and soil is bare or nearly so (AGFD 1998e). Santa Cruz striped agave have been found throughout the Nogales RD (primarily within the Atascosa, Pajarito, San Luis, and Las Guijas mountains), and in recent years the documented number of individual plants and number of locations has increased for this area (T. Newman, CNF, pers. comm., 20 August 2002).

Some populations of Santa Cruz striped agave have declined due to illegal collection and loss of habitat due to mining and road construction. Livestock grazing has caused degradation of habitat and browsing of flower stalks (AGFD 1998e). The proposed TEP transmission line crosses areas with known populations of Santa Cruz striped agave and there may be an impact to individual plants during development of the line. Placement of

the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area and transplanting of agave plants in project area will minimize impacts. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Seeman groundsel (Senecio carlomasonii)

The seeman groundsel is a perennial herb or subshrub found in southern Arizona and Mexico (Sonora, Chihuahua, Nayarit). Within Arizona, this plant is found in the Chiricahua and Huachuca mountains of Cochise County, the Baboquivari and Santa Rita mountains of Pima County, and the Santa Rita, Pajarito, and Peña Blanca mountains of Santa Cruz County (AGFD 2000f). Within the Nogales RD, seeman groundsel have been recorded in the Peña Blanca Lake and Sycamore Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of seeman groundsel (AGFD 2000f). A potential threat to seeman groundsel habitat may be trampling by hikers. Placement of the proposed transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Sonoran noseburn (*Tragia laciniata*)

Sonoran noseburn is an herbaceous perennial that occurs in southern Arizona, Mexico (Sonora and Chihuahua), and possibly New Mexico. Within Arizona this plant can be found in Cochise County in the Huachuca Mountains and Canelo Hills, in Pima County in the Santa Rita Mountains, and in Santa Cruz County in the Atascosa Mountains (Sycamore Canyon), Patagonia Mountains, Pajarito Mountains, Canelo Hills (O'Donnell Canyon), and Santa Rita Mountains. Sonoran noseburn typically occur at elevations of 1,067 to 1,722 m (3,500 – 5,650 ft) along streams and canyon bottoms, on shaded hillsides within the upper parts of the Lower Sonoran and Upper Sonoran biotic communities, and open woodland areas (AGFD 2000g). This species has been found in canyons, along streams, and near roadways of the Nogales RD (AGFD 2000g).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Sonoran noseburn (AGFD 2000g). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Superb beardtongue (*Penstemon superbus*)

The superb beardtongue is a perennial herbaceous forb found in southeastern Arizona, New Mexico, and Mexico (Chihuahua). Within southern Arizona, this species is found in Pima County in the Santa Catalina and Santa Rita mountains, and in Santa Cruz County within the Tumacacori Mountains. This plant is generally found in rocky canyons, dry hillsides, and along washes in sandy or gravelly soils at elevations between 945 and 1,676 m (3,100 – 5,500 ft) (AGFD 2000h). Within the Nogales RD, it has been found in Rock Corral Canyon and Box Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of superb beardtongue (AGFD 2000h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Supine bean (*Macroptilium supinum*)

The supine bean is a perennial herb that grows in colonies and produces underground fruits. The total range for this species includes Santa Cruz County, Arizona, south into Mexico, including the states of Sonoran and Nayarit. Within Arizona, this plant can be found in the Atascosa/Pajarito, San Luis, and Patagonia Mountains, and the southern portion of the Santa Cruz River drainage in Santa Cruz County (much of this area is within the Nogales RD). Supine bean are typically found along ridge tops and gentle slopes of rolling hills in semi-desert grassland or grassy openings in oak-juniper woodlands at elevations between 1,097 and 1,494 m (3,600 – 4,900 ft) (AGFD 1999g).

There are currently an estimated 12 populations of this species in Arizona. Populations range from small (around 20 individuals) to relatively large (around 3,500 individuals). A 43% decline in a monitored population was recorded from 1989 to 1993. This decline was apparently due to low reproductive output and poor recruitment, although the reasons for these are unknown (AGFD 1999g). Possible threats to this species include degradation of habitat due to livestock grazing, off-road vehicle activity, recreation (camping and hiking), Border Patrol activities, utility corridor and road construction/maintenance, and home building (AGFD 1999g).

Because of the recent decline in monitored populations and drought conditions noted in 2002, additional surveys will be conducted prior to construction in potential supine bean habitat. If populations of this species are found in the vicinity of construction, consultation with USFS biologists will be initiated to minimize impacts. Development of the proposed TEP transmission line is likely to have an impact on this species. However, once additional surveys are completed, impacts are likely to be limited to individual plants and not whole populations. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Sweet acacia (Acacia smallii)

The sweet acacia is a woody perennial spiny shrub or small tree found in Texas, Arizona, and California south to Argentina. Within Arizona, this species is found in the Baboquivari Mountains of Pima County and Sycamore Canyon and Atascosa Mountains of Santa Cruz County. Sweet acacia are typically found in the lower slopes of canyons of riparian areas in desert grassland communities from elevations ranging from 1,067 to 1,219 m (3,500 – 4,000 ft) (AGFD 1992).

Population trends for the sweet acacia are unknown (AGFD 1992). The proposed TEP transmission line may cross potential sweet acacia habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Thurber hoary pea (Tephrosia thurberi)

The Thurber hoary pea is a perennial shrub that occurs in southern Arizona and Mexico (northern Sonora and southwestern Chihuahua). Within Arizona, this plant can be found in Cochise, Santa Cruz, and Pima counties. On the Nogales RD, Thurber hoary pea plants are found in the Santa Rita and Atascosa mountains. This species typically occurs on rocky slopes among oaks, pines, junipers, manzanitas, open hilltops, and grasslands at elevations between 1,067 and 2,134 m (3,500 – 7,000 ft) (AGFD 1999h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber hoary pea (AGFD 1999h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Thurber's morning-glory (*Ipomoea thurberi*)

Thurber's morning-glory are perennial herbaceous vines that are found in southern Arizona and Mexico (Chihuahua and Sonora). Within Arizona, this plant is found in the Huachuca and Mule Mountains of Cochise County, the Santa Rita Mountains of Pima County, and in the vicinity of Nogales, the Canelo Hills, and the Patagonia and Atascosa/Pajarito mountains of Santa Cruz County. Habitat in Arizona typically consists of rocky hillsides and canyon slopes in madrean evergreen woodland and semi-desert grassland communities in elevations between 1,158 and 1,570 m (3,800 – 5,150 ft) (AGFD 2000i). On the Nogales RD, this morning glory has been found in the vicinity of Peña Blanca Lake, east of Peñasco Canyon, and Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber's morning-glory (AGFD 2000i). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Virlet paspalum (*Paspalum virletti*)

The virlet paspalum is a perennial grass found in southeastern Arizona and Mexico (Sonora and San Luis Potosi). Within Arizona, this grass is found in the Huachuca Mountains of Cochise County, and in the Pajarito Mountains and Sycamore Canyon of Santa Cruz County. This grass is found in sandy soils of canyon bottoms in semi-desert grassland communities and grassy areas within madrean evergreen woodland communities at elevations ranging from 1,067 to 1,737 m (3,500 – 5,700 ft) (AGFD 1999i). In the Nogales RD, the only known location for this grass is in Sycamore Canyon growing in a sandy canyon bottom (T. Newman, CNF, pers. comm., 20 August 2002).

This species is rare in Arizona, where it is known from only 2 widely separated populations. There is no information on the potential effects of land use activities, such as utility placement, on the population status of virlet paspalum (AGFD 1999i). Known locations of this plant occur outside of the proposed TEP transmission line corridor; therefore, placement of the line is not likely to impact the virlet paspalum.

Weeping muhly (Sycamore Canyon muhly) (Muhlenbergia xerophila)

Weeping muhly is a perennial herbaceous grass found only in southern Arizona. Populations occur in the Santa Catalina, Rincon, Santa Rita, Tumacacori, and Baboquivari mountains of Pima County, and in Sycamore Canyon within the Pajarito Mountains of Santa Cruz County. Weeping muhly most often grow in crevices of cliffs, bedrock, and other rocks along canyon bottoms. This grass is also known from rocky canyon slopes in oak, pine-oak, and riparian woodlands at elevations between 1,073 and 1,829 m (3,520 – 6,000 ft) (AGFD 1999j).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of weeping mully (AGFD 1999j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wiggins milkweed vine (*Metastelma mexicanum*)

Wiggins milkweed vine is a perennial herbaceous vine with a woody base found in southeastern Arizona to southern Sonora, Mexico. Within Arizona, this vine occurs around the Nogales and Ruby areas, Sycamore Canyon area, and Patagonia Mountains of Santa Cruz County, and Baboquivari, Coyote, and Catalina mountains of Pima County.

This vine is typically found on open slopes within open oak woodland on granite soils of juniper flats at elevations between 1,067 and 1,554 m (3,500 - 5,100 ft) (AGFD 2000j). Wiggins milkweed vine has been found in several locations within the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of Wiggins milkweed vine within Arizona appear to be stable. This vine depends on surrounding vegetation for microhabitat and will be affected by any disturbance to area habitat (AGFD 2000j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wooly fleabane (*Laennecia eriophylla*)

Wooly fleabane is a perennial herb found in southeastern Arizona and northern Mexico (Sonora and Chihuahua). In Arizona, wooly fleabane occurs in the Atascosa Mountains, Pajarito Mountains, Santa Rita Mountains, Canelo Hills, and in the vicinity of Sonoita Creek in Santa Cruz County. This species is typically found in gravelly soil of rocky slopes and ridges with dense grass cover in semi-desert grassland, dry oak woodland, and pine-oak woodland communities at elevations between 1,292 and 1,722 m (4,240 – 5,650 ft) (AGFD 1999k). There are known locations of wooly fleabane in the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Population sizes of this plant are usually very small, with typically no more than 40 plants found in any of the populations known from Arizona. Population numbers fluctuate with the amount and timing of summer rains from year to year. This species was probably more common before its habitat was altered by excessive grazing (AGFD 1999k). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

3.2 INVERTEBRATES

Arizona metalmark (Calephelis rawsoni arizonensis)

The Arizona metalmark is a small, brown butterfly with bands of blue metallic markings on the upper and underside of the body. This butterfly occurs in Arizona, and from the Animas Mountains in southwestern New Mexico southward to Sonora, Mexico. The southern limits of its range are poorly defined to date. In Arizona, this species is known from as far north as Gila County then southward through Graham, Cochise, Pima, and Santa Cruz counties in most of the mountains therein. Arizona metalmark butterflies occur mostly above the desert floor in mountain foothills. Within these mountains, it is found in riparian canyons in oak woodland or more arid regions at elevations from 716 to 1,676 m (2,350 – 5,500 ft). Canyons with standing water for a major portion of the year

appear to contain populations of this species as long as *Agave* spp. are present for larvae development (AGFD 2001a). There is no information on the potential effects of land use activities, such as utility placement, on the population status of Arizona metalmark (AGFD 2001a).

Placement of the transmission line may indirectly impact individuals of this species through habitat modification, however because the species is widely distributed across southern Arizona, only a small percentage of Arizona metalmarks may be impacted. Furthermore, transplanting of agave plants also will minimize impacts. Impacts are not likely to result in a trend toward federal listing or loss of viability.

3.3 BIRDS

American peregrine falcon (Falco peregrinus anatum)

The American peregrine falcon subspecies is a medium-sized raptor that nests from central Alaska south to Baja California, Sonora, and the highlands of Central Mexico. Within Arizona, this raptor breeds wherever sufficient prey is available near cliffs. These raptors are rare or absent as breeders in the southwestern quarter of Arizona. Optimum habitat for peregrine falcons consists of steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats supporting avian prey species in abundance. These raptors may also be found in less optimal habitat consisting of small broken cliffs in ponderosa pine forests or large sheer cliffs in very xeric areas. The presence of an open expanse is critical. American peregrine falcons can be found at elevations ranging from 122 to 2,743 m (400 – 9,000 ft) (Glinski 1998, AGFD 1998f). Peregrine falcon nests were found on Ramanote Peak and along Sycamore Canyon (CNF 2000). Both these nests are at least 1.6 km (1 mi) from the proposed ROW. In 2002, another nest was found on Castle Rock, which is within the MSO PAC and within 0.3 km (0.18 mi) of proposed structures. The seasonal restrictions in effect for MSO (SECTION 1.4) will prevent breeding season disturbance of peregrines on Castle Rock.

American peregrine falcons have been found in great numbers in Arizona as well as in areas that will have formerly been considered marginal habitat. This trend suggests that populations in Arizona may have reached levels saturating the optimal habitat available (AGFD 1998f). Placement of the proposed transmission line is not likely to disturb known nesting peregrine falcons. If new nest sites are encountered during construction, conservation measures will be developed in coordination with CNF biologists to prevent adverse effects. Development of the TEP line is not likely to result in a trend toward federal listing or loss of viability of this species.

Five-stripped sparrow (Aimophila quinquestriata)

The five-stripped sparrow is found in western portions of northern Sinaloa and Sonora, Mexico and the southeastern most portions of Arizona. This sparrow is primarily found in Mexico, but its range reaches into southeastern Arizona. Here, it is rarely found during breeding season, and there are only a few winter records. Five-stripped sparrow habitat is highly specialized, consisting of tall, dense shrubs on rocky, semi-desert hillsides and canyon slopes (New Mexico Game and Fish Department and the Fish and Wildlife

Information Exchange 2000). Within the Nogales RD, this sparrow has been recorded within Sycamore Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of five-stripped sparrow have declined because of habitat loss, fragmentation, and degradation (New Mexico Game and Fish Department and the Fish and Wildlife Information Exchange 2000). The proposed TEP transmission line will not cross Sycamore Canyon where these sparrows have been observed. This species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD.

Northern gray hawk (Asturina nitida maxima)

The gray hawk is a medium-sized raptor with a gray back, black tail with 2 or 3 white bands, and a finely barred gray and white chest, abdomen, and thighs (Glinski 1998). The gray hawk prefers Sonoran riparian deciduous forest and woodland plant communities and can be found along the Santa Cruz and San Pedro rivers, Sonoita Creek, and Sopori Wash. This species also has been reported from the Hassayampa and Salt rivers. This hawk species is migratory and usually arrives in Arizona in mid-March and returns south during winter months (AGFD 2000k). Gray hawks prefer cottonwood, mesquite, and hackberry woodlands with a prey base of lizards, especially the whiptail lizard (*Cnemidophorus* spp.).

The current population trend for gray hawks is considered stable by the AGFD (2000k). Potential nesting habitat exists along small portions of the proposed TEP transmission line corridor along Sopori Wash. Individual gray hawks may be indirectly impacted by habitat modification from construction activity related to transmission line placement; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, riparian plants within Sopori Wash will be mitigated to facilitate habitat recovery. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)

The western yellow-billed cuckoo is a long and slender bird with short, dark legs that nests from southern California through the northeastern United States, south through the United States to the Florida Keys, Central America and southern Baja California, Mexico. This species winters from South America to central Argentina and Uruguay. Within Arizona, western yellow-billed cuckoo are found in southern and central Arizona and the extreme northeast portion of the state. This species is typically found in streamside areas with cottonwood, willow groves, and larger mesquite bosques (AGFD 1998g). This species has been observed in Sopori Wash and Sycamore, Peck, and Peña Blanca canyons (AGFD 1998g; CNF 2000; P. Titus, T. Furgason, SWCA, pers. comm.16 October 2002).

Populations of western yellow-billed cuckoo have been reduced; a general decline is occurring in all areas with known populations (AGFD 1998g). This species is sensitive to habitat fragmentation and degradation of riparian woodlands due to agricultural and residential development (Hughes 1999). The proposed transmission line may cross

potential cuckoo habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

3.4 REPTILES AND AMPHIBIANS

Giant spotted whiptail (*Cnemidophorus burti strictogrammus*)

The giant spotted whiptail is a long, slender lizard found in southeastern Arizona, extreme southwest New Mexico, and northern Sonora, Mexico. Within southeastern Arizona, this lizard is found in Cochise County; the Santa Catalina, Santa Rita, Baboquívari, and Pajarito mountains and in the vicinity of Oracle in Pima County; and in Pinal County. Giant spotted whiptail lizards inhabit mountain canyons, arroyos, and mesas in arid and semi-arid regions, entering lowland deserts along stream courses. They are found in dense shrubby vegetation, often among rocks near permanent and intermittent streams at elevations ranging from near sea level to 1,372 m (4,500 ft). Open areas of bunch grass within these riparian habitats are also occupied (AGFD 2001b).

Giant spotted whiptail populations are thought to be stable and some populations are locally abundant even though this species is limited in distribution (AGFD 2001b). Because the known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the giant spotted whiptail.

Lowland leopard frog (*Rana yavapaiensis*)

The lowland leopard frog is found in low elevations in the drainage of the lower Colorado River and its tributaries in Nevada, California, Arizona, New Mexico, northern Sonora and extreme northeast Baja California, Mexico (probably extirpated from California and Nevada). Within Arizona, this frog has been found in the Virginia River drainage in the extreme northwestern part of the state, in the Colorado River near Yuma, and west, central, and southeast Arizona south of the Mogollon Rim. This frog frequents desert, grassland, oak, and oak-pine woodland in permanent pools of foothill streams, rivers, and permanent stock tanks. They typically stay close to water at elevations ranging from 244 to 1,676 m (800 – 5,500 ft) (AGFD 1997b). Within the Nogales RD, this frog has been recorded in Pesquiera and Alamo canyons, California Gulch, Adobe, Temporal Gulch, Big Casa Blanca, Box Canyon, and Gardner Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Lowland leopard frog populations are considered stable in central Arizona but declining in southeast Arizona, and populations have been extirpated from southwestern Arizona. Potential threats to this species are manipulation to major watercourses, water pollution, introduced species (fish, bullfrogs, and crayfish), heavy grazing, and habitat fragmentation (AGFD 1997b). Because no construction will occur within perennial aquatic habitats and known populations occur outside project area, the proposed

transmission line will have no significant effect on the population status of the lowland leopard frog.

Mexican garter snake (*Thamnophis eques megalops*)

The Mexican garter snake ranges from southeastern Arizona and extreme southwestern New Mexico, southward into the highlands of western and southern Mexico, to Oaxaca. Within Arizona, this snake occurs in the southeast corner of the state from the Santa Cruz Valley east and generally south of the Gila River. Valid records (post 1980) have recorded this snake in the San Rafael and Sonoita grasslands area and from Arivaca. Mexican garter snakes are most abundant in densely vegetated desert grassland habitat surrounding cienegas, cienega-streams, stock tanks, and in or near water along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. This snake is generally found at elevations ranging from 914 to 1,524 m (3,000 – 5,000 ft) but may reach elevations of 2,591 m (8,500 ft) (AGFD 2001c).

Populations of Mexican garter snakes are decreasing, with extirpations at several localities since 1950 as habitat has changed and introduced predators have invaded. Management concerns for this species include predation by introduced bullfrogs and predatory fishes, urbanization and lowered water tables, and habitat destruction, including that due to overgrazing (AGFD 2001c). Because no construction will occur within perennial aquatic habitats and construction within riparian habitats will be minimized, the proposed transmission line will have no significant effect on the population status of the Mexican garter snake.

Western barking frog (*Eleutherodactylus augusti cactorum*)

The western barking frog is a secretive terrestrial frog found in extreme southern Arizona, southeast New Mexico, and central Texas south to the Isthmus of Tehuantepec. In Arizona, this frog historically occurred in Pima and Santa Cruz counties within the Santa Rita and Pajarito mountains. Habitat consists of rocky hillsides of canyons in woodland vegetation at elevations between 1,158 and 2,134 m (3,800 – 7,000 ft). Permanent water is not a necessary component of western barking frog habitat. There are very few records of this species in Arizona, and none have been recorded within the Nogales RD (AGFD 1995b).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of western barking frogs (AGFD 1995b). Because known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the western barking frog and is not likely to result in a trend toward listing or loss of viability.

3.5 MAMMALS

Cave myotis (*Myotis velifer*)

The cave myotis is a large bat found in the southwestern half of Arizona and the immediate adjacent parts of California, Nevada, New Mexico, and the northern third of Sonora, Mexico. Within Arizona, this bat is found south of the Mogollon Plateau from

Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation, and the Chiricahua Mountains south to Mexico. Cave myotis have not been recorded in the extreme southwestern part of the state and are found in small numbers in southeastern Arizona in the winter. This bat typically prefers desertscrub habitats of creosote, brittlebush, paloverde, and cacti but they sometimes can be found up in pine-oak communities. Cave myotis roost in caves, tunnels, mineshafts, under bridges, and sometimes buildings within a few kilometers of a water source (AGFD 1997c).

Cave myotis colonies are vulnerable at the roost sites, especially maternity roosts, because the congregate in large numbers (AGFD 1997c). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the cave myotis.

Southern pocket gopher (*Thomomys umbrinus intermedius*)

The southern pocket gopher is a small gopher found in extreme southeastern Arizona and southwestern New Mexico, south into Mexico. Within Arizona, this gopher is found primarily in the southern most portion of the state in the oak belt of the Santa Rita, Patagonia, Atascosa, Pajarito, and Huachuca mountains. Southern pocket gophers have been found at Peña Blanca Spring in gravelly soil along a broad wash. Elsewhere, this species is generally found on rocky slopes within open oak woodlands in the lower parts of mountain ranges from 1,372 to 2,743 m (4,500 – 9,000 ft) in elevation. There has been only 1 record for the southern pocket gopher within the Nogales RD, specifically at Peña Blanca Canyon in the Atascosa/Pajarito mountains. However, it is suspected that this species has a much wider range (AGFD 1998h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of southern pocket gopher (AGFD 1998h). Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.0 BLM SENSITIVE SPECIES

Criteria for BLM Sensitive species include those that are:

- 1. Under status review by the USFWS, or
- 2. Whose numbers are declining so rapidly that Federal listing may become necessary, or
- 3. With typically small and widely dispersed populations,
- 4. Those inhabiting ecological refugia or other specialized or unique habitats.

The potential impacts to BLM Sensitive species were determined based on the habitat conditions within the BLM lands crossed by the proposed action, the life history of the species, and the proposed construction methods. Only those species that have a potential of occurring on or near the BLM parcel were evaluated. The 13 BLM Sensitive species evaluated were identified in the BLM Sensitive species list for Arizona (Instruction Memorandum No. AZ-2000-018) dated 21 April 2000 and are listed in Table 5.

TABLE 5. SUMMARY OF EFFECTS ON BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Balloonvine Cardiospermum corindum False grama Cathestecum erectum brevifolium	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability. May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Tumamoc globeberry Tumamoca macdougalii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Loggerhead shrike Lanius ludovicianus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southern Arizona.
Rufous-winged sparrow Aimophila carpalis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

TABLE 5 (CONTINUED).	SUMMARY OF EFFECTS ON I	BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Western burrowing owl Athene curnicularia hypugea	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southwestern U.S.
Texas horned lizard Phrynosoma cornutum	No Impacts.	Known populations occur outside project area.
Big free-tailed bat Nyctinomops macrotis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
California leaf-nosed bat Macrotus californicus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Fringed myotis Myotis thysandodes	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Pocketed free-tailed bat Nyctinomops femorosaccus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Spotted bat Euderma maculatum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Underwood's mastiff bat Eumops underwoodi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.

4.1 PLANTS

Balloonvine (Cardiospermum corindum)

This perennial vine is widely distributed in tropical and subtropical regions and is known from the Coyote Mountains in Pima County (Kearny and Peebles 1960). Because potential habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

False grama (*Cathestecum erectum* (*brevifolium*))

False grama is a perennial, drought-tolerant grass found on dry hills and plains of Southern Arizona and Northern Mexico. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Tumamoc globeberry (Tumamoca macdougalii)

This perennial vine occurs in shade of nurse plants along sandy washes below ~914 m (3,000 ft) in elevation. The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

4.2 BIRDS

Loggerhead shrike (*Lanius ludovicianus*)

The loggerhead shrike occurs in open country with scattered trees and shrubs, savanna, desertscrub and occasionally open woodland (AGFD 2002). In Arizona, this species usually summers throughout open parts of the state below the Transition Zone and is also periodically found along the Mexican border west of Baboquívari Mountains (Phillips et al. 1983). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Rufous-winged sparrow (Aimophila carpalis)

The rufous-winged sparrow is classified as a migratory bird and is a resident of eastern Pima County, including Avra Valley, and was once thought to be extirpated in Arizona due to overgrazing but was rediscovered in the Tucson Area in 1936. Rufous-winged sparrows generally use habitats characterized by scattered low shrubs and trees, which provide cover and foraging areas during mid-summer days. Many of these areas contain significant grassland components. Threats to the species include urban development, overgrazing, and exotic species, all of which result in losses of grassland communities utilized by this species (Pima County 2001). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western burrowing owl (Athene cunicularia hypugea)

The Western burrowing owl inhabits heavily grazed tracts of mixed-grass prairie, particularly where there are burrows created by large rodents, such as prairie dogs and Richardson ground squirrels. Distribution extends from southern Canada through the western United States to South America. Arizona is 1 of 3 states that provide important wintering areas for this species (USGS 2003). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout the southwestern United States. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.3 REPTILES AND AMPHIBIANS

Texas horned lizard (*Phrynosoma cornutum*)

The Texas horned lizard occurs from Kansas to extreme southeastern Arizona and lives mainly in sandy areas of deserts, grasslands, prairies, and scrublands (Bartlett and Bartlett 1999) where it often inhabits abandoned animal burrows (Bockstanz 1998). Because known populations occur outside of the project area, the proposed transmission line will have no significant effect on the population status of this species.

4.4 MAMMALS

Big free-tailed bat (*Nyctinomops macrotis*)

Distribution of the big free-tailed bat occurs from the southwestern United States southward through the Caribbean, Central America, and into the northern part of South America. Northern populations are known to migrate to southern Arizona and Mexico in the fall, yet this species is widely scattered throughout Arizona during the spring and summer too. In Arizona, this bat has been found in pinyon-juniper, Douglas-fir, and Sonoran desertscrub habitats, but it is believed that these locations are foraging sites. Preferred roosting sites include rock crevices and fissures of mountain cliffs in rugged,

rocky areas of desertscrub habitat (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the big free-tailed bat.

California leaf-nosed bat (Macrotus californicus)

Distribution of the California leaf-nosed bat in the United States spans southern California, southern Nevada, and southwestern Arizona and extends southward into Mexico, to the southern tip of Baja California, northern Sinaloa, and southwestern Chihuahua. This bat lives predominantly in Sonoran and Mohave desertscrub habitats, but is occasionally found in the Chihuahuan and Great Basin deserts. Daytime roosting sites are usually mines and caves, and nighttime roosts include open buildings, cellars, bridges, porches, and mines. These bats do not hibernate or migrate; therefore, they tend to live in the same area year after year and remain active year-round (AGFD 1993, 2001d; Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the California leaf-nosed bat.

Fringed myotis (*Myotis thysandodes*)

Distribution of the fringed myotis ranges from southern British Columbia, Canada southward throughout the western United States, and down to southern Mexico. It occurs in a variety of habitats – from desertscrub to oak and pinyon woodlands to spruce-fir forests. Roosting sites include caves, mines, and buildings. These bats tend to roost in tight clusters and may change locations periodically in response to thermoregulatory needs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the fringed myotis.

Pocketed free-tailed bat (*Nyctinomops femorosaccus*)

The pocketed free-tailed bat ranges from the southwestern United States (including southern California, Arizona, and New Mexico, and the Trans-Pecos region of Texas), south into Mexico through Baja, Sonora, Durango, and Jalisco to, at least, Michoacan. This bat can be found in the arid lowlands of the desert Southwest, where it roosts in crevices and caves of rugged cliffs, slopes, and rock outcrops (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed and will not likely result in a trend toward federal listing or loss of viability of this species.

Spotted bat (*Euderma maculatum*)

Distribution of the spotted bat ranges throughout centralwestern North America, from southcentral British Columbia down to southern Mexico. In Arizona, its habitat ranges from low desert areas in the Southwest to high desert and riparian habitats in the northwestern part of the state. This bat has also been documented in conifer forests in northern Arizona. Roosting sites are often situated in rock crevices on high cliffs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the spotted bat.

Underwood's mastiff bat (*Eumops underwoodi*)

The range of Underwood's mastiff bat is limited, from south-central Arizona, into the arid lowlands of Sonoran and western Mexico, and into Honduras. It is believed to be a year-round resident of Arizona, ranging from the Baboquívari Mountains down to Organpipe National Monument. This bat prefers Sonoran desertscrub and mesquite/grassland plant communities. Roosting tends to occur in crevices along steep cliffs and sometimes in the cracks of buildings (AGFD 1993). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of this species.

5.0 AGFD WILDLIFE OF SPECIAL CONCERN

AGFD was consulted in regards to state listed special status species and habitats that may be affected by the proposed action. Several state listed special status species and overall wildlife habitat may be affected by the proposed action. The AGFD mission is to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs. Continued consultation and input from AGFD will ensure that impacts of the proposed action are minimized and mitigation efforts are successful.

Listed in Table 6 are state special status species that may be found in the vicinity of the proposed action, based on AGFD's Heritage Data Management System (HDMS) (1 July 2002). Effects of the proposed action on the majority of these species will be avoided or minimized through mitigation efforts stipulated for federally listed species. However, additional mitigation is recommend for the Sonoran Desert tortoise as 5 individuals were located near the Tinaja Hills area during field surveys of the proposed ROW (HEG 2002, unpublished data).

TABLE 6. SUMMARY OF EFFECTS ON WILDLIFE OF SPECIAL CONCERN IN ARIZONA.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Black-bellied whistling duck Dendrocyna autumnalis	No Impacts.	No construction in perennial aquatic habitats.
Crested caracara Caracara cheriway_	No Impacts.	Known populations occur outside project area.
Desert tortoise - Sonoran population Gopherus agassizii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total potential habitat within project area may be impacted. Pre-construction surveys will minimize impacts to species.
Elegant trogon Trogon elegans	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Great Plains narrow- mouthed toad Gastrophryne olivacea	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Mexican long-tongued bat Choeronycteris mexicana	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total potential habitat within project area may be impacted. Mitigation plantings of agaves will reduce impacts.

TABLE 6 (CONTINUED).	SUMMARY OF EFFECTS ON WILL	DLIFE OF SPECIAL CONCERN IN ARIZONA.
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Mexican vine snake Oxibelis aeneus	No Impacts.	Known occurrences are outside project area.
Osprey Pandion haliaetus	No Impacts	No construction in perennial aquatic habitats.
Rose-throated becard Pachyramphus aglaiae	No Impacts.	Known occurrences are outside project area.
Tarahumara frog Rana tarahumarae	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability	 Currently does not exist in project area but may be reintroduced into Sycamore Canyon. Conservation measures for federally listed species in Sycamore Canyon will prevent significant impacts.
Thick-billed kingbird Tyrannus crassirostris	No Impacts	No potential habitat within project area.
Tropical Kingbird Tyrannus melancholicus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

Black-bellied whistling duck (*Dendrocyna autumnalis*)

The black-bellied whistling duck is "goose-like" with a long neck and long pink legs. This species has a cinnamon or chestnut breast and back with a black belly and bright coral-red bill. The total range for this species is from the Gulf coast and lower Rio Grande Valley of Texas and central Arizona south through Mexico, Central America to southern Brazil. In Arizona, the range for the black-bellied whistling duck is southeastern and central Arizona. Black-bellied whistling ducks are commonly seen in the Santa Cruz Valley, particularly in ponds near and around Nogales. The habitat for this species consists of the banks of rivers, lakes, ponds, riparian areas, and stock tanks (Brown 1985).

Because of habitat loss and apparent population declines from historic levels, the black-bellied whistling duck has been placed on the AGFD Threatened Native Wildlife of Arizona List as a candidate species. This species appears to be increasing in Arizona in urban settings at man-made ponds and at sewage treatment plants. It also appears to be stable at some private ranch ponds, which tend to be isolated from hunting pressure (Corman 1994).

Because no construction will occur in perennial aquatic habitats, the proposed transmission line will have no effect on the population status of the black-bellied whistling duck.

Crested caracara (Caracara cheriway)

The crested caracara is a medium sized raptor with bold black and white plumage and a bright yellow-orange face and legs. The crested caracara ranges from southern Arizona and northern Mexico to Tierra del Fuego. In the United States, it occurs only along the southern border in Texas and Arizona, and in Florida, where there is an isolated population in the south-central peninsula. In Arizona, their range extends up from San Miguel in the Baboquivari Valley north to Quijotoa, Sells, and Coyote Pass. This raptor occurs regularly on the Tohono O'odham Indian Reservation. Small groups of crested caracara are seen in Sasabe and south of the Mexican border near Sonoyta, Sonora. This raptor is found in open habitats, typically grassland, prairie, pastures, or desert with scattered taller trees, shrubs, or cacti. The crested caracara is found in areas characterized by low-profile ground vegetation and scattered tall vegetation. Specifically in Arizona, vegetation consists of saguaro, mesquite, paloverde, cholla and acacia (Morrison 1996).

Arizona populations of crested caracara on the Tohono O'odham Reservation are likely stable because few threats exist. Reports of individual, and in some cases groups, of this raptor outside of the reservation indicate that its range within Arizona is probably as extensive as it was historically. No apparent threat currently exits to Arizona populations; however, the AGFD has listed the crested caracara as a threatened native wildlife. This species is considered vulnerable if habitat conditions worsen (Morrison 1996).

Habitat surveys did not detect the presence of any bird of prey nests along the corridor. Furthermore, no know populations of this species occur within the project area. Therefore, the proposed action will have no effect on the population status of the crested caracara.

Desert tortoise (Sonoran) (Gopherus agassizii)

The Sonoran Desert tortoise ranges from northern Sinaloa, Mexico to southern Nevada and southwestern Utah, and from southcentral California east to southeastern Arizona. The desert tortoise is divided into 2 populations for purposes of the Endangered Species Act. The threatened Mojave population occurs north and west of the Colorado River and the unlisted Sonoran population occurs south and east of the Colorado River. Within Arizona, the Sonoran Desert tortoise is found south and east of the Colorado River from Mojave County to the south, beyond the International Boundary and many scattered locations in between. The Sonoran population of the desert tortoise occurs primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub at elevations ranging from 152 to 1,615 m (500 – 5,300 ft). Burrows and shelter sites are generally below rocks and boulders, in rock crevices, under vegetation, and also in caliche caves of incised wash banks (AGFD 2001e).

Several threats to tortoise populations in the Sonoran Desert have been identified, including habitat fragmentation, habitat loss and degradation from urban and agricultural development and roads, wildfires associated with invasion of non-native grasses and forbs, illegal collection, and genetic contamination of wild populations by escaped or

released captives. Although current evidence suggests that Arizona populations are stable there are substantial gaps in available data (Arizona Interagency Desert Tortoise Team 1996).

During ground surveys of the proposed transmission line corridor, 5 desert tortoise were found (HEG, unpublished data). Per recommendations of Spencer and Humphrey (1999) for any ground disturbing projects, surveys should be conducted a minimum of 48 hours prior to grading and again just prior (as it is occurring) to vegetation clearing (Desert Tortoise Council 1999). While the proposed action may have a minimal effect on the potential habitat of this species, pre-construction surveys will minimize impacts to individual tortoise and is therefore not likely to result in a trend toward listing or loss of viability.

Elegant trogon (*Trogon elegans*)

The elegant trogon is a medium sized bird with a round head, large eyes, a white band on an iridescent green breast, black face and throat, red belly and undertail coverts. The total range for this bird is from southern Arizona and New Mexico south through Mexico to southern Nicaragua to northwestern Costa Rica. In Arizona, the elegant trogon is found in sky island mountains, most commonly the Atascosa, Chiricahua, Huachuca, and Santa Rita mountains. Elegant trogons are found in riparian areas consisting of sycamore, cottonwood, and oak, and also in coniferous woodlands at elevations ranging from 1,036 to 2,073 m (3,400 – 6,800 ft) (AGFD 2001f).

Population trends for the elegant trogon are not well known. No evidence indicates population declines in any of the core canyons occupied over the past few decades. Threats to this species include degradation and loss of native riparian habitat through stream diversion, groundwater withdrawal, erosion, and overgrazing (AGFD 2001f).

The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual trogons, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Great Plains narrow-mouthed toad (*Gastrophryne olivacea*)

The Great Plains narrow-mouthed toad is a small, stout toad with stubby limbs, a small pointed head with a fold of skin on the back of the head. The total range for this species is from southeastern Nebraska and Missouri south through Texas to western Mexico. Within Arizona, the Great Plains narrow-mouthed toad is found in the vicinity of Santa Cruz County, Pima County, to near Casa Grande, Arizona in Pinal County. Habitat for this species in Arizona consists of mesquite semi-desert grassland communities to oak woodland communities near riparian areas at elevations ranging from sea level to around 1,250 m (4,100 ft) (AGFD 1995c).

Population trends for the Great Plains narrow-mouthed toad are currently unknown. Populations in Arizona are at the extreme northwestern edge of the species range and distribution is limited throughout its range (AGFD 1995c). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican long-tongued bat (*Choeronycteris mexicana*)

The Mexican long-tongued bat has a long, slender nose with a leaf-like structure on the base of the nose. The total range for this species is from southeastern Arizona, southwestern New Mexico, and California south through Central America to Venezuela. In Arizona, the Mexican long-tongued bat is found from the Chiricahua Mountains extending as far north as the Santa Catalina Mountains and west to the Baboquivari Mountains. Habitat for this bat is typically within canyons of mixed oak-conifer forests in mountains at elevations ranging from 1,082 to 2,231 m (3,550 – 7,320 ft) (AGFD 1994). This species do not congregate in sizeable maternity or bachelor colonies like *Leptonycteris* bats do (Hoffmeister 1986). They feed on nectar and pollen, especially from paniculate agaves (AGFD 1994).

Populations of Mexican long-tongued bats in Arizona appear to be highly variable (AGFD 1994) and there is no evidence of a long-term decline or any clear trend. The limitation of riparian zones and the distribution of food plants may limit populations of this species in Arizona and loss of riparian vegetation may be a greater threat to this species than human disturbance at particular roost sites (Pima County 2001). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during construction; however, these disturbances will be isolated and will impact only a small percentage of potential habitat. Furthermore, transplanting of agave plants also will minimize impacts. Impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican vine snake (Oxibelis aeneus)

The Mexican vine snake has an elongated head, pointed snout, and is thin bodied with an ash gray to yellow-brown and tan coloring. The total range for this species is from extreme southern Arizona south to Brazil. In Arizona, this species occurs in the Tumacacori, Pajarito, and Patagonia mountains in Santa Cruz County. Habitat for the Mexican vine snake consists of brush-covered hillsides and riparian areas with sycamore, oak, walnut and wild grape trees at elevations ranging from 914 to 1,768 m (3,000 – 5,800 ft) (AGFD 1991b).

Population trends for the Mexican vine snake are currently unknown. Populations in Arizona are at the extreme northern edge of the species range and distribution is limited,

with occurrences known from Sycamore Canyon (AGFD 1991b). A potential threat is the high interest by collectors for this species (AGFD 1991b). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the Mexican vine snake.

Osprey (Pandion haliaetus)

This raptor is dark brown on its back and white on the underparts with a prominent dark eye stripe. The total range for the osprey is from Alaska to Newfoundland, along the Atlantic and Pacific coastlines, and in the Rocky Mountains south through central and South America. Within Arizona, the osprey occurs primarily in the White Mountains, along the Mogollon Rim, and along the Salt and Verde rivers. In southeastern Arizona, this raptor is an uncommon spring and fall transient, usually seen at ponds and reservoirs. Nesting habitat of the osprey consists of coniferous trees along rivers and lakes at elevations ranging from 1,829 to 2,377 m (6,000 – 7,800 ft) (AGFD 1997d).

Osprey population trends in Arizona are not well known. Only about 20 nest sites are known in the southwest, all within Arizona. This raptor is threatened by loss of nesting habitat and foraging perch sites. It is also threatened by recreational use of nesting habitat, shooting, and pesticide poisoning on wintering grounds (AGFD 1997d).

Because no construction will occur in perennial aquatic habitats, the proposed action will have no effect on the population status of the osprey.

Rose-throated becard (*Pachyramphus aglaiae*)

The rose-throated becard is a big-headed, thick billed bird that breeds in southeast Arizona, southern Texas (rare visitor along the Rio Grande), south through Mexico to Costa Rica. This species winters from northern Mexico south through to its breeding range. Within Arizona, rose-throated becards have been found breeding along Sonoita and Arivaca creeks, Sycamore Canyon (Atascosa Mountains), and Patagonia. Historically, this species nested in Guadalupe Canyon (east of Douglas) and near Tucson. Rose-throated becards typically inhabit marshes of Sonoran desertscrub communities of open to dense vegetation of shrubs, low trees, and succulents dominated by paloverde, prickly pear, and saguaro. This species also is found in the desert riparian deciduous woodland communities of marsh-woodlands, especially of cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of deciduous trees and shrubs along the margins. In Arizona, the rose-throated becard is found at elevations ranging from 1,082 to 1,228 m (3,550 – 4,030 ft) (AGFD 2001g).

Population trends for the rose-throated becard are currently unknown. Potential threats to this species include disturbance from bird watchers and degradation and loss of native riparian habitat through overgrazing, urban development, and groundwater depletion (AGFD 2001g). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the rose-throated becard.

Tarahumar frog (*Rana tarahumarae*)

The Tarahumara frog, is a medium-sized (adults range from 2.5 to 4.5 in [64 to 114 mm] in snout-vent length), drab green-brown frog with small brown to black spots on the body and dark crossbars on the legs. Throughout its range the Tarahumara frog is typically associated with canyons and deep "plunge pools" formed am idst boulders or in bedroc k. Plunge pools in canyon s with low mean flow s (<0.2 cubic feet per second) and elatively steep gradients (> 60 m per km of stream) provide the best breeding sites. Permanent water is probably necessary for metamorphosis. Tarahumara frog habitats are located within oak, pine-oak woodland, or the Pacific coast tropical area (Sinaloan thornscrub and tropical deciduous forest).

In the United States, the species was known historically from six locales, including three from Santa Rita Mountains and three from Atascosa-Pajarito-Tumacacori Mountains complex, which are located north and west, respectively, of Nogales in Santa Cruz County, Arizona. Tarahumara frogs have been extirpated from all localities in Arizona. In September 2003, the USFWS announced plans to reintroduce this species back into suitable habitat in southern Arizona, including Sycamore Canyon.

Causes of population decline and extirpation are not clear, but the following factors have been implicated: winter cold, flooding or severe drought, competition with and predation by nonnative fish and bullfrogs, disease, habitat loss, and heavy metal poisoning. No direct impacts from the proposed TEP transmission line on the Tarahumara frog are anticipated. Indirect effects from increased erosion, increased risk of wildfire, or the introduction of nonnative species may impact individuals of this species, however, because of the distance of the project and the conservation measures (invasive species control, fire prevention plan, erosion control), only a small percentage of the population within the project area may be subject to potential impacts. Furthermore, those measures designed to minimize impacts to federally listed species within the potential reintroduction areas should provide adequate protection for the species. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Thick-billed kingbird (*Tyrannus crassirostris*)

The thick-billed kingbird is a relatively stocky flycatcher with a large head and heavy bill. This kingbird occurs from southeastern Arizona and southwestern New Mexico south through western Mexico to western Guatemala. In Arizona, thick-billed kingbirds are most often seen around Sonoita and Arivaca creeks and in Madera and Guadalupe canyons. This species may occur in mountains of Pima, Santa Cruz and Cochise counties where there are drainages with well-developed riparian areas. Habitat for the thick-billed kingbird consists of broad-leaved, riparian forests usually with well-developed large sycamores and cottonwoods at elevations ranging from 914 to 1,981 m (3,000-6,500 ft) (Tibbitts 1991).

Present distribution of the thick-billed kingbirds in Arizona is very limited. Potential threats include human recreational activities, encroachment of human development into breeding habitat, woodcutting, grazing, and groundwater depletion (Tibbitts 1991).

Because no potential habitat occurs within the project area, the proposed action will have no effect on the population status of the thick-billed kingbird.

Tropical Kingbird (Tyrannus melancholicus)

The tropical kingbird is a large tyrant-flycatcher with a large bill and long, slightly notched tail. The tropical kingbird ranges from southeastern Arizona through western and central Mexico to central Argentina. Breeding birds have been found in Tucson, along the Santa Cruz Valley from Green Valley south, east of Phoenix in the Salt River Valley, to the San Pedro Valley. This species also has been reported from Sopori Wash. The Tropical Kingbird inhabits open and semi-open areas with scattered trees and shrubs. Also found in urban areas and roadsides with tall human-made fixtures (Stouffer and Chesser 1998).

Tropical kingbirds seem to persist or even thrive in developed areas. No negative effects of human activities have been reported (Stouffer and Chesser 1998). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual tropical kingbirds, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to tropical kingbirds are not likely to result in a trend toward federal listing or loss of viability.

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7.0 LIST OF ACRONYMS

ACC Arizona Corporation Commission

ADEQ Arizona Department of Environmental Quality

AGFD Arizona Game and Fish Department

AOU American Ornithologists' Union

ASLD Arizona State Land Department

AUM Animal Unit per Month

BA Biological Assessment

BLM Bureau of Land Management

BMP Best Management Practices

BO Biological Opinion

CFPO Cactus Ferruginous Pygmy Owl

Citizens Communications

CLF Chiricahua Leopard Frog

CNF Coronado National Forest

DBH Diameter Breast Height

DOE Department of Energy

EMA Ecosystem Management Area

ESA Endangered Species Act

GPS Global Positioning System

HDMS Heritage Data Management System

HEG Harris Environmental Group, Inc.

I-19 Interstate 19

LLNB Lesser Long-nosed Bat

MOA Memorandum of Agreement

MSO Mexican Spotted Owl

NPDES National Pollutant Discharge Elimination System

OHV Off-Highway Vehicle

PAC Protected Activity Center

PPC Pima Pineapple Cactus

RNA Research Natural Area

ROW Right-of-way

RD Ranger District

RU Recovery Units

SL Standard Length

SWFL Southwestern Willow Flycatcher

TEP Tucson Electric Power

USDOI United States Department of Interior

USFWS United States Fish and Wildlife Service

USFS United States Department of Agriculture Forest Service

YOY Young-of-the-year

APPENDIX A

Natural Resource Agencies Correspondence.

- 1. U.S. Fish and Wildlife Service, dated 14 May 2002.
- 2. Arizona Game and Fish Department, dated 25 April 2002.

APPENDIX B

Plants documented along proposed ROW of the TEP Citizens Interconnect Project, July to October 2002.

	SCIENTIFIC NAME	COMMON NAME	FAMILY
CACTUS & SUCC	ULENTS		
	Agave parryi	century plant	Agavaceae
	Agave schottii	shindagger	Agavaceae
	Coryphantha scheeri		, igar are care
	var. robustispina	Pima pineapple cactus	Cactaceae
	Dasylirion wheeleri	sotol	Agavaceae
	Echinocereus spp.	hedgehog cactus	Cactaceae
	Echinocereus pectinatus var. rigidissimus	Arizona rainbow cactus	Cactaceae
	Ferocactus wislizenii	fishhook barrel cactus	Cactaceae
	Fouquieria splendens	ocotillo	Fouquieriaceae
	Mammillaria spp.	pincushion cactus	Cactaceae
	Nolina microcarpa	beargrass	Agavaceae
	Opuntia spp.	cholla	Cactaceae
	Opuntia spp.	prickly pear	Cactaceae
	Opuntia spinosior	walkingstick cactus	Cactaceae
	Yucca elata	soaptree yucca	Agavaceae
GRASSES			
	Bouteloua barbata or		
	B. rothrockii	six-weeks or Rothrock grama	Poaceae
	Bothriochloa barbinodis	cane beard grass	Poaceae
	Bouteloua curtipendula	side oats grama	Poaceae
	Bouteloua gracilis	blue grama	Poaceae
	Bouteloua hirsuta	hairy grama	Poaceae
	Bouteloua parryi	Parry grama	Poaceae
	Bouteloua repens	slender grama	Poaceae
	Digitaria californica	Arizona cottontop	Poaceae
	Erioneuron pulchellum	fluffgrass	Poaceae
	Hilaria belangeri	curly mesquite	Poaceae
	Leptochloa dubia	green sprangletop	Poaceae
	Muhlenbergia emersleyi	bull grass	Poaceae
	Muhlenbergia rigens	deer grass	Poaceae
	Piptochaetium fimbriatum	pinyon rice grass	Poaceae
	Sporobolus spp.	dropseed	Poaceae
FORBS			
	Abutilon incanum	Indian mallow	Malvaceae
	Allionia incarnata	trailing windmills	Nyctaginaceae
	Ambrosia confertiflora	weakleaf burr ragweed	Asteraceae
	Amoreuxia palmatiflida	Arizona yellow show	Cochlospermaceae
	Argemone sp.	prickly poppy	Papaveraceae
	Artemisia ludoviciana		Asteraceae
	Asclepias asperula	antelope horns	Asclepiadaceae
	Asclepias nummularia	tufted milkweed	Asclepiadaceae
	Asclepias tuberosa	butterfly milkweed	Asclepiadaceae
	Aspicarpa hirtella	aspicarpa	Malpighiaceae
	Boerhaavia coccinea	red spiderling	Nyctaginaceae
	Bouchea prismatica	bouchea	Verbenaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY
FORBS (Cont.)			
· ·	Bouvardia glaberrima	smooth bouvardia	Rubiaceae
	Brickellia spp.	brickellbush	Asteraceae
	Chamaecrista serpens var. wrightii	sensitive pea	Fabaceae
	Cheilanthes fendleri	cloak fern	Pteridaceae
	Cheilanthes spp.	claok fern	Pteridaceae
	Chenopodium fremontii	lamb's quarter	Chenopodiaceae
	Clitoria mariana	butterfly pea	Fabaceae
	Cnidosculus angustidens	mala mujer	Euphorbiaceae
	Cologania longifolia	narrowleaf tick clover	Fabaceae
	Commelina dianthifolia	western dayflower	Commelinaceae
	Cucurbita digitata	coyote gourd	Cucurbitaceae
	Datura metaloides	sacred datura	Solanaceae
	Eleocharis spp.	spikerush	Cyperaceae
	Eriogonum wrightii	buckwheat	Polygonaceae
	Eryngium heterophylla	button snakeroot	Apiaceae
	Evolvulus alsinoides		Convolvulaceae
	Evolvulus arizonicus	Arizona blue eyes	Convolvulaceae
	Galium wrightii	northern bedstraw	Rubiaceae
	Glandularia gooddingii	verbena	Verbenaceae
	Gnaphalium leucocephalum	white cudweed	Asteraceae
	Gnaphalium wrightii	cudweed	Asteraceae
	Gomphrena sp.	globe amaranth	Amarnathaceae
	Gutierrezia spp.	snakeweed	Asteraceae
	Ipomoea barbatisepala	morning glory	Convolvulaceae
	Ipomoea coccinea	scarlet creeper	Convolvulaceae
	Ipomoea hirsutula	wooly morning glory	Convolvulaceae
	Ipomoea leptotoma	bird's foot morning glory	Convolvulaceae
	Ipomoea longifolia	long leaf morning glory	Convolvulaceae
	Isocoma tenuisecta	burroweed	Asteraceae
	Jatropha macrorhiza	Arizona desert potato	Euphorbiaceae
	Kallstroemia grandiflora	Arizona caltrop	Zygophyllaceae
	Krameria parvifolia	range ratany	Krameriaceae
	Machaeranthera spp.	spiny aster	Asteraceae
	Macroptilium gibbosifolium	variableleaf bushbean	Fabaceae
	Milla biflora	Mexican star	Liliaceae
	Oenothera rosea	evening primrose	Onagraceae
	Oxalis albicans	wild oxalis	Oxalidaceae
	Penstemon linarioides	linear leaf penstemmon	Scrophulariaceae
	Phaseolus ritensus	eggleaf stringbean	Fabaceae
	Phaseolus sp.	stringbean	Fabaceae
	Portulaca suffrutescens	portulaca	Portulacaceae
	Portulaca umbraticola	portulaca	Portulacaceae
	Proboscidea sp.	unicorn plant, devil's claw	Pedaliaceae
	Salvia subincisa	sawtooth sage	Lamiaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY
FORBS (Cont.)			2 111/212/2
, ,	Schoenocrambe linearifolia	schoenocrambe	Brassicaceae
	Scirpus sp.	bulrush	Cyperaceae
	Senna covesii	desert senna	Fabaceae
	Senna hirsuta	woolly senna	Fabaceae
	Solanum douglassii	greenspot nightshade	Solanaceae
	Solanum elaeagnifolium	silverleaf nightshade	Solanaceae
	Sphaeralcea spp.	globe mallow	Malvaceae
	Tagetes sp.	marigold	Asteraceae
	Talinum angustissimum	talinum	Portulacaceae
	Talinum aurantiacum	orange fameflower	Portulacaceae
	Tetramerium hispidum	tetramerium	Acanthatceae
	Thalictrum fendleri	Fendler's meadow rue	Ranunculaceae
	Vitis arizonica	Arizona grape	Vitaceae
	Zinnia acerosa	desert zinnia	Asteraceae
TREES & SHRUBS	8		·
	Acacia angustissima	white ball acacia	Fabaceae
	Acacia constricta	whitethorn acacia	Fabaceae
	Acacia greggii	catclaw acacia	Fabaceae
	Aloysia wrightii	oreganillo	Verbenaceae
	Arctostaphylos sp.	manzanita	Ericaceae
	Baccharis salicifolia	seep willow	Asteraceae
	Baccharis sarothroides	desert broom	Asteraceae
	Calliandra eriophylla	fairyduster	Fabaceae
	Celtis pallida	desert hackberry	Ulmaceae
	Celtis reticulata	netleaf hackberry	Ulmaceae
	Chrysothamnus teretifolius	green rabbitbrush	Asteraceae
	Dodonaea viscosa	hopbush	Sapindaceae
	Ericameria laricifolia	turpentine bush	Asteraceae
	Erythrina flabelliformis	coral bean	Fabaceae
	Eysenhardtia orthocarpa	kidney wood	Fabaceae
	Fraxinus velutina	velvet ash; Arizona ash	Oleaceae
	Gossypium thurberi	desert cotton	Malvaceae
	Guardiola platyphylla	Apache plant	Asteraceae
	Hibiscus coulteri	desert rosemallow	Malvaceae
	Indigofera spaerocarpa	Sonoran Indigo	Fabaceae
		Arizona walnut	
	Juglans major		Juglandaceae
	Juniperus deppeana	alligator juniper	Cupressaceae Asteraceae
	Lasianthaea podocephala	San Pedro daisy	
	Lycium spp.	wolfberry	Solanaceae
	Mimosa biuncifera	catclaw mimosa	Fabaceae
	Mimosa dysocarpa	velvet pod mimosa	Fabaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY			
TREES & SHRUBS	TREES & SHRUBS (Cont.)					
	Parkinsonia microphylla	yellow paloverde	Fabaceae			
	Populus fremontii	Fremont cottonwood	Salicaceae			
	Prosopis velutina	velvet mesquite	Fabaceae			
	Q. arizonica	Arizona white oak	Fagaceae			
	Q. garrya	silktassel	Fagaceae			
	Quercus emoryii	Emory oak	Fagaceae			
	Rhus aromatica	skunkbush	Anacardiaceae			
	Rhus choriophylla	sumac	Anacardiaceae			
	Salix exigua	coyote willow	Salicaceae			
	Tamarix pentandra	salt cedar	Tamaricaceae			
	Ziziphus obtusifolia	graythorn	Rhamnaceae			

TEP-Citizen's Interconnect Project

Environmental Training Guidelines for Construction Supervisors

- Stay in the designated work areas. Approved work areas, access roads, and staging areas will be clearly marked. All project activities must remain in these areas. Do not work or trespass beyond the signed or fenced restricted work areas.
- Restrict vehicle access to public roadways and designated access roads. Crosscountry driving is prohibited.
- No driving or parking within 100 feet of ponds and tanks.
- Do not transfer water from one pond or tank to another or between any other bodies of water.
- No in-stream activity or disposal of construction debris or fill is allowed.
- Store topsoil and trench spoils behind sediment control structures at least 20 feet from any stream bank, including dry washes.
- Check equipment for leaks or heavy surface oil build-up before working in streams or washes.
- The use or transfer of hazardous materials will not be allowed within 100 feet of any stream or wash is prohibited.
- Do not litter. Dispose of trash in designated containers. Uncontained trash can attract wildlife and unwanted pests. Cigarette butts are considered litter, and should be extinguished and disposed of appropriately. All litter and construction debris must be removed from the job site daily.
- No pets or firearms. They are prohibited for job-site protection and protection of wildlife.
- Hunting is prohibited.
- Clearing will be limited to the minimum required to provide a safe construction area. Make sure you know the clearing limit, and if possible, leave plant root systems in place when clearing vegetation.
- It is illegal to harm, harass, pursue, hunt, shoot, wound, trap, kill capture, or collect wildlife officially listed as threatened or endangered. Violation of threatened and endangered special laws can result in penalties of up to \$100,000 and/or 1year in jail.
- Do not approach or feed wildlife. Keep away form their burrows and nests. Do not harm or kill any wildlife encountered.
- If animal is harmed or found harmed, contact your Construction Supervisor or the Environmental Inspector. Do not attempt to move the animal yourself.

APPENDIX D

APPENDIX D. Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima and Santa Cruz Counties, Arizona as of 18 November 2003, excluded from further consideration.

COMMON	SCIENTIFIC			
NAME	NAME	STATUS	Навітат	JUSTIFICATION
PLANTS				
Canelo Hills ladies' tresses	Spiranthes delitescens	Endangered	Finely grained, highly organic, saturated soils of cienegas. Potential habitat occurs in Sonora, Mexico, but no populations have been found.	No habitat present.
Huachuca water umbel	Lilaeopsis schaffneriana ssp. recurva	Endangered	An emergent aquatic plant that requires marshy wetlands.	No habitat present.
Kearney's blue star	Amsonia kearneyana	Endangered	Known only from the Baboquivari Mountains.	ROW is outside of known range.
Nichol's Turk's head cactus	Echinocactus horizonthalonius var. nicholii	Endangered	Dependent on limestone substrates in desert hills.	No habitat present.
FISH				
Desert pupfish	Cyprinodon macularius	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	No habitat present in area.
Gila chub	Gila intermedia	Proposed Endangered	Small streams and cienegas; prefer deeper pools with cover.	No habitat present in area.
Loach minnow	Tiaroga cobitis	Threatened	Requires perennial streams with swift water over cobble or gravel	No habitat present in area.
Spikedace	Meda fulgida	Threatened	Requires perennial streams with swift velocities over sand and gravel.	No habitat present in area.
AMPHIBIANS				
Sonoran tiger salamander	Ambystoma tigrinum stebbinsi	Endangered	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains at 4,000-6,300 ft.	ROW is outside of known range. This species is not known to occur in the Nogales RD.

APPENDIX D (*cont.*). Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima and Santa Cruz Counties, Arizona as of 18 November 2003, excluded from further consideration.

BIRDS				
Bald eagle	Haliaeetus leucocephalus	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Winter surveys of Peña Blanca and Arivaca lakes were conducted in 1994, 1995, 1996, 1998, 2000, 2001, and 2002. No bald eagles have been observed.
California brown pelican	Pelecanus occidentalis californicus	Endangered	Coastal land and islands; species is found around many Arizona lakes and rivers.	No habitat present in area.
Masked bobwhite	Colinus virginianus ridgewayi	Endangered	Only known Arizona population has been reintroduced on Buenos Aires Natl. Wildl. Refuge	ROW is outside of known range.
Mountain plover	Charadrius montanus	Proposed Threatened	Open arid plains, short grass prairies, and cultivated farms.	No habitat present in area.
Northern apolomado falcon	Falco femoralis septentrionalis	Endangered	Grassland and savannah habitats.	No recent confirmed reports for Arizona.
MAMMALS				
Ocelot	Felis pardalis	Endangered	Prefers humid tropical & subtropical habitats; typically found at higher elevations.	ROW is outside of known range.
Jaguarundi	Felis yagouaroundi tolteca	Endangered	Deciduous forests, riparian areas, swampy grasslands, upland dry savannahs, etc.	ROW is outside of known range.
Sonoran pronghorn	Antilocapra americana sonoriensis	Endangered	Grassy desertscrub in northwestern Sonora and adjacent Arizona borderlands, mainly Yuma Co.	ROW is outside of known range.

STATUS DEFINITIONS: ENDANGERED SPECIES ACT

Endangered: Imminent jeopardy of extinction.

Threatened: Imminent jeopardy of becoming endangered.

Proposed: Proposed Rule has been published in Federal Register to list as Threatened or Endangered.

Appendix D, Part 2

U.S. Fish and Wildlife Service Biological Opinion for the Western Corridor

United States Department of the Interior U.S. Fish and Wildlife Service 2321 West Royal Palm Road, Suite 103 Phoenix, Arizona 85021

Telephone: (602) 242-0210 FAX: (602) 242-2513

AESO/SE 02-21-00-F-0427

April 26, 2004

Mr. Anthony J. Como Deputy Director, Electric Power Regulation Office of Coal and Power Systems Office of Fossil Energy Department of Energy Washington, D.C. 20585

Dear Mr. Como:

This biological opinion (BO) responds to the Department of Energy's (DOE) request for consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. et. seq., ESA). Your request for formal consultation was dated November 18, 2003, and received by us on November 21, 2003. At issue are adverse impacts that may result to Pima pineapple cactus (Coryphantha scheeri var. robustispina), the cactus ferruginous pygmy-owl (pygmy-owl) (Glaucidium brasilianum cactorum), and lesser long-nosed bat (Leptonycteris curasoae yerbabuenae) from the proposed issuance of a Presidential Permit to construct a new, double-circuit, 345,000-volt transmission line from Sahuarita, Arizona to a sub-station in Nogales, Arizona, continuing south across the United States-Mexico border for approximately 60 miles into Sonora, Mexico. In addition, you have determined that the project may affect, but is not likely to adversely affect, the jaguar (Panthera onca), Mexican gray wolf (Canis lupus baileyi), Mexican spotted owl (Strix occidentalis lucida) and its proposed critical habitat, southwestern willow flycatcher (Empidonax trailii extimus), Chiricahua leopard frog (Rana chiricahuensis), Gila topminnow (Poeciliopsis occidentalis occidentalis), and Sonora chub (Gila ditaenia). Our concurrences are provided in Appendix A.

This biological opinion was prepared using information from the November 2003 Biological Assessment (BA) (Harris Environmental, Inc. 2003), the supplemental BA, dated March 15, 2004, information in our files, site visits, and coordination among our staffs and other knowledgeable individuals. Literature cited in this biological opinion is not a complete bibliography of all literature available on the effects of transmission corridors on the affected species, or other subjects considered in this opinion. A complete administrative record of this consultation is on file at the Arizona Ecological Services Field Office

CONSULTATION HISTORY

July 10, 2001: DOE published notice in the Federal Register of Intent to Prepare Environmental Impact Statement (EIS) for the proposed action.

April 9, 2002: First meeting with the applicant, Tucson Electric Power, (TEP), Coronado National Forest (FS), the U.S. Fish and Wildlife Service (FWS), and the biological consultants (HEG) (Harris Environmental Group, Inc.) took place to discuss the proposed action and biological concerns associated with this project.

April 16, 2002: HEG requested a species list from the FWS for the project area.

May 9, 2002: We received a request for formal consultation from DOE.

June 4, 2002: We responded to DOE that we had insufficient information to proceed with consultation.

August 11, 2003: The Draft EIS was made available for public comment until October 14, 2003. The western corridor was identified as the preferred alternative in the Draft EIS.

November 18, 2003: DOE requested formal consultation on the western corridor alternative.

December 3, 2003: a public hearing of the Arizona Corporation Commission took place. Federal agencies involved in this project were asked to appear and testify on their involvement in the process.

February 24, 2004: At the request of DOE, the White House Task Force on Energy Project Streamlining convened a meeting in Tucson, Arizona, with all of the involved Federal agencies to discuss Federal cooperation.

March 15, 2004: We received the supplement to the BA analyzing the route from the main transmission line to the sub-station in Nogales and providing additional information on Mexican spotted owl proposed critical habitat.

April 1, 2004: The draft biological opinion was provided to DOE and other Federal agencies for their review.

April 9, 2004: Comments on the draft biological opinion were received from the FS.

April 12, 2004: Comments on the draft biological opinion were received via Fax from the Arizona Game and Fish Department (AGFD).

April 15, 2004: We met with HEG and TEP to go over the comments.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

TEP and Citizens Communications (Citizens) are proposing to build a new, dual-circuit, 345,000-volt (345-KV) transmission line from the TEP South Substation in the vicinity of Sahuarita, Arizona to interconnect with Citizens' system at a Gateway Substation that TEP will construct west of Nogales, Arizona. From this point, the proposed line will continue south across the United States-Mexico border for approximately 60 miles, connecting with the Comisión Federal de Electricidad at the Santa Ana Substation. The proposed transmission line will improve Citizens' service in Nogales and allow for the transfer of electrical energy blocks between the United States and Mexico. In order to connect the proposed Gateway Substation to Citizens' existing Valencia generating station, TEP proposes to construct a 115kV transmission line between the two substations. This additional line is approximately three miles in length and is located on the north side of the City of Nogales. The Arizona Corporation Commission (ACC) ordered Citizens to improve its system by the end of 2003.

TEP has applied for a Presidential Permit from the DOE to construct the proposed transmission line. The DOE is the lead Federal agency for this project. Other Federal agencies involved in the proposed action are: FS, Bureau of Land Management (BLM), and the U.S. Section of the International Boundary and Water Commission (USIBWC). The preferred alternative, known as the Western Corridor, extends for approximately 65.7 miles, from the South Substation to the United States-Mexico border, including 9.3 miles along the El Paso Natural Gas Company gas line right-of-way (ROW). The length of the Western Corridor is 29.5 miles within the FS and approximately 1.25 miles on BLM land (Fig. 1). The Western Corridor will require approximately 446 support structures; 191 of them will be on the FS and nine on BLM lands.

TEP will use existing utility maintenance roads and ranch access roads, where available. New access will be needed in some areas. Approximately 20 miles of new temporary roads will be built on the FS and one mile of new road will be built on BLM lands. The total new temporary acres of disturbance on FS will be approximately 197 acres. Following construction, TEP will close roads not required for project maintenance and will limit access to maintenance roads, in accordance with agreements with land owners or land managers. On the FS, TEP will close existing road mileage equal to that required for project maintenance, in order to maintain current road density. The maintenance access required by TEP will be limited to roads that access selected structures, rather than a single cleared ROW leading to the United States-Mexico border. Transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yards will be obliterated within six months of the project becoming fully operational.

The proposed transmission line will consist of twelve transmission line wires, or conductors, and two neutral ground wires that will provide lightning protection and fiber optic communication on single pole support structures. The South Substation in Sahuarita will be expanded by

approximately 1.3 acres to add a switching device that will connect to the proposed line. The new Gateway Substation will be constructed within a developed industrial park north of Mariposa Road (State Route 189). The TEP portion of the site (18 acres) is within the City of Nogales. TEP will also need a fiber-optic regeneration site, and that will most likely be located approximately 10 miles southwest of Sahuarita, on private land. That site will consist of an approximate 0.5-acre fenced yard. There will be three, 3-acre construction staging areas, located near the South and Gateway Substations and the Interstate 19 (I-19)/Arivaca Road interchange and an 80-acre temporary lay down yard (located near the I-19/Arivaca Rd interchange) used during construction of the proposed line. Additional information, maps, and other details are provided in the November 2003 BA, the March 2004 BA Supplement, and the July 2003 Draft EIS, which are incorporated here by reference.

Proposed Conservation Measures

The applicant and DOE propose the following conservation measures to minimize the effects to listed species and their habitats. The following measures were documented in the November 2003 BA and the DEIS (Table 2.2-2).

General Conservation Measures

- 1. All construction supervisors will be required to attend environmental training, which will outline their obligation to obey applicable laws and regulations regarding wildlife and habitats (Refer to Appendix C in the November 2003 BA). This environmental training program will be approved by the FS. A biological monitor will be on site during all phases of construction.
- 2. TEP will utilize Best Management Practices (BMPs), in consultation with the FS and Arizona Department of Environmental Quality (ADEQ), to minimize project impacts on soils and water resources on National Forest System lands. TEP will also coordinate with ADEQ to develop BMPs for the remainder of the Western Corridor.
- 3. A Fire Prevention Plan, to be approved by the FS, will be developed to minimize the risk of accidental fire. All construction activities will adhere to this plan, and fire suppression equipment will be available to work crews. On the FS, the Fire Prevention Plan will be in conformance with Forest Service Manual 5100.
- 4. A hazardous material spill response plan will be developed that will describe the measures and practices to prevent, control, clean up, and report spills of fuels, lubricants, and other hazardous substances during construction operations. This plan will ensure that no hazardous materials are stored, dispensed, or transferred in streams, watercourses, or dry washes and vehicles are regularly inspected and maintained to prevent leaks.
- 5. An invasive species management plan, in accordance with Executive Order 13112 will be developed in coordination with the FS, Arizona State Land Department (ASLD), and

BLM to identify problem areas and mitigation measures. Only native seed will be used to rehabilitate disturbed areas. The seed mix must be approved by the land manager or owner.

6. TEP has committed to obliterate and permanently close excess, duplicative roads in the area of the powerline, up to one mile of closure for each one mile of new road, to maintain the same general road mileage in accordance with direction from the FS. TEP will monitor road closures during regularly scheduled inspection flights and/or ground inspections, and repair or replace road-closure structures as necessary following construction. The FS will coordinate with AGFD on the road closures. TEP will cooperate with landowners on all reseeding and ongoing road closure maintenance. For complete details of methods to close roads and additional mitigation measures associated with roads, refer to the November 2003 BA and to the Road Analysis, Section 1.3.2 (URS 2003).

Cactus ferruginous pygmy-owl

- 1. Two consecutive years of protocol surveys will be conducted before construction activities in suitable habitat. In areas where two years of consecutive protocol surveys cannot be completed, construction activities will occur outside of the breeding season (February 1-July 31). If TEP is working in suitable habitat outside of the breeding season, where two years of consecutive surveys have not taken place, TEP will not remove nesting substrate (i.e.: saguaros with cavities).
- 2. If a pygmy-owl is detected during construction, the following guidelines will be followed:
 - a. Within Zone 1(0-100 m from the pygmy-owl Activity Center), no additional clearing of vegetation will be permitted without authorization from us nd applicable land managers. Construction-related activities may continue on land that has been cleared of vegetation provided that the level of activity does not exceed that level or intensity that was occurring at the time the territory was established. Activities that exceed this threshold cannot continue without authorization from us and applicable land managers.
 - b. Within Zone 2 (100-400 m from the pygmy-owl Activity Center), no additional clearing of vegetation will be permitted without authorization from us and applicable land managers. There will be no restrictions on other construction-related activities from August 1-January 31, and construction activities during the breeding season cannot exceed the levels or intensity of activities that occurred at the time the territory was established.
 - c. Within Zone 3 (400-600 m from the pygmy-owl Activity Center), there will be no additional clearing of vegetation without authorization from us and applicable land managers. There will be no restrictions on the levels or intensity of construction activity at any time of the year.

d. Within Zone 4 (greater than 600 m from the pygmy-owl Activity Center), there are no restrictions.

3. TEP will transplant those saguaros that it cannot avoid. All saguaros that it cannot avoid within the construction areas will be transplanted or replaced with minimum 6.5 ft. specimens. Transplanted saguaros will be watered at least once after planting and their survival will be monitored for two years following project completion. Within xeroriparian desertscrub and deciduous riparian areas, tree and shrub removal will be minimized to the greatest extent possible.

Southwestern willow flycatcher

Damaged deciduous riparian vegetation will be compensated with willow or cottonwood plantings at a 2:1 ratio by species. Willow and cottonwood cuttings will be collected on site.

Lesser long-nosed bat

- 1. Agaves within the construction zone will be transplanted or replaced with similar age and size class individuals.
- 2. If any new day roosts are detected during project construction, they will be identified to us and protected throughout the construction period.

Chiricahua leopard frog

- 1. To prevent the spread of disease, equipment cleaning stations will be established at sites to be determined in consultation with us and the FS.
- 2. Silt fences will be installed alongside road construction, extending at least 2 miles in both directions, in areas near Chiricahua leopard frog locations to keep frogs out of the construction zone. The silt fences will be removed at the end of the project and the silt dealt with properly in accordance with FS direction.

Pima pineapple cactus

- 1. TEP will purchase 36.5 acre-credits in a FWS approved conservation bank for PPC. This will protect 36.5 acres of occupied PPC habitat in the bank and compensate for the loss of PPC and its habitat from the proposed action.
- 2. The placement of the transmission poles and new roads will be done in a manner that avoids any direct impacts to Pima pineapple cactus. All Pima pineapple cacti located near construction areas and access routes will be clearly marked and protected.

Jaguar

Five remote cameras will be donated to the Jaguar Conservation Team to assist with the monitoring of jaguar movements across the border region. These cameras will be placed

within the Tumacacori area under permit from the FS. Consultation with us will be reinitiated if a jaguar is detected in the Tumacacori area.

Cactus ferruginous pygmy-owl (pygmy-owl) Status of the Species/Critical Habitat

A detailed description of the life history and ecology of the pygmy-owl can be found in the *Birds of North America* (Proudfoot and Johnson 2000), *Ecology and Conservation of the Cactus Ferruginous Pygmy-owl in Arizona* (Cartron and Finch 2000), and in other information available from the Arizona Ecological Services Field Office website (arizonaes.fws.gov). Information specific to the pygmy-owl in Arizona is preliminary. Research completed in Texas has provided useful insights into the ecology of this subspecies and, in some instances, represents the best available scientific information. However, habitat and environmental conditions are somewhat different than in Arizona, and conclusions based on information developed in Texas and elsewhere may require qualification.

Species Description

The pygmy-owl is in the order Strigiformes and the family Strigidae. They are small birds of prey, averaging 6.75 inches in length. Males average 2.2 ounces with females slightly larger averaging 2.6 ounces. The pygmy-owl is reddish brown overall, with a cream-colored belly streaked with reddish brown. The crown is lightly streaked, and a pair of dark brown/black spots outlined in white occurs on the nape suggesting eyes. The species lacks ear tufts and the eyes are yellow. The tail is relatively long for an owl and is reddish brown in color with darker brown bars. Pygmy-owls have large feet and talons relative to their size.

Listing and Critical Habitat

The Arizona population of the pygmy-owl was listed as an endangered distinct population segment on March 10, 1997 (U.S. Fish and Wildlife Service 1997a) without critical habitat. In response to a court order, approximately 731,712 acres of critical habitat were designated on July 12, 1999 (U.S. Fish and Wildlife Service 1999) in areas within Pima, Cochise, Pinal, and Maricopa counties in Arizona. On January 9, 2001, a coalition of plaintiffs filed a lawsuit with the District Court of Arizona challenging the validity of the listing of the Arizona population of the pygmy-owl as an endangered species and the designation of its critical habitat. On September 21, 2001, the Court upheld the listing of the pygmy-owl in Arizona but, at our request, and without otherwise ruling on the critical habitat issues, remanded the designation of critical habitat for preparation of a new analysis of the economic and other effects of the designation (National Association of Home Builders *et al.* v. Norton, Civ.-00-0903-PHX-SRB). The Court also vacated the critical habitat designation during the remand. We published a proposed rule to redesignate critical habitat in the Federal Register on November 27, 2002 (U.S. Fish and Wildlife Service 2002). The proposal includes approximately 1,208,000 acres in portions of Pima and Pinal counties, Arizona.

The plaintiffs appealed the District Court's ruling on the listing of the pygmy-owl as a distinct population segment. On August 19, 2003, the 9th Circuit Court of Appeals rendered an opinion

regarding this appeal, which held that, although we did not arbitrarily find the Arizona pygmyowl population to be discrete, we arbitrarily found the discrete population to be significant. The judgment of the District Court was reversed and the case was remanded to the district court for further proceedings consistent with the 9th Circuit's opinion. Prior to being remanded to the District Court, Defenders of Wildlife, intervenors on the original 2001 lawsuit, filed a petition with the 9th Circuit for rehearing, or, in the alternative, rehearing *en banc*. This petition was denied and the matter returned to the District Court, but no ruling has been issued, nor has the right to appeal been forfeited. At this writing, therefore, the pygmy-owl remains listed as endangered, and proposed critical habitat exists.

Because conservation and recovery of the pygmy-owl may rely upon a landscape mosaic of appropriate habitat, we have proposed critical habitat areas that will link a network of State, private, and Federal lands. The proposed system of critical habitat is designed to provide an interconnected system of suitable habitat essential to Arizona pygmy-owl survival and maintain the viability of groups of pygmy-owls that are dependant upon continued genetic interchange and population immigration. Two premises were considered in establishing this system: 1) protecting verified pygmy-owl sites and areas with the presence of one or more of the constituent elements within the mean straight-line dispersal distance of 5 miles from nest sites and three of the four Special Management Areas (SMAs) recommended by the recovery team; and 2) providing for the linkage of these verified sites with areas of suitable habitat for which we have adequate scientific information indicating that they are essential to the conservation of the listed population and in need of special management. A complete description of the primary constituent elements of proposed critical habitat and the proposed critical habitat units can be found in the Federal Register announcement of the proposed rule to designate critical habitat for the pygmy-owls (U.S. Fish and Wildlife Service 2002). When consulting with Federal agencies on projects that may destroy or adversely modify proposed critical habitat, we will evaluate the effects of their project on both the Unit and all critical habitat. Then we can best evaluate the scope of effects and recommend project modifications that conserve or augment the values that would otherwise potentially be lost to that particular unit.

In September 1998, we appointed the Cactus Ferruginous Pygmy-Owl Recovery Team. The Team is comprised of a Technical Group of biologists (pygmy-owl experts and raptor ecologists) and an Implementation Group that includes representatives from affected and interested parties (i.e., Federal and State agencies, local governments, the Tohono O'odham Nation, and private groups). A draft recovery plan was released for public comment in January 2003 (U.S. Fish and Wildlife Service 2003). Following consideration of the public comments and resolution of listing litigation, we will work to finalize the recovery plan.

<u>Life History</u>

Pygmy-owls are considered non-migratory throughout their range. There are winter (November through January) pygmy-owl location records from throughout Arizona (University of Arizona 1995; Tibbitts 1996; Abbate *et al.* 1999, 2000). These winter records suggest that pygmy-owls are found within Arizona throughout the year and do not appear to make any sort of seasonal migration.

The pygmy-owl is primarily diurnal (active during daylight) with crepuscular (active at dawn and dusk) tendencies. They can be heard making a long, monotonous series of short, repetitive notes. Pygmy-owls are most vocal and responsive during the courtship and nesting period (February through June). Male pygmy-owls establish territories using territorial-advertisement calls to repel neighboring males and attract females. Calling and defensive behavior is also manifest in nesting territories from fledging to dispersal (June through August).

Usually, pygmy-owls nest as yearlings (Abbate *et al.* 1999, Gryimek 1972), and both sexes breed annually thereafter. Territories normally contain several potential nest-roost cavities from which responding females select a nest. Hence, cavities/acre may be a fundamental criterion for habitat selection. Historically, pygmy-owls in Arizona used cavities in cottonwood, mesquite, and ash trees, and saguaro cacti for nest sites (Millsap and Johnson 1988). Recent information from Arizona indicates nests were located in cavities in saguaro cacti for all but two of the known nests documented from 1996 to 2002 (Abbate *et al.* 1996, 1999, 2000; AGFD 2003). One nest in an ash tree and one in a eucalyptus tree were the only non-saguaro nest sites (Abbate *et al.* 2000).

Pygmy-owls exhibit a high degree of site fidelity once territories (the area defended) and home ranges (the area used throughout the year) have been established (AGFD 2003). Therefore, it is important that habitat characteristics within territories and home ranges be maintained over time in order for them to remain suitable. This is important for established pygmy-owl sites, as well as new sites established by dispersing pygmy-owls.

Pygmy-owls are more likely to be affected by projects within their home range because of the species' strong site fidelity. Behaviorally, the option to seek alternative areas outside of the home range appears limited, particularly for males.

Data on the size of areas used by pygmy-owls on an annual basis in Arizona are limited. Most of the telemetry data gathered occurs during the breeding season due to the opportunity to capture the pygmy-owls and the limited battery life of transmitters. Until more complete information is available from Arizona, the home range size estimate we are using is based on telemetry work completed in Texas. In Texas, Proudfoot (1996) noted that, while pygmy-owls used between three and 57 acres during the incubation period, they defend areas up to 279 acres in the winter. Proudfoot and Johnson (2000) indicate males defend areas with radii from 1,100 - 2,000 feet. Initial results from ongoing studies in Texas indicate that the home range of pygmy-owls may also expand substantially during dry years (G. Proudfoot, pers. comm.). Therefore, a 280-acre home range is considered necessary for pygmy-owls to meet their life history requirements on an annual basis.

Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. Documented and suspected pygmy-owl predators include great horned owls (*Bubo virginianus*), Harris' hawks (*Parabuteo unicinctus*), Cooper's hawks (*Accipiter cooperii*), screech-owls (*Otus kennicottii*), and domestic cats (*Felis domesticus*) (Abbate *et al.* 2000, AGFD 2003). Pygmy-owls may be particularly vulnerable to predation and other threats during and shortly after fledging (Abbate *et al.* 1999).

AGFD telemetry monitoring in 2002 indicated at least three of the nine young produced that year were killed by predators prior to dispersal during a year when tree species failed to leaf out due to drought conditions (AGFD 2003). Therefore, cover near nest sites may be important for young to fledge successfully (Wilcox *et al.* 1999, 2000). A number of fledgling pygmy-owls have perished after being impaled on cholla cactus, probably due to undeveloped flight skills (Abbate *et al.* 1999). In order to support successful reproduction and rearing of young, home ranges should provide trees and cacti that are of adequate size to provide cavities in proximity to foraging, roosting, sheltering, and dispersal habitats, in addition to adequate cover for protection from climatic elements and predators, in an appropriate configuration in relation to the nest site.

Vegetation communities that provide a diversity of structural layers and plant species likely contribute to the availability of prey for pygmy-owls (Wilcox *et al.* 2000). Pygmy-owls also utilize different groups of prey species on a seasonal basis. For example, lizards, small mammals, and insects are used as available during the spring and summer during periods of warm temperatures (Abbate *et al.* 1999). However, during winter months, when low temperatures reduce the activity by these prey groups, pygmy-owls likely turn to birds as their primary source of food and appear to expand their use area in response to reduced prey availability (Proudfoot 1996). Therefore, conservation of the pygmy-owl should include consideration of the habitat needs of prey species, including structural and species diversity and seasonal availability. Pygmy-owl habitat must provide sufficient prey base and cover from which to hunt in an appropriate configuration and proximity to nest and roost sites.

Free-standing water does not appear to be necessary for the survival of pygmy-owls. During many hours of research monitoring, pygmy-owls have never been observed directly drinking water (Abbate *et al.* 1999, AGFD 2003). It is likely that pygmy-owls meet much of their biological water requirements through the prey they consume. However, the presence of water may provide related benefits to pygmy-owls. The availability of water may contribute to improved vegetation structure and diversity, which improves cover availability. The presence of water also likely attracts potential prey species, improving prey availability.

Habitat

Pygmy-owls were historically recorded in association with riparian woodlands in central and southern Arizona (Bendire 1892, Gilman 1909, Johnson *et al.* 1987, Johnson *et al.* 2003). Plants present in these riparian communities included cottonwood (*Populus fremontii*), willow (*Salix* spp.), ash (*Fraxinus velutina*), and hackberry (*Celtis* spp.). However, recent records have documented pygmy-owls in a variety of vegetation communities such as riparian woodlands, mesquite (*Prosopis velutina*) bosques (Spanish for woodlands), Sonoran desertscrub, semidesert grassland, and Sonoran savanna grassland communities (see Brown 1994 for a description of these vegetation communities).

In recent years, pygmy-owls have been primarily found in the Arizona Upland Subdivision of the Sonoran desert, particularly Sonoran desertscrub (Phillips *et al.* 1964, Monson and Phillips 1981, Davis and Russell 1984, Johnson and Haight 1985, Johnsgard 1988). This subdivision is limited in its distribution, forming a narrow, curved band along the northeast edge of the Sonoran Desert from the Buckskin Mountains, southeast to Phoenix, Arizona, and south into Sonora, Mexico. It

is described as low woodland of leguminous trees with an overstory of columnar cacti and with one or more layers of shrubs and perennial succulents. Within the United States, columnar cacti include either saguaros (Carnegiea gigantea), or organ pipe cactus (Stenocereus thurberi). Trees within this subdivision include blue paloverde (Parkinsonia floridum), foothills paloverde (P. microphyllum), ironwood (Olneya tesota), mesquites (Prosopis spp.), and cat-claw acacia (Acacia spp.). Cacti of many species are found within this subdivision, and include many varieties of cholla and prickly pear (Cylindropuntia and Opuntia spp.), fish-hook barrel cactus (Ferocactus wislizenii), and compass barrel cactus (F. acanthodes) (Brown 1994). The paloverde-cacti mixed scrub series is described as developed on the bajadas and mountain slopes away from valley floors. A bajada is the area between level plains and the foot of a mountain and is dissected by arroyos, exhibiting numerous variations in slope and pattern. While there is great variation between bajadas, they are generally characterized by good drainage and slowed evaporation, resulting in enhanced growing conditions for xerophytic plants. Cacti are particularly prevalent on bajadas, and woody, spiny shrubs and small trees, and annuals are abundant. The increased diversity of plants in turn supports a diversity of wildlife species (Benson and Darrow 1981, Olin 1994). A list of plant and wildlife species associated within this subdivision can be found in Appendix II of Brown (1994), and is incorporated herein by reference.

While there are hundreds of thousands of acres of Sonoran desertscrub, not all of this plant community is suitable for pygmy-owls. Preliminary habitat assessment data appears to indicate that those areas of Sonoran desertscrub characterized by high plant species diversity, high structural diversity, and the presence of tall canopy are the areas being used by pygmy-owls (Wilcox *et al.* 2000, Flesch 2003a). These types of areas are typically located along drainages and wash systems, or in areas with better soil and moisture conditions such as bajadas. The occurrence of these areas is more limited than the overall distribution of Sonoran desertscrub.

In addition to desertscrub, pygmy-owls have also been found in riparian and xeroriparian communities and semidesert grasslands as classified by Brown (1994). Desertscrub communities are characterized by an abundance of saguaros or large trees, and a diversity of plant species and vegetation strata. Xeroriparian habitats contain a rich diversity of plants that support a wide array of prey species and provide cover. Semidesert grasslands have experienced the invasion of velvet mesquites in uplands, and linear woodlands of various tree species occur along bottoms and washes. In Arizona, these grassland communities often transition into desertscrub, which results in the availability of some saguaros for nesting.

While plant species composition differs among these communities, there are certain unifying characteristics such as the presence of vegetation in fairly dense thickets or woodlands; the presence of trees, saguaros, or organ pipe cactus large enough to support cavities for nesting; and elevations below 4,000 feet (Swarth 1914, Karalus and Eckert 1974, Monson and Phillips 1981, Johnsgard 1988, Enriquez-Rocha *et al.* 1993, Proudfoot and Johnson 2000). Large trees provide canopy cover and cavities used for nesting, while the density of mid- and lower-story vegetation provides foraging habitat and protection from predators, and it contributes to the occurrence of prey items (Wilcox *et al.* 2000). Perch substrates used by pygmy-owls for calling are typically the tallest trees available within a home range, though pygmy-owls have also been noted calling from within saguaro cavities (Flesch 2003a).

The density of trees and the amount of canopy cover preferred by pygmy-owls in Arizona has not been fully defined. However, preliminary results from a habitat selection study indicate that nest sites tend to have a higher degree of canopy cover and higher vegetation diversity than random sites (Wilcox *et al.* 2000). Overall vegetation density may not be as important as patches of dense vegetation with a developed canopy layer interspersed with open areas. Vegetation structure may be more important than species composition (Wilcox *et al.* 1999, Cartron *et al.* 2000a). This is related to the fact that canopy cover and layers of vegetation provide hunting perches, thermal cover, and promote predator avoidance regardless of species. Larger trees with greater canopy also have a greater potential to support cavities needed for nesting. Flesch (1999) indicated that areas with large trees and canopy coverage are likely important areas for pygmyowls in the Altar Valley, though the author also noted (Flesch 2003a) that the presence of large, columnar cacti was also a potentially critical factor due to a greater availability of cavities relative to broadleaf trees. Riparian and xeroriparian areas, which are often used by pygmyowls, are generally characterized by increased vegetation layers, higher plant diversity, and larger tree sizes because of increased moisture availability.

Species Status and Distribution

The pygmy-owl is one of four subspecies of the ferruginous pygmy-owl. It occurs from lowland central Arizona south through western Mexico to the States of Colima and Michoacan and from southern Texas south through the Mexican States of Tamaulipas and Nuevo Leon. Only the Arizona population of the pygmy-owl is listed as an endangered species (U.S. Fish and Wildlife Service 1997a).

The northernmost historical record for the pygmy-owl is from New River, Arizona, about 35 miles north of Phoenix, where Fisher (1893) reported the pygmy-owl to be "quite common" in thickets of intermixed mesquite and saguaro cactus. According to early surveys referenced in the literature, the pygmy-owl, prior to the mid-1900s, was "not uncommon," "of common occurrence," and a "fairly numerous" resident of lowland central and southern Arizona in cottonwood forests, mesquite-cottonwood woodlands, and mesquite bosques along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers and various tributaries (Breninger 1898, Gilman 1909, Swarth 1914). Additionally, pygmy-owls were detected at Dudleyville on the San Pedro River as recently as 1985 and 1986 (Hunter 1988, AGFD 2002a).

Records from the eastern portion of the pygmy-owl's range include an 1876 record from Camp Goodwin (nearby current day Geronimo) on the Gila River, and a 1978 record from Gillard Hot Springs, also on the Gila River. Pygmy-owls have been found as far west as the Cabeza Prieta Tanks, Yuma County in 1955 (Monson 1998). Hunter (1988) found fewer than 20 verified records of pygmy-owls in Arizona for the period of 1971 to 1988.

Documentation of the total number of pygmy-owls and their current distribution in Arizona is incomplete. Survey and monitoring work in Arizona resulted in documenting 41 adult pygmy-owls in 1999, 34 in 2000, 36 in 2001, 24 in 2002, and, most recently, 21 in 2003 (AGFD 2002a). Most of these pygmy-owls were distributed in four general areas: northwest Tucson, southern Pinal County, Organ Pipe Cactus National Monument, and the Altar Valley. We believe that

more pygmy-owls exist in Arizona, but systematic surveys have not been conducted in all areas of potential habitat.

In addition, recent survey information has shown pygmy-owls to be relatively numerous adjacent to and near the Arizona border in Mexico (Flesch and Steidl 2000). There also exists considerable unsurveyed habitat on the Tohono O'odham Nation, and, although we have no means of quantifying this habitat, the distribution of recent sightings on non-Tribal areas east, west, and south of the U.S. portion of the Tohono O'odham Nation lead us to reasonably conclude that these Tribal lands may support meaningful numbers of pygmy-owls. Consequently, we believe that it is highly likely that the overall pygmy-owl population in Arizona is maintained by the movement and dispersal of pygmy-owls among groups of pygmy-owls in southern Arizona and northern Mexico resulting from the connectivity of suitable habitat.

The extent to which pygmy-owls disperse across the U.S./Mexico border is unknown, but recent survey work indicates that pygmy-owls regularly occur along the border (Flesch and Steidl 2000, Flesch 2003b). However, addressing habitat connectivity and the movements of pygmy-owls within Arizona is a primary consideration in the analysis of this project due to the importance of maintaining dispersal and movement among pygmy-owl groups within Arizona.

The patchy, dispersed nature of the pygmy-owl populations in Arizona (Abbate *et al.* 2000) and Mexico (Flesch 2003b) suggests that the overall population may function as a metapopulation. A metapopulation is a set of subpopulations within an area, where movement and exchange of individuals among population segments is possible, but not routine. A metapopulation's persistence depends on the combined dynamics of the productivity of subpopulations, the maintenance of genetic diversity, the availability of suitable habitat for maintenance and expansion of subpopulations, and the replacement of subpopulations that have experienced local extinctions by the subsequent recolonization of these areas by dispersal from adjacent population segments (Hanski and Gilpin 1991, 1997). The local groups of pygmy-owls within Arizona may function as subpopulations within the context of metapopulation theory. However, more information is needed regarding the population dynamics of pygmy-owls in Arizona.

The ability and opportunity for pygmy-owls to disperse within population segments, as well as emigrate to adjacent population segments, is likely important for the long-term persistence of pygmy-owls in Arizona. Pygmy-owl dispersal patterns are just beginning to be documented. A banded juvenile in Arizona was observed in 1998 approximately 2.4 miles from its nest site following dispersal. Five young monitored with radio telemetry during 1998 were recorded dispersing from 2.17 miles to 6.5 miles for an average of 3.6 miles (Abbate *et al.* 1999). In 1999, six juveniles in Arizona dispersed from 1.4 mile to 12.9 miles for an average of 6.2 miles (Abbate *et al.* 2000). In Arizona, the maximum documented dispersal distance is 21.8 miles (AGFD 2002b).

Table 1 summarizes the numbers of pygmy-owls documented since 1993, excluding Tribal lands.

Table 1. Numbers and distribution of documented pygmy-owl locations 1993 - 2003 (Abbate *et al.* 1996, 1999, 2000, AGFD 2002a)

Area	Year	Sites	Adults	Young
Northwest Tucson	1993-1997	9	19	6
	1998	4	7	11
	1999	6	10	16
	2000	8	11	11
	2001	5	8	10
	2002	9	9	2
	2003	4	4	0
Pinal County	1993-1997	2	6	1
	1998	2	2	0
	1999	3	5	5
	2000	2	3	5
	2001	0	0	0
	2002	1	1	0
	2003	0	0	0

Altar Valley	1998	2	4	unknown
	1999	14	18	11
	2000	6	8	4
	2001	11	18	12
	2002	8	10	7
	2003	5	9	16
Area	Year	Sites	Adults	Young
Organ Pipe Cactus National Monument and Cabeza Prieta National Wildlife Refuge	1993-1997	2	2	0
	1998	1	2	4
	1999	3	4	unknown
	2000	6	8	0
	2001	7	10	5
	2002	3	4	0
	2003	5	6?	0

With so few individual pygmy-owls in Arizona, the maximum dispersal distance may be periodically needed to maintain genetic interchange between groups of pygmy-owls. Results of preliminary genetic analysis (Proudfoot and Slack 2001) and observations of incestuous breeding provide evidence that genetic variability may be low within northwest Tucson. On two separate occasions in this area, siblings of the same nest were documented breeding with each other the following year (Abbate *et al.* 1999). Instances of sibling breeding may be a reflection of small isolated populations of pygmy-owls. Maintaining genetic diversity within depressed populations is important to maintain genetic stochasticity and fitness. AGFD (Abbate *et al.* 1999) has documented movement between pygmy-owl groups in southern Pinal County and northwest Tucson; maintaining this genetic interchange is important.

Juveniles typically disperse from natal areas in July and August and do not appear to defend a territory until September. They typically fly from tree to tree instead of long flights and may move up to a mile or more in a night (Abbate *et al.* 1999). Trees of appropriate size and spacing appear to be necessary for successful dispersal, but specific data describing this pattern are currently unavailable. Once dispersing male pygmy-owls settle in a territory (the area defended by a pygmy-owl), they rarely make additional movements outside of their home range. For example, spring surveys have found male juveniles in the same general location as observed the preceding autumn (Abbate *et al.* 2000). However, unpaired female dispersers may make additional movements that sometimes continue into the subsequent breeding season (AGFD 2003).

Reasons for Listing

In determining whether listing of the pygmy-owl was warranted, we were required under section 4(a)(1) of the ESA to consider five listing factors: a) the present or threatened destruction, modification, or curtailment of its habitat or range; b) overutilization for commercial, recreational, scientific, or educational purposes; c) disease or predation; d) the inadequacy of existing regulatory mechanisms; or e) other natural or manmade factors affecting its continued existence. We determined that the following three factors applied to the pygmy-owl - Arizona DPS to the extent that endangered status is appropriate (USFWS 1997a).

Factor 1 - The present or threatened destruction, modification, or curtailment of the species habitat or range.

The pygmy-owl is threatened by present and potential future destruction and modification of its habitat throughout a significant portion of its range in Arizona (Phillips *et al.* 1964, Johnson *et al.* 1979, Monson and Phillips 1981, Johnson and Haight 1985, Hunter 1988, Millsap and Johnson 1988). One of the most urgent threats to pygmy-owls in Arizona continues to be the loss and fragmentation of habitat (U.S. Fish and Wildlife Service 1997a, Abbate *et al.* 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments, and the increased fragmentation of habitat caused by urban sprawl, directly and indirectly affects the pygmy-owl (Abbate *et al.* 1999).

Factor 4 - Inadequacy of existing regulatory mechanisms.

Although the pygmy-owl in Arizona is considered nonmigratory, it is protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712). The MBTA prohibits "take" of any migratory bird; however, unlike the ESA, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of an active nest occurs. Other Federal and State regulations and policies such as the Clean Water Act, military policies (Barry M. Goldwater Range), National Park Service policy, and inclusion of the pygmy-owl on the State of Arizona's list of Species of Special Concern will not adequately protect the pygmy-owl in Arizona from further decline. There are currently no provisions under Arizona statute addressing the destruction or alteration of pygmy-owl habitat.

Factor 5 - Other natural or manmade factors affecting its continued existence.

Recent genetic research suggests that pygmy-owls in northwestern Tucson show evidence of genetic separation from other populations in Arizona and Mexico (Proudfoot and Slack 2001). They have found that the low level of genetic variation and the absence of shared haplotypes between pygmy-owls in northwestern Tucson and the remainder of the State and Mexico increase the potential for the natural divergence of this population from the rest of the pygmy-owl population in Arizona. In addition, these owls have extremely low levels of average haplotype diversity. Researchers acknowledge this may also be a product of sampling (i.e., sampling from one maternal lineage) and/or an extremely high level of inbreeding as a result of low population numbers and geographic isolation.

Application of pesticides and herbicides in Arizona occurs year-round, and these chemicals may pose a threat to the pygmy-owl. The presence of pygmy-owls in proximity to residences, golf courses, agricultural fields, and nurseries may cause direct exposure to pesticides and herbicides. Furthermore, ingestion of affected prey items may cause death or reproductive failure (Abbate *et al.* 1999). Illegal dumping of waste also occurs in areas occupied by pygmy-owls and may be a threat to pygmy-owls and their prey. In one case, drums of toxic solvents were found within one mile of a pygmy-owl detection (Abbate *et al.* 1999).

Additional Threats

Although not used as the basis of listing, we identified several other potential threats to the pygmy-owl in the final listing rule (U.S. Fish and Wildlife Service 1997a).

Recreational Birding. The pygmy-owl is highly sought by birders who concentrate at several of the remaining known locations of pygmy-owls in the United States. Oberholser (1974) and Hunter (1988) suggest that recreational birding may disturb pygmy-owls in highly visited areas, affecting their occurrence, behavior, and reproductive success. Limited, conservative bird watching is probably not harmful; however, excessive attention and playing of tape-recorded calls may at times constitute harassment and affect the occurrence and behavior of the pygmy-owl (Oberholser 1974, Tewes 1995). For example, in 1996, a resident in Tucson reported a pygmy-owl sighting that subsequently was added to a local birding hotline, and the location was added to their website on the internet. Several car loads of birders were later observed in the area of the reported location (AGFD pers. comm. 1999). As recently as 2003, concerns have been expressed by property owners that birders and others have been documented trying to get photos or see pygmy-owls at occupied sites (AGFD pers. comm.).

Predation and Disease. Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. In Texas, eggs and nestlings were depredated by raccoons (Procyon lotor) and bullsnakes (Pituophis catenifer). Adult and juvenile pygmy-owls are likely killed by great horned owls (Bubo virginianus), Harris' hawks (Parabuteo unicinctus), Cooper's hawks (Accipiter cooperii), and eastern screech-owls (Otus asio) (Proudfoot and Johnson 2000). Similar predators are suspected in Arizona. Pygmy-owls are particularly vulnerable to predation and other threats during and shortly after fledging (Abbate et al. 1999). Recent research indicates that predation likely plays a key role in pygmy-

owl population dynamics, particularly after fledging and during the post-breeding season (AGFD 2003). Additional research is needed to determine the effects of predation, including nest depredation, on pygmy-owls in Arizona and elsewhere.

Hematozoa (blood parasites) may cause neonatal bacterial diarrhea, marginal anemia, and septicemia (Hunter et al. 1987), reducing survival and recruitment of birds. However, no evidence of hematozoa in pygmy-owls in Texas (Proudfoot and Radomski 1997) or Arizona (Proudfoot et al. unpubl. data) has been recorded. Trichomoniasis also can cause mortality of raptors (e.g., Cooper's hawks in Tucson) (Boal et al. 1998) that ingest doves and pigeons, but the effects of this disease on pygmy-owls in Arizona is unknown. Most species of raptors in the Tucson area, including small owls such as screech-owls and elf owls, have had documented cases of trichomoniasis (AGFD pers. comm.). House finches and doves are prey items for pygmy-owls in Arizona and are carriers of trichomoniasis (Abbate et al. 1999). Recent investigations in Texas and Arizona have indicated the regular occurrence of avian parasites in the materials inside of pygmy-owl nest cavities. The numbers of parasites may be high enough to affect nestling pygmy-owls. Hence, further study is needed in Arizona and Texas to assess the potential for diseases and parasites to affect pygmy-owl populations. West Nile Virus has been identified as the cause of a number of unusual raptor mortalities in some areas of the eastern United States. This virus is expanding to the west and the potential for infecting pygmy-owl warrants investigation and development of monitoring strategies.

Human-related Mortality. Direct and indirect human-caused mortalities (e.g., collisions with cars, glass windows, fences, power lines, domestic cats, etc.), while likely uncommon, are often underestimated, and probably increase as human interactions with pygmy-owls increase (Banks 1979, Klem 1979, Churcher and Lawton 1987). This may be particularly important in the Tucson area where pygmy-owls are located in proximity to urban development. Pygmy-owls flying into windows and fences, resulting in serious injuries or death to the birds, have been documented twice. A pygmy-owl collided into a closed window of a parked vehicle; it eventually flew off, but had a dilated pupil in one eye indicating neurological injury as the result of this encounter (Abbate et al. 1999). In another incident, an adult pygmy-owl was found dead at a wire fence; apparently it flew into the fence and died (Abbate et al. 1999). AGFD also has documented an incident of individuals shooting BB guns at birds perched on a saguaro that contained an active pygmy-owl nest. In Texas, two adult pygmy-owls and one fledgling were killed by a domestic cat. These pygmy-owls used a nest box about 245 feet from a human residence. In 2001, predation by domestic cats was also suspected by researchers in two instances in northwestern Tucson (AGFD 2003). Free-roaming cats can also affect the number of lizards, birds, and other prey species available to pygmy-owls; however, very little research has been done in the southwest on this potential problem.

Rangewide Trend

Data collection related to the pygmy-owl has only been consistent throughout the state for the past few years (see Table 1). Even with expanded survey efforts since the pygmy-owl was listed as endangered in 1997, there are still many areas within Arizona that have not been surveyed or for which survey efforts are inadequate. Because research has been conducted for only a few years and because research and survey efforts have not been comprehensive or random in nature,

it is not possible to determine population size or trend within Arizona. Additionally, the Tohono O'odham Nation supports pygmy-owls, but due to cultural and political considerations, complete information on the numbers or distribution on the Nation is not available. Given the historical distribution of pygmy-owls in Arizona, it is clear that they have declined throughout the state to the degree that they are now extremely limited in distribution (Monson and Phillips 1981, Davis and Russell 1984, Millsap and Johnson 1988, Proudfoot and Johnson 2000, Johnson *et al.* 2003). Johnson *et al.* (2003) hypothesized that large-scale water development (damming and diversion of the Salt and Verde rivers) and subsequent decline of riparian woodlands led to initial declines in species abundance and distribution.

Information gathered over the past few years indicates that pygmy-owls occur in Arizona in low numbers and are patchily distributed across southern Arizona. They occur in four main areas of the state, and numbers found within each area tend to vary on an annual basis (Table 1). Data are insufficient to determine meaningful trends, but it is likely that for the pygmy-owl to persist in Arizona, additional pygmy-owls need to be located, productivity needs to be expanded, and population support from Mexico or artificial augmentation is probably required.

Information about populations of pygmy-owls in Mexico is limited. Based on personal observations and anecdotal information, Russell and Monson (1998) recorded no decline in numbers from Sonora, Mexico. However, the first systematic surveys for pygmy-owls in Sonora were conducted in 2000 and 2001. These surveys resulted in the detection of 524 pygmy-owls along 329 transects, covering 690 miles (Flesch and Steidl 2000, Flesch 2003b). Pygmy-owls were detected throughout the state of Sonora, from the international border south to the Sonora/Sinaloa border, with the exception of the area around Hermosillo where agricultural and buffelgrass (*Pennisetum ciliaris*) conversion has impacted available habitat (Flesch 2003b). In 2000 and 2003, AGFD personnel documented, through the use of radio telemetry, the movement of two dispersing juvenile pygmy-owls into Mexico from nests just north of the international border (AGFD pers. comm.). However, while movement of pygmy-owls across the border likely occurs, we have no information regarding the extent to which this happens.

In addition, we are not aware of any management or conservation practices in Mexico that are directed towards pygmy-owls. The expansion of agricultural and urban land uses increases habitat loss and fragmentation in Mexico and the stability of pygmy-owl populations cannot be determined. In Mexico, millions of acres of Sonoran Desert and thornscrub are being converted to buffelgrass, which represents both a direct and an indirect loss of habitat because of invasion into adjacent areas and increased fire frequency and intensity (McLaughlin and Bowers 1982, Burquez-Montijo et al. 2002). Burquez and Yrizar (1997) state that the government subsidies to establish exotic introduced grasslands, to maintain large cattle herds, and to support marginal cattle ranching, the desert and thornscrub in Sonora will probably be replaced in the near term by ecosystems with significantly lower species diversity and reduced structural complexity, unless control measures are implemented. Such replacement is and will continue to affect pygmy-owl prey base and habitat availability. The importance of the pygmy-owl population in Arizona to the segment of the overall pygmy-owl population occupying Sonoran desertscrub and semi-desert grasslands will increase as habitat is converted in Mexico.

Under the current taxonomic classification, cactus ferruginous pygmy-owls also occur in southern Texas. However, recent genetic work (Proudfoot and Slack 2001) may indicate that the pygmy-owls in Texas are genetically distinct from the pygmy-owls in Arizona, possibly to the subspecies level. Regardless of the genetic distinction, pygmy-owls in Texas are found primarily on large private ranches where the levels of threat to habitat are reduced from those found in Arizona. Pygmy-owl populations in Texas are geographically separated from Arizona and currently provide no genetic or demographic support for Arizona populations.

Since listing in 1997, approximately 165 Federal agency actions have undergone informal consultation regarding the potential effects to pygmy-owls. These are actions that included sufficient measures to avoid or minimize impacts to the pygmy-owls so that the effects were insignificant or discountable. At least 49 Federal agency actions have undergone formal section 7 consultations throughout the pygmy-owl's range. Of these, only one resulted in a draft jeopardy opinion, and that was resolved as a non-jeopardy final opinion. Six formal consultations anticipated incidental take of one or more pygmy-owls. Given the extremely low number of known pygmy-owls in Arizona at present, lethal "take" of even a single owl would make it difficult to avoid jeopardizing the species. Many activities continue to adversely affect the distribution and extent of all types of pygmy-owl habitat throughout its range (development, urbanization, grazing, fire, recreation, native and non-native habitat removal, river crossings, ground and surface water extraction, etc.). Since 1997, we have provided technical assistance to hundreds of projects that do not have a federal nexus, primarily single-family residences. These actions have no legal requirement to follow the recommendations we provide under technical assistance and we have no way of monitoring if or to what extent the recommendations are incorporated. They may or may not contribute to the conservation of the pygmy-owl, but they certainly contribute to ongoing effects to pygmy-owl habitat. Stochastic events, such as fire, drought, and spikes in predator populations, also continue to adversely affect the distribution and extent of pygmy-owl habitat.

Anticipated or actual loss of occupied pygmy-owl habitat due to Federal or federally-permitted projects has resulted in biological opinions that have also led to acquisition of otherwise unprotected property specifically for conservation of the pygmy-owl.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform from which to assess the effects of the action now under consultation.

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR '402.02). In the BA, the applicant defined the action area as those areas of habitat below 4,000 feet that may be affected by construction and potential nesting sites within 1,310 feet of the proposed action that may be subject to noise disturbance during construction. In addition, the applicant is proposing a 7.08

mile buffer surrounding the project area to accommodate dispersing juvenile pygmy-owls. A pygmy-owl home range consists of 1,970 feet around the nest site or activity center, and we believe this is the distance that should be used to define the action area.

Pygmy-owl surveys were conducted by HEG in 2001 and 2002. No pygmy-owls were detected. No surveys were done in 2003, but surveys will be done in 2004. The only historical records of pygmy-owls within the Nogales District of the FS are in Sycamore Canyon and a dispersing juvenile in the Jarillas allotment. Pygmy-owl surveys were done in Sycamore Canyon in 1997 and 1998, and no owls were detected. In addition, the FS has surveyed 2,300 acres and found no pygmy-owls. A lone female pygmy-owl has been monitored in the Green Valley area in 2003 and 2004. This bird is being tracked by AGFD biologists. It is not known how close this pygmy-owl is to the action area.

Pygmy-owl habitat north of Sahuarita Road consists of Sonoran desertscrub, including scattered saguaros with potential nesting cavities. This area has the highest potential for pygmy-owl occupancy in the entire project area. Land status in this area is a mix of private and State land. The ASARCO Mission mine complex is also in this area. Grazing occurs on much of the State land.

Pygmy-owl habitat south of Sahuarita Road consists primarily of former semi-desert grassland that has been invaded by mesquite and acacia trees, mixed-cacti, ocotillo, yucca, and grasses, including the non-native Lehmann's lovegrass (*Eragrostis lehmanniana*). The area is largely undeveloped, but contains some existing electrical distribution lines and associated roads. There are also some low-density housing developments. Some areas of deciduous riparian forests are also found south of Arivaca Road in Sopori Wash and Peck Canyon. Land ownership in this area includes private, State, BLM, and FS.

An undetermined amount of undocumented immigrant (UDI) traffic occurs within the action area. Habitat damage is often associated with this, including discarded trash, illegal campfires, and disturbance near water sources. This type of activity is likely to remain the same or increase in the future.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Direct Effects

Pygmy-owls have been documented colliding with windows and fences in the Tucson area (U.S. Fish and Wildlife Service 2002). Pygmy-owls are capable flyers, but rarely make flights greater

than 100 feet (observational data from AGFD and FWS). Typical flight patterns are more likely to be from one tree to another, avoiding long flights in open areas, presumably to avoid exposure to predation (AGFD 2003). However, as opening size (i.e., gaps between trees or large shrubs) increases, coupled with increased threats (e.g., moderate to high traffic volumes and other human disturbances) relatively wide open areas may restrict pygmy-owl movement. The maximum size of the ROW will be 125 feet. Not all of the vegetation will be cleared from the ROW; only 12 feet is allowed for road construction.

Wide roadways and associated clear zones cause large gaps between tree canopies on either side of roadways, resulting in lower flight patterns over roads. This low flight level may result in pygmy-owls flying directly into the pathway of oncoming cars and trucks, significantly increasing the threat of pygmy-owls being struck. Measures can be implemented in roadway design to minimize these threats and allow successful movement across roadways. Among other measures, decreasing the canopy openings between trees on either side of roads and increasing the density of trees along roadways to provide greater shelter and cover from predators and human activities can be used to minimize adverse effects to pygmy-owls attempting to cross roads. Specific research is needed to determine the distance at which road and clear-zone widths significantly affect successful pygmy-owl movement, types of vegetation needed, roadway and landscaping designs, speed limits, etc.

There is potential for a pygmy-owl to be injured or killed in a collision with a construction vehicle. But, since there have been no pygmy-owls detected within the project area, it is unlikely that a collision would occur. Also, there will be existing vegetation on either side of the road since most of the surrounding area is undeveloped. This will reduce the chances of low-flying pygmy-owls as appropriate vegetation will be available on either side of the road.

There is a small risk of collision and electrocution with power lines, structures, and towers. To minimize the risk of powerline collisions, TEP will be following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996". To minimize the risk of electrocution, the distance between the power lines will be at least 18 feet. The average wingspan of an adult pygmy-owl is 15 inches; therefore there should be no risk of electrocution because there will no contact zone between pygmy-owl wings and the wires.

Short-term noise associated with construction activities, especially from the use of helicopters to install the transmission lines, could disturb pygmy-owls. These noises may also cause pygmy-owls to avoid using potential habitat in proximity to the action area. Since no pygmy-owls are known from the action area, direct effects from noise disturbance are expected to be minimal. The conservation measures outlined for pygmy-owl will provide additional protection if a pygmy-owl is detected during construction. Proposed critical habitat does not occur in the action area; thus none would be affected by the proposed action.

Indirect Effects

The proposed action will result in the disturbance of areas that support potential pygmy-owl habitat. The disturbance will be of a temporary nature, as most of the roads will be closed and restored, and all of the disturbed areas will be reseeded. The proposed action will result in the

temporary disturbance of 38.9 acres of Sonoran desertscrub, 36.7 acres of desert xeroriparian scrub, and 0.14 acre of deciduous riparian habitat. There will be a permanent loss of 4.9 acres of Sonoran desertscrub and 4.5 acres desert riparian scrub. Local disturbance to the pygmy-owl prey base will be minimized due to the linear nature of the project.

There will be the potential for increased use of pygmy-owl habitat by the public, due to the creation of new access points. Although TEP is proposing to use existing roads as much as possible, some new construction will take place. TEP will control access to the ROW on private lands and closure of the ROW on public lands will occur as needed. Unauthorized off-road vehicle use may occur and disturb any pygmy-owls in the area in the future. There is also an increased probability of human-caused ignitions in the action area. Suitable habitat may be destroyed. The measures outlined in the Fire Plan will minimize the risk of wildfire in the action area.

New disturbance and equipment can contribute to the spread of non-native species into a previously uninfected area. Some areas already support stands of Lehmann's lovegrass and additional disturbance can facilitate its spread into other areas. This is also the case for buffelgrass. Both of these invasive grass species have the potential to alter the ecosystem of the plant community by forming monotypic stands that do not allow for the regeneration of native species and create a much heavier fuel load with higher fire intensities. This change in plant composition can lead to a permanent change in the plant community by allowing fires to burn hotter and more frequently than would occur in the natural vegetation. Species like saguaros, which are not fire-adapted, can be removed from the plant community. Saguaros provide nesting substrate for pygmy-owls and their loss can represent an adverse effect. Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species in the action area.

CUMULATIVE EFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The amount of development within the action area that may occur in the future is unknown. Pima County grew by 26.5 percent between 1990 and 2000. It seems likely that this growth will continue, especially near the areas of Tucson and Sahuarita. Areas in Pima County within the action area, where the majority of pygmy-owl potential habitat is located, are a mix of private and State lands. All of these lands could become available for development in the future. This would mean continued loss of pygmy-owl habitat and further fragmentation of habitat and dispersal corridors for the owls.

Lands in Santa Cruz County are primarily on Forest Service lands. Actions on the Forest would be subject to our review under section 7 of the ESA and are not considered cumulative to this proposed action. As discussed in the Environmental Baseline, illegal smuggling and UDIs in the

action area cause environmental damage that may adversely affect pygmy-owls and their habitat. The effects of these illegal activities are cumulative effects.

Conclusion

After reviewing the current status of the pygmy-owl, the environmental baseline for the action area, the effects of the proposed transmission line, and cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the pygmy-owl. This project does not occur within proposed critical habitat for the pygmy-owl, thus none will be affected. In making our determination we considered the following:

- The status of the pygmy-owl in Arizona is tenuous. The number of adult pygmy-owls documented in Arizona has never exceeded 50 since regular survey and monitoring work began in 1993. In both 2002 and 2003, the number of known pygmy-owl nests in the State was three and four respectively, down from the highest number, 13, documented in 2001. Although the sample size is low and the monitoring period short, there appears to be a declining trend in the population that has somewhat corresponded with recent drought conditions.
- Surveys in the action area (2001 and 2002) have detected no pygmy-owls. There is one female pygmy-owl in the vicinity, but her location in proximity to the action area is unknown. Suitable habitat exists within the action area, but the majority of the disturbance will be temporary in nature. A total of 85.1 acres of suitable habitat will be altered, but only 9.4 acres (11 percent) will be permanently cleared within the ROW.
- Cumulative effects considered in our analysis include effects from illegal smuggling and UDI activity and the likelihood of residential subdivisions, single-family residences, and commercial projects where zoning, development plans, subdivision plats, or impact fee assessment make them reasonably certain to occur, but no Federal nexus and associated section 7 review are anticipated. Areas where these cumulative effects are anticipated to occur include areas where pygmy-owls have been documented and in habitat suitable for pygmy-owl dispersal. Cumulative effects are likely to contribute to habitat fragmentation and degradation. We are not aware of site-specific development plans within the action area.
- The Applicant has included a number of conservation measures that will meaningfully reduce the effects of the proposed action on pygmy-owls.

In summary, our conclusions are based on the record of this consultation, including the BA, supplements to the BA, correspondence, meetings with the Applicant, the information outlined in this BO, and the following:

• Surveys completed up to this date have detected no pygmy-owls within the project area; therefore, the likelihood of incidental take is minimal.

• Two years of consecutive surveys will be completed prior to construction. If surveys are not completed no construction will take place during the breeding season. If a pygmyowl is detected during construction, TEP will follow the conservation measures outlined in the proposed action.

- The project will disturb 38.9 acres of Sonoran desertscrub, 36.7 acres of desert riparian vegetation, and 0.14 acre of deciduous riparian vegetation. All of this disturbance will be of a temporary nature as TEP will reseed, close, and rehabilitate roads after construction is completed. A total of 9.4 acres will be permanently cleared of vegetation. TEP will also transplant saguaros that cannot be avoided during construction.
- Plans will be in place to address indirect effects from increased wildfire risk and the potential spread and introduction of invasive species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. "Harm" is defined (50 CFR Sect. 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR Sect. 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take Anticipated

We do not anticipate that the proposed action will result in incidental take of any pygmy-owls.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a) (1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a) (1) responsibilities for the pygmy-owl. In furtherance of the purposes of the Act, we recommend implementing the following discretionary actions:

• Conduct or fund studies using both monitoring and telemetry to determine habitat use patterns in that portion of the action area suitable for pygmy-owls. Surveys involving simulated or recorded calls of pygmy-owls require an appropriate permit from us. AGFD should also be contacted in regard to State permitting requirements.

- Assist in the implementation of recovery tasks identified in the pygmy-owl Recovery Plan, when approved by FWS.
- Monitor the effectiveness of conservation measures associated with this proposed action, especially road closures and the potential for increased off-road vehicle use in the action area.

Lesser long-nosed bat Status of the Species

We listed the lesser long-nosed bat (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered on September 30, 1988 (53 FR 38456). Critical habitat has not been designated for this species.

The lesser long-nosed bat is one of four members of the tropical bat family *Phyllostomidae*, which are found in the United States. It was formally separated from the Mexican long-nosed bat (*L. nivalis*) as a distinct species (*L. sanborni*) by Hoffmeister (1986). It has a long muzzle, a long tongue, and is capable of hover flight. These features are adaptations that allow the bat to feed on nectar from the flowers of columnar cacti such as the saguaro and organ pipe cactus, and from paniculate agaves such as Palmer's agave (*Agave palmeri*) and Parry's agave (*A. parryi*).

The lesser long-nosed bat is a medium-sized bat with a forearm measuring 2.0-2.2 inches and weighing 0.7-0.9 ounces as an adult. Adult fur is grayish to reddish-brown; juveniles have gray fur. Its elongated rostrum bears a small, triangular noseleaf, its ears are relatively small and simple in structure, and it has a minute tail. It is generally smaller in external and cranial measurements than *L. nivalis. Leptonycteris curasoae* can be distinguished from the Mexican long-tongued bat (*Choeronycteris mexicana*), with which it co-occurs in Arizona, by the larger size, less elongated snout, and tiny tail.

The lesser long-nosed bat is migratory and found throughout its historical range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. In southern Arizona lesser long-nosed bat roosts have been found from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County) and south to the international boundary. Individuals have also been observed from the vicinity of the Pinaleno Mountains (Graham County) and as far north as the McDowell Mountains (Maricopa County) (AGFD 1999). This bat is also known from far southwestern New Mexico in the Animas and Peloncillo Mountains (Hidalgo County). It is a seasonal resident in Arizona, usually arriving in early April and leaving in mid-September to early October. It resides in New Mexico only from mid-July to early September (Hoyt *et al.* 1994).

Roosts in Arizona are typically occupied from late April to October (Cockrum and Petryszyn 1991, Sidner 1997). In spring, adult females, most of which are pregnant, arrive in Arizona and gather into maternity colonies in southwestern Arizona. These roosts are typically at low elevations near concentrations of flowering columnar cacti. Litter size is one. After the young are weaned these colonies disband in July and August; some females and young move to higher elevations, ranging up to more than 6,000 feet, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Actual dates of these seasonal movements are rather variable from one year to the next (Cockrum and Petryszyn 1991, Fleming *et al.* 1993). Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains, but also occur with adult females and young of the year at maternity sites (Fish and Wildlife Service 1997b). Throughout the night between foraging bouts both sexes will rest in temporary night roosts.

The lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. In Arizona, four species of agave and two cacti are the main food plants (Wilson 1985). The agaves include Palmer's agave, Parry's agave, desert agave (A. deserti), and amole (A. schotti). Amole is considered to be an incidental food source. The cacti include saguaro and organ pipe cactus. Nectar of these cacti and agaves are high-energy foods. Concentrations of food resources appear to be patchily distributed on the landscape and the nectar of each forage plant species is only seasonally available. Cacti flowers and fruit are available during the spring and early summer; blooming agaves are available through the summer, primarily from July through early October, though Parry's agave blooms earlier. Columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desertscrub areas, desert grasslands and shrublands, and into the mountains. Parry's agave is usually found at higher elevations than Palmer's agave (Gentry 1982). The bats are generally considered to time their movement and feeding to the progression of flowering associated with these cacti and agaves. Many species of columnar cacti and agaves appear to provide a "nectar corridor" for lesser long-nosed bats as they migrate in spring from Central America and Mexico to as far north as southern Arizona, through fall when they return south (Gentry 1982, Flemming et al. 1993, Slauson et al. 1998). Lesser long-nosed bats appear to be opportunistic foragers and efficient fliers, capable of flight speeds up to 14 miles per hour (Sahley et al. 1993). They often forage in flocks. Seasonally available food resources may account for the seasonal movement patterns of the bat.

The lesser long-nosed bat is known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to flowering columnar cacti have been documented in Arizona at 15 miles and in Mexico at 25 miles and 38 miles (one way) (Dalton *et al.* 1994, V. Dalton, pers. comm., Y. Petryszyn, University of Arizona, pers. comm.). A substantial portion of the lesser long-nosed bats at the Pinacate Cave in Sonora (a maternity colony) fly 25-31 miles each night to foraging areas in Organ Pipe Cactus National Monument (Fish and Wildlife Service 1997b). Horner *et al.* (1990) found that lesser long-nosed bats commuted 30-36 miles round trip between an island maternity roost and the mainland in Sonora; the authors suggested these bats regularly flew at least 50-62.5 miles each night. In southeastern Arizona, lesser long-nosed bats commuted up to 17.4 miles, and an average of 11.7 miles, from the roost to core foraging areas (Steidl and Ober 2003, Ober and Steidl 2004). Lesser long-nosed bats have been observed feeding at hummingbird feeders many miles from the closest potential roost site (Petryszyn, pers. comm.).

Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (Fish and Wildlife Service 1997b). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are that determine selection of roost locations; the species seems sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements.

Food requirements of the lesser long-nosed bat are very specific. Adequate numbers of flowers or fruits are required within foraging range of day roosts and along migration routes to support large numbers of this bat. Locations of good feeding sites play an important role in determining availability of potential roosting sites, and roost/food requirements must be considered jointly when discussing the habitat requirements of this bat. A suitable day roost is probably the most important habitat requirement, but potentially suitable roosts must be within reasonable foraging distances of sufficient amounts of required foods before this bat will use them. It seems evident that the lesser long-nosed bat forages over wide areas and that large roosts require extensive stands of cacti or agaves for food. Therefore, destruction of food plants many miles from a roost could have an adverse effect on this bat (Fish and Wildlife Service 1997b).

The lesser long-nosed bat recovery plan (Fish and Wildlife Service 1997b) identifies the need to protect foraging areas and food plants. Columnar cacti and agaves provide critical food resources for this bat. Populations of these plants need continued protection to sustain nectar-feeding bat populations. A critical need in this area is information about the size of the foraging areas around roosts so that adequate areas can be protected. This information will show the minimum area needed to support a roost of nectar- and fruit-eating bats, provided the roost locations are known. There are 16 major roost sites in Arizona and Mexico (Fish and Wildlife Service 1997b).

According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by a total of more than 150,000 lesser long-nosed bats. The numbers above indicate that, although many of these bats are known to exist, the relative number of known large roosts is small. Disturbance of these roosts and the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

ENVIRONMENTAL BASELINE

In the BA, the applicant defined the action area to encompass all of the suitable foraging and roosting habitat within a 40-mile buffer surrounding the proposed transmission corridor. Lesser long-nosed bats have been documented to forage up to 40 miles from their roost site. Potential

roosting habitat occurs on FS lands and also along the proposed route in areas that contain saguaros and agaves.

Leptonycteris bats require suitable forage plants (paniculate agaves and columnar cacti) and suitable roost sites. Mines and caves occurring in southern and central Arizona provide suitable sites for post-maternity roosts of the lesser long-nosed bat. There are two known roost sites within the action area. There are a few small caves and crevices that may be suitable sites for day roosts. There are unsurveyed caves and mine adits on the FS that may support roosts. The two closest roost sites are Cave of the Bells in the Santa Rita Mountains (approximately 20 miles to the west) and a cave in the Patagonia Mountains (approximately 35 miles to the west). These roosts are within 40 miles of the proposed route, and habitat exists between the roosts and the proposed route that may be used by the bats. Agaves, and to a lesser extent, saguaros, are found in varying densities and age classes within the action area. They are found within the broad vegetation community classification of desertscrub, desert grassland, interior chaparral, oak woodland, pinyon-juniper woodland, pine-oak woodland, and mixed conifer in areas of the FS and other areas in the region. The primary agave used by the bat is Palmer's agave, which, as estimated by the FS, is widely scattered over 1,000,000 acres at densities of 10-200 per acre, generally between the elevations of 3,000-6,000 feet. Parry's agave is found between 5,000-8,200 feet and begins blooming in mid-spring. Both species occur within the action area.

Considerable evidence exists suggesting a dependence of *Leptonycteris* on certain agaves and cacti, although some Palmer's agave has been shown not to be dependent on *Leptonycteris* for pollination (Slauson 1996 and 1999, Slauson and Dalton 1998). Activities that adversely affect the density and productivity of columnar cacti and paniculate agaves may adversely affect populations of lesser long-nosed bats (Abouhalder 1992, Fish and Wildlife Service 1997b). Excess harvest of agaves in Mexico, collection of cacti in the United States, and conversion of habitat due to urban expansion, agricultural uses, livestock grazing, and other development may contribute to the decline of long-nosed bat populations (Fish and Wildlife Service 1988a). The northern portion of the proposed route is primarily undeveloped but contains some existing electrical lines as well as low-density housing near Sahuarita Road. There is one large mining operation, the Mission Mine Complex, that is also located within the action areas. State lands are used primarily for grazing. Lands on the FS are also used for livestock grazing. The route passes through several FS allotments. All of the livestock activities on the FS have been through section 7 consultation (2-21-98-F-399-R1).

An undetermined amount of undocumented immigrant (UDI) traffic occurs within the action area. Habitat damage is often associated with this, including discarded trash, illegal campfires, and disturbance near water sources. This type of activity is likely to remain the same or increase in the future.

EFFECTS OF THE ACTION

Direct Effects

If bats are present in an undetected roost within the project area, it is possible they may be disturbed by loud noises associated with construction, especially when helicopters are installing

the transmission lines. This will depend on the proximity of the roost to the construction zone. It is anticipated that as long as the roost sites themselves are not disturbed, it is unlikely that bats will abandon a roost because of an outside noise. As stated, there are no known roosts in close proximity to the proposed route, and the two known roosts are far enough away to not be affected by noise. Small numbers of bats may be temporarily displaced from small day roosts, but they can fly to another temporary roost in the area.

Indirect Effects

There will be loss of foraging plants due to construction. The severity of adverse effects to *Leptonycteris* bats resulting from potential reduction in forage resources is dependent on the importance of forage plants in a specific area to reproduction, survival, and growth of the bat. The primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall are Palmer's and Parry's agave. Both species occur in varying densities within the action area. Saguaros may be used, but they have usually finished flowering by the time lesser long-nosed bats arrive in southeastern Arizona. Saguaros usually bloom in May and the bats normally arrive in July-August.

It is not known how many individual agave or saguaros plants will be lost through the creation of new roads and clearing of sites for tower placement. The total amount of disturbance is relatively small due to the linear nature of this project. All agaves and saguaros will be transplanted outside of the construction zone. It is anticipated that the effect to the foraging habitat from the proposed action will be minimal as there will be intact areas of potential foraging habitat on either side of the proposed ROW. The mobility of the bats, coupled with the patchy distribution of foraging resources across the landscape, will reduce the overall effects of construction.

All of the other indirect effects (wildfire, invasive species, increased access) were addressed in the pygmy-owl effects section and are minimized by the same proposed conservation measures that were discussed in that section.

CUMULATIVE EFFECTS

The cumulative effects are the same as those discussed in the pygmy-owl section.

Conclusion

After reviewing the current status of the lesser long-nosed bat, the environmental baseline for the action area, the effects of the proposed transmission line, and cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the lesser long-nosed bat. In making our determination we considered the following:

• There are at least 16 major roost sites in Arizona. The number of bats fluctuates from year to year. The bats arrival in southeastern Arizona is usually timed with the blooming of paniculate agaves (*Agave palmeri* and *A. parryi*). They also feed on saguaro blooms, particularly in the southwestern deserts, when their arrival in Arizona, from Mexico,

coincides with saguaro flowering. Limiting factors for the bat are most likely the number of roost sites, disturbance of roost sites, and destruction of habitat that supports their food base. There are no current estimates of the population size.

- The cumulative effects discussed for the action area include residential development and continued degradation of habitat from undocumented aliens from Mexico. Many of these subdivisions will not require section 7 consultation because of a lack of Federal nexus. There will be continued fragmentation of habitat and loss of foraging plants.
- Potential direct adverse effects to the species are expected to be discountable (i.e., extremely unlikely to occur), as no roosts occur within the project area.
- There are no known roost sites adjacent to the proposed route. The nearest roost sites are 20 and 35 miles to the west of the project area and will not be affected by construction noise associated with the proposed action. Both roost sites are on Federal land, with some protections in place.
- Some foraging plants will be lost through construction activities. Agaves and saguaros will be transplanted to areas outside of the ROW to minimize the effects from the proposed action. In addition, due to the linear nature of this project, large areas of potential foraging habitat will be available within the action area.
- Plans will be in place to address indirect effects from increased wildfire risk and the potential spread and introduction of invasive species that may affect potential foraging habitat of the bat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. "Harm" is defined (50 CFR Sect. 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR Sect. 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take Anticipated

We do not anticipate that the proposed action will result in incidental take of any lesser long-nosed bats.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a) (1) of the Act direct Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a) (1) responsibilities for the lesser long-nosed bats. In furtherance of the purposes of the Act, we recommend implementing the following discretionary actions:

- Survey suitable roost habitat within the action area.
- Monitor the effectiveness of the saguaro and agave transplant efforts.
- Provide funding to bat researchers and/or the FS to continue monitoring efforts at the two known lesser long-nosed bat roosts within the action area.

Pima pineapple cactus STATUS OF THE SPECIES

Life History

The final rule listing Pima pineapple cactus as endangered was published on September 23, 1993 (58 FR 49875). The rule became effective on October 25, 1993; no critical habitat has been designated. Factors that contributed to the listing include habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution and plant species rareness, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations. The biological information below is summarized from the proposed and final rules, and other sources.

Pima pineapple cactus is a low-growing hemispherical cactus with adults varying in stem diameter from 2.0-8.3 inches and height from 1.8-18.0 inches. Individuals are considered adults when they reproduce sexually. Plants can be either single or multi-stemmed with yellow flowers blooming with the summer rains. Clusters of Pima pineapple cactus stems are formed primarily from vegetative clones produced at the plant base (Benson 1982, Roller 1996). The diagnostic field character of this taxon is the presence of one stout, straw-colored, hooked central spine. Radial spines extend laterally around the central spine and average 10 to 15 spines on large cacti and six on small cacti (Benson 1982).

Pima pineapple cactus occurs south of Tucson, in Pima and Santa Cruz counties, Arizona and adjacent northern Sonora, Mexico. It is distributed at very low densities throughout both the Altar and Santa Cruz valleys, and in low-lying areas connecting the two valleys.

Groups of flowers begin to bloom for single day periods five to seven days after the first monsoon rains. Flowering is triggered by as little as 0.12 inches of precipitation. Generally flowers begin opening midmorning and close at dusk (Roller 1996). Adult plants bloom one to three days each year; flowering is usually over by the end of August. Cross-pollination produces significantly more viable seeds than self-pollination. Fruits are mature within two weeks following successful pollination. Germination has been observed in the field during the summer monsoon rainy season (Roller 1996). Anecdotal observations indicate the species' flowers are visited by a variety of native bees and European honey bees, which have been observed to leave the flowers with their forehead and hind legs covered in Pima pineapple cactus pollen.

Habitat fragmentation and isolation may be an important factor limiting future seed set of this cactus. Recent data show that the species cannot successfully self pollinate *in situ* and is reliant on invertebrate pollinators. One hypothesis is that the spatial distribution pattern of individual Pima pineapple cacti within a given area may regulate pollinator visitations, thus resulting in more successful cross-pollination and subsequent seed set over the population (Roller 1996). If the pollinators are small insects with limited ability to fly over large distances, habitat fragmentation may contribute to a decrease in pollinator effectiveness with a subsequent decrease in seed set and recruitment.

Population Stability

Extrapolations from recent (1992-1997) surveys of known Pima pineapple cactus locations suggest that the cactus may be more numerous than previously thought. Projections based only on known individuals may underestimate the total number of individuals. This in no way indicates that the cactus is not rare or endangered. Pima pineapple cactus is widely dispersed in very small clusters across land areas well suited for residential, commercial, or mining development. Field observations suggest a great deal of land area within the range boundaries would not support Pima pineapple cactus today due to historical human impacts. Thus, populations are already considerably isolated from each other in many portions of the range, and population size and apparent recruitment varies significantly across the range. On a more local scale, population variability may relate to habitat development, modification, and/or other environmental factors such as slope, vegetation, pollinators, dispersal mechanisms, etc.

The transitional zone between the two regions of vegetation described by Brown (1982) as semidesert grassland and Sonoran desertscrub contains denser populations, better recruitment, and individuals exhibiting greater plant vigor. Vegetation within this transition zone is dominated by mid-sized mesquite trees, half shrubs (snakeweed, burroweed, and desert zinnia), and patches of native grass and scattered succulents. Because populations are healthier in this transitional zone, conservation within these areas is very important (Roller and Halvorson 1997). However, this important habitat type is not uniformly distributed throughout the plant's range. Populations of Pima pineapple cacti are patchy, widely dispersed, and highly variable in density. The higher population densities have only been documented at three sites. Compared to other

surveys, two of these sites are very small in scale and range from 1-3 plants per acre. Other densities across the majority of the plant's range vary between one plant per 4.6 acres and one plant per 21 acres (Mills 1991, Ecosphere 1992, Roller 1996).

Land areas surrounding developed parts of Green Valley and Sahuarita, Arizona, (including adjacent areas of the San Xavier District of the Tohono O'odham Nation) may be important for the conservation of this species within its range. Analysis of surveys conducted from 1992 to 1995 with a multivariate statistical analysis documented a pattern of greater population densities, higher ranks of cactus vigor, and better reproduction occurring within the transitional vegetation type found in this area of the northern Santa Cruz Valley (Roller and Halvorson 1997). This area could be defined as an ecotone boundary between semidesert grassland and Sonoran desertscrub.

Seedling and sub-adult size classes are uncommon in documented populations across the plant's range. However, this may be a function of the difficulty of finding such small, well-camouflaged plants in a large-scale survey, or because the establishment phase of the seedling may be limited in some unknown way. Research on Pima pineapple cactus reproduction has suggested that the establishment phase of Pima pineapple cactus life history may limit recruitment within populations (Roller 1996). Evidence presented to support this conclusion was the abundance of flowers, fruits, and viable seed, and the rarity of seedling presence at different sites spread throughout the plant's range (Roller 1996). Other research has confirmed that the establishment phase of other Sonoran cacti species may be critical for survival to reproductive maturity (Steenbergh and Lowe 1977).

Status and Distribution

Generally, the Pima pineapple cactus grows on gentle slopes of less than 10 percent and along the tops (upland areas) of alluvial bajadas nearest to the basins coming down from steep rocky slopes. The plant is found at elevations between 2,360 and 4,700 feet. (Phillips *et al.* 1981, Benson 1982, Ecosphere 1992), in vegetation characterized as either or a combination of both the Arizona upland of the Sonoran desertscrub and semidesert grasslands (Brown 1982).

The acquisition of baseline information began with surveys documenting the presence of Pima pineapple cactus as early as 1935. More intensive surveys were initiated in 1991 and other research established in 1993 further investigated the reproductive biology, distribution, fire effects, and mortality associated with various threats. Therefore, the best available baseline information is relatively recent and may not represent actual changes in distribution since the decline in the status of the species began.

Widely scattered surveys have been conducted across sites that varied considerably in cacti density. Pima pineapple cactus occurs in 50 townships within its U.S. range. However, a considerable amount of land area within the range boundaries does not provide habitat for the species due to elevation, topography, hydrology, plant community type, and human degradation. To date, an estimated 56,730 acres, or 10 to 20 percent of the U.S. range, have been surveyed. Not all of this area has been intensively surveyed; some has only been partially surveyed using small land blocks to estimate densities rather than 100 percent ground surveys. A conservative

estimate of total cacti located to date would be 3,800 individuals. The majority of those were located after 1991.

It is important to clarify that the above number represents the total number of cacti found and not the current population size. It would be impossible to estimate densities over the remaining unsurveyed area because of the clumped and widely dispersed pattern of distribution of this species. Of the 3,800 individuals recorded to date, 2,203 (58 percent) have been removed. This quantity includes observed and authorized mortalities (e.g. as a result of urban development) and individuals transplanted since the species was listed in 1993. A small portion of these mortalities were caused by natural factors (i.e., drought). Moreover, this figure does not take into account those cacti that are removed from private land or lost to other projects that have not undergone section 7 reviews.

Transplanted individuals are not considered as functioning within the context of a self-sustaining population. Efforts to transplant individual cacti to other locations have only had limited success and the mortality rate has been high, especially after the first year. Furthermore, once individuals are transplanted from a site, it is considered to be extirpated as those individuals functioning in that habitat are irretrievably lost. We view transplanting cacti as a measure of last resort for conserving the species. Transplanting will be recommended only when on-site and off-site habitat conservation is not possible and the death of cacti is unavoidable.

The area of habitat reviewed under section 7 of the ESA between 1987 and 2000 (i.e., habitat developed or significantly modified beyond the point where restoration would be a likely alternative) is approximately 24,429 acres, which represents 43 percent of the total area surveyed to date. In 1998, more than 1,100 acres of Pima pineapple cactus habitat were lost including 353 acres from the Las Campanas Housing Development project, and 752 acres from the ASARCO, Inc. Mission complex project. In 2000, 586 acres of habitat were lost with the expansion of a state prison in Tucson. In 2001, 177 acres of habitat were lost through development, but 888 acres of occupied and suitable habitat were conserved through conservation easements. In 2002, 383 acres of Pima pineapple cactus habitat were destroyed for development, but 36 acres were protected in the conservation bank and an additional 258 acres of habitat were conserved in private conservation easements. In 2003, one subdivision resulted in the loss of 858 acres of suitable Pima pineapple cactus habitat and set aside 784 acres of occupied habitat in a conservation easement. We are aware of housing developments along Valencia Road, Pima County, Arizona, in the vicinity of T15S, R12E, Section 15 and surrounding areas that support Pima pineapple cactus. These developments affect several hundred acres of habitat and have not been evaluated through the section 7 process. The number of acres lost through private actions, not subject to Federal jurisdiction, is not known, but given the rate of urban development in Pima County, we believe it is significant.

Most of the documented habitat loss has occurred south of Tucson down through the Santa Cruz Valley to the town of Amado. This area is critical for the future recovery of the species. The expansion of urban centers, human population, and mining activities will continue to eliminate habitat and individuals, and result in habitat fragmentation.

The protection of habitat and individuals is complicated by the varying land ownership within the range of this species. An estimated 10 percent of the potential habitat for Pima pineapple cactus is held in Federal ownership. The remaining 90 percent is on Tribal, State, and private lands. Most of the federally-owned land is either at the edge of the plant's range or in scattered parcels. The largest contiguous piece of federally-owned land is the Buenos Aires National Wildlife Refuge, located at the southwestern edge of the plant's range at higher elevations and lower plant densities.

Based on surveys and habitat analysis, areas south of Tucson through the Santa Cruz Valley to the town of Amado and surrounding developed parts of Green Valley and Sahuarita, and parts of the San Xavier District of the Tohono O'odham Nation, appear to support abundant populations, some recruitment, and units of extensive habitat still remain. However, the primary threat to the status of this species throughout its range is the accelerated rate (i.e., since 1993) at which this prime habitat is being developed, fragmented, or modified.

The Arizona Native Plant Law may delay vegetation clearing on private property for the salvage of specific plant species within a 30-day period. Although the Arizona State Native Plant Law prohibits the illegal taking of this species on state and private lands without a permit for educational or research purposes, it does not provide for protection of plants *in situ* through restrictions on development activities.

Based on current knowledge, urbanization, farm and crop development, and exotic species invasion alter the landscape in a manner that would be nearly irreversible in terms of supporting Pima pineapple cactus populations. Prescribed fire can have a negative effect if not planned properly.

Other specific threats that have been previously documented (U.S. Fish and Wildlife Service 1993), such as overgrazing and mining, have not yet been analyzed to determine the extent of effects to this species. However, partial information exists. Mining has resulted in the loss of hundreds, if not thousands, of acres of potential habitat throughout the range of the plant. Much of the mining activity has been occurring in the Green Valley area, which is the center of the plant's distribution and the area known to support the highest densities of individuals. Overgrazing by livestock, illegal plant collection, and fire-related interactions involving exotic Lehmann lovegrass may also negatively affect Pima pineapple cactus populations (U.S. Fish and Wildlife Service 1993).

Even with complete data on historical change related to Pima pineapple cactus distribution and abundance, we cannot reliably predict population status due to compounding factors such as climate change, urbanization, and legal and political complexities (McPherson 1995). We do not know if the majority of populations of Pima pineapple cactus can be sustainable under current reduced and fragmented conditions. Thus, there is a need to gather information on limits to the plant's distribution under current habitat conditions.

In summary, monitoring has shown that the range-wide status of the Pima pineapple cactus appears to have been recently affected by threats that have completely altered or considerably modified more than a third of the species' surveyed habitat, and have caused the elimination of

nearly 60 percent of documented locations. Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to detrimentally impact the habitat. The remaining habitat also is subject to degradation or modification from current land management practices, increased recreational use when adjacent to urban expansion (i.e., off-road vehicle use and illegal collection), and the continuing aggressive spread of nonnative grasses into habitat. Habitat fragmentation and degradation will likely continue into the foreseeable future based on historical data and growth projections produced by the Pima County Association of Governments (1996). There is very little Federal oversight on conservation measures that would protect or recover the majority of the potential habitat. Even some areas that have been the subject of section 7 consultations have been modified and may not be able to support viable populations of the Pima pineapple cactus over the long-term.

ENVIRONMENTAL BASELINE

The action area includes all potential habitat within the proposed ROW and a distance of 0.25 mile surrounding the proposed action. The 0.25 mile buffer encompasses the area that might be indirectly affected by the proposed action (e.g. the area that may be affected by the spread of a invasive grass). Pima pineapple cacti are known to occur in areas adjacent to the proposed route. Surveys were conducted along the entire 125 feet ROW in July 2002 and March 2003. A total of 52 Pima pineapple cacti were found within the ROW.

The northern portion of the proposed route is primarily undeveloped but contains some existing electrical lines as well as low-density housing near Sahuarita Road. There is one large mining operation, the Mission Mine Complex, that is also located adjacent to the action area. State lands are used primarily for grazing. Lands on the FS are also used for livestock grazing and the route passes through several FS allotments. All of the livestock activities on the FS have been through section 7 consultation (2-21-98-F-399-R1).

An undetermined amount of undocumented immigrant (UDI) traffic occurs within the action area. Habitat damage is often associated with this, including discarded trash, illegal campfires, and disturbance near water sources. This type of activity is likely to remain the same or increase in the future.

EFFECTS OF THE PROPOSED ACTION

Direct Effects

The proposed action will not result in the loss of any of the known Pima pineapple cactus within the ROW. The exact placement of the structures and new roads can be modified to avoid direct impacts to individual Pima pineapple cactus. All of the Pima pineapple cactus near construction areas and along main access routes will be clearly marked and protected to avoid impacts.

Indirect Effects

Occupied and suitable Pima pineapple cactus habitat will be lost or modified due to construction activities. Areas of permanent disturbance will remove portions of the seed bank, and areas of temporary disturbance can also alter the seed bank. In addition, the complete removal of vegetation will change water infiltration, compact soil, and change local site conditions. Although some areas of temporary disturbance may recover, it may take many years before full recovery is achieved. Sometimes Pima pineapple cactus can be found in areas of recent disturbance, as competition with other plants for nutrients and light are reduced.

To calculate the amount of disturbance to Pima pineapple cactus habitat, the entire alignment was divided into habitat classes based upon Pima pineapple cactus density. Areas that were over 15 percent slope, washes, and areas already disturbed were eliminated as potential Pima pineapple cactus habitat. The following habitat classes were used: Class A = > 0.3 Pima pineapple cactus/acre; Class B = 0.1 - 0.3 Pima pineapple cactus/acre; Class $C = 0^* - 0.09$ Pima pineapple cactus/acre. Density was used as a surrogate for habitat quality; the higher the density of Pima pineapple cactus, the higher the quality of the habitat. The 0^* value indicates an area that supported no pineapple cactus, but pineapple cactus were found in the vicinity of the ROW. The amount of permanent disturbance from access roads and pole locations was calculated for each habitat class. Acres lost in Class A will be compensated for at a 3:1 ratio, acres lost in Class B at a 2:1 ratio, and acres lost in Class C at a 1:1 ratio. The applicant will offset the loss of 28.9 acres of Pima pineapple cactus habitat by purchasing 36.5 credits (thereby protecting 36.5 acres of Pima pineapple cactus habitat) in a FWS-approved conservation bank for Pima pineapple cactus in the Altar Valley. The bank provides protection in perpetuity for the cactus and its habitat and the bank contributes to the overall recovery and conservation of the species.

Areas surrounding the northern portion of the proposed alignment, where the majority of Pima pineapple cacti were detected, are fairly inaccessible by vehicles and people. New permanent roads may allow for access into areas that were not available before. Pima pineapple cactus can be affected by off-road vehicle use, which modifies habitat and results in the destruction of cacti. We have observed Pima pineapple cactus that have been run over by off-highway vehicles. The majority of the ROWs in the northern portions will be within existing roads, with very little new road construction.

All of the other indirect effects (wildfire, invasive species, increased access) were addressed in the pygmy-owl effects section and are minimized by the same proposed conservation measures that were discussed in that section.

CUMULATIVE EFFECTS

The cumulative effects are the same as those discussed in the pygmy-owl section.

CONCLUSION

After reviewing the current status of Pima pineapple cactus, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological

opinion that the proposed action is not likely to jeopardize the continued existence of the Pima pineapple cactus. No critical habitat has been designated, therefore, none will be affected. We base this conclusion on the following:

- The status of Pima pineapple cactus continues to degrade. We estimate that almost one-half of the known population has been destroyed; the result of urban development. New populations of Pima pineapple cactus, detected during project surveys, do not contribute to the overall population estimate because the cacti are often transplanted, resulting in death. Habitat continues to be developed and habitat loss and fragmentation remain significant threats for this species.
- Cumulative effects considered in our analysis include effects of illegal smuggling and UDI activities, and residential subdivisions, single-family residences, and commercial projects where zoning, development plans, subdivision plats, or impact fee assessment make them reasonably certain to occur, but no Federal nexus is anticipated. Areas where these cumulative effects are anticipated to occur include areas where Pima pineapple cactus have been documented and in suitable habitat. Cumulative effects are likely to contribute to habitat degradation and fragmentation.
- The applicant will offset the loss of 28.9 acres of Pima pineapple cactus habitat by purchasing 36.5 credits (thereby protecting 36.5 acres of Pima pineapple cactus habitat) in a FWS-approved conservation bank for Pima pineapple cactus. The bank provides protection in perpetuity for the cactus and its habitat and the bank contributes to the overall recovery and conservation of the species.
- Plans will be in place to address indirect effects from increased wildfire risk and the
 potential spread and introduction of invasive species that may affect Pima pineapple
 cactus and its habitat.

INCIDENTAL TAKE STATEMENT

Sections 7(b) (4) and 7(o) (2) of the ESA do not apply to listed plant species. However, protection of listed plants is provided to the extent that the ESA requires a Federal permit for removal or reduction to possession of endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law. Neither incidental take nor recovery permits are needed from us for implementation of the proposed action.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

• TEP should monitor the off-road vehicle use within the action area to determine if there are additional effects to Pima pineapple cactus and its habitat from increased access.

- TEP should monitor the other conservation measures for their effectiveness.
- TEP should participate in the stakeholder group in developing the recovery plan for Pima pineapple cactus.

In order that we are kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

Reporting Requirements/Disposition of Dead or Injured Listed Animals

Should a dead or injured threatened or endangered animal be found, initial notification must be made to the Service's Division of Law Enforcement, 2450 West Broadway #113, Mesa, Arizona 85202 (480-967/7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in the handling of injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted as soon as possible to the nearest Service or AGFD office, educational, or research institutions (e.g. University of Arizona in Tucson) holding appropriate state and Federal permits.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, we should be contacted regarding the final disposition of the animal.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation with DOE on the proposed TEP transmission line in the Western Corridor. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We have assigned log number 02-21-0-F-0427 to this consultation. Please refer to that number in future correspondence regarding this consultation. Any questions of comments should be directed to Mima Falk at (520) 670-6150 (x 225) or Sherry Barrett at (520) 670-6150 (x 223).

Sincerely,

/s/ Steven L. Spangle Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
(Attn: Sarah Rinkevich)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

Bob Broscheid, Habitat Branch, Arizona Game and Fish, Phoenix, AZ Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ U.S. Army Corps of Engineers, Phoenix, AZ Forest Supervisor, Coronado National Forest, Tucson, AZ Bureau of Land Management, Tucson Field Office, Tucson, AZ U.S. Boundary and Water Commission, El Paso, TX

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Appendix A

CONCURRENCES

In the November 18, 2003, request for formal consultation, you concluded that the proposed construction of the transmission line, located in the Western Corridor, was not likely to adversely affect the jaguar, Mexican gray wolf, Mexican spotted owl and its proposed critical habitat, southwestern willow flycatcher, Chiricahua leopard frog, Gila topminnow, and Sonora chub and its critical habitat. We concur with these findings based on the following reasons:

Jaguar (Panthera onca)

- There is one documented sighting of a jaguar (December 2001) from within two miles of the proposed action, in the Atascosa mountains. Jaguars have been documented in the border area, traveling northward from Mexico, perhaps looking for unoccupied habitat. Their use of the area has been incidental. There have been no documented breeding pairs or females in the area. Jaguars are primarily nocturnal and would be expected to avoid the construction sites. It is highly unlikely that a jaguar will be encountered during the construction phase of the project.
- Jaguars use riparian areas and canyon bottoms as dispersal corridors. There will be minimal construction activities in these areas on the FS. The road density will not be increased on the Forest because TEP will close one mile of road for each mile they construct. Also, the majority of road construction will consist of spur roads off existing roads, usually between 500-1000 feet in length. It is unlikely that this level of road construction will fragment the habitat or isolate patches of habitat to the extent that it that would inhibit jaguar movement. Therefore, the effects to jaguars will be insignificant. There is no designated critical habitat for this species, therefore, none will be affected.
- TEP will donate five remote cameras to the Jaguar Conservation Team. These are in addition to the 14 cameras that are already in place along the United States/Mexico border. These cameras will assist with the monitoring of jaguar movements across the border region. If jaguars are detected in the project area, consultation with us will be reinitiated.

Mexican gray wolf (Canis lupus baileyi)

- There are no known sightings of wolves in the project area. The nearest populations are on the Apache National Forest, many miles away from the project area.
- It is highly unlikely that wolves from Mexico will use the action area. Construction noise may affect the use of the area by wolves. The likelihood that wolves would be affected by the project is discountable because there are no known records from the action area.

Due to the linear nature of the project, the potential for noise disturbance and habitat destruction would be minimal if wolves were in the area.

Mexican spotted owl (Strix occidentalis lucida) and proposed critical habitat

- The proposed action passes within one mile of two Protected Activity Centers (PACs) near the Ruby Road. PAC # 0502015 contains portions of FS roads 4195 and 4196. There is a campground and numerous other roads in the vicinity of these PACs. There was confirmed occupancy of PAC # 0502015 in 1999. Monitoring in 2001 found no owls. PAC # 0502016 has been monitored several times since 1998, with no response. The route is crossing Sonoran Desert grassland and chaparral and not crossing through canyons or washes containing xeroriparian vegetation. The nest sites are suspected to be in the upper reaches of the canyons. In addition, TEP will avoid construction within one mile of the known PACs during the breeding season (March 1 to August 31). It is unlikely that owls, if they were present in the area, would be disturbed by the construction in the area.
- Mexican spotted owls are primarily nocturnal, and it is unlikely that collisions with construction vehicles would occur. This also minimizes the chances of disturbance from daytime construction activities.
- Possible collision with the powerline and electrocution are possibilities. TEP will construct the transmission line following guidelines suggested for raptor protection. The average wingspan of an adult Mexican spotted owl is 3.3 feet, much smaller than the distance between the transmission lines (18 feet). This greatly minimizes the chances of electrocution.
- There is a small amount of proposed critical habitat within the project area in Unit BR-W-13. The proposed route would permanently disturb 9.7 acres of proposed critical habitat and temporarily disturb 46.8 acres. The area where the proposed route traverses does not contain constituent elements of critical habitat. The canyons that support riparian vegetation, with the overstory required, are not present within the ROW. Most of the area is exposed ridgeline, supporting scrub species and chaparral, and it is fairly open. Large oaks and other trees that would typify critical habitat are not present. The washes in the area would not support the type of riparian trees needed for critical habitat. The washes are ephemeral in nature. Although the area is included within proposed critical habitat, the area encompassed by the proposed route does not support vegetation described as constituent elements of critical habitat.
- Mexican spotted owls may be affected by new roads and the potential for increased fire. The outlined conservation measures will minimize those effects such that they are insignificant and discountable.

Southwestern willow flycatcher (*Empidonax traillii extimus*)

• There is no suitable breeding habitat for southwestern willow flycatcher in the project area.

• The alignment crosses one riparian area, Sopori wash, which supports some xeroriparain vegetation. The wash does not support perennial water. This area might be used by migratory willow flycatchers. To minimize the effects of construction, the road width in this area will be limited to 12 feet. Total disturbance to riparian vegetation will amount to 0.14 acre. Cottonwoods and willows that will be removed will be replaced at a 2:1 ratio. The effects to potential migratory willow flycatcher habitat will be temporary and short-lived and thus insignificant.

Chiricahua leopard frog (Rana chiricahuensis)

- No construction activities will take place in stock tanks or other occupied habitat of the frog.
- There are two occupied sites, Pena Blanca Spring and Sycamore Canyon, which are located downstream of construction areas. TEP will be implementing Best Management Practices, developed in conjunction with the FS, to minimize possible downstream sediment flow. It is anticipated that the distance (one mile) and the small area of construction in relation to the entire watershed, will result in an insignificant amount of sediment that could be deposited in occupied habitat.
- Chytrid fungus kills Chiricahua leopard frogs. The fungus can be introduced into areas in mud on boots, vehicle tires, and other equipment. To reduce the possibility of introducing the fungus into areas that do not already have it (it is known from Sycamore Canyon), TEP will set up cleaning stations (with a diluted bleach solution) to minimize the spread. The cleaning stations will be used when moving personnel and vehicles between wet zones.
- There is the possibility of frogs being run over by construction vehicles. Chiricahua leopard frogs can disperse up to five miles overland or through drainages and have been observed on Ruby Road. To significantly reduce this possibility, TEP will install silt fences along construction zones near the occupied sites. The fence will be at least two feet in height and buried to a depth of six inches. This should prevent frogs from entering the construction site, and render the possibility of them being run over discountable.

Gila topminnow (Poeciliopsis occidentalis)

- There is no occupied or suitable habitat for Gila topminnow in the project area.
- The nearest location of occupied Gila topminnow habitat is in the perennial portions of the Santa Cruz River, located east of the project area. It is unlikely, due to the distance

and the I-19 freeway, that any sediment associated with construction of the transmission line will affect occupied habitat. The BMPs that will be in place will further minimize sediment transport. Therefore, effects to Gila topminnow are discountable.

Sonora chub (Gila ditaenia)

- No construction activities will occur in occupied habitat in Sycamore Canyon.
- One occupied site, Casita Spring, is located within 656 feet of proposed construction. There is the possibility of increased sediment from road construction. With the BMPs in place, sediment associated with road construction should be minimized. The amount of sediment that may be transported into the spring would be greatly reduced. In the event of a large rainfall event, the amount of sediment runoff would be insignificant compared to overall sediment runoff from the watershed. The possible effects to Casita Springs from road construction would be insignificant (small area of construction) and discountable (low frequency of rainfall events). In addition, this particular road will be closed and revegetated after construction, so it does not become a permanent source of sediment.
- Critical habitat for Sonora chub has been designated in Sycamore Canyon. The critical habitat is downstream of the proposed alignment (Hank and Yank spring is one mile from the route), and the BMPs will reduce the amount of sediment that may enter Sycamore Canyon.

Appendix E

Harris Environmental Group, Inc.
Final Biological Assessment
TEP Proposed Sahuarita-Nogales
Transmission Line Project
Central Corridor (HEG 2004b)

FINAL BIOLOGICAL ASSESSMENT OF THE

TUCSON ELECTRIC POWER SAHUARITA – NOGALES TRANSMISSION LINE CENTRAL CORRIDOR

12 APRIL 2004

PREPARED FOR:

TUCSON ELECTRIC POWER

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EXECUTIVE SUMMARY

Tucson Electric Power (TEP) and Citizens Communications (Citizens) are proposing to build a new, dual-circuit, 345,000-volt (345-kV) transmission line from the TEP South Substation in the vicinity of Sahuarita, Arizona to interconnect with Citizens system at a Gateway Substation that TEP will construct west of Nogales, Arizona. From the Gateway Substation, the proposed transmission line will continue south across the United States-Mexico border for approximately 60 miles (mi) (98 kilometers [km]) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at the Santa Ana Substation. The proposed transmission line will improve Citizens' service in Nogales and allow for the transfer of blocks of electrical energy between the United States and Mexico. Southern Arizona and Sonora, Mexico have experienced rapid growth, and forecasts predict this growth will Citizens' customers have already experienced outages due to limited transmission facilities into the region. TEP recognizes the need to improve transmission into the southern Arizona region and proposes to assist Citizens in meeting an Arizona Corporation Commission (ACC) mandate to improve the reliability and service of its Nogales electrical system. The ACC has ordered Citizens to improve its system by the end of 2003. The TEP Sahuarita – Nogales Transmission Line, a double-circuit 345-kV transmission line will provide the additional reliability that Citizens requires while providing additional capacity into the southern Arizona region for future needs.

This Biological Assessment (BA) was prepared to meet the requirements of Section 7 of the Endangered Species Act (ESA) of 1973, 16 U.S.C. Section 1536(a)(2). Section 7 requires all federal agencies to consult with the United States Fish and Wildlife Service (USFWS) if an action may affect listed species or their designated critical habitat. Section 7 consultation is required for any project that requires a federal permit or receives federal funding. Action is defined broadly to include funding, permitting, and other regulatory actions. All activities associated with construction of the TEP Sahuarita – Nogales Transmission Line are included in the proposed action being evaluated for this BA. Because TEP has applied for a Presidential Permit to construct the transmission line across the international border, the Department of Energy (DOE) is preparing a Draft Environmental Impact Statement (DEIS) (Tetra Tech 2003) concurrently with this document.

Federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat. This is accomplished through consultation with the USFWS. If such species may be present, the applicant must conduct a BA to determine if a proposed action is likely to adversely affect listed species or designated critical habitat. USFWS will review this BA and issue a biological opinion (BO). DOE is the permitting agency for this proposed action, and therefore the lead federal agency in Section 7 consultation with USFWS.

The proposed action crosses a variety of land jurisdictions: including private, Arizona State Land Department (ASLD), Bureau of Land Management (BLM), and United States

Department of Agriculture Forest Service (USFS). Because each jurisdiction has different requirements for environmental review of the proposed action, this document is subdivided by agency. SECTION 2 addresses species that receive protection under the ESA of 1973. SECTION 3 reviews the potential effects of the proposed action on those species classified as "Sensitive" by the USFS. SECTION 4 reviews the potential effects of the proposed action on those species classified as "Sensitive" by the BLM. SECTION 5 addresses those species that are considered "Wildlife of Special Concern" by the Arizona Game and Fish Department (AGFD). Because habitats often overlap different jurisdictions, many species have classifications within each agency. In these instances, the species is evaluated under the jurisdiction which affords the highest level of protection.

We contacted federal (USFWS) and state (AGFD) natural resource agencies to request information on possible special status species (sensitive, threatened, and endangered) that may exist on or near the proposed Central Corridor of the TEP Sahuarita – Nogales Transmission Line from Sahuarita to Nogales, Arizona. Agency correspondence is presented in Appendix A.

SUMMARY OF DETERMINATIONS FOR FEDERALLY LISTED SPECIES

Based on contact with USFWS, USFS, BLM, and AGFD, 8 federally listed species may be affected by the proposed action. Upon review of the current status of these species, the environmental baseline of the project area, the effects of the proposed actions on the species as well as cumulative effects, the following determinations are made for the 8 affected species (Table 1).

Table 1. Effects of the proposed action on federally listed species.

SPECIES	POTENTIAL EFFECT	
Cactus ferruginous pygmy-owl	The proposed action may affect and is likely to adversely affect this species.	
Southwestern willow flycatcher	The proposed action may affect but is not likely to adversely affect this species.	
Lesser long-nosed bat	The proposed action may affect and is likely to adversely affect this species.	
Pima pineapple cactus	The proposed action may affect and is likely to adversely affect this species.	
Jaguar	The proposed action may affect but is not likely to adversely affect this species.	
Gila topminnow	The proposed action may affect but is not likely to adversely affect this species.	
Mexican spotted owl	The proposed action may affect, but is not likely to adversely affect this species. The proposed action may affect, but is not likely to adversely affect proposed critical habitat for this species.	
Mexican gray wolf	The proposed action may affect but is not likely to adversely affect this species.	

1.0 PROJECT DESCRIPTION

1.1 PROPOSED ACTION

The proposed TEP Central Corridor Sahuarita – Nogales Transmission Line will consist of 12 transmission line wires, or conductors, and 2 neutral ground wires that will provide lightning protection and fiber optic communication, on a single set of support structures. The transmission line will originate at the existing South Substation, in the vicinity of Sahuarita, Arizona, and interconnect with Citizens system at a Gateway Substation that TEP will construct west of Nogales, Arizona. The double-circuit transmission line will continue from the Gateway Substation south to cross the United States-Mexico border and extend approximately 60 mi (98 km) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at the Santa Ana Substation. Figure 1 shows the overall proposed project location.

The South Substation in Sahuarita will be upgraded and expanded to provide interconnection between a new TEP 345-kV transmission line and the new Gateway Substation west of Nogales. The South Substation will be expanded by approximately 1.3 acres (0.53 ha) to add a switching device that will connect to the proposed transmission line, with a 100 ft (30 m) expansion of the existing fence line for the addition of the second 345-kV circuit. The new Gateway Substation will include a 345kV to 115-kV power transformer to provide power to the local area. The new Gateway Substation will be constructed within a developed industrial park north of Mariposa Road (State Route 189), approximately 0.5 mi (0.8 km) east of the Coronado National Forest (CNF) boundary (Northeast ¼ of Section 12, Township 24 South, Range 13 East). The TEP portion of the site is approximately 18 acres (7.3 ha) and is within the City of Nogales, Arizona. TEP has purchased the substation site and preliminary construction activities have been completed. TEP is flexible in the placement of a fiber-optic regeneration site, but it will likely be located in the area of Township 18 South, Range 12 East, approximately 10 mi (16 km) southwest of Sahuarita on private land. The fiber optic regeneration site will consist of an approximate 0.5-acre (0.2-ha) fenced yard, containing a 10 ft (3 m) by 20 ft (6 m) concrete pad with an equipment house. The cleared area for the equipment house will be approximately 20 ft (6 m) by 30 ft (9 m). There will be three 3-acre (1.2-ha) construction staging areas (located near the South and Gateway Substations and the Interstate 19 [I-19]/Arivaca Road interchange) and an 80 acre (32 ha) temporary laydown yard (also near the I-19/Arivaca Road interchange) used during construction of the proposed line.

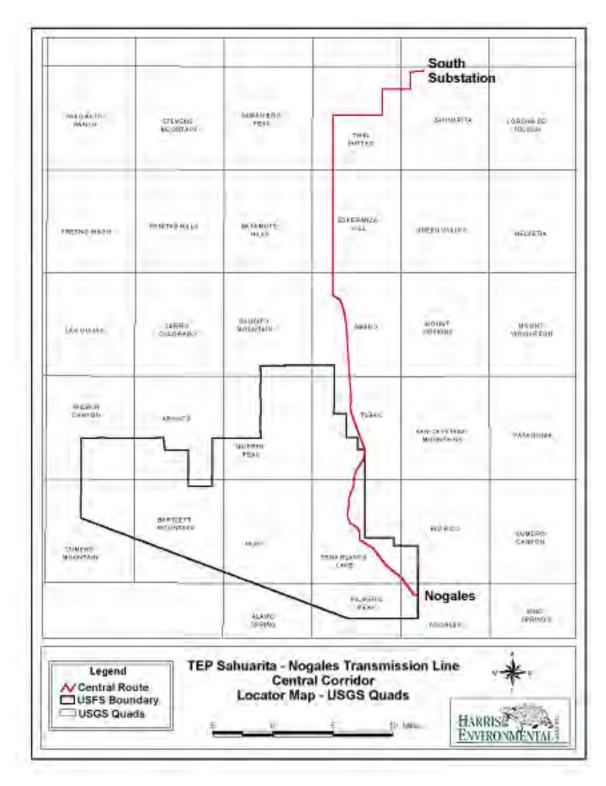
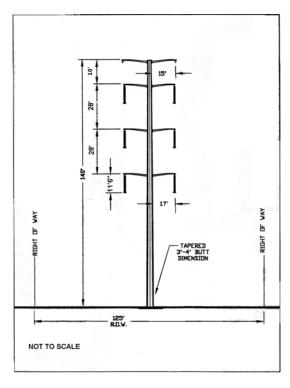


Figure 1. Map of the TEP Sahuarita – Nogales Transmission Line Central Corridor.

The primary support structures to be used for the transmission line are self-weathering steel single structures, or monostructures (Figure 2). Dulled, galvanized steel lattice towers (Figure 3) will be used in locations where their use will minimize overall environmental impacts, in accordance with Arizona Corporation Commission (ACC) Decision No. 64356 (ACC 2001).



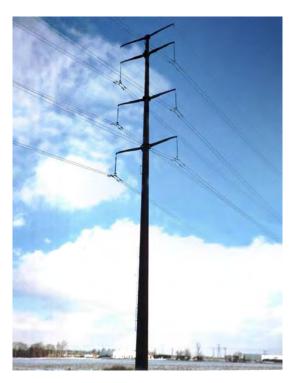


Figure 2. Monopole Transmission Line Structure Drawing and Photo.

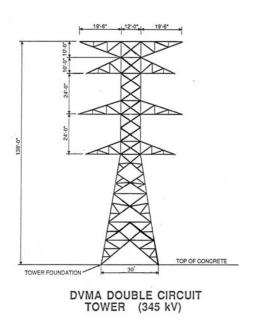




Figure 3. Lattice Tower Transmission Line Structure Drawing and Photo.

1.2 PROJECT LOCATION

The Central Corridor extends for approximately 57.1 mi (91.9 km), from the South Substation to the United States-Mexico border, including 43.2 mi (69.5 km) along the El Paso Natural Gas Company (EPNG) gasline right-of-way (ROW). The length of the Central Corridor is approximately 15.1 mi (24.3 km) within the CNF, and approximately 1.25 mi (2.01 km) on BLM land. The Central Corridor will require approximately 390 support structures, including approximately 102 within the CNF and 9 on BLM land. The Cental Corridor exits the TEP South Substation located within the incorporated area of the Town of Sahuarita and proceeds westerly for approximately 1.0 mi (1.6 km) before turning south for 1.5 mi (2.4 km). The corridor turns west across I-19 and continues through Pima County to the southwest, crossing approximately 1.25 mi (2.01 km) of federal land managed by BLM parallel to 2 existing TEP transmission lines (138-kV and 345-kV). The Central Corridor turns south to parallel the EPNG gasline ROW until reaching approximately 3 mi (4.8 km) south of the existing TEP Cyprus Sierrita Substation. South of the TEP Cyprus Sierrita Substation, the Central Corridor continues south to follow the EPNG gasline ROW to the south.

The Central Corridor continues south about 1.0 mi (1.6 km) west of I-19, and passes Amado, Tubac, and Tumacacori. The Central Corridor continues approximately 2.0 mi (3.2 km) south of Tumacacori, and enters the CNF, adjacent to the EPNG gasline ROW. The Central Corridor centerline diverges from the EPNG gasline ROW for approximately 1.9 mi (3.1 km) and avoids the USFS inventoried roadless area (IRA). The Central Corridor continues through the CNF, paralleling the EPNG gasline ROW to the southeast for several miles to the forest boundary. The proposed corridor exits CNF onto private land and proceeds 0.5 mi (0.8 km) east to the Gateway Substation. From the Gateway Substation, the proposed corridor returns to the west through private land and then turns south to parallel the CNF boundary. The proposed corridor meets the United States-Mexico border approximately 3,300 ft (1,006 m) west of Arizona State Highway 189 in Nogales, Arizona.

TEP will use existing access when feasible. Approximately 13.8 mi (22.2 km) of temporary new roads will be built for construction of the Central Corridor on the CNF (URS 2003a); spur roads off existing access roads adjacent to TEP transmission lines will provide project access on BLM land. Transmission line tensioning and pulling and fiberoptic splicing sites will also disturb land. The total new temporary area of disturbance on the CNF during construction of the Central Corridor will be approximately 105 acres (42.5 ha) (URS 2003a). Following construction, TEP will close new roads, construction areas, and existing roads not required for project maintenance in accordance with agreements with land owners or managers (e.g., BLM or USFS). On national forest land, TEP will close existing road mileage equal to that required for project maintenance, to avoid impacting the current road density. The maintenance access required by TEP will be limited to roads to selected structures, rather than a single cleared ROW leading to the United States-Mexico border. On the CNF transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yard areas will be obliterated within six months of the project becoming fully operational (URS 2003a).

1.3 PROJECT AREA

The project area includes the location where all construction and associated activities will occur along the ROW. Action areas are locations affected directly or indirectly by these activities and often include sites outside the immediate area of construction. Action areas are unique for each listed species and are outlined in SECTION 2.0 of this document.

Between Sahuarita and Nogales, the proposed action crosses four distinct biotic communities, or biomes (Brown 1994). A complete list of plant species documented during field surveys in 2002 is presented in Appendix B.



Figure 4. Sonoran desertscrub.

The northern end of the corridor contains vegetation characteristic of the Sonoran desertscrub biome (Figure 4). This biome is typically represented by saguaro (Carnegiea gigantea), cholla and prickly pear (Opuntia spp.) cacti, ocotillo (Fouquieria splendens), mesquite, velutina), acacia (Acacia paloverde (Parkinsonia spp.), creosote (Larrea tridentata), triangle-leaf bursage (Ambrosia deltoidea), and brittlebush (Encelia farinosa).

Vegetation south of the ASARCO mine transitions into the semidesert grassland biome (Figure 5). This area is dominated by grama (*Bouteloua* spp.), lovegrass (*Eragrostis* spp.), and three-awn (*Aristida* spp.) grasses, with low shrubs such as mesquite and acacia locally co-dominant. Agave (*Agave* spp.) and yucca (*Yucca* spp.) are also common in this biome. These grasslands are transected by desert riparian scrub dominated by mesquite and netleaf hackberry (*Celtis reticulata*).



Figure 5. Semidesert grassland.



Figure 6. Madrean oak woodland.

The higher elevations (above 3,500 ft [1,067 m]) of the project area are within the madrean oak woodland biome (Figure 6). Representative plants of this biome within the project area include Mexican blue oak (*Quercus oblongifolia*) and emory oak (*Q. emoryi*) trees, side-oats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), and fluffgrass (*Erioneuron pulchellum*).

The 4th biome represented within the project area is the Sonoran deciduous riparian forest (Figure 7), which is located within or near the ROW in Peck Canyon and in the Santa

Cruz River. The high water table in these areas supports stands of Fremont cottonwood (*Populus fremontii*), ash (*Fraxinus pennsylvanica* ssp. *velutina*), walnut (*Juglans major*), and willow (*Salix* spp.) trees.

The proposed ROW begins at an elevation of approximately 2,674 ft (815 m) at the TEP South Substation and reaches its maximum elevation of approximately 4,321 ft (1,317 m) near Tinaja Peak located southwest of the ASARCO Mine complex.

The Chiltepine Botanical Area is a 2,836 ac (1,148 ha) reserve located approximately 2 mi (1.2 km) west of the Central Corridor, in the northern portion of the Tumacacori Ecosystem Management Area (EMA) of the CNF. This area was established in June 1999 for the purpose of protecting and facilitating the study of chiltepine. These wild chiles typically are found in the more tropical environments between Mexico and South America. This area has been noted as the northernmost occurrence of chiltepine in the world.



Figure 7. Sonoran deciduous riparian forest.

Between 12 June and 22 June 2002, the Walker Fire, a human-caused fire, burned 16,369 ac (6,624 ha) of land along the United States-Mexico border approximately 1mi (1.6 km) west of the southern end of the Central Corridor. Portions of the Walker fire were very hot, especially near the international border and the upper slopes of ridges, while other areas, like Walker Canyon, burned relatively cool (T. Newman, CNF, pers. comm., 26 November 2002). While vegetation has begun to recover in some areas, other areas are highly susceptible to erosion due to reduced groundcover (Figure 8).



Figure 8. Area burned in Walker fire.

1.4 Conservation Measures

PROJECT-WIDE CONSERVATION MEASURES

- 1. Environmental Training All construction supervisors will be required to attend environmental training, which will outline their obligation to obey applicable laws and regulations regarding wildlife and habitats (Appendix C).
- 2. Erosion Control Measures TEP is in consultation with CNF regarding development of Best Management Practices (BMPs) for minimizing proposed project impacts on geologic, soil, and water resources on national forest land, in accordance with the USFS "Soil and Water Conservation Practices Handbook" (USFS 1990). Specific BMPs will be identified after coordination with Arizona Department of Environmental Quality (ADEQ) and before implementation of the project, for the entire length of the selected corridor.
- 3. Fire Prevention Plan A Fire Prevention Plan is under development to minimize the risk of accidental wildfire. All construction activities will adhere to this plan and fire suppression equipment will be available to all work crews. On CNF lands, the Fire Prevention Plan will comply with Forest Service Manual 5100.
- 4. Hazardous Material Spill Response Plan A Hazardous Material Spill Response Plan is under development which will describe the measures and practices to prevent, control, cleanup, and report spills of fuels, lubricants, and other hazardous substances during construction operations. This plan will ensure that no hazardous materials are stored, dispensed, or transferred in streams, watercourses, or dry washes, and vehicles are regularly inspected and maintained to prevent leaks.
- 5. Invasive Species Control An Invasive Species Management Plan in accordance with Executive Order 13112 is under development in coordination with CNF, ASLD, and BLM to identify problem areas and mitigation measures.
- 6. Road Closure/Obliteration TEP has committed to obliterate and permanently close 1 mi (1.6 km) of existing road on CNF (to be identified by CNF) for every 1 mi (1.6 km) of proposed new road used in the construction, operation, or long-term maintenance of the proposed action. TEP will monitor road closures during regularly scheduled inspection flights and/or ground inspections, and repair or replace road-closure structures as necessary following construction. Furthermore, TEP will cooperate with landowners on all ongoing road closure maintenance.

The following selective criteria and techniques for closing roads are taken from Section 1.3.2 of the Roads Analysis (URS 2003) and applies to access roads on CNF. Administrative roads will be closed to the general public but made available to TEP and its assigned contractors for the evaluation, maintenance, or upgrading of existing facilities.

Closure methods for administrative roads will include the following:

- a. Placement of heavy pipe posts with an attached, locked chain entrance on the road.
- b. Placement of heavy pipe posts with an attached, locked gate in a manner that blocks entrance on the road.
- c. Placement of a pipe barricade across the roadbed, locked in place in multiple locations in concrete sleeves.

The following methods may be used for the long-term closure of transmission line access roads used during construction and those roads required to be closed by the CNF. These roads may be reopened for emergency repair of transmission facilities, but will not be used intermittently as with administrative roads. Techniques include:

- a. Placement of boulders or other natural impediments across the road.
- b. Placement of a berm or trench across the the road.
- c. Rip, obliterate, and reseed/revegetate portions of roadbed as needed. This effort could be applied to the initial visual portion of roadway (e.g., first 100 ft [30 m]) to effectively obscure the roadway. This could be accomplished by transplanting native species of medium and large vegetation from the general area and reseeding with native grasses. By obscuring visible portions of roadway, future vehicular travel could be more effectively discouraged than by placing berms or other unnatural impediments to an otherwise visually inviting roadway.
- 7. Additional mitigation measures are outlined in Table 2.2-2 of the DEIS (Tetra Tech 2003).

SPECIES-SPECIFIC CONSERVATION MEASURES

Cactus ferruginous pygmy-owl (CFPO)

1. Protocol surveys – 2 consecutive years of protocol surveys must be conducted immediately prior to construction activities beginning within 1,969 ft (600 m) of designated habitat. If a CFPO is detected, USFWS has determined that certain continued construction activities will not harm or harass a CFPO as defined by ESA regulations. In areas where two consecutive years of protocol surveys cannot be completed, construction will occur outside of the breeding season.

Four zones are described (Zone I through Zone IV) that are based upon the distance of construction activity from a known nest or activity center. Certain levels of construction can occur within each zone without resulting in harm or harassment of the species. Situations that do not comply with the restrictions provided for each zone will require USFWS authorization before construction continues. Specific

development restrictions that apply to each of the four zones are described in the sections below:

Zone I: 0 to 328 ft (100 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- Construction-related activities may continue on land that has been cleared of vegetation provided that they do not exceed the level and/or intensity of activity that was occurring during the period of time that the territory was established.
- 3. Activities that will be more intense or cause more noise disturbance than was occurring during the period of time that the territory was established cannot proceed without authorization from USFWS and relevant land management agencies.

Zone II: 328 ft (100 m) to 1,312 ft(400 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. No restrictions on the nature or type of construction activity (excluding the clearing of vegetation) from 1 August through 31 January of the following calendar year.
- 3. Construction activities during the breeding season (1 February to 31 July) cannot exceed the levels or intensity of activities that occurred at the time the territory was established.

Zone III: 1,312 ft (400 m) to 1,969 ft (600 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. No restrictions on the levels or intensity of construction activity (excluding the clearing of vegetation) at any time of the year.

Zone IV: Greater than 1,969 ft (600 m) from the CFPO Activity Center

- 1. No restrictions any activity consistent with the project description provided to USFWS (as amended by supplemental reports) is allowed. For the purposes of this consultation, USFWS assumes that all construction or construction-related activities referred to under each zone description will be limited to those described in the project description in this BA.
- 2. All saguaros within construction areas will be transplanted or mitigated with

minimum 6.5 ft (2 m) specimens. Within riparian desertscrub and deciduous riparian areas, tree and shrub removal will be minimized to the greatest extent possible.

Lesser long-nosed bat (LLNB)

1. Agave within construction areas will be transplanted or replaced with similar age and size class individuals.

Pima pineapple cactus (PPC)

1. Purchase of 27 credits in a USFWS-approved conservation bank for PPC.

<u>Jaguar</u>

1. Two remote cameras will be donated to the Jaguar Conservation Team to assist with monitoring of jaguar movements across the Arizona-Mexico border. These cameras will all be placed within the Tumacacori EMA under permit from CNF. If female jaguar or cubs are documented by the Jaguar Management Team within the Tumacacori EMA, consultation with USFWS will be reinitiated.

2.0 FEDERALLY LISTED SPECIES

Special status species are plant and wildlife species that are of concern because their populations are either in jeopardy of extinction or are declining in number. The AGFD and USFWS were contacted concerning information on possible threatened and endangered species that may exist on or near the proposed action. In a letter dated 14 June 2002, USFWS listed 17 endangered species, seven threatened species, and two proposed species that occur in Pima and Santa Cruz counties, Arizona (Table 2). Agency correspondence is presented in Appendix A. Species included in USFWS correspondence, but excluded from evaluation are addressed in Appendix D.

Meetings with USFWS and USFS personnel were held on 9 April, 13 May, 3 December 2002, and 28 March 2003 to discuss the potential effects of the proposed action on special status species. BLM personnel also attended the 3 December 2002 meeting. A meeting with AGFD was held on 19 April 2002. Additional meetings were held with USFWS on 30 May, 6 November, and 10 December 2002, and 19 March, 16 May, 11 June, 14 July, and 11 September 2003, and 18 March 2004.

Table 2. Federally listed species that may occur near the proposed action.						
		DRAFT				
SPECIES	STATUS	DETERMINATION				
Canelo Hills ladies' tresses	Endangered	No Effect				
Cactus ferruginous pygmy-owl	Endangered	May affect,				
Cactus ferruginious pyginy-owi	Endangered	likely to adversely affect				
Desert pupfish	Endangered	No Effect				
Gila topminnow	Endangered	May affect, not likely to				
-		adversely affect				
Huachuca water umbel	Endangered	No Effect				
Jaguar	Endangered	May affect, not likely to adversely affect				
Jaguarundi	Endangered	No Effect				
Kearney's blue star	Endangered	No Effect				
Laggar lang noged but		May affect,				
Lesser long-nosed bat	Endangered	likely to adversely affect				
Masked bobwhite	Endangered	No Effect				
Mayigan gray wolf	Endangered	May affect, not likely to				
Mexican gray wolf	Endangered	adversely affect				
Nichols turk's head cactus	Endangered	No Effect				
Northern aplomado falcon	Endangered	No Effect				
Ocelot	Endangered	No Effect				
Pima pineapple cactus	Endangered	May affect,				
1 11	Lituangereu	likely to adversely affect				
Sonoran pronghorn	Endangered	No Effect				
Sonoran tiger salamander	Endangered	No Effect				
Southwestern willow flycatcher	Endangered	May affect, not likely to				
·		adversely affect				
Bald eagle	Threatened	No Effect				
Brown pelican	Threatened	No Effect				
Chiricahua leopard frog	Threatened	No Effect				
Loach minnow	Threatened	No Effect				
Mexican spotted owl	Threatened	May affect, not likely to				
•	Tincateneu	adversely affect				
Sonora chub	Threatened	No Effect				
Spikedace	Threatened	No Effect				
Mountain plover	Proposed	No Effect				
Gila chub	Proposed	No Effect				

2.1 CACTUS FERRUGINOUS PYGMY-OWL (*Glaucidium brasilianum cactorum*) (Endangered)

2.1a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the CFPO includes those areas of habitat below 4,000 ft (1,219 m) that may be directly impacted by construction as well as potential nesting sites within 1,312 ft (400 m) of the proposed action (USFWS 2000a) that may be subject to noise disturbance during construction. In addition, a 5 mi (8 km) buffer area surrounding the project area is included in the action area because juvenile CFPO have been documented traveling up to this distance during dispersal.

2.1b Natural History and Distribution:

USFWS listed CFPO in Arizona on 10 March 1997 (USFWS 1997a) as endangered. Listing was based on historical and current evidence that suggested a significant population decline of this subspecies had occurred in Arizona. USFWS considered the loss and alteration of habitat as the primary threat to the remaining population. A recovery plan for the species is currently in development by the CFPO recovery team.

CFPO (Figure 9) are small brown birds, with a cream-colored belly streaked with paler brown (Pyle 1997). The *cactorum* race; however, is described as "a well-marked, pale

grayish extreme for the species" (Phillips et al. 1964). The call for this mostly diurnal owl is heard chiefly near dawn and dusk. The best field identification features are its small size, eyespots on the nape of the neck, and long reddish-barred tail, which is often nervously wagged or twitched (Monson 1998).

Originally CFPO were described as a separate subspecies based on specimens from Arizona and Sonora, Mexico. CFPO were first documented in the United States from a collection by Lieutenant Charles E. Bendire on 24 January 1872 in the "heavy mesquite thickets along Creek" near the present day site of historic Camp Lowell, Tucson (Coues 1872, Bendire 1892).



Figure 9. Cactus ferruginous pygmy-owl.

Very little is known about the life history of CFPO in Arizona (Cartron et al. 2000a). Little or no literature currently exists concerning life history variables such as longevity, age distribution, and recruitment. Current studies undertaken by AGFD, USFWS, and The University of Arizona are examining these variables.

The diet of CFPO is not well understood, but they are believed to be prey generalists (Cartron et al. 2000a). Observations, stomach content analysis, and records of Texas pygmy-owls suggest that these owls have a diverse diet that includes mammals, birds, reptiles, and insects (Proudfoot and Beasom 1997).

CFPO nest in cavities of larger trees (typically defined as a tree with a trunk at least 6 in [15 cm] diameter at breast height [DBH]) or large columnar cactus. Cavities may be naturally formed (e.g. knotholes) or excavated by woodpeckers. CFPO do not construct their own nest holes. All currently known CFPO nest sites in Arizona are in woodpecker excavated cavities in saguaros. Historically, the species also has been documented nesting in cottonwood, paloverde, and mesquite trees in Arizona.

Nesting activity for this owl species in Arizona begins in late winter to early spring (Lesh and Corman 1995, Abbate et al. 1996). Little is known about its courtship flight behavior. Egg laying begins by late April with three to four eggs typically laid. It is uncertain if only one brood is hatched per year. Nestlings have been observed through the end of July. During nesting, the male brings food to the female and young (Glinski 1998).

Historically, CFPO occurred from the lowlands of central Arizona, south through western Mexico to the states of Colima and Michoacan, and from southern Texas south through the Mexican states of Tamaulipas and Nuevo Leon. In Arizona, the species was documented as far north as New River and Cave Creek in northern Maricopa County (Harris and Duncan 1999). Elsewhere in Maricopa County, the species has been found near the Yuma County line along the Gila River at Agua Caliente, along the Salt River at Phoenix, and near the Verde River confluence. The eastern most verifiable record was along the Gila River at Old Fort Goodwin, located approximately 2 mi (1.2 km) southwest of present day Geronimo, Graham County, Arizona (Aiken 1937). In the southeastern part of the state, the species has been documented in recent times near Dudleyville along the lower San Pedro River between 1985 and 1987 (Harris and Duncan 1999), and probably also along lower Aravaipa Creek in 1987 (Monson 1987). Other localities in south central Arizona include historical records in Pinal County near Sacaton and Blackwater on the Gila River Indian Reservation, and at Casa Grande (Harris and Duncan 1999). Near the Mexican border, the species has been found in Santa Cruz County near Patagonia and in Sycamore Canyon west of Nogales. A likely accidental sighting was documented once on 10 April 1955 in eastern Yuma County near the Mexican border at Cabeza Prieta Tanks on the Cabeza Prieta National Wildlife Refuge (Monson and Phillips 1981, Harris and Duncan 1998).

Surveys conducted by University of Arizona biologists in Sonora, Mexico found 280 CFPO during the 2000 survey season. CFPO within Sonora, Mexico and Arizona may have been the same population prior to agricultural expansion within the last 75 years. However, due to isolation, the genetic connection of the Arizona population to owls in the nearby state of Sonora, Mexico may be tenuous (USFWS 2002a).

CFPO have been documented in several habitat types in the northern portion of its range in Arizona and adjacent Mexico. In Arizona, these include streamside Sonoran riparian deciduous forest and woodland associations and Sonoran desertscrub. CFPO also inhabit Sinaloan deciduous forest and thornscrub in Mexico (not discussed here). The streamside associations include such species as cottonwood, ash, netleaf hackberry, willows, velvet mesquite, and others. The Sonoran desertscrub associations are composed of relatively

dense saguaro cactus stands associated with short trees such as paloverde, mesquite, and ironwood (*Olneya tesota*), and an open understory of triangle-leaf bursage, creosote, and various other cacti and shrubs. Throughout its range, CFPO occur at low elevations, generally below 4,000 ft (1,219 m).

CFPO found in Sonoran desertscrub habitats are typically associated with structurally diverse stands of desert riparian scrub with saguaros along washes (Wilcox et al. 2000). Such habitat is often referred to as xeroriparian vegetation (Johnson and Haight 1985). These washes have no permanent water flow. Instead, flow is intermittent and based on seasonal rainfall as well as strength and duration of individual storms. Desert riparian scrub vegetation is easily recognizable by the presence of a linear assemblage of trees and shrubs that grow along the wash. Density is higher and taller than the sparse desertscrub vegetation that typically exists in the adjacent uplands. Before listing the species as endangered, all known CFPO were documented in such Sonoran desertscrub habitat (Lesh and Corman 1995, Abbate et al. 1996).

At the northern periphery of the subspecies range in southern Arizona, CFPO distribution and preferred habitat is not well understood. It is believed CFPO require the cover of denser wooded areas with understory thickets, like riparian habitat, for nesting, foraging, and predator avoidance (Abbate et al. 2000). Riparian habitat also is known for its high density and diversity of animal species that constitute the prey base of CFPO.

A significant decline in the Arizona population has occurred over the past several decades (USFWS 1997a, Richardson et al. 2000). Loss or modification of habitat from woodcutting, agriculture, groundwater pumping, and related human activities has presumably contributed to the population decline (USFWS 1997a).

2.1c Critical Habitat

On 12 July 1999, USFWS designated approximately 731,712 acres (296,113 ha) of critical habitat supporting riverine, riparian, and upland vegetation in seven critical habitat units, located in Pima, Cochise, Pinal, and Maricopa counties of Arizona (USFWS 1999). However, on 21 September 2001, the U.S. District Court for the State of Arizona vacated this final rule designating critical habitat for CFPO, and remanded its designation back to the USFWS for further consideration. On 27 November 2002, USFWS proposed designating 1.2 million acres (485,000 ha) of critical habitat for CFPO in southern Arizona (Federal Register Vol. 67, No 229:71031-71064). The proposed action does not enter any areas proposed as critical habitat.

2.1d Current Status Statewide

USFWS determined that CFPO in Arizona were endangered because of the following factors (USFWS 1997a):

- present or threatened destruction, modification, or curtailment of its habitat or range;
- inadequacy of existing regulatory mechanisms;
- other natural and manmade factors, which include low genetic viability.

Surveys conducted statewide during the 2002 season confirmed a total of 18 adult CFPO and three nests in Arizona. Similar to the previous four years, there was greater than 50 percent fledgling mortality documented in 2002, with only one juvenile confirmed surviving dispersal (S. Richardson, USFWS, pers. comm., 3 December 2002).

One of most urgent threats to CFPO in Arizona is thought to be the loss and fragmentation of habitat (USFWS 1997a, Abbate et al. 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments directly and indirectly impacts CFPO survival and recovery (Abbate et al. 1999). In recent decades, CFPO riparian habitat has continually been modified and destroyed by agricultural development, woodcutting, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Bahre 1991, Stromberg et al. 1992, Stromberg 1993a and 1993b). Sonoran desertscrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991). Pumping of groundwater and the diversion and channelization of natural watercourses are also likely to have reduced CFPO habitat.

Proudfoot and Slack (2001) found that CFPO in northwestern Tucson may be isolated from other populations in Arizona and Mexico. Low genetic variability can lead to a reduction in reproductive success and environmental adaptability. In 1998 and 1999, two cases of sibling CFPO pairing and breeding were documented (Abbate et al. 1999). In both cases, young were fledged from the nesting attempts. These unusual pairings may have resulted from extremely low numbers of available mates within dispersal range, and/or from barriers (including fragmentation of habitat) that have influenced dispersal and limited the movement of young owls (Abbate et al. 1999).

Soule (1986) notes that very small populations are in extreme jeopardy due to their susceptibility to a variety of factors, including variations in birth and death rates that can result in extinction. In small populations such as with CFPO, each individual is important for its contribution to the genetic variability of that population.

2.1e Environmental Baseline

CFPO habitat north of Sahuarita Road consists of Sonoran desertscrub with relatively high species diversity and structural diversity, including scattered saguaro cacti containing potential nesting cavities. This area is within Survey Zone 1 (USFWS 2000a) and has the highest potential for occupancy of the entire action area. Land status in this area is a mixture of private and state land. The Mission Mine Complex also is located within this section of the proposed action and grazing occurs on much of the state lands in the area.

CFPO habitat south of Sahuarita Road consists primarily of semidesert grassland dominated by mesquite and acacia trees, mixed-cacti, ocotillo, yucca, and grasses, including non-native Lehmann's lovegrass (*Eragrostis lehmanniana*). The area is primarily undeveloped, but does contain some existing electrical distribution lines and

associated roads (Figure 10) as well as low density housing developments. These grasslands are transected by desert riparian scrub dominated by mesquite and netleaf hackberry trees. Some areas of deciduous riparian forests are also found south of Arivaca Road in Sopori Wash and Peck Canyon. Land jurisdictions in this area include private, state, BLM, and USFS.



igure 10. Example of existing disturbance within the corridor.

CFPO surveys were conducted by Harris Environmental Group, Inc. (HEG) biologists in 2001 and 2002 (data previously submitted to USFWS) in accordance with the approved protocol (USFWS 2000a). Surveys were conducted in Sonoran desertscrub habitat where saguaros were present and in desert riparian scrub and deciduous riparian habitats that contained large trees (over 6 in [15.2 cm] DBH). No CFPO were detected during either survey year.

The only historical records of CFPO within the Nogales Ranger District (RD) of the CNF are in Sycamore Canyon (CNF 2000) and a dispersing juvenile in the Jarillas Alloment. USFS surveys in Sycamore Canyon in 1997 and 1998 did not locate CFPO. Additionally, USFS personnel surveyed 2,300 acres (930 ha) in 1999 with negative results and conducted 58 habitat assessments for CFPO habitat (CNF 2000). The habitat assessments identified four areas that ranked high enough to warrant CFPO surveys. No CFPO have been detected during surveys of these four areas (T. Newman, CNF, pers. comm., 9 October 2002).

2.1f Effects of Proposed Action on the CFPO

Direct Effects

Vehicle and Powerline Collisions

CFPO collisions with windows and fences have been documented in the Tucson area (USFWS 2002a), and observations of low flying CFPO across roadways indicate vehicle collisions are a realistic hazard (Abbate et al. 1999). While CFPO may be active during daylight, no CFPO have been detected within the action area, therefore, CFPO collisions with construction related vehicles are unlikely.

There is a small risk of a CFPO collision with power lines, however, raptors have lower rates of collision with power lines than passerine birds (McNeil et al. 1985). This reduced collision rate may be due to the visual acuity, maneuverability, and non-flocking tendencies (Nobel 1995). To minimize the risk of powerline collisions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996).

Electrocution

Because power structures and towers are attractive perching and nesting sites for some raptor species, significant raptor mortality from electrocution has been reported in North America (Harness and Wilson 2000). Electrocution occurs when a bird simultaneously touches two phase conductors or a conductor and a ground wire (Bevanger 1994). Most electrocutions occur on distribution lines (34-kV or less) rather than on transmission lines (69-kV or more), primarily because clearances between wires on distribution lines are less and distribution lines have an array of uninsulated, structure-mounted equipment (Marti 2002). To minimize the risk of raptor electrocutions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996). Furthermore, on the structures to be used in the proposed action, the distance between the power lines is at least 18 ft (5.5 m). Because the average wingspan of an adult CFPO is 15 in (38 cm), there is no foreseeable risk of electrocution.

Construction Noise and Activity

Although no CFPO have been detected in the project area, short term noise disturbance and human activity associated with construction may discourage CFPO from using habitat within and adjacent to the proposed ROW. Human activity near nest sites at critical periods of the nesting cycle may cause CFPO to abandon their nests (USFWS 2002a). While CFPO may tolerate low level noise disturbances, such as those in low density residential areas (Cartron et al. 2000b), they will probably not tolerate noise levels associated with construction activities in close proximity to a nest. The greatest likelihood of noise disturbance will result from the use of helicopters during the installation of the transmission lines, but also could result from the presence of heavy machinery or large groups of construction personnel. If CFPO are not detected during the two consecutive years of protocol surveys, the potential for direct impacts to this species is minimal.

Indirect Effects

Habitat Modification and Fragmentation

The proposed action will result in the disturbance of areas that could provide potential nesting, foraging, and dispersal habitat for CFPO. Under the proposed action, the following amounts of temporary (laydown areas, tensioning and pulling sites) and permanent (proposed new roads and structure bases) habitat disturbance would occur:

Sonoran Desertscrub: Temporary = 38.9 acres

Permanent = 4.9 acres

Desert Riparian Scrub: Temporary = 22.3 acres

Permanent = 3.1 acres

Deciduous Riparian 0 acres

While all large saguaros within construction sites will be transplanted, construction could temporarily degrade CFPO habitat by removing vegetation that provides forage and shelter. Elimination of groundcover plant species, rodent burrows, and native soils, as well as loss of trees and shrubs, may impact local reptile and bird populations that are important to the pygmy-owl diet. Loss of complex vegetation structure increases energy demands on owls that must forage at greater distances and risk exposure to a variety of hazards (Abbate et al. 1999). Because of the linear nature of the proposed action, these impacts will be widely distributed and relatively minor in any single area.

Increased Legal and Unauthorized Access to CFPO Habitat

Although CFPO have not been detected in the project area, recreationists may access potential CFPO habitat using temporary construction roads associated with the proposed action. While hikers and other non-motorized recreationists will create minimal disturbance, noise from Off Highway Vehicle (OHV) users are much more likely to disturb CFPO, especially if the activity occurs over an extended period of time in or near a CFPO nesting territory. Increased access to CFPO habitat may subject the species to poaching or other harassment. While TEP will prevent unauthorized access to the ROW across private land, closure of the ROW on public land, particularly state land, is not feasible. Therefore, some increase in access to potential CFPO habitat is anticipated.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, CFPO will not likely be directly impacted by wildfires. However, wildfires may destroy columnar cacti and trees that provide nesting cavities as well as affect CFPO prey species through direct mortality from the fire or habitat destruction. Herbaceous plant species that serve as cover and forage for small mammals could be drastically reduced. Because of reduced groundcover, predation upon surviving small mammals by CFPO may actually increase in the short term. Furthermore, increased herbaceous production in the years following a fire may improve habitat for small mammals in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977).

The measures outlined in the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away

from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.1g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this biological assessment. While the action area for this species crosses private, state, and federal lands, the habitat with the highest potential for occupancy by CFPO occurs on state and private lands in Pima County. Future federal actions on these lands will be subject to Section 7 consultation. These actions will not be considered cumulative.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). Because of the growth rate and the development pressures from nearby Tucson and Sahuarita, it is foreseeable that land adjacent to the proposed ROW will be developed. These developments will likely include increases in associated infrastructure such as roads, groundwater use, and commercial services, all resulting in the degradation of CFPO habitat.

An undetermined level of border crossings by undocumented immigrants (UDI) occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase. Additionally, agriculture, recreation, OHV use, grazing, and other activities continue to occur on private and state land and adversely affect CFPO and their habitats.

2.1h Effects Determination and Incidental Take

While CFPO are not currently known to occupy the action area, the disturbance of potential habitat from construction activities and increased access may affect, and are likely to adversely affect, this species.

Take of CFPO is not anticipated because construction activities during breeding season will only occur following protocol surveys and the Conservation Measures outlined in SECTION 1.4 will minimize disturbance to potential habitat and prevent disturbance to nesting CFPO within the action area should any be detected in the future.

2.2a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. While habitat for SWFL does not exist within the Central Corridor, migratory SWFL have been documented along the Santa Cruz River, which is within 0.5 mi (0.8 km) of the proposed action near the community of Tumacacori, Arizona.

2.2b Natural History and Distribution

SWFL (Figure 11) are small passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 5.75 in (14.6 cm) in length from the tip of the bill to the tip of the tail and weighing only 0.4 ounces (11.34 grams). This species has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two



white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark and the lower is light yellow grading to black at the tip. SWFL are riparian obligate species, nesting along rivers, streams, and other wetlands where dense growths of willow, seepwillow (*Baccharis* sp.), buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix* spp.), carrizo (*Phragmites australis*) or other plants are present, often with a scattered overstory of cottonwood and/or willow.

Figure 11. Southwestern willow flycatcher.

One of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), SWFL are neotropical migratory species that breed in the southwestern U.S. from approximately 15 May to 1 September. This species migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical range of SWFL included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

SWFL breed in dense riparian habitats from sea level in California to just over 7,000 ft (2,134 m) in Arizona and southwestern Colorado. Historic egg/nest collections and species descriptions throughout SWFL range describe the widespread use of willow for nesting (Phillips 1948, Phillips et al. 1964, Hubbard 1987, Unitt 1987, San Diego Natural History Museum 1995). Currently, SWFL primarily use Geyer willow (Salix geyeriana), Goodding willow (Salix gooddingii), boxelder, saltcedar, Russian olive (Elaeagnus angustifolio), and live oak (Quercus agrifolia) for nesting. Other plant species less commonly used for nesting include: buttonbush, black twinberry (Lonicera involucrata), cottonwood, white alder (Alnus rhombifolia), blackberry (Rubus ursinus), carrizo, and stinging nettle (Urtica spp.). Nesting SWFL exhibit a strong preference for dense vegetation at the nest site, but high variation and density of vegetation at the patch scale (Hatten et al. 2000). Nesting sites are typically close to the edge of the vegetation patch and close to water (Allison et al. 2000). Based on the diversity of plant species

composition and complexity of habitat structure, four basic nesting habitat types can be described for SWFL: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge et al. 1997).

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of SWFL territories and nests; SWFL sometimes nest in areas where nesting substrates are in standing water (Maynard 1995, Sferra et al. 1995, 1997). Hydrological conditions at a particular site can vary remarkably in the arid southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g. creation of pilot channels), where modification of subsurface flows has occurred (e.g. agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer et al. 1996). Throughout their range, SWFL arrive on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Maynard 1995, Sferra et al. 1995, 1997). Nesting begins in late May and early June, and young fledge from late June typically through mid August, but as late as early September.

SWFL are insectivores, foraging in dense shrub and tree vegetation along rivers, streams, and other wetlands. Flying insects are the most important SWFL prey item; however, they will also glean larvae of non-flying insects from vegetation (Drost et al. 1998). Drost et al. (1998) found that the major prey items of SWFL (in Arizona and Colorado), consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera), and true bugs (Hemiptera). Other insect prey taxa include leafhoppers (Homoptera: Cicadellidae), dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey include spiders (Araneae), sowbugs (Isopoda), and fragments of plant material.

2.2c Critical Habitat

Critical habitat for SWFL was originally designated on 22 July 1997 (USFWS 1997b), but on 11 May 2001, the 10th Circuit Court of Appeals set aside the critical habitat designation and instructed USFWS to issue a new designation in compliance with the court ruling. USFWS is currently soliciting information regarding areas important for the conservation of this species in order to re-propose critical habitat.

2.2d Current Status Statewide

The following status of SWFL in Arizona was summarized from Smith et al. (2002). In 2001, 177 sites covering approximately 139 mi (225 km) of riparian habitat were surveyed for SWFL in Arizona. Sites range from 98 ft (30 m) to 8,802 ft (2,683 m) in elevation and 98.5 ft (30 m) to 10 mi (16.1 km) in length. The mean site length was 1 mi (1.6 km). Fifty-two of the 177 sites were not surveyed according to protocol. This was due to time or funding limitations or because unsuitable SWFL habitat was found during the first survey. Of the 177 sites, 20 had not been previously surveyed. Most new survey sites were located along the Colorado River (n = 9) and Gila River (n = 4). Six hundred thirty-five resident SWFL were documented within 346 territories at 46 sites. AGFD personnel and statewide cooperators recorded 311 pairs.

SWFL were documented along 11 drainages. The greatest concentrations of SWFL were found at Roosevelt Lake (40 percent) and the Winkelman Study Area (35 percent). Resident SWFL were detected at five sites that had been surveyed at least once in previous years. Resident SWFL were documented in two drainages (Virgin River and Cienega Creek) for the first time since protocol surveys began. No historical occurrence record exists for SWFL along the Virgin River and SWFL have not been reported at Cienega Creek since 1964. These colonizations yield evidence of habitat restoration potential in these drainages that can aid in recovery of the SWFL.

2.2e Environmental Baseline

Deciduous riparian vegetation only occurs within the project area at the Peck Canyon crossing. The canyon and associated riparian area supports ash, walnut, and netleaf hackberry but consists primarily of scattered, individual trees with low understory density (Figure 12). This reach of Peck Canyon is ephemeral and water is probably present only for short periods of time following precipitation events. Semidesert grasslands that are subject to grazing characterize the uplands surrounding Peck Canyon. Because of the patchy habitat and lack of surface water, this area likely will not function as SWFL habitat.



Figure 12. Central Corridor crossing of Peck Canyon.

The Central Corridor also passes within 0.5 mi (0.8 km) of the Santa Cruz River near the community of Tumacacori, Arizona. The riparian vegetation within the Santa Cruz floodplain in this area consists of mature Fremont cottonwood and Goodding willow with a greater than 75 percent canopy cover in most places (Figure 13), as well as a well-developed understory. This reach of the Santa Cruz River is perennial.



Figure 13. Santa Cruz River near Tumacacori, Arizona.

The nearest recent (1999) reports of SWFL are from the Santa Cruz River between Tubac and Rio Rico (McCarthey et al. 1998, Paradzick et al. 1999, Paradzick et al. 2000). All of these reports were of migrant SWFL. Additionally, in May 1998, USFWS personnel located a calling willow flycatcher at the I-19 frontage road across Peck Canyon (USFWS 2001a), 2.5 mi (4 km) east of the proposed action. No follow-up surveys were conducted and it is unknown if this was a migrant or breeding flycatcher.

2.2f Effects of Proposed Action on the SWFL

Direct Effects

Construction Noise and Activity

Noise from helicopter flights associated with construction activities may disturb SWFL using suitable habitat along the Santa Cruz River. However, because I-19 is adjacent to the Santa Cruz River, any SWFL using the river will already be subject to a certain level of ambient noise from traffic. Because of the distance of the proposed action from the

Santa Cruz River and the existing noise level along I-19, any increase in noise associated with the proposed action will be minimal and short term.

Indirect Effects

Habitat Modification and Fragmentation

Deciduous riparian vegetation only occurs within the project area at the Peck Canyon crossing. The proposed action spans Peck Canyon parallel to the existing EPNG gasline and no new access roads are planned within the habitat. This portion of riparian habitat is not suitable for breeding SWFL, therefore, no indirect effects to SWFL through habitat modification are anticipated.

Increased Legal and Unauthorized Access to SWFL Habitat

Access and construction roads for the proposed action will typically be spurs off the existing EPNG gasline and range between 500 - 1,000 ft (152 m and 305 m) in length. Because of the short lengths of the new roads and the presence of I-19 between the proposed action and the Santa Cruz River, there will not be any foreseeable increase in access to SWFL habitat.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). New roads also may act as firebreaks and improve response times of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977).

While there is a minimal risk from accidental wildfire associated with the proposed action, any fire will have to spread a significant distance to the east before impacting suitable SWFL habitat. Several roads that could serve as firebreaks and afford firefighting accessibility, most notably I-19, occur between the proposed action and suitable SWFL habitat. Furthermore, measures oulined in the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). The short lengths of new access roads, their distance from SWFL habitat, as well as the measures outlined in the Invasive Species Management Plan, will minimize the introduction or spread of invasive species into SWFL habitat.

2.2g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. The land between the

proposed action and the Santa Cruz River consists almost exclusively of private land. While Federal actions on these lands will be subject to Section 7 consultation, and therefore not considered cumulative, many private actions could occur without consultation.

Although the amount of planned private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Pima County grew by 26.5 percent and Santa Cruz County by 29.3 percent (U.S. Census Bureau 2000). Because of these growth rates and the trend of rural development to occur in areas with some existing infrastructure, it is foreseeable that the private ranches adjacent to Arivaca Road could be sold and subdivided for residential homes and ranchettes. Any substantial population increase in the area also could increase demands for access to recreational land, increase groundwater pumping, and foster the development of commercial services. These impacts to the watershed could degrade the value of habitat within Sopori Wash preventing its use by a variety of species.

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase into the foreseeable future.

2.2h Effects Determination and Incidental Take

Noise from construction of the proposed action may affect SWFL, but it is not likely to adversely affect the species because any increase in noise will be minimal compared to ambient noise levels and short term in duration. Because the proposed action is not likely to adversely affect the species, no take of SWFL is anticipated.

2.3a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential roosting habitat for LLNB occurs in the Tumacacori and Atascosa/Pajarito mountains, and foraging habitat occurs through those portions of the proposed ROW that contain agave and saguaro cacti. Because LLNB have been documented foraging up to 40 mi (64 km) from roost sites, the action area for the LLNB consists of all potential foraging and roosting habitat within a 40 mi (64 km) buffer surrounding the proposed action.

2.3b Natural History and Distribution

LLNB (formerly Sanborn's long-nosed bat) are one of three members of American leaf-nosed bats (Family Phyllostomidae) in Arizona (Hoffmeister 1986). LLNB (Figure 14) is one of the larger Arizona bats, gray to reddish brown in color. This bat has an erect triangular flap of skin (nose leaf) at the end of a long slender nose. LLNB can be distinguished from *Macrotus* by a much longer nose, greatly reduce tail membrane, and smaller ears; and from *Choeronycteris*, which has a shorter tail, larger tail membrane, and longer, narrower nose than LLNB.



Figure 14. Lesser long-nosed bat.

LLNB occur from the southern United States to northern South America, including several islands and the adjacent mainland of Venezuela and Colombia. LLNB are found between 4 degrees to 32 degrees N latitude in semiarid to arid conditions (Nowak 1994). This bat is typically associated with their primary food source, flower nectar and fruit of columnar cacti, and flower nectar of certain agave species. Because of the seasonal nature of their food source, they must migrate to follow flowering and fruiting plants. In addition to food availability, there must be suitable roosting within commuting distance of the food source. Currently, the longest known commute distance is about 48 km (30 mi).

The primary range of this bat lies in Mexico and Central America. Occurrences in Arizona probably represent range expansion. Prior to the 1930s, there are no records of LLNB in Arizona (Cockrum 1991). Colossal Cave and the Old Mammon Mine are the most northern sites known to house colonies of these bats. However, these sites support colonies of about 5,000 individuals, versus sites in Mexico, which are as large as 150,000 individuals.

LLNB have a bi-seasonal occurrence in Arizona. The maternity season, when bats migrate to southwestern Arizona, represents a United States population of about 30,000

individuals. The other is the fall agave flowering season, located in southeastern Arizona, which attracts about 70,000 bats. Each of these areas contains three known primary roosts and some number of secondary/transient or night roosts (sheltering ten to a few hundred individuals/site).

With the exception of a small bachelor roost located in the Chiricahua Mountains, all remaining records represent small numbers (usually single individuals) at hummingbird feeders, caught in mist nets, or chance findings in residential areas. Constantine (1966) reported two immature females from Maricopa County, one in Phoenix on 30 August 1963 and the other in Glendale on 16 September 1963. The Glendale specimen was found dead. The other was hanging on a screen door (not a normal place) indicating something was likely wrong with that bat. He also reported two males from southern California: one was taken alive on 3 October 1993 outside a home in Yucaipa, the other was taken on 18 October 1996 from the outside of a building in Oceanside (Constantine 1998). LLNB also have been reported from the Aravaipa Canyon area (Cockrum 1991). Hoffmeister (1986) has a record in the Santa Catalina Mountains, but Cockrum (1991) states it was probably a transcription error because the nectar-feeding bats found there belong to the genus *Choeronycteris*. However, Cockrum (1991) does report LLNB from the Santa Catalina Mountains but only once in a mist net set in Sabino Canyon (a female in June).

The diet of LLNB in Arizona consists primarily of the nectar, pollen, and ripe fruit of columnar cacti (particularly saguaro) and agave (e.g., *Agave chrysantha, A. deserti, A. palmeri*, and *A. parryi*). LLNB have been demonstrated to be a significant pollinator of saguaros, organpipe cacti (*Stenocereus thurberi*), and agaves (Howell and Roth 1981, Alcorn et al. 1962, and McGregor et al. 1962). Generally, LLNB in Arizona forage after dusk to nearly dawn during the months of May through September. In a single night, LLNB will forage well away from their daytime roost sites. In Sonora, Mexico, bats feed on the mainland by night at Bahia Kino and roost by day on Isla Tiburon, 15 to 20 mi (24 to 32 km) away. The closest sizable densities of columnar cacti to LLNB roosts in the Sierra Pinacate, Sonora, Mexico, are found in Organpipe Cactus National Monument in Arizona, about 25 to 30 mi (40 to 48 km) away (Fleming 1991).

In Arizona, females arrive in late March and early April, then migrate northward through Mexico along a "nectar corridor" provided by columnar cacti such as saguaro and organpipe (Fleming 1991). Female LLNB usually arrive in Arizona pregnant and congregate in traditional maternity roosts at lower elevations, feeding primarily on saguaro nectar (Cockrum 1991). Adult males arrive later in the summer and, along with dispersing members of the maternity roosts, usually roost at higher elevations, especially within proximity to significant stands of flowering agave.

LLNB are gregarious and form large maternity colonies that number in the thousands (Hayward and Cockrum 1971, Hoffmeister 1986). All four of the verified LLNB maternity roosts in the United States are found in Arizona (Cockrum 1991). The largest and most important of the four is found in a mine located in Organpipe Cactus National

Monument. About 15,000 LLNB use this mine as a maternity roost. Young are typically born between mid-May and early June (Cockrum 1991, Hayward and Cockrum 1971).

While in the roost during the day, LLNB engage in various activities such as flying, suckling of young, grooming, resting, and interacting with neighbors. LLNB are particularly active during the day and any disturbance, such as aircraft or other human activities, may cause an expenditure of extra energy (Dalton and Dalton 1993, Dalton et al. 1994). Female LLNB gathered in large maternity colonies are particularly vulnerable to disturbances. Maternity colonies are more sensitive because of the vulnerability of nonvolant young, whose recruitment into the population is essential to maintain a viable population.

2.3c Critical Habitat

No critical habitat has been designated for LLNB.

2.3d Current Status Statewide

USFWS listed LLNB as endangered throughout its range in the southwestern United States and Mexico on 30 September 1988 (USFWS 1988). Loss of roost and foraging habitat, as well as direct take of individual bats during animal control programs (particularly in Mexico) have contributed to the current endangered status of the species. All available information on the species through 1994 was summarized in the Lesser Long-nosed Bat Recovery Plan approved in 1997 (Fleming 1994). The Plan indicates that the species is not in danger of extinction in Arizona or Mexico. The species still warrants some protection, as it is vulnerable to human disturbance at roost sites because of its gregarious behavior. There also is particular concern for the protection of forage plants from disturbance or destruction near roost sites.

The primary threats to LLNB populations are agave harvesting and human disturbance of roosting and maternity colonies. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial to LLNB (Fleming 1995). The USFWS determined that the LLNB was endangered because of the following factors (USFWS 1988):

- A long term decline in population,
- Reports of absence from previously occupied sites
- Decline in the pollination of certain agaves.

Known major roost sites include 16 large roosts in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. Disturbance of these roosts, or removal of the food plants associated with them, could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

2.3e Environmental Baseline

LLNB roosts are not known within the proposed corridor, but field surveys did locate small caves and crevices nearby that could serve as LLNB day roosts (HEG 2002, unpublished data). Furthermore, unsurveyed caves, mineshafts, and adits, which may provide suitable roost sites, occur within the Tumacacori-Atascosa mountains. The two closest known LLNB roost sites are the Cave of the Bells in the Santa Rita Mountains, approximately 32 km (20 mi) to the west, and a cave in the Patagonia Mountains, approximately 56 km (35 mi) to the west. Both of these roost sites are within the known flight distance to the proposed action and may utilize the proposed corridor for foraging.

Saguaro cacti occur within the proposed corridor north of Duval Mine Road, and agaves are present in varying densities south of Arivaca Road. While the exact densities of agaves and saguaro cacti were not determined for this BA, CNF estimates that Palmer's agave is widely scattered over 1 million ac (400,000 ha) at densities of 10 to 200 per acre, generally between the elevations of 3,000 ft (914 m) and 6,000 ft (1,829 m) (USFWS 2002b).

The northern portion of the proposed action is primarily undeveloped but does contain some existing electrical distribution lines as well as low density housing developments near Sahuarita Road. The Mission Mine Complex also is located within this section of the project area and the proposed action passes through the Tumacacori EMA of the CNF. Range condition in areas crossed by the proposed action is moderately high with a stable or unknown trend. While agaves have persisted in areas grazed for more that 100 years, mortality through direct herbivory and trampling is known to occur. There is a forest-wide study to determine the effects of livestock grazing on agaves currently underway (USFWS 2001b). Livestock stocking rates for the allotments within the Tumacacori EMA range from 1,320 AUMs in the Peña Blanca Allotment to 2400 AUMs in the Bear Valley Allotment. Allotment Management Plans for Bear Valley and Sardinia Allotments are currently being revised.

2.3f Effects of Proposed Action on LLNB

Direct Effects

Construction Noise and Activity

Although LLNB roosts have not been detected within the proposed corridor, short term noise disturbance and human activity associated with construction activities may disturb LLNB if they are present in undetected roosts adjacent to the proposed corridor. The greatest likelihood of noise disturbance will result from the use of helicopters during the installation, but could also result from the presence of heavy machinery or large groups of construction personnel in close proximity to an undetected roost. The consequences of disturbance to small numbers of LLNB in day roost will be less serious than disturbance of large aggregations of bats at one location.

Indirect Effects

Habitat Modification

Indirect effects to LLNB may result from the potential reduction in forage resources (agaves and saguaro cacti) during construction of temporary access roads or the installation of transmission structures. Because agaves and saguaro cacti are unevenlydistributed and the nectar provided by them are seasonally and geographically separated, the loss of significant numbers of either species may alter LLNB foraging patterns and roost selection within the action area. Even if the loss of a high density patch of flowering agaves does not cause the abandonment of a roost, bat survivorship may be reduced through increased foraging flight distances, related energy expenditures, and increased exposure to predators. Because of the linear nature of the proposed action, however, these impacts will be widely distributed and relatively minor in any single area.

Although all agave and saguaro disturbed as a result of the proposed action will be transplanted immediately outside of the construction zone, the long term survival and future flowering of these specimens is uncertain. Agaves are typically easy to cultivate in warm climates with well drained soils (Gentry 1982), but no long term studies of agave transplant survival have been conducted. Transplantation of saguaro is a common practice within southern Arizona, but preliminary results from a 10 year study indicate that smaller saguaros (<16 ft [5 m] tall) are more successfully transplanted than larger saguaros (HEG, unpublished data).

Even in areas where no agave or saguaro presently exist, dormant seeds may be present in the soil. Construction activities associated with the proposed action may compact soil and alter water infiltration, which may prohibit seed germination.

Increased Legal and Unauthorized Access to LLNB Habitat

Because LLNB are sensitive to human disturbance, (to the point of temporarily abandoning a day roost after a single human intrusion) increased human access to roost sites could negatively impact LLNB. The presence of new roads on state land will not likely result in disturbance to undetected roosts because few sites in this area support the rock outcropings, caves, and mine shafts necessary for LLNB roosts. The greatest potential for undetected roosts occurs on CNF land. The road closures on CNF land outlined in SECTION 1.4 and in the RA (URS 2003) will minimize the probability of increased human access and disturbance of LLNB in undetected roosts in these areas.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human caused ignitions in some areas (Gucinski et al. 2001). Agaves in desert grasslands have evolved with fire, but unnaturally high fire frequency and intensity can lead to the decline or elimination of agave populations. Furthermore, agave mortality from fire may affect the abundance and distribution of blooming agaves for a number of years, especially if there is high mortality within certain age and size classes.

New roads also may act as firebreaks and improve the response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in

southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of supplying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.3g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. The action area for this species crosses private, state, and federal land. Future federal actions on USFS land will be subject to Section 7 consultation but these actions will not be considered cumulative. Because the action area for this species includes a 40 mi (64 km) buffer, some of the future planned actions on private and state land in southern Pima County and much of Santa Cruz County may be considered cumulative.

Although the amount of this future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). In the same time period, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000).

An undetermined level of border crossings by UDI occurs within the action area resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase. Additionally, agriculture, recreation, OHV use, grazing, and other activities continue to occur on private and state land that adversely affect LLNB and their habitats.

2.3h Incidental Take

The potential disturbance of LLNB in undetected roosts from construction noise and potential mortality of transplanted forage species may affect, and is likely to adversely affect, this species.

No take of LLNB is anticipated as a result of the proposed action for the following reasons. First, noise disturbance will likely impact small numbers of individuals and will be short term in duration, and secondly, changes in agave and saguaro distribution will not be significant in any single location.

2.4 PIMA PINEAPPLE CACTUS (*Coryphantha scheeri* var. *robustispina*) (Endangered)

2.4a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for the PPC includes the entire proposed Central Corridor.

2.4b Natural History and Distribution

PPC (Figure 15) are small, round cacti with finger-like projections. Adult cacti range in size from 1.8 in (4.6 cm) to 18 in (46 cm) in height. At the tip of each projection or

tubercle is a rosette of 10 to 15 straw-colored spines with one central hooked spine. Plants can be single or multi-stemmed and produce bright yellow flowers after summer rains (Roller 1996).

Populations of PPC are known to occur south of Tucson, in Pima and Santa Cruz counties, Arizona and in adjacent northern Sonora, Mexico. It is distributed at low densities within the Altar and Santa Cruz Valleys, as well as in low lying areas connecting these valleys.



Figure 15. Pima pineapple cactus.

PPC populations are generally found in open patches within semidesert grassland and Sonoran desertscrub plant communities (Brown 1994). They are typically found on flat alluvial bajadas that are comprised of granitic material and are most abundant within the ecotone between the grassland and desertscrub biomes (Roller 1996). This plant is found at elevations between 2,362 (720 m) and 4,593 ft (1,400 m). Typically, PPC are not found in washes or riparian areas.

2.4c Critical Habitat

No critical habitat has been designated for this species.

2.4d Current Status Statewide

USFWS listed PPC as endangered throughout its range on 25 October 1993 (58 FR 49875). Habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution, the rarity fo this plant species, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations, all are factors that contribute to the current endangered status of this species. Due to the limited information on PPC population distributions under current habitat conditions, it is difficult to determine the current status of the plant statewide. USFWS has insufficient data to determine if the majority of populations of PPC can be sustained under current reduced and fragmented conditions. PPC densities vary throughout its range with the highest densities occurring south of Tucson through the Santa Cruz Valley (to Amado and surrounding developed parts of Green Valley and Sahuarita, and parts of the San Xavier

District of the Tohono O'odham Nation). Continued urbanization, farm and crop development, mine expansion, and invasion of non-native species are primary threats to PPC populations. Overgrazing by livestock, illegal plant collection, and fire-related interactions involving non-native Lehmann's lovegrass also may have negative impacts on PPC (USFWS 1993a).

2.4e Environmental Baseline

The environmental baseline for the PPC evaluates the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat and ecosystem within the action area. Based on monitoring results, the status of the PPC appears to have been recently affected by threats that completely alter or considerably modify more than one-third of the species surveyed habitat and have caused the elimination of nearly 60 percent of documented locations (USFWS 2001c). Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to negatively impact PPC habitat.

The Central Corridor is primarily undeveloped but contains some existing electrical distribution lines and associated roads (Figure 14) and is in close proximity to low density housing developments, and the Mission Mine Complex. A majority of the corridor also parallels the previously disturbed EPNG gasline. While portions of the existing EPNG gasline access road appear relatively unused and support early successional plants (Figure 12), other areas are severely eroded and virtually impassable by motor vehicles.

Surveys for PPC were conducted using an approved survey protocol (Roller 1996) by establishing a belt transect across identified potential habitat with each surveyor covering a 16.4 to 23 ft (5 to 7 m) swath. One survey pass of the entire corridor was conducted with more intensive area searches around confirmed PPC locations. Surveys on state, private, and BLM land covered a 200 ft (61 m) wide area centered on the proposed structure alignment. On the CNF, the coverage was expanded to 750 ft (229 m) wide. During surveys conducted between July 2002 and March 2003, 78 PPC were detected within the 125-ft (38.1 m) ROW between the TEP South Substation and the CNF boundary (HEG 2003, unpublished data). All detected PPC locations were recorded using a Global Positioning System (GPS) unit.

2.4f Effects of Proposed Action on the PPC

Direct Effects

Because the precise locations of structures and access roads can be modified to avoid sensitive resources, the proposed action will not result in the loss of any individual PPC. All known individual PPC near construction areas and along main access routes will be clearly marked and protected to avoid impacts.

Indirect Effects

Modification of Habitat

The construction of new access roads and the installation of structures will alter PPC seed sources in unoccupied, but potential PPC habitat. Construction vehicles will compact soil, changing water infiltration rates, and road construction will dramatically alter soil structure and seed source depth. Areas around structure sites and many access roads will be temporary and will regenerate as potential PPC habitat in the future. Recent observations indicate that PPC may readily establish in recently disturbed habitats (USFWS 2002c), but these areas must be allowed to recover for years or possibly decades.

To determine the extent of proposed disturbance to PPC habitat, recent aerial photography was used to eliminate areas not suitable for PPC, including slopes over 15 percent, washes, and previously disturbed areas such as roads, buildings, mining disturbance, etc. Based on this analysis, the ROW was divided into habitat classes based upon density of PPC in each area. The habitat classes are as follows: Class A = 0.3 PPC/acre; Class B = 0.1 - 0.3 PPC/acre; Class $C = 0^* - 0.09$ PPC/acre.

The amount of permanent habitat disturbance from access roads and pole locations is 16.86 acres. To mitigate for this potential loss of PPC habitat, TEP will purchase 27 credits in a USFWS-approved conservation bank for PPC.

Increased Legal and Unauthorized Access to PPC Habitat

Much of the proposed corridor through PPC habitat parallels existing electrical distribution lines with existing utility access roads. Some new access roads, however, will be constructed, potentially resulting in unintended access into previously undisturbed PPC habitat (especially by OHV users). Off-road travel could directly impact additional PPC or impede seedling establishment through changes in soil characteristics. Where possible, TEP will review the potential for closure of roads on private land to limit unauthorized access to the ROW.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). It is widely regarded that most succulent species are negatively impacted by fire and are not fire adapted (Rogers and Steele 1980, McLaughlin and Bowers 1982). Plants die by direct heating of the fire or later through

Indirect fire effects such as grazing of spineless plants, post-fire increase in plant tissuetemperature, or the introduction of disease or infestation into weakened plants (Thomas 1991). The sparse distribution of this species across the landscape can mean that loss of just a few individuals to fire can greatly affect the range and density of local PPC populations.

New roads may act as natural firebreaks and improve response times of firefighters to wildfires, thereby preventing fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what

suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak efficacy in southern California came to similar conclusions (Green 1977).

The measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.4g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this biological assessment. Under Section 9 of the Act, the taking of listed animals is specifically prohibited, regardless of land ownership status. For listed plants, these prohibitions and the protection they afford do not apply. Listed plant species are protected only from deliberate removal from Federal land. There is no protection against removal or destruction of plants by a landowner on private land under the ESA.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). Because of these growth rates and the development pressures of nearby Tucson and Sahuarita, Arizona, it is foreseeable that some lands adjacent to the proposed ROW will be developed. These developments will likely include increases in associated infrastructure such as roads, groundwater use, and commercial services, all resulting in the degradation of PPC habitat.

An undetermined level of border crossings by UDI occurs within the action area and results in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

Additionally, PPC habitat is adversely affected by continual agriculture, recreation, OHV use, grazing, and other activities on private and state land.

2.4h Effects Determination

Construction activities and increased access may affect, and are likely to adversely affect PPC within the ROW, potential PPC habitat, and seedling establishment. The adverse affects to the species will be mitigated through the purchase of mitigation bank credits.

2.5a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Because of the large movements possible by the jaguar and historical records for the species in a variety of habitats, the action area for the jaguar considered for the proposed action includes most of western Santa Cruz and southern Pima counties.

2.5b Natural History and Distribution

Jaguars (Figure 16) are the largest species of cat now native to the Western Hemisphere. Jaguars are large muscular cats with relatively short massive limbs, a deep-chested body, and cinnamon-buff in color with many black spots. Its range in North America includes Mexico and portions of the southwestern United States (Hall 1981). A number of jaguar records are known for Arizona, New Mexico, and Texas. Additional reports exist for California and Louisiana. Records of the jaguar in Arizona and New Mexico have been attributed to the subspecies *Panthera onca arizonensis*. The type specimen of this subspecies was collected in Navajo County, Arizona, in 1924 (Goldman 1932). Nelson

and Goldman (1933) described the distribution of this subspecies as the mountainous parts of eastern Arizona north to the Grand Canyon, the southern half of western Mexico, northeastern Sonora, and, formerly, southeastern California. The records for Texas have been attributed to another subspecies P. o. veraecrucis. Distribution of this subspecies was described by Nelson and Goldman (1933) as the Gulf slope of eastern and southeastern Mexico from the coast region of Tabasco, north through Vera Cruz and Tamaulipas, to central Texas. Swank and Teer (1989) indicated the historical range of the jaguar included portions of Arizona, New Mexico, and These authors consider the current range to be Texas. central Mexico through Central America and into South America as far as northern Argentina.



Figure 16. Jaguar.

Swank and Teer (1989) stated the United States no longer contains established breeding populations of jaguar, which probably disappeared from the United States in the 1960s. According to these authors, the jaguar prefers a warm tropical climate and is usually associated with water, and rarely found in extensive arid areas. Goldman (1932) believed the jaguar was a regular, but not abundant, resident in southeastern Arizona. Hoffmeister (1986) considered the jaguar an uncommon resident species in Arizona. He concluded that the reports of jaguars between 1885 and 1965 indicated a small but resident population once occurred in southeastern Arizona. Brown (1983a) suggested the jaguar in Arizona ranged widely throughout a variety of habitats from Sonoran desert scrub through subalpine conifer forest. Most of the records were from Madrean evergreen-woodland, shrub-invaded semidesert grassland, and along rivers.

Brown (1983a) presented an analysis suggesting there was a resident breeding population of jaguars in the southwestern United States at least into the 20th century. USFWS (1990) recognized that the jaguar continues to occur in the American southwest as an occasional wanderer from Mexico. Currently, breeding population of jaguar are unknown in the United States.

In Arizona, the gradual decline of the jaguar appeared to be concurrent with predator control associated with land settlement and the development of the cattle industry (Brown 1983a, USFWS 1990). Lange (1960) summarized the jaguar records from Arizona, and between 1885 and 1959 the reports consisted of 45 jaguars killed, six sighted, and two recorded by sign. Brown (1991) related that the accumulation of all known records indicated a minimum of 64 jaguars were killed in Arizona after 1900.

2.5c Critical Habitat

No critical habitat has been designated for this species.

2.5d Current Status Statewide

Jaguar were initially listed as endangered from the United States - Mexico border southward to include Mexico and Central and South America (37 FR 6476, 1972; 50 CFR 17.11, August 1994). As a result of a petition, the jaguar was proposed as endangered in the United States (59 FR 35674; July 13, 1994). In a Federal Register notice dated 22 July 1997, the jaguar was listed as an endangered species in the United States (62 FR 39147).

The most recent records of jaguars in the United States are from Arizona. In 1971, a jaguar was taken east of Nogales and in 1986 one was taken from the Dos Cabezas Mountains. The latter reportedly had been in the area for about a year before it was killed. AGFD (1988) cited two recent reports of jaguars in Arizona. The individuals were considered to be transients from Mexico. One report (1987) was from an undisclosed location. The other report was from 1988, when tracks were observed for several days prior to the treeing of a jaguar by hounds in the Altar Valley, Pima County. An unconfirmed report of a jaguar at the Coronado National Memorial was made in 1991. In 1993, an unconfirmed sighting of a jaguar was reported for Buenos Aires National Wildlife Refuge. In March 1996, the presence of a jaguar was confirmed through photographs made in the Peloncillo Mountains of Arizona and New Mexico (Glenn 1996). AGFD reported a jaguar sighting in the Baboquívari Mountains in 1996, and in the fall of 1997, one was reported from the Cerro Colorado Mountains of southern A jaguar was recently documented (December 2001) in the Atascosa Mountains within about 2 mi (3 km) of the proposed action.

2.5e Environmental Baseline

The Tumacacori EMA is the location of recent reports of jaguars in the United States. This area continues to include the most likely habitat that will support the existence of jaguars in the United States. Many of the larger canyon bottoms in the Tumacacori EMA contain substantial cover and could act as travel corridors for dispersing jaguars. It is believed that all recent sightings of jaguars in Arizona are males dispersing north from

the northern most breeding population in Mexico in an effort to find unoccupied habitat (B. VanPelt, AGFD, pers. comm., 3 October 2002). Because no breeding pairs are thought to exist north of the United Sates-Mexico border, conservation of the Mexican population is vital to the future presence of jaguars in Arizona.

Under the leadership of AGFD and New Mexico Department of Game and Fish, a conservation agreement and strategy has been prepared to address the conservation of the Arizona and New This agreement in Mexico. established interstate/intergovernmental Jaguar Conservation Team under a Memorandum of Agreement (MOA). This MOA has been signed by various state and federal cooperators and local and tribal governments with land and wildlife management responsibilities in the geographic area of concern. The Jaguar Conservation Agreement and Strategy serves as a mechanism for implementation of actions for the protection and conservation of the jaguar, while providing a template for the recovery of the species until a recovery plan is prepared and adopted.

The Conservation Agreement established procedures for reporting and evaluating jaguar sightings and compiling distribution and occurrence information, investigation of livestock depredation, evaluation of habitat suitability, development of education materials, and other activities. The Jaguar Conservation Agreement also provides for participation by interested private citizens and organizations. CNF grazing allotment permitees are participating in this process.

The December 2001 sighting mentioned earlier came from a remote camera operated under the direction of the Jaguar Conservation Team (S. Schwartz, AGFD, pers. comm., 17 September 2002). Currently, 14 remote cameras are positioned along the United States-Mexico border in an attempt to document movement of jaguars in and out of Arizona (J. Childs, Jaguar Conservation Team, pers. comm., 3 October 2002).

2.5f Effects of Proposed Action on the Jaguar

Direct Effects

Construction Noise and Activity

Because jaguars are primarily nocturnal, disturbance from construction activities, even in suitable dispersal habitat, is unlikely. The greatest likelihood of noise disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise disturbance will be widely distributed and relatively short term in any location. Any jaguar within the action area will likely avoid construction sites. The use of additional remote cameras to monitor the United States-Mexico border south of the proposed action also will minimize the possibility of construction activities affecting breeding jaguars.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Some studies have shown that a few large areas of low road density, even in a landscape of high

average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Because construction activities within riparian corridors or other major canyons will be minimal and widely distributed, no adverse impacts to the composition or structure of jaguar movement corridors or fragmentation of habitat is anticipated. Furthermore, access and construction roads for the proposed action commonly are spurs off existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches.

While access roads and structure site construction could degrade the habitats of jaguar prey species, effects on the prey base are difficult to quantify. The primary jaguar prey species in Arizona is deer (*Odocoileus* spp.), which have relatively large home ranges. Road-avoidance behavior (up to distances of 300 ft [90 m] to 600 ft [180 m]) is common in large mammals (Lyon 1983), including those species that may serve as prey for jaguars. Because of the linear nature of the proposed action, impacts to deer habitat will be widely distributed and relatively minor in any single area.

Increased Legal and Unauthorized Access to Jaguar Habitat

Jaguars appear to be relatively tolerant of some level of human activity (B. VanPelt, AGFD, pers. comm., 3 October 2002) and have been documented using areas that have recreational and agricultural activities occurring on a regular basis. However, increased human access to potential jaguar habitat through the use of temporary proposed construction roads could reduce the quality of the habitat. The road closure techniques outlined in the Section 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, jaguars will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. The fire prevention measures being developed for the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.5g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by jaguars occurs on USFS land in Santa Cruz County. Future federal actions on these lands will be subject to Section 7 consultation; these actions will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.5h Effects Determination and Incidental Take

Construction noise and activity associated with the proposed action may affect the jaguar, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration.

Because the proposed action is not likely to adversely affect the jaguar, no take is anticipated.

2.6a Action Area

The action area includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. In streams, the action area is often much larger than the area of the proposed action because impacts in the watershed may be concentrated in the stream and actions within the stream may be carried downstream well outside of the immediate project area. The action area for the Gila topminnow is the entire Santa Cruz River watershed.

2.6b Natural History and Distribution

The Gila topminnow (Figure 17) was originally described by Baird and Girard (1853) as *Heterandria occidentalis* from a specimen collected in 1851 from the Santa Cruz River near Tucson. It was redescribed by Hubbs and Miller (1941) as *Poeciliopsis occidentalis*. As with all species in the family Poeciliidae, the Gila topminnow exhibits sexual dimorphism. Both males and females are tan to olive-bodied and usually white on the belly. Scales of the dorsum are darkly outlined and the fin rays contain melanophores, although lacking in dark spots. Dominant sexually mature males are often blackened,



Figure 17. Gila topminnow

with some gold on the pre-dorsal midline, orange at the base of the gonopodium, and exhibits bright yellow pelvic, pectoral, and caudal fins (Minckley 1973). Females remain drab in coloration upon reaching maturity and throughout their life. All male poeciliids have a modified anal fin (gonopodium) used to fertilize the female internally.

Habitat requirements of *P. o. occidentalis* are broad. The species prefers shallow, warm, fairly quiet water; however, they can become acclimated to a much wider range of conditions. Both lentic habitats and lotic habitats with moderate current are easily tolerated. Temperatures from near freezing under ice to 98.6 degrees F (37 degrees C) have been reported, with a maximum tolerance of 109.4 degrees F (43 degrees C) for brief periods (Heath 1962). Gila topminnows can live in a wide range of water chemistries, with recorded pH values from 6.6 to 8.9, dissolved oxygen readings from 2.2 to 11 milligrams/liter (Meffe et al. 1983), and salinities from very dilute to sea water (Schoenherr 1974). The widespread historic distribution of Gila topminnows throughout rivers, streams, marshes, and springs of the Gila River Basin is evidence for their tolerance of these environmental extremes. One reestablished population (Mud Springs) survived for 16 years in a simple cement-watering trough before being moved.

Meffe et al. (1983) reported that topminnows can tolerate almost total loss of water by burrowing into the mud for 1-2 days. Preferred habitats contain dense mats of algae and debris, usually along stream margins or below riffles, with sandy substrates sometimes covered with organic mud and debris (Minckley 1973). Topminnows are usually found in the upper third of the water column and young show a preference for the warmest and shallowest areas (Forrest 1992). Simms and Simms (1992) found topminnows occupying pools, glides, and backwaters more frequently than marshes or areas of fast flow.

According to Schoenherr (1974), the spring-heads presently occupied by Gila topminnows are questionable as preferred habitat. Destruction of historically occupied habitats such as the marshes, sloughs, backwaters, and edgewaters of larger rivers and presence of non-native fish in such habitats that remain has undoubtedly forced Gila topminnow out of their preferred historic habitats and into the spring-heads and smaller erosive creeks we see them in today. Their tolerance of conditions in these habitats has allowed them to maintain populations with less impact from non-native fishes.

Gila topminnows are viviparous fish, meaning embryos grow and mature within the Eggs are fertilized internally through deposition of female and are born living. spermatophores (packets of sperm) into the female genital pore by the male gonopodium. Female Gila topminnow can store spermatozoa for several months, and may produce up to 10 broods after being isolated from males (Schultz 1961). Female Gila topminnows also exhibit superfetation in which 2 or more groups of embryos at different stages develop simultaneously. Females of the genus *Poeciliopsis* generally carry only 2 stages, although some P. o. occidentalis females have been shown to carry 3 stages for a few days when population densities are low. The mean interval between broods is 21.5 days (Schoenherr 1974). Brood size ranges from 1-31 dependent upon female standard length (SL) (Constantz 1974; Schoenherr 1974, 1977). Under optimum laboratory conditions, *Poeciliopsis* can produce 10 broods per year at intervals of 7 to 14 days (Schultz 1961). Sexual maturity can be attained as early as 2 months or as late as 11 months following birth, dependent upon the season of birth (Schultz 1961; Constantz 1976, 1979; Schoenherr 1974).

Breeding occurs primarily during January through August, but in thermally constant springs, young may be produced throughout the year (Heath 1962; Minckley 1973; Schoenherr 1974). During the peak of the breeding season up to 98 percent of mature females are pregnant (Minckley 1973). Dominant males turn black, defend territories, and court females. Smaller subordinate males do not turn black or defend territories. Instead, they take on a "sneaking" mating strategy where they attempt to mate with uncooperative females while the dominant male is busy elsewhere. Subordinate males have a longer gonopodium, which may have an adaptive benefit for this type of mating strategy (Constantz 1989). However, if the larger territorial males are removed, smaller males will become dominant, take on breeding coloration, and defend territories (Constantz 1975; Schoenherr 1977). Brood size and the onset of breeding in topminnows can be influenced by several factors including food abundance, photoperiod, temperature, predation upon the population, and female size. Increased food supply and larger female size are believed to contribute to the greater fecundity seen in topminnows from Monkey Spring canal compared with topminnows from Monkey Spring headspring (Constantz 1974, 1979; Schoenherr 1974, 1977). Sex ratios in stabilized populations nearly always favor females, varying from 1.5 to 6.3 per male (Schoenherr 1974).

Gila topminnows are opportunistic omnivorous feeders, having a gut length 1.5 to 2 times SL of the individual (Schoenherr 1974). They have weakly spatulate dentition characteristic of an omnivorous diet. Primary food items include detritus, vegetation,

amphipods, ostracods, insect larvae, and rarely, other fish (Schoenherr 1974; Gerking and Plantz 1980; Meffe et al. 1983; Meffe 1984).

Gerking and Plantz (1980) noted that Gila topminnows prefer to eat large prey, but prey sizes are limited by mouth size. Schoenherr (1974) observed that individual fishes in complex habitats with several food resources present will select and focus on different items. He suggested that variation in feeding among individuals prevents over-utilization of a single resource, thus enhancing survival potential of the species.

In the United States, this species currently occurs in the Gila River drainage, Arizona, particularly in the upper Santa Cruz River, Sonoita and Cienega creeks, and the middle Gila River. The Gila topminnow is restricted to 14 natural localities in Arizona. In Mexico, the species occurs in the Río Sonora, Río de la Concepción, and Santa Cruz River but are not listed under the ESA. Gila topminnows occupy a variety of habitats, including: springs, cienegas, permanent and interrupted streams, and margins of large rivers. Habitat alteration and destruction, and introduction of predatory non-native fish, (principally western mosquitofish [Gambusia affini]) is the main reason for decline of the Gila topminnow.

2.6c Critical Habitat

No critical habitat has been designated for this species.

2.6d Current Status Statewide

The United States population of the Gila topminnow was federally listed as an endangered species in 1967 (USDOI 1967). The original recovery plan for Gila topminnow listed 10 extant natural populations: Monkey Spring, Cottonwood Spring, Sheehy Spring, Sharp Spring, Santa Cruz River near Lochiel, Redrock Canyon, Cienega Creek, Sonoita Creek (presumably including localities above and below Patagonia Lake), Salt Creek, and Bylas Springs (USFWS 1984). Gila topminnows were also known from Middle Spring (also known as SII or Second Spring) on the San Carlos Apache Indian Reservation (Meffe et al. 1983). Middle Spring was considered part of the Bylas Springs complex in the earlier recovery plan.

Since 1984, Gila topminnows have been discovered or rediscovered at 4 additional locations: North Fork of Ash Creek in 1985 (Jennings 1987), Fresno Canyon in 1992, Santa Cruz River north of Nogales in 1994, and Coal Mine Canyon in 1996 (Weedman and Young 1997). However, Gila topminnow were last collected from the North Fork of Ash Creek in 1985 and from Sheehy Spring in 1987. They have also been very rare or absent during recent surveys (last 5 years) of Sonoita Creek above Patagonia Lake and Santa Cruz River near Lochiel. Mosquitofish are quite common in both areas. Topminnows were extirpated from 1 of the original 10 localities, Salt Creek, by mosquitofish (Marsh and Minckley 1990), but the stream was renovated and restocked with Gila topminnows from Middle Spring. Subsequently, mosquitofish were found in the stream and it was again renovated and restocked with topminnows from Bylas Spring. Thus, there are 14 naturally occurring localities (considering Sonoita Creek above and

below Patagonia Lake as 2 separate localities) currently known to support Gila topminnows in the United States.

Eleven of the naturally occurring locations currently supporting Gila topminnows are in the Santa Cruz River system: Redrock Canyon, Cottonwood Spring, Monkey Spring, upper Sonoita Creek, Fresno Canyon, Coal Mine Canyon, lower Sonoita Creek, Santa Cruz River north of Nogales, Cienega Creek, Sharp Spring, and the upper Santa Cruz River. The 2 remaining localities (Bylas Springs and Middle Spring) and Salt Creek are next to the Gila River on the San Carlos Apache Indian Reservation. Bylas Springs has been unsuccessfully poisoned twice to remove mosquitofish (Meffe et al. 1983; Brooks 1985; Marsh and Minckley 1990). Another attempt at renovation of Bylas Springs was done by USFWS Arizona Fishery Resource Office and has so far been successful. The population at Middle Spring was eliminated by lack of water during the summer of 1989, but was recently reestablished (following construction of additional pool habitat) with Gila topminnows from the original Middle Spring population held at Roper Lake State Park. Salt Creek has also been renovated and restocked with topminnows originally from Bylas Spring.

As part of past recovery actions, more than 200 Gila topminnow reintroductions or natural dispersals from reintroductions have occurred at 175 wild locations. For this count, a wild location refers to an area that does not have a mailing address, in contrast with a captive population that does (following Simons 1987). Eighteen wild populations remained in 1997, 17 of which are in historic range (Weedman and Young 1997). Seven of these populations are secure enough that they should persist into the foreseeable future. Minckley and Brooks (1985), Brooks (1985, 1986), Simons (1987), Bagley et al. (1991), Brown and Abarca (1992), and Weedman and Young (1997) describe the plight of reestablished and captive populations of Gila topminnows.

Gila topminnows also have been stocked into many captive locations for propagation or conservation. Twelve captive populations were known to persist in 1997. The following publicly maintained populations are large enough to provide individuals for reintroductions, although one is known to be mixed with topminnows from more than one natural population (Arizona-Sonora Desert Museum, Boyce-Thompson Arboretum (mixed), Dexter National Fish Hatchery and Technology Center, Roper Lake State Park, Arizona State University, and Hassayampa River Preserve).

2.6e Environmental Baseline

Gila topminnow currently occupy the Santa Cruz River in its perennial reaches, as far north as Chavez Siding Road. This reach of the river was also occupied by longfin dace (*Agosia chrysogaster*), desert sucker (*Catostomus clarki*), Sonora sucker (*Catostomus insignis*), green sunfish (*Lepomis cyanellus*), and mosquitofish as recently as 1997 (USFWS 2001d). No Gila topminnows occur on the Tumacacori EMA and there are currently no plans for reintroductions in any locations (CNF 2000; D. Duncan, USFWS, pers. comm., 1 October 2002).

2.6f Effects of Proposed Action on the Gila topminnow

Direct Effects

The effects of the proposed action on this species are not anticipated to include direct effects to individual Gila topminnow because no construction will occur within occupied habitat.

Indirect Effects

Habitat Modification

Some indirect impacts to Gila topminnow habitat from erosion are possible from the construction of the proposed action. While the removal of vegetation for construction of access roads will increase surface runoff and sediment transport, and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997), the implementation of BMPs will help control erosion. However, unusually large precipitation events may temporarily overwhelm BMPs and result in some increase in sediment transport. Nevertheless, the distance of the proposed action from the Santa Cruz River will minimize the amount of sediments reaching Gila topminnow habitat.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Roads constructed for the proposed action also may allow the establishment or increased density of non-native grasses, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Wildfires could remove groundcover that is important in dissipating rainfall energy and reducing erosion.

However, new roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action. Measures outlined in the Invasive Species Management Plan also will minimize the introduction or spread of invasive species that may facilitate fires.

2.6g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal land, the habitat with the

highest potential for occupancy by Gila topminnow occurs on private land in Santa Cruz County. Most future actions on private land will not be subject to Section 7 consultation.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of national forest lands.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.6h Effects Determination and Incidental Take

The transport of sediments into the Santa Cruz River may affect the Gila topminnow; however, any increase in sediments will be relatively small because of the distance of the proposed action from occupied habitat. Therefore, it is not likely to adversely affect the species.

Because the proposed action is not likely to adversely affect the species, no take of Gila topminnow is anticipated.

2.7 MEXICAN GRAY WOLF (*Canis lupus baileyi*) (Endangered)

2.7a. Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for Mexican gray wolf is found within portions of Santa Cruz County containing oak and pine-juniper savannas above 4,000 ft (1,200 m). Wolves may travel long distances during hunting expeditions, typically in an irregular circle 20 mi (34 km) to 60 mi (68 km) in diameter. The action area for the Mexican gray wolf considered for the proposed action includes all potential habitat and travel corridors in western Santa Cruz and southern Pima County.

2.7b. Natural History and Distribution

Mexican gray wolves (Figure 18) are the smallest and southernmost of the 5 subspecies of gray wolf in North America. The Mexican gray wolf is a large dog-like carnivore with a mixed brown, rust, black, gray, and white. This species has a distinct white lip line, chin, and throat. Adults weigh between 50-90 lbs (23-41 kg) (Hoffmeister 1986). The historic range was from southeastern Arizona, southwestern New Mexico, southwestern



Texas, and south through the Sierra Madre of Mexico. The Mexican gray wolf is the southernmost occurring most endangered subspecies in North America. This wolf is the last subspecies of gray wolf known to occur in the Arizona-New Mexico area. The last known naturally occurring specimen in the United States was found in New Mexico in 1970 (USFWS 2001d).

Figure 18. Mexican gray wolf.

Historically, Mexican gray wolf habitat was montane woodlands, presumably because of the favorable combination of cover, water, and prey availability. Most wolf collections came from pine, oak, and pinyon-juniper woodlands, and intervening or adjacent grasslands above 1,372 m (4,500 ft) (Brown 1983b). Wolves avoided desertscrub and semidesert grasslands, but wooded riparian corridors were probably used for travelling and hunting (Parsons 1996).

These are social animals in the dog family that live and travel in packs of 7 to 30 animals depending upon prey size and availability. Mexican gray wolves prey upon a variety of animals from mice and squirrels to deer and elk. Territory size can range from 30 (78 km²) to 500 mi² (1,295 km²) or more. Packs are led by a pair of dominant animals that control most of the breeding. Breeding season lasts from late winter to early spring, and the dominant female produces up to 6 pups for the pack. The wolves care for the pups communally.

During the late 1800s through the mid 1900s, extensive hunting, trapping, and poisoning efforts at local, state, and federal levels resulted in the extirpation of this species from the United States portion of its range. Reintroduction efforts of captive-bred wolves are under way in the Blue Range Recovery Area of eastern Arizona and New Mexico. Fourteen packs have been released to date.

2.7c Critical Habitat

No critical habitat has been designated for this species.

2.7d Current Status Statewide

Mexican gray wolves were listed as endangered by USFWS in 1976 (41 FR 17736) without critical habitat. In 1998, an experimental, non-essential population was designated for the southwest (63 FR 1763) and a reintroduction program was initiated. Eleven wolves from captive breed stock were reintroduced into the Apache National Forest in southeastern Arizona under the experimental, non-essential designation in an effort to re-establish the subspecies to a portion of its historic range. A Recovery Plan for this subspecies was completed in 1982 and revisions are currently in progress (USFWS 2001d).

Mexican gray wolf populations steadily declined in Arizona because of predator control programs and conflicts with livestock interests. Pressure to control wolves became a priority beginning in the 1920s when this subspecies was nearly eliminated from the state and prevention of wolves from entering from Mexico was undertaken. In 1921 and 1922, a reported 58 wolves were taken by trapping or poisoning in Arizona. By 1924, reported takings dropped to 29 and by 1936, to 5. After 1952, only 2 wolves were reported taken in Arizona, 1 in 1958 and another in 1960 (Hoffmeister 1986). Reports of Mexican gray wolves living in the wild in Arizona continued into the early 1970s (USFWS 1982).

Similar predator control programs in Mexico reduced populations and may have eliminated the wolf by the 1980s. Surveys conducted in Mexico in the early 1990s did not confirm Mexican gray wolf populations in the wild (Parsons 1996).

2.7e Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consideration.

The Tumacacori EMA contains some areas of montane and riparian woodlands that may serve as dispersal corridors for Mexican gray wolves. If wolf populations exist in the mountains of Sonora, these corridors may be used as hunting and dispersal corridors. There are currently no plans to reintroduce the Mexican gray wolf into southern Arizona and, because of the distance and fragmentation of intervening habitat, it is unlikely that current experimental populations in northern Arizona could disperse into Santa Cruz County.

2.7f Effects of Proposed Action on the Mexican Gray Wolf

Direct Effects

Construction Noise and Activity

Because the only wild populations of Mexican gray wolves in Arizona occur in the Apache National Forest, disturbance from construction of the proposed action, even in suitable dispersal habitat, is highly unlikely. In the event that populations of wolves exist in Mexico and could disperse into southern Arizona, the greatest likelihood of disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise or construction disturbance will be widely distributed and relatively minor in any single area.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Gray wolves (*Canis lupus*) in Wisconsin are limited to places with pack-area mean road densities of 0.7 mi/1 mi² (1.1 km/1 km²) or less (Mladenoff et al. 1995). Some studies have shown that a few large areas of low road density, even in a landscape of high average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Access and construction roads for the proposed action commonly are spurs from existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches. Furthermore, construction activities within montane woodlands, riparian corridors or major canyons will be minimal and widely distributed, resulting in negligible impacts to the composition or structure of Mexican gray wolf habitat.

Increased Legal and Unauthorized Access to Mexican Gray Wolf Habitat

Gray wolves experience negative interactions with humans and roads are a key facilitator (Thiel 1985). Increased human access to potential wolf habitat through the use of temporary proposed construction roads could reduce the quality of the habitat and human interactions may increase mortality (Mech 1973). The road closure techniques outlined in the SECTION 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, wolves will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining suppression strategies were used, both in firefighter access and because roads were

widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. Fire prevention measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.7g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by Mexican gray wolf occurs on USFS land in Santa Cruz County. Future federal actions will be subject to Section 7 consultation and will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area and results in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.7h Effects Determination and Incidental Take

Construction noise and activity associated with the proposed action may affect the Mexican gray wolf, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration. Because the proposed action is not likely to adversely affect the Mexican gray wolf, no take is anticipated.

2.8 MEXICAN SPOTTED OWL (*Strix occidentalis lucida*) (Threatened)

2.8a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the MSO includes those areas of MSO habitat that may be directly impacted by construction as well as protected activity centers (PAC) within 1 mi (1.6 km) of the proposed action that may be subject to noise disturbance during construction. The entire action area for this species is within the Tumacacori EMA.

2.8b Natural History and Distribution

The MSO is one of three subspecies of spotted owl currently recognized by the American Ornithologists' Union in their most recent treatise on subspecies (A.O.U. 1957). However, Dickerman (1997), in a recent taxonomic review of *S. o. lucida*, has identified

three subspecies throughout the species' range, including resurrecting the use of *S. o. huachucae* as the subspecies in the southwestern United States and northern Mexico. Although this new revision is probably valid, the currently accepted taxonomy was followed. The MSO (Figure 8) is a medium-sized owl with a round head lacking ear tufts; light brown to dark brown plumage, and dark eyes. It has white spots on the head and nape, and white mottling on the breast and abdomen; thus, the name spotted owl (Pyle 1997). All three subspecies of spotted owl inhabit mountainous, forested regions of western North America.



Figure 19. Mexican spotted owl.

A detailed account of the spotted owl, inclusive of the three currently recognized subspecies, is given by Gutiérrez et al. (1995). Ganey (1998) presents a synthesis of what is presently known about the MSO, particularly in Arizona. The MSO Recovery Plan (USFWS 1995a) and technical supporting chapters on distribution and abundance (Ward et al. 1995), population biology (White et al. 1995), landscape analysis and metapopulation structure (Keitt et al. 1995), habitat relationships (Ganey and Dick 1995), and prey ecology (Ward and Block 1995) also are important summary documents. The following brief species account was obtained from these and other more current references.

The MSO is widely but patchily distributed in forested mountains and canyons from southern Utah and central Colorado, south into Arizona, New Mexico, extreme western Texas, and into Mexico to near Mexico City (McDonald et al. 1991, Gutiérrez et al. 1995, Ward et al. 1995, Dickerman 1997). The MSO nests, roosts, forages, and disperses in a variety of habitats in Arizona from about 3,770 ft (1,236 m) to 9,600 ft (3,150 m). Nest and roost habitats include forests and woodlands that are structurally complex, unevenly aged and multistoried, with mature or old-growth stands containing trees older than 200 years with a high (>70 percent) canopy closure, including many snags and fallen logs (Ganey and Dick 1995). According to Ganey (1998), they appear to be most common in mature and old growth forests in steep canyons, but also are found in canyons that include prominent cliffs with little forested habitat. The MSO preys on small mammals,

birds, reptiles, and insects, with woodrats (*Neotoma* spp.) and white-footed mice (*Peromyscus* spp.) constituting the bulk of its diet by biomass (Ward and Block 1995, Ganey et al. 1992, Reichenbacher and Duncan 1992).

Adult MSO are considered to have a relatively high survival rate, with an estimated probability of adult survival rate of 0.8 to 0.9 from one year to the next (White et al. 1995). Juveniles on the other hand, have a much lower survival probability rate, ranging from 0.06 to 0.29 (Ganey et al. 1998, White et al. 1995). There is a great deal of spatial and temporal variation in reproductive output, but one estimate places the general reproductive rate at 1.001 fledglings per pair (White et al. 1995). Typical of *K*-selected species (Ricklefs 1990), the MSO is long-lived with low reproductive output and generally maintains population densities near carrying capacity. The high survival rate of *K*-selected species enables MSO to maintain stable populations over time despite variable recruitment rates (White et al. 1995).

In 1993, the MSO was federally listed as a threatened species by the USFWS. The listing was based primarily on historical and ongoing habitat alteration due to timber management practices, specifically the use of even-aged silviculture, the threat of these practices continuing as prescribed in National Forest Plans, and the threat of additional habitat loss from catastrophic wildfire (USFWS 1993b).

The primary administrator of lands supporting MSO in the United States is the USFS. According to the recovery plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on land administered by USFS (USFWS 1995a). The majority of known MSO have been found within Region 3 of the USFS, which includes 11 National Forests in New Mexico and Arizona. USFS Regions 2 and 4, including two National Forests in Colorado and three in Utah, support fewer MSO.

2.8c Critical Habitat

Critical habitat was designated for the MSO in 1995 (USFWS 1995b). However, it was revoked by court order in 1998 for failing to complete the National Environmental Policy Act process (USFWS 1998). USFWS (USFWS 2000b) again proposed to designate 13.5 million acres (5.6 million ha), mostly on USFS land, as critical habitat for the species in 2000. The final rule published in the Federal Register on 1 February 2001 designated approximately 4.6 million acres (1.9 million ha) in Arizona, Colorado, New Mexico, and Utah on federal land outside of the USFS system (USFWS 2001e). The reason given for not designating critical habitat on USFS land was that current Forest Plans conform to management guidelines outlined in the recovery plan, which have undergone consultation with the USFWS, whereas other federal agencies have yet to formally adopt these guidelines.

On 13 January 2003, a federal judge stated that the USFWS final rule designating critical habitat for the MSO violated the ESA. On 18 November 2003, the USFWS again redesignated proposed critical habitat for the MSO, including unit BR-W-13 in the

Atascosa/Pajarito Mountains. The proposed action crosses this unit of proposed critical habitat.

2.8d Current Status Statewide

In Arizona, MSO have been documented throughout much of the state except for the arid southwestern portion. The greatest concentration of owls occurs along the Mogollon Rim from the White Mountains region to the peaks near Flagstaff and Williams (Ward et al. 1995, Ganey 1998). The majority of owls are located on federal lands managed by the USFS (USFWS 1995a).

There are three Recovery Units (RU) identified in Arizona. From north to south they are the Colorado Plateau, Upper Gila Mountains, and Basin and Range-West. No current estimate of the number of MSO within its entire range is available, but between 1990 and 1993, 103 MSO sites were recorded during planned surveys and incidental observations in the Basin and Range-West RU in Arizona (USFWS 1995a).

2.8e Environmental Baseline

The proposed action occurs in the Basin and Range - West RU. Within this RU, MSO are mainly associated with steep, rocky canyons containing cliffs and stands of oak, Mexican pine, and broad-leaved riparian vegetation (Ganey and Balda 1989). Most MSO habitat in this RU occurs on the CNF. However, the majority of the EMA crossed by the proposed action is semidesert grassland and lacks the features typically associated with MSO habitat.

The proposed action passes through the Tumacacori EMA of the CNF, which currently contains five PACs. The proposed action passes approximately 1.75 mi (2.8 km) east of PAC #0502020.

Livestock stocking rates for the allotments within the Tumacacori EMA range from 1,320 Animal Unit Months (AUM) in the Peña Blanca Allotment to 2,400 AUMs in the Bear Valley Allotment. Allotment Management Plans for Bear Valley and Sardinia Allotments are currently being revised. Range condition in areas crossed by the proposed action is moderately high with a stable or unknown trend. Native grasses dominate groundcover throughout the action area, but some non-native species, such as Lehmann's lovegrass (*Eragrostis lehmanniana*), tree of heaven (*Ailanthus altissima*), and salt cedar (*Tamarix* spp.) occur within the EMA (USFS 2002). Lehmann's lovegrass was seeded in many areas to prevent erosion (Cox et. al. 1984) but has extended in range far beyond the seeded areas (Cox and Ruyle 1986).

2.8f Effects of Proposed Action on MSO and Proposed Critical Habitat Direct Effects

Because the action area does not pass through suitable MSO habitat, no direct effects to the species are anticipated.

Indirect Effects

Habitat Modification and Fragmentation

Because the action area lacks the features typically associated with nesting or foraging habitat, no habitat modification directly attributed to construction or maintenance is anticipated.

Effects to Proposed Critical Habitat

While the proposed action passes through the boundaries of proposed critical habitat unit #BR-W-13, (Figure 20) the area where the project is located does not contain constituent elements as outlined in the 2001 critical habitat designation (USFWS 2001e).

The proposed action includes the placement of 14 structures and 12,137 linear feet (3,700 m) of new roads within unit BR-W-13 of proposed critical habitat. Therefore, the proposed Central Corridor would permanently disturb 3.4 acres (1.4 ha) and temporarily disturb 10.1 acres (4 ha) of land within proposed MSO critical habitat. These calculations are based on the assumptions listed in the Final Roads Analysis (Section 1.4) (URS 2003), including: (1) temporary disturbance at structure locations would occur in an area within a 100-foot (30.5-m) radius; (2) laydown areas were calculated as temporary disturbance; (3) the permanent area of disturbance at each structure site as 25 ft² (2.3 m²); (4) proposed new roads would be maintained for maintenance (and thus were permanent disturbance); and (5) the average width of proposed new roads would be 12 feet (3.7 m) wide.

Because the action area does not contain constituent elements of proposed critical habitat, and the conservation measures outlined above will minimize the impacts from accidental wildfire and invasive species, the impacts from the proposed action will not appreciably diminish the value of the proposed critical habitat to the survival and recovery of MSO.

2.8g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Because the action area for this species lies entirely on USFS land, all activities are managed according to the MSO recovery plan guidelines, and future actions will be subject to the consultation requirements established under Section 7, and are not considered cumulative to the proposed action.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the MSO action area, an increase in population in Nogales, and other regional population centers may translate into an increased demand for outdoor recreation, and therefore more recreational use of USFS land.

An undetermined level of border crossings by undocumented immigrants (UDI) occurs within the action area, resulting in habitat damage from new roads, discarded trash,

illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.8h Effects Determination and Incidental Take

Effects to the Species

The proposed action may affect, but is not likely to affect MSO. Because the proposed action is not likely to adversely affect the MSO, no take is anticipated.

Effects to Critical Habitat

While the proposed action passes through proposed critical habitat for this species, the area where the project is located does not contain constituent elements as outlined in the 2001 critical habitat designation (USFWS 2001e). Therefore, the proposed action may affect, but is not likely to adversely modify proposed critical habitat for the MSO.

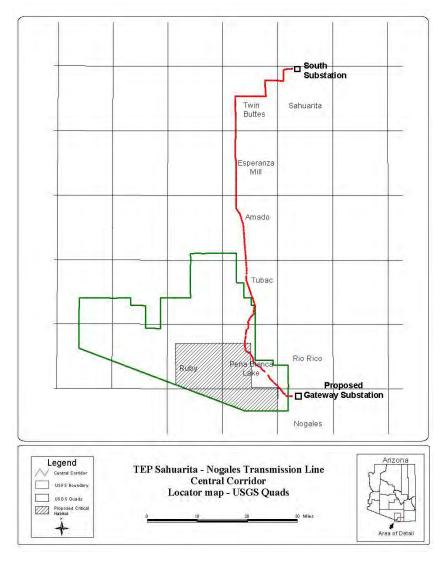


Figure 20. Location of proposed critical habitat for Mexican spotted owl as of 18 November 2003.

3.0 USFS SENSITIVE SPECIES

USFS Special status species are plant and wildlife species that are of concern because their populations are declining in size. In a letter dated 2 May 2002, AGFD listed 21 USFS Sensitive species that are known to occur within 3 mi (4.8 km) of the proposed corridor or may be expected to occur along the corridor if suitable habitat exists. The information listed in the letter was based on the AGFD Heritage Data Management System. In addition, 21 USFS Sensitive species known to occur within 5 mi (8 km) to 10 mi (16 km) of the proposed corridor have been included (AGFD letter dated 25 April 2002). AGFD species abstracts and other literature were reviewed for species' historical ranges and habitat preferences and field reconnaissance surveys were conducted along the entire corridor. However, species-specific surveys were impractical because of ongoing drought conditions in the project area, therefore the potential presence of sensitive species was assumed in all areas containing potential habitat. The 42 USFS Sensitive species that may occur on or near the proposed Central Corridor are listed in Table3.

COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Alamos Deer Vetch Lotus alamosanus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arid Throne Fleabane Erigeron arisolis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arizona Giant Sedge Carex ultra	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arizona Metalmark Calephelis rawsoni arizonensis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Mitigation plantings of host species will reduce impacts.
American Peregrine Falcon Falco peregrinus anatum	No Impacts.	Known occurrences and potential habitat are outside project area.
Bartram's Stonecrop Graptopetalum bartramii	No Impacts.	Known populations occur outside project area.
Beardless Chinch Weed Pectis imberbis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Species is adapted to disturbances.
Broadleaf ground cherry Physalis latiphysa	No Impacts.	Known populations occur outside project area.

TABLE 3 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Catalina Beardtongue Penstemon discolor	No Impacts.	Known populations occur outside project area.
Cave Myotis Myotis velifer	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Chiltepine Capsicum annuum var.glabriusculum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Chihuahuan Sedge Carex chihuahuensis	No Impacts.	Known populations occur outside project area.
Chiricahua Mountain Brookweed Samolus vagans	No Impacts.	No construction in perennial aquatic habitats.
Five-Stripped Sparrow Aimophila quinquestriata	No Impacts.	Potential habitat and know occurrences are outside project area.
Foetid Passionflower Passiflora foetida	No Impacts.	Known populations occur outside project area.
Gentry Indigo Bush Dalea tentaculoides	No Impacts.	Known populations occur outside project area.
Giant Spotted Whiptail Cnemidophorus burti strictogrammus	No Impacts.	Known populations occur outside project area.
Large-Flowered Blue Star Amsonia grandiflora	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Lowland Leopard Frog Rana yavapaiensis	No Impacts.	Known populations occur outside project area.No construction in perennial aquatic habitats.
Lumholtz Nightshade Solanum lumholtzianum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Mexican Garter Snake Thamnophis eques megalops	No Impacts.	No construction in perennial aquatic habitats.Minimal impacts to riparian habitat.
Mock-Pennyroyal Hedeoma dentatum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Nodding Blue-eyed Grass Sisyrinchium cernuum	No Impacts.	Known populations occur outside project area.
Northern Gray Hawk Asturina nitida maxima	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Distance of habitat from project area will attenuate effects. Only small percentage of total population within project area may be impacted.
Pima Indian mallow Abutilon parishii	No Impacts.	Known populations occur outside project area.
Santa Cruz Beehive Cactus Coryphantha recurvata	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Santa Cruz Star Leaf Choisya mollis	No Impacts.	Known populations occur outside project area.
Santa Cruz Striped Agave Agave parviflora ssp. parviflora	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Plants occur throughout Nogales Ranger District. Mitigation plantings of agave will reduce impacts.

COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Seeman Groundsel Senecio carlomasonii	No Impacts.	Known populations occur outside project area.
Sonoran Noseburn Tragia laciniata	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Southern Pocket Gopher Thomomys umbrinus intermedius	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Superb Beardtongue Penstemon superbus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Supine Bean Macroptilium supinum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	Pre-construction surveys will be conducted and, if necessary, mitigation measures will be coordinated with USFS personnel.
Sweet Acacia Acacia smallii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Thurber Hoary Pea Tephrosia thurberi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Thurber's Morning-glory Ipomoea thurberi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Virlet Paspalum Paspalum virletti	No Impacts.	Known populations occur outside project area.

TABLE 3 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Weeping Muhly Muhlenbergia xerophila	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Western Barking Frog Eleutherodactylus augusti cactorum	No Impacts.	Known populations occur outside project area.
Western Yellow-billed Cuckoo Coccyzus americanus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Wiggins Milkweed Vine Metastelma mexicanum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Populations within Arizona appear stable. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Wooly Fleabane Laennecia eriophylla	No Impacts.	Potential habitat and know occurrences are outside project area.

3.1 PLANTS

Alamos deer vetch (*Lotus alamosanus*)

Alamos deer vetch is a perennial herb found in southern Arizona, and Sonora, Chihuahua, and Durango, Mexico. Within Arizona, this plant is found in Sycamore Canyon and the Pajarito Mountains of Santa Cruz County, and near Garden Valley in Maricopa County. This plant is considered a wetland obligate species that is restricted to stream banks in canyons at elevations ranging from 3,500 ft (1,067 m) to 5,500 ft (1,676 m) (AGFD 1999a). Within the Nogales RD, this plant occurs in the Sycamore Canyon and Peña Blanca Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

Population trends for Alamos deer vetch are unknown (AGFD 1999a). The proposed transmission line may cross potential Alamos deer vetch habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, viable populations occur outside of the project area, including the Gooding RNA. There may be an impact to individual plants during development of the line; however, disturbance will be limited to a few individuals and is not likely to result in a trend toward federal listing or loss of viability.

Arid throne fleabane (*Erigeron arisolis*)

Arid throne fleabane is an annual to short-lived perennial forb that occurs in Arizona, southwestern New Mexico and Sonora, Mexico. Within Arizona, this plant is found in Apache, Cochise, Pima, and Santa Cruz counties. This species is typically found on moist rocky soils in grasslands, grassy openings within oak woodlands, and roadsides at elevations between 4,200 ft (1,280 m) and 5,500 ft (1,676 m) (AGFD 2000a). On the CNF Nogales RD, it has been documented from Box Canyon and Ruby Roads (T. Newman, CNF, pers. comm., 20 August 2002).

Arid throne fleabane favors moist areas in grasslands and grassy openings in oak woodlands, areas also favored by livestock for grazing (AGFD 2000a). The proposed transmission line parallels Ruby Road, a known location for this species. Placement of the transmission line may impact individual arid throne fleabane, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Arizona giant sedge (*Carex ultra*)

Arizona giant sedge is the largest sedge found in Arizona. Its range includes southeast Arizona, extreme southwest New Mexico (Hidalgo County, Indian Springs in the Pelocillos) and Mexico (Sonora and Coahila). Within Arizona, this sedge is found in Cochise, Graham, Pinal, Yavapai, Pima (Santa Rita Mountains and the Rincon Valley), and Santa Cruz counties (Santa Rita and Atascosa mountains). Typically only 1 patch per mountain has been found. Like other sedges, this plant is associated with moist soil

near perennial wet springs and streams and undulating rocky-gravelly terrain at elevations ranging from 2,040 ft (622 m) to 6,000 ft (1,829 m) (AGFD 2000b). Within the Nogales RD, Arizona giant sedge is found in Sycamore Canyon and Mule Ridge in the Atascosa Mountains, and at Deering Spring and Big Casa Blanca Canyon in the Santa Rita Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

Small populations of this sedge are vulnerable to local disturbance of aquatic or riparian habitat (AGFD 2000b). The proposed transmission line may cross potential Arizona giant sedge habitat; however, no construction will occur in perennial aquatic habitats and construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Bartram's stonecrop (*Graptopetalum bartramii*)

Bartram's stonecrop is a small succulent perennial found in southern Arizona and Chihuahua, Mexico (one record). In Arizona, this plant occurs in Santa Cruz County within the Patagonia, Santa Rita, and Tumacacori Mountains, in Pima County within the Baboquivari, Dragoon, and Rincon mountains, and in Cochise County within the Chiricahua Mountains. Habitat for Bartram's stonecrop consists of cracks in rocky outcrops within shrub live oak-grassland communities located on the sides of rugged canyons. This plant is usually found in heavy litter cover and shade where moisture drips from rocks at elevations ranging from 3,900 ft (1,189 m) to 6,700 ft (2,042 m) (AGFD 1997a). Bartram's stonecrop plants are found on the west side of the Nogales RD in Tres Amigos Gulch; Sycamore, Peña Blanca, Alamo, and Peñasco canyons; in the vicinity of Montana Peak and Peña Blanca Lake (T. Newman, CNF, pers. comm., 20 August 2002).

Bartram's stonecrop populations are typically small and isolated. Illegal collection of the plant is the main management issue at this time. Other factors that may affect populations include mining and mineral exploration, habitat alteration due to livestock grazing, trampling by cattle and recreationists, and road construction and maintenance. Bartram's stonecrop populations are typically small and isolated but illegal collection of the plant is the main management issue at this time. Other factors that may affect populations include mining and mineral exploration, habitat alteration due to livestock grazing, trampling by cattle and recreationists, and road construction and maintenance (AGFD 1997a). The proposed TEP transmission line does not cross known Bartram's stonecrop populations within the Nogales RD, therefore placement of the transmission line will not impact this species.

Beardless chinch weed (*Pectis imberbis*)

Beardless chinch weed is a perennial herb that is found in southern Arizona, western Chihuahua and eastern Sonora, Mexico. Within Arizona, this plant can be found in Cochise, Pima, and Santa Cruz counties (within Santa Cruz County it is found along Ruby Road in the Atascosa Mountains and in the Red Rock area of Canelo Hills). Habitat for this species consists of open areas in grassland and oak-grassland

communities. Beardless chinch weed has an extremely broad habitat range and can be found at elevations from 4,000 ft (1,219 m) to 5,000 ft (1,524 m) (AGFD 1998a).

Populations of beardless chinch weed may be susceptible to impacts from grazing and road maintenance activities but the species is adapted to disturbances and grows along road cuts (AGFD 1998a). The proposed transmission line crosses over known beardless chinch weed populations within the Nogales RD. Placement of the transmission line may impact individual beardless chinch weed, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to beardless chinch weed are not likely to result in a trend toward federal listing or loss of viability.

Broadleaf ground cherry (*Physalis latiphysa*)

Broadleaf ground cherry is an herbaceous annual found in southern Arizona. This plant can be found in the San Bernardino Valley of Cochise County, the Pinaleno Mountains of Graham County, in the vicinity of Arivaca Creek in Pima County, and the Santa Cruz River of Santa Cruz County. Habitat for the broad-leaf ground cherry consists of washes, often in the shade of shrubs and boulders, desertscrub vegetation, and grasslands at elevations ranging from 914 to 1,372 m (3,000 – 4,500 feet) (AGFD 2000c). There are no known sites for this plant in the Nogales RD. The nearest locations are northwest of Arivaca Lake and in the vicinity of Tubac on the Santa Cruz River (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of broad-leaf ground cherry (AGFD 2000c). The proposed TEP transmission line does not cross known broadleaf ground cherry populations within the Nogales RD, therefore placement of the transmission line will not impact this species.

Catalina beardtongue (Penstemon discolor)

Catalina beardtongue is a perennial herbaceous sub-shrub found in southern Arizona. This shrub is found in Cochise, Graham, Pinal, Pima (within the Santa Catalina Mountains), and Santa Cruz counties (within the Atascosa and Tumacacori mountains). Habitat for Catalina beardtongue consists of bare rock outcrops, barren soil outcrops, and bedrock openings in chapparal or pine-oak woodlands at elevations ranging from 4,120 ft (1,256 m) to 7,600 ft (2,316) (AGFD 1999b). On the Nogales RD, this shrub occurs in the upper end of Peck Canyon, Corral Nuevo, and the adjacent Bartalo Mountain (Cedar Canyon), typically on whitish volcanic ash (T. Newman, CNF, pers. comm., 20 August 2002).

Rock climbers threaten some populations of this plant but few other threats exist (AGFD 1999b). The proposed TEP transmission line does not cross known Catalina beardtongue populations within the Nogales RD, therefore placement of the transmission line will not impact this species.

Chiltepine (*Capsicum annuum* var.*glabriusculum*)

Chiltepine is an herbaceous to woody perennial shrub that is found in south Texas, southern New Mexico, southern Arizona, and south to tropical America. Within Arizona, a few populations of this plant are found in the Chiricahua, Tumacacori, Baboquivari, and Ajo Mountains. This plant occurs in protected, frost-free canyons in oak woodlands of slopes at less than 4,500 ft (1,372 m) elevation (typically found at elevations ranging from 3,600 ft [1,097 m] to 4,400 ft [1,341 m]). Chiltepine plants grow under nurse shrubs and usually are associated with rock ledges and outcrops. Within the Nogales RD, there are populations in the Tumacacori Mountains and Cobre Ridge area, and there are suspected populations on the west side of the RD (AGFD 1991a; T. Newman, CNF, pers. comm., 20 August 2002).

This plant is declining in some areas because of drought, overgrazing, and local over-collection of berries (AGFD 1991a). Placement of the transmission line may impact individual chiltepine plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to chiltepine are not likely to result in a trend toward federal listing or loss of viability.

Chihuahuan sedge (*Carex chihuahuensis*)

Chihuahuan sedge is a grass-like perennial plant that occurs in southeastern Arizona, New Mexico (Hidalgo County), and Mexico (Sonora and Chihuahua). Within Arizona, this plant ranges from Cochise, Graham, Gila, Pima (Santa Catalina, San Luis, and Rincon mountains), and Santa Cruz counties (Atascosa and Santa Rita mountains, and the Santa Cruz River). Chihuahuan sedge can be found in wet soils along streambeds and in shallower draws of pine-oak forests and riparian woodlands. It also is found in wet meadows, cienegas, marshy areas, and canyon bottoms from 1,100 ft (335 m) to 8,000 ft) (AGFD 1999c). Within the Nogales RD, this plant has been found near Arivaca Lake (on private land), Sycamore Canyon, and south of Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement on the population status of Chihuahuan sedge (AGFD 1999c). The proposed transmission line may cross potential Chihuahuan sedge habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Chiricahua Mountain brookweed (Samolus vagans)

Chiricahua Mountain brookweed is a perennial herb found in southeastern Arizona, western Chihuahua, and eastern Sonora, Mexico. This plant apparently reaches its southern limit in southern Sonora, Mexico. Within Arizona, this species is found in the Huachuca Mountains of Cochise County, the Rincon, Santa Catalina, and Santa Rita

mountains of Pima County, and the Canelo Hills and Pajarito mountains of Santa Cruz County. The Chiricahua Mountain brookweed is confined to areas with permanent water, such as springs, seeps, and in and along streams at elevations ranging from 1,219 to 2,195 m (4,000-7,200 ft) (AGFD 1999d). Within the Nogales RD, this plant occurs in Florida Canyon of the Santa Rita Mountains and in Sycamore Canyon of the Atascosa Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Chiricahua Mountain brookweed (AGFD 1999d). Because no construction will occur within perennial aquatic habitats, the proposed action will have no effect on the population status of the Chiricahua Mountain brookweed.

Foetid passionflower (*Passiflora foetida*)

The foetid passionflower is a herbaceous vine found in southeastern Texas and the Rio Grande Valley, southern Arizona, and southward throughout Mexico, Central and South America, and the West Indies. Within Arizona, this species is found in the Baboquivari Mountains, Arivaca, and Las Guijas Mountains of Pima County and in California Gulch and the Bartlett Mountains of Santa Cruz County. In Arizona, this plant occurs on hillsides and canyons of the Lower Sonoran zone from 1,067 to 1,707 m (3,500 – 5,600 ft) in elevation (AGFD 2000c). Within the Nogales RD, foetid passionflowers have been recorded in the California Gulch and Holden Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of foetid passionflower (AGFD 2000c). Known locations of this plant occur outside of the proposed TEP transmission line corridor, therefore the proposed TEP transmission line will have no effect on the population status of the foetid passionflower

Gentry indigo bush (*Dalea tentaculoides*)

The Gentry indigo bush is an herbaceous perennial shrub found primarily in southern Arizona, but its range may extend into Mexico. Within Arizona, this shrub was historically found in the Sycamore Canyon drainage of the Atascosa Mountains, in the Pajarito Mountains of Santa Cruz County, and within the Baboquivari Mountains (1930s record) and Mendoza Canyon (1965 record) of Pima County. A population currently exists in the Gooding Natural Area approximately 12 Km (7.5 mi) from the proposed action. Gentry indigo bush is typically found along canyon bottoms on cobble terraces subject to occasional flooding and seems to prefer disturbance-prone environments at elevations ranging from 1,097 to 1,341 m (3,600 – 4,400 ft) (AGFD 1998b). Historic collection records indicate that this plant may grow on rocky hillsides. Within the Nogales RD, this plant has been recorded in Sycamore Canyon, in the vicinity of Peñasco Canyon, Kaiser Canyon, and north of Manzanita Mountain (T. Newman, CNF, pers. comm., 20 August 2002).

Potential threats to Gentry indigo bush populations are cattle grazing (Gori et al. 1991), recreational foot traffic, and flooding events that eliminate terraces occupied by this

species (AGFD 1998b). No direct impacts from the proposed TEP transmission line on Gentry indigo bush are anticipated. Indirect effects from increased risk of wildfire or the introduction of nonnative species may impact individual plants, however because of the distance of the project and the conservation measures (invasive species control, fire prevention plan) the potential for any impact is highly unlikely. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Large-flowered blue star (Amsonia grandiflora)

The large-flowered blue star is an herbaceous perennial that is found in northern Sonora and Durango, Mexico, and southern Arizona. Within Arizona, this plant is found in the Patagonia, Atascosa/Pajarito Mountains of Santa Cruz and Pima counties. Habitat for this species consists of canyon bottoms in oak woodlands typically dominated by Emory oak and Mexican blue oak; however, site-specific qualities are inconsistent. Large-flowered blue star plants have adapted to rock fall disturbance and are typically found at elevations ranging from 1,189 to 1,372 m (3,900 4,500 ft) (AGFD 1998c). Within the west side of the Nogales RD, this plant occurs at Peña Blanca and Arivaca Lakes, Sycamore Canyon, Chiminea Canyon, California Gulch, and near Ruby (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of large-flowered blue star are rare, with only 15 to 20 populations within 2 mountain ranges as the total world distribution, but populations seem to be stable. This plant is highly susceptible to disturbance, and expanding development in the Nogales area (AGFD 1998c) may impact populations. The proposed TEP transmission line crosses near a known large-flowered blue star population in Peña Blanca Canyon, and some individual plants, comprising a small percentage of the total population, may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Lumholtz nightshade (Solanum lumholtzianum)

The Lumholtz nightshade is an herbaceous annual that is found in southern Arizona and northern Mexico. Within Arizona, this plant is found in the Arivaca and San Luis Mountains of Pima County and the Patagonia, Atascosa, and Santa Rita Mountains of Santa Cruz County. Lumholtz nightshade plants are typically found in washes and low ground near wet depressions and along stream banks from 914 to 1,402 m (3,000 – 4,600 ft) elevation in desert grassland plant communities. This plant is also often found in disturbed, weedy areas (AGFD 2000d). Within the Nogales RD, this nightshade is found in the vicinity of Arivaca, Ruby, California Gulch, Nogales, Cobre Ridge, and Oro Blanco Wash (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Lumholtz nightshade (AGFD 2000d). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated

mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mock-pennyroyal (*Hedeoma dentatum*)

The mock-pennyroyal is an herbaceous perennial plant found in southeastern Arizona and northern Sonora, Mexico. Within Arizona, this plant is found in the Chiricahua, Huachuca, Mule, Whetstone, and Winchester mountains of Cochise County, the Pinaleno Mountains of Graham County, the Baboquivari, Rincon, and Santa Cruz mountains of Pima County, and the Atascosa, Mustang, Pajarito, and Santa Rita mountains of Santa Cruz County. Habitat for this plant consists of oak woodland, oak-pine forest, and pine forest. It can be found on open roadcuts, steep rocky outcrops, and gravelly slopes in wooded canyons with open to full sunlight at elevations ranging from 1,173 to 2,500 m (3,850 – 8,200 ft) (AGFD 2000e).

Populations of mock-pennyroyal seem to be restricted to a relatively small geographic area, and populations are apparently small. Because habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Nodding blue-eyed grass (Sisyrinchium cernuum)

Nodding blue-eyed grass is a perennial forb with grass-like leaves that occurs in southeastern Arizona, west Texas, and Mexico. Within Pima and Santa Cruz counties, Arizona it occurs in the Pajarito, Santa Rita, Atascosa, and Rincon mountains as well as Sycamore Canyon. This species can be found in desert grassland and pine-oak woodlands from 1,006 to 2,438 m (3,300 – 8,000 ft) in elevation along streams in partial shade and in canyon bottoms. It grows in wet soil by seeps, pools, or springs in desert scrub. It has also been found on sandy stream banks. On the Nogales RD, this plant has been found at 1,189 m (3,900 ft) in Sycamore Canyon on the west side and at 1,402 m (4,600 ft) in Big Casa Blanca Canyon in the Santa Rita Mountains (AGFD 1999e). The known location of this plant in Sycamore Canyon is within the Goodding RNA, located approximately 1.6 km (1 mi) west of the proposed ROW (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of nodding blue-eyed grass (AGFD 1999e). However, this species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD. The proposed transmission line will not cross over or near known locations of this plant within the Goodding RNA. Therefore, placement of the TEP transmission line from Sahuarita to Nogales will have no impact on the nodding blue-eyed grass.

Pima Indian mallow (Abutilon parishii)

The Pima Indian mallow is a perennial woody-based plant with herbaceous branches. This plant is known from 84 populations in 17 mountain ranges from near the town of Bagdad in central Arizona to Nachopouli Canyon, Sonora, Mexico. Within Arizona, Pima Indian mallow are found in the Superstition Mountains of Maricopa County, the Santa Catalina, Rincon, Silverbell, and Tucson mountains of Pima County, the Mineral Hills, Superstition, Picacho, Tortolito, and Dripping Springs mountains of Pinal County, the Santa Rita and Tumacacori mountains of Santa Cruz County, and the Little Shipp Wash and Cottonwood Creek areas near Bagdad in Yavapai County. This plant has also been identified within Sabino Canyon in Pima County. Pima Indian mallow are typically found in mesic situations in full sun within higher elevations of Sonoran desertscrub. They can be found on rocky slopes, cliff bases, lower side slopes and ledges of canyons among rocks and boulders. In riparian zones, this plant occurs on flat secondary terraces but typically not in canyon bottoms. Pima Indian mallow are often found near trails, probably because of the trails influence on the light, heat, and water on the micro-habitat. This species is found at elevations ranging from 900 to 1,440 m (3,000 to 4,800 feet) (AGFD 1997b). Within the Nogales RD, this plant occurs in the Devils Cash Box area of the Santa Rita Mountains and within Peck Canyon of the Tumacacori Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

In Arizona, few threats exist to the populations of Pima Indian mallow because this plant grows in steep areas eliminating grazing pressures, and neither light fires nor freezing temperatures cause harm to it (AGFD 1997b). The proposed transmission line will not cross over or near known locations of this plant; therefore, placement of the TEP transmission line will have no impact on the population status of the Pima Indian mallow.

Santa Cruz beehive cactus (*Corvphantha recurvata*)

The Santa Cruz beehive cactus is a succulent perennial that occurs in southern Arizona and northern Sonora (about 20 km [12.4 mi] south of the international border), Mexico. Within Arizona, this species occurs in western Santa Cruz County from Nogales and the Tumacacori Mountains west to the Atascosa/Pajarito mountains. Santa Cruz beehive cacti are found in alluvial soils of valleys and foothills in grassland and oak woodland habitats from 1,219 to 1,829 m (4,000 – 6,000 ft). These plants are either on rocky hillsides with high grass cover or in rock crevices where runoff accumulates and provides a more favorable moisture relationship than the surrounding soils (AGFD 1998d). Within the Nogales RD known plant locations have increased since 1997 (813 plant clumps in 1997, 807 plant clumps in 1998, and 175 in 1999) (T. Newman, CNF, pers. comm., 20 August 2002).

Accessible populations of the Santa Cruz beehive cactus have declined due to collection, but the status of populations beyond accessible areas is unknown (AGFD 1998d). The proposed TEP transmission line crosses over several known Santa Cruz beehive cactus populations within the Nogales RD. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz star leaf (Choisya mollis)

The Santa Cruz star leaf is a perennial shrub that occurs in southern Arizona within the Atascosa, Pajarito, and Tumacacori mountains of Santa Cruz County. Santa Cruz star leaf plants are found primarily within madrean evergreen woodland communities from 1,067 to 1,524 m (3,500 – 5,000 ft) in elevation. This plant is usually found in canyon bottoms and slopes, usually in the shade of oaks and other trees, or rock outcrops (AGFD 1999f). Santa Cruz star leaf plants have been found throughout the eastern portion of the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Santa Cruz star leaf are typically found in rugged and remote mountainous areas where human activity is low and the likelihood of disturbance or removal of plants is minimal. However, the species population trend is unknown and existing populations are relatively rare, have a restricted range, and are only found within specific habitats (AGFD 1999f). The proposed transmission line will not cross over or near known locations of this plant; therefore, placement of the TEP transmission line will have no impact on the Santa Cruz star leaf.

Santa Cruz striped agave (*Agave parviflora* ssp. *parviflora*)

Santa Cruz striped agave is a small perennial succulent found in southern Arizona and northern Mexico. Within Arizona, this species is found near Arivaca in Pima County, and in the Las Guijas, Pajarito, Patagonia, Santa Rita, and Atascosa mountains of Santa Cruz County. Habitat for this agave consists of rocky or gravelly slopes of middle elevation mountains, in desert grassland or oak woodlands. This plant appears to prefer soils on rounded ridge-tops where grasses and shrubs are sparse and soil is bare or nearly so (AGFD 1998e). Santa Cruz striped agave have been found throughout the Nogales RD (primarily within the Atascosa, Pajarito, San Luis, and Las Guijas mountains), and in recent years the documented number of individual plants and number of locations has increased for this area (T. Newman, CNF, pers. comm., 20 August 2002).

Some populations of Santa Cruz striped agave have declined due to illegal collection and loss of habitat due to mining and road construction. Livestock grazing has caused degradation of habitat and browsing of flower stalks (AGFD 1998e). The proposed TEP transmission line crosses areas with known populations of Santa Cruz striped agave and there may be an impact to individual plants during development of the line. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area and transplanting of agave plants in project area will minimize impacts. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Seeman groundsel (Senecio carlomasonii)

The seeman groundsel is a perennial herb or subshrub found in southern Arizona and Mexico (Sonora, Chihuahua, Nayarit). Within Arizona, this plant is found in the Chiricahua and Huachuca mountains of Cochise County, the Baboquivari and Santa Rita mountains of Pima County, and the Santa Rita, Pajarito, and Peña Blanca mountains of

Santa Cruz County (AGFD 2000f). Within the Nogales RD, seeman groundsel have been recorded in the Peña Blanca Lake and Sycamore Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of seeman groundsel (AGFD 2000f). A potential threat to seeman groundsel habitat may be trampling by hikers. The proposed transmission line will not cross over or near known locations of this plant; therefore, placement of the TEP transmission line will have no impact on the population status of the seeman groundsel.

Sonoran noseburn (*Tragia laciniata*)

Sonoran noseburn is an herbaceous perennial that occurs in southern Arizona, Mexico (Sonora and Chihuahua), and possibly New Mexico. Within Arizona this plant can be found in Cochise County in the Huachuca Mountains and Canelo Hills, in Pima County in the Santa Rita Mountains, and in Santa Cruz County in the Atascosa Mountains (Sycamore Canyon), Patagonia Mountains, Pajarito Mountains, Canelo Hills (O'Donnell Canyon), and Santa Rita Mountains. Sonoran noseburn typically occur at elevations of 1,067 to 1,722 m (3,500 – 5,650 ft) along streams and canyon bottoms, on shaded hillsides within the upper parts of the Lower Sonoran and Upper Sonoran biotic communities, and open woodland areas (AGFD 2000g). This species has been found in canyons, along streams, and near roadways of the Nogales RD (AGFD 2000g).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Sonoran noseburn (AGFD 2000g). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Superb beardtongue (*Penstemon superbus*)

The superb beardtongue is a perennial herbaceous forb found in southeastern Arizona, New Mexico, and Mexico (Chihuahua). Within southern Arizona, this species is found in Pima County in the Santa Catalina and Santa Rita mountains, and in Santa Cruz County within the Tumacacori Mountains. This plant is generally found in rocky canyons, dry hillsides, and along washes in sandy or gravelly soils at elevations between 945 and 1,676 m (3,100 – 5,500 ft) (AGFD 2000h). Within the Nogales RD, it has been found in Rock Corral Canyon and Box Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of superb beardtongue (AGFD 2000h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges

throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Supine bean (*Macroptilium supinum*)

The supine bean is a perennial herb that grows in colonies and produces underground fruits. The total range for this species includes Santa Cruz County, Arizona, south into Mexico, including the states of Sonoran and Nayarit. Within Arizona, this plant can be found in the Atascosa/Pajarito, San Luis, and Patagonia Mountains, and the southern portion of the Santa Cruz River drainage in Santa Cruz County (much of this area is within the Nogales RD). Supine bean are typically found along ridge tops and gentle slopes of rolling hills in semi-desert grassland or grassy openings in oak-juniper woodlands at elevations between 1,097 and 1,494 m (3,600 – 4,900 ft) (AGFD 1999g).

There are currently an estimated 12 populations of this species in Arizona. Populations range from small (around 20 individuals) to relatively large (around 3,500 individuals). A 43% decline in a monitored population was recorded from 1989 to 1993. This decline was apparently due to low reproductive output and poor recruitment, although the reasons for these are unknown (AGFD 1999g). Possible threats to this species include degradation of habitat due to livestock grazing, off-road vehicle activity, recreation (camping and hiking), Border Patrol activities, utility corridor and road construction/maintenance, and home building (AGFD 1999g).

Because of the recent decline in monitored populations and drought conditions noted in 2002, additional surveys will be conducted prior to construction in potential supine bean If populations of this species are found in the vicinity of construction, consultation with USFS biologists will be initiated to minimize impacts. Development of the proposed TEP transmission line is likely to have an impact on this species. However, once additional surveys are completed, impacts are likely to be limited to individual plants and not whole populations. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Sweet acacia (Acacia smallii)

The sweet acacia is a woody perennial spiny shrub or small tree found in Texas, Arizona, and California south to Argentina. Within Arizona, this species is found in the Baboquivari Mountains of Pima County and Sycamore Canyon and Atascosa Mountains of Santa Cruz County. Sweet acacia are typically found in the lower slopes of canyons of riparian areas in desert grassland communities from elevations ranging from 1,067 to 1,219 m (3,500 – 4,000 ft) (AGFD 1992).

Population trends for the sweet acacia are unknown (AGFD 1992). The proposed TEP transmission line may cross potential sweet acacia habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area.

Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Thurber hoary pea (Tephrosia thurberi)

The Thurber hoary pea is a perennial shrub that occurs in southern Arizona and Mexico (northern Sonora and southwestern Chihuahua). Within Arizona, this plant can be found in Cochise, Santa Cruz, and Pima counties. On the Nogales RD, Thurber hoary pea plants are found in the Santa Rita and Atascosa mountains. This species typically occurs on rocky slopes among oaks, pines, junipers, manzanitas, open hilltops, and grasslands at elevations between 1,067 and 2,134 m (3,500 – 7,000 ft) (AGFD 1999h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber hoary pea (AGFD 1999h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Thurber's morning-glory (Ipomoea thurberi)

Thurber's morning-glory are perennial herbaceous vines that are found in southern Arizona and Mexico (Chihuahua and Sonora). Within Arizona, this plant is found in the Huachuca and Mule Mountains of Cochise County, the Santa Rita Mountains of Pima County, and in the vicinity of Nogales, the Canelo Hills, and the Patagonia and Atascosa/Pajarito mountains of Santa Cruz County. Habitat in Arizona typically consists of rocky hillsides and canyon slopes in madrean evergreen woodland and semi-desert grassland communities in elevations between 1,158 and 1,570 m (3,800 – 5,150 ft) (AGFD 2000i). On the Nogales RD, this morning glory has been found in the vicinity of Peña Blanca Lake, east of Peñasco Canyon, and Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber's morning-glory (AGFD 2000i). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Virlet paspalum (*Paspalum virletti*)

The virlet paspalum is a perennial grass found in southeastern Arizona and Mexico (Sonora and San Luis Potosi). Within Arizona, this grass is found in the Huachuca Mountains of Cochise County, and in the Pajarito Mountains and Sycamore Canyon of Santa Cruz County. This grass is found in sandy soils of canyon bottoms in semi-desert grassland communities and grassy areas within madrean evergreen woodland communities at elevations ranging from 1,067 to 1,737 m (3,500 – 5,700 ft) (AGFD

1999i). In the Nogales RD, the only known location for this grass is in Sycamore Canyon growing in a sandy canyon bottom (T. Newman, CNF, pers. comm., 20 August 2002).

This species is rare in Arizona, where it is known from only 2 widely separated populations. There is no information on the potential effects of land use activities, such as utility placement, on the population status of virlet paspalum (AGFD 1999i). Known locations of this plant occur outside of the proposed TEP transmission line corridor; therefore, placement of the line is not likely to impact the virlet paspalum.

Weeping muhly (Sycamore Canyon muhly) (Muhlenbergia xerophila)

Weeping muhly is a perennial herbaceous grass found only in southern Arizona. Populations occur in the Santa Catalina, Rincon, Santa Rita, Tumacacori, and Baboquivari mountains of Pima County, and in Sycamore Canyon within the Pajarito Mountains of Santa Cruz County. Weeping muhly most often grow in crevices of cliffs, bedrock, and other rocks along canyon bottoms. This grass is also known from rocky canyon slopes in oak, pine-oak, and riparian woodlands at elevations between 1,073 and 1,829 m (3,520 – 6,000 ft) (AGFD 1999j).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of weeping muhly (AGFD 1999j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wiggins milkweed vine (*Metastelma mexicanum*)

Wiggins milkweed vine is a perennial herbaceous vine with a woody base found in southeastern Arizona to southern Sonora, Mexico. Within Arizona, this vine occurs around the Nogales and Ruby areas, Sycamore Canyon area, and Patagonia Mountains of Santa Cruz County, and Baboquivari, Coyote, and Catalina mountains of Pima County. This vine is typically found on open slopes within open oak woodland on granite soils of juniper flats at elevations between 1,067 and 1,554 m (3,500 – 5,100 ft) (AGFD 2000j). Wiggins milkweed vine has been found in several locations within the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of Wiggins milkweed vine within Arizona appear to be stable. This vine depends on surrounding vegetation for microhabitat and will be affected by any disturbance to area habitat (AGFD 2000j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wooly fleabane (Laennecia eriophylla)

Wooly fleabane is a perennial herb found in southeastern Arizona and northern Mexico (Sonora and Chihuahua). In Arizona, wooly fleabane occurs in the Atascosa Mountains, Pajarito Mountains, Santa Rita Mountains, Canelo Hills, and in the vicinity of Sonoita Creek in Santa Cruz County. This species is typically found in gravelly soil of rocky slopes and ridges with dense grass cover in semi-desert grassland, dry oak woodland, and pine-oak woodland communities at elevations between 1,292 and 1,722 m (4,240 – 5,650 ft) (AGFD 1999k). There are known locations of wooly fleabane in the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Population sizes of this plant are usually very small, with typically no more than 40 plants found in any of the populations known from Arizona. Population numbers fluctuate with the amount and timing of summer rains from year to year. This species was probably more common before its habitat was altered by excessive grazing (AGFD 1999k). Known locations of this plant and potential habitat occur outside of the proposed TEP transmission line corridor; therefore, placement of the line is not likely to impact the wooly fleabane.

3.2 Invertebrates

Arizona metalmark (*Calephelis rawsoni arizonensis*)

The Arizona metalmark is a small, brown butterfly with bands of blue metallic markings on the upper and underside of the body. This butterfly occurs in Arizona, and from the Animas Mountains in southwestern New Mexico southward to Sonora, Mexico. The southern limits of its range are poorly defined to date. In Arizona, this species is known from as far north as Gila County then southward through Graham, Cochise, Pima, and Santa Cruz counties in most of the mountains therein. Arizona metalmark butterflies occur mostly above the desert floor in mountain foothills. Within these mountains, it is found in riparian canyons in oak woodland or more arid regions at elevations from 716 to 1,676 m (2,350 – 5,500 ft). Canyons with standing water for a major portion of the year appear to contain populations of this species as long as *Agave* spp. are present for larvae development (AGFD 2001a). There is no information on the potential effects of land use activities, such as utility placement, on the population status of Arizona metalmark (AGFD 2001a).

Placement of the transmission line may indirectly impact individuals of this species through habitat modification, however because the species is widely distributed across southern Arizona, only a small percentage of Arizona metalmarks may be impacted. Furthermore, transplanting of agave plants also will minimize impacts. Impacts are not likely to result in a trend toward federal listing or loss of viability.

3.3 BIRDS

American peregrine falcon (Falco peregrinus anatum)

The American peregrine falcon subspecies is a medium-sized raptor that nests from central Alaska south to Baja California, Sonora, and the highlands of Central Mexico.

Within Arizona, this raptor breeds wherever sufficient prey is available near cliffs. These raptors are rare or absent as breeders in the southwestern quarter of Arizona. Optimum habitat for peregrine falcons consists of steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats supporting avian prey species in abundance. These raptors may also be found in less optimal habitat consisting of small broken cliffs in ponderosa pine forests or large sheer cliffs in very xeric areas. The presence of an open expanse is critical. American peregrine falcons can be found at elevations ranging from 122 to 2,743 m (400 – 9,000 ft) (Glinski 1998, AGFD 1998f). Peregrine falcon nests were found on Ramanote Peak and along Sycamore Canyon (CNF 2000). Both these nests are at least 1.6 km (1 mi) from the proposed ROW. In 2002, another nest was found on Castle Rock, which is within the MSO PAC and within 0.3 km (0.18 mi) of proposed structures. The seasonal restrictions in effect for MSO (SECTION 1.4) will prevent breeding season disturbance of peregrines on Castle Rock.

American peregrine falcons have been found in great numbers in Arizona as well as in areas that will have formerly been considered marginal habitat. This trend suggests that populations in Arizona may have reached levels saturating the optimal habitat available (AGFD 1998f). Placement of the proposed transmission line is not near known nesting sites for peregrine falcons. If new nest sites are encountered during construction, conservation measures will be developed in coordination with CNF biologists to prevent adverse effects. Therefore, placement of the transmission line will not impact this species.

Five-stripped sparrow (Aimophila quinquestriata)

The five-stripped sparrow is found in western portions of northern Sinaloa and Sonora, Mexico and the southeastern most portions of Arizona. This sparrow is primarily found in Mexico, but its range reaches into southeastern Arizona. Here, it is rarely found during breeding season, and there are only a few winter records. Five-stripped sparrow habitat is highly specialized, consisting of tall, dense shrubs on rocky, semi-desert hillsides and canyon slopes (New Mexico Game and Fish Department and the Fish and Wildlife Information Exchange 2000). Within the Nogales RD, this sparrow has been recorded within Sycamore Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of five-stripped sparrow have declined because of habitat loss, fragmentation, and degradation (New Mexico Game and Fish Department and the Fish and Wildlife Information Exchange 2000). The proposed TEP transmission line will not cross Sycamore Canyon where these sparrows have been observed. This species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD.

Northern gray hawk (Asturina nitida maxima)

The gray hawk is a medium-sized raptor with a gray back, black tail with 2 or 3 white bands, and a finely barred gray and white chest, abdomen, and thighs (Glinski 1998). The gray hawk prefers Sonoran riparian deciduous forest and woodland plant communities and can be found along the Santa Cruz and San Pedro rivers, Sonoita Creek, and Sopori Wash. This species also has been reported from the Hassayampa and Salt rivers. This

hawk species is migratory and usually arrives in Arizona in mid-March and returns south during winter months (AGFD 2000k). Gray hawks prefer cottonwood, mesquite, and hackberry woodlands with a prey base of lizards, especially the whiptail lizard (*Cnemidophorus* spp.).

The current population trend for gray hawks is considered stable by the AGFD (2000k). Potential nesting habitat exists near the proposed TEP transmission line corridor in Peck Canyon. Individual gray hawks may be impacted by noise from construction activity related to transmission line placement. However, because of the distance of the proposed action from suitable habitat in Peck Canyon, any increase in noise will be marginal. Furthermore, only a small percentage of the population may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western yellow-billed cuckoo (Coccyzus americanus occidentalis)

The western yellow-billed cuckoo is a long and slender bird with short, dark legs that nests from southern California through the northeastern United States, south through the United States to the Florida Keys, Central America and southern Baja California, Mexico. This species winters from South America to central Argentina and Uruguay. Within Arizona, western yellow-billed cuckoo are found in southern and central Arizona and the extreme northeast portion of the state. This species is typically found in streamside areas with cottonwood, willow groves, and larger mesquite bosques (AGFD 1998g). This species has been observed in Sopori Wash and Sycamore, Peck, and Peña Blanca canyons (AGFD 1998g; CNF 2000; P. Titus, T. Furgason, SWCA, pers. comm.16 October 2002).

Populations of western yellow-billed cuckoo have been reduced; a general decline is occurring in all areas with known populations (AGFD 1998g). This species is sensitive to habitat fragmentation and degradation of riparian woodlands due to agricultural and residential development (Hughes 1999). The proposed transmission line may cross potential cuckoo habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

3.4 REPTILES AND AMPHIBIANS

Giant spotted whiptail (*Cnemidophorus burti strictogrammus*)

The giant spotted whiptail is a long, slender lizard found in southeastern Arizona, extreme southwest New Mexico, and northern Sonora, Mexico. Within southeastern Arizona, this lizard is found in Cochise County; the Santa Catalina, Santa Rita, Baboquívari, and Pajarito mountains and in the vicinity of Oracle in Pima County; and in Pinal County. Giant spotted whiptail lizards inhabit mountain canyons, arroyos, and mesas in arid and semi-arid regions, entering lowland deserts along stream courses. They are found in dense shrubby vegetation, often among rocks near permanent and

intermittent streams at elevations ranging from near sea level to 1,372 m (4,500 ft). Open areas of bunch grass within these riparian habitats are also occupied (AGFD 2001b).

Giant spotted whiptail populations are thought to be stable and some populations are locally abundant even though this species is limited in distribution (AGFD 2001b). Because the known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the giant spotted whiptail.

Lowland leopard frog (*Rana yavapaiensis*)

The lowland leopard frog is found in low elevations in the drainage of the lower Colorado River and its tributaries in Nevada, California, Arizona, New Mexico, northern Sonora and extreme northeast Baja California, Mexico (probably extirpated from California and Nevada). Within Arizona, this frog has been found in the Virginia River drainage in the extreme northwestern part of the state, in the Colorado River near Yuma, and west, central, and southeast Arizona south of the Mogollon Rim. This frog frequents desert, grassland, oak, and oak-pine woodland in permanent pools of foothill streams, rivers, and permanent stock tanks. They typically stay close to water at elevations ranging from 244 to 1,676 m (800 – 5,500 ft) (AGFD 1997b). Within the Nogales RD, this frog has been recorded in Pesquiera and Alamo canyons, California Gulch, Adobe, Temporal Gulch, Big Casa Blanca, Box Canyon, and Gardner Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Lowland leopard frog populations are considered stable in central Arizona but declining in southeast Arizona, and populations have been extirpated from southwestern Arizona. Potential threats to this species are manipulation to major watercourses, water pollution, introduced species (fish, bullfrogs, and crayfish), heavy grazing, and habitat fragmentation (AGFD 1997b). Because no construction will occur within perennial aquatic habitats and known populations occur outside project area, the proposed transmission line will have no significant effect on the population status of the lowland leopard frog.

Mexican garter snake (*Thamnophis eques megalops*)

The Mexican garter snake ranges from southeastern Arizona and extreme southwestern New Mexico, southward into the highlands of western and southern Mexico, to Oaxaca. Within Arizona, this snake occurs in the southeast corner of the state from the Santa Cruz Valley east and generally south of the Gila River. Valid records (post 1980) have recorded this snake in the San Rafael and Sonoita grasslands area and from Arivaca. Mexican garter snakes are most abundant in densely vegetated desert grassland habitat surrounding cienegas, cienega-streams, stock tanks, and in or near water along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. This snake is generally found at elevations ranging from 914 to 1,524 m (3,000 – 5,000 ft) but may reach elevations of 2,591 m (8,500 ft) (AGFD 2001c).

Populations of Mexican garter snakes are decreasing, with extirpations at several localities since 1950 as habitat has changed and introduced predators have invaded. Management concerns for this species include predation by introduced bullfrogs and

predatory fishes, urbanization and lowered water tables, and habitat destruction, including that due to overgrazing (AGFD 2001c). Because no construction will occur within perennial aquatic habitats and construction within riparian habitats will be minimized, the proposed transmission line will have no significant effect on the population status of the Mexican garter snake.

Western barking frog (Eleutherodactylus augusti cactorum)

The western barking frog is a secretive terrestrial frog found in extreme southern Arizona, southeast New Mexico, and central Texas south to the Isthmus of Tehuantepec. In Arizona, this frog historically occurred in Pima and Santa Cruz counties within the Santa Rita and Pajarito mountains. Habitat consists of rocky hillsides of canyons in woodland vegetation at elevations between 1,158 and 2,134 m (3,800 – 7,000 ft). Permanent water is not a necessary component of western barking frog habitat. There are very few records of this species in Arizona, and none have been recorded within the Nogales RD (AGFD 1995b).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of western barking frogs (AGFD 1995b). Because known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the western barking frog and is not likely to result in a trend toward listing or loss of viability.

3.5 MAMMALS

Cave myotis (Myotis velifer)

The cave myotis is a large bat found in the southwestern half of Arizona and the immediate adjacent parts of California, Nevada, New Mexico, and the northern third of Sonora, Mexico. Within Arizona, this bat is found south of the Mogollon Plateau from Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation, and the Chiricahua Mountains south to Mexico. Cave myotis have not been recorded in the extreme southwestern part of the state and are found in small numbers in southeastern Arizona in the winter. This bat typically prefers desertscrub habitats of creosote, brittlebush, paloverde, and cacti but they sometimes can be found up in pine-oak communities. Cave myotis roost in caves, tunnels, mineshafts, under bridges, and sometimes buildings within a few kilometers of a water source (AGFD 1997c).

Cave myotis colonies are vulnerable at the roost sites, especially maternity roosts, because the congregate in large numbers (AGFD 1997c). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the cave myotis.

Southern pocket gopher (*Thomomys umbrinus intermedius*)

The southern pocket gopher is a small gopher found in extreme southeastern Arizona and southwestern New Mexico, south into Mexico. Within Arizona, this gopher is found primarily in the southern most portion of the state in the oak belt of the Santa Rita, Patagonia, Atascosa, Pajarito, and Huachuca mountains. Southern pocket gophers have been found at Peña Blanca Spring in gravelly soil along a broad wash. Elsewhere, this species is generally found on rocky slopes within open oak woodlands in the lower parts of mountain ranges from 1,372 to 2,743 m (4,500 – 9,000 ft) in elevation. There has been only 1 record for the southern pocket gopher within the Nogales RD, specifically at Peña Blanca Canyon in the Atascosa/Pajarito mountains. However, it is suspected that this species has a much wider range (AGFD 1998h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of southern pocket gopher (AGFD 1998h). Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.0 BLM SENSITIVE SPECIES

Criteria for BLM Sensitive species include those that are:

- 1. Under status review by the USFWS, or
- 2. Whose numbers are declining so rapidly that Federal listing may become necessary, or
- 3. With typically small and widely dispersed populations,
- 4. Those inhabiting ecological refugia or other specialized or unique habitats.

The potential impacts to BLM Sensitive species were determined based on the habitat conditions within the BLM lands crossed by the proposed action, the life history of the species, and the proposed construction methods. Only those species that have a potential of occurring on or near the BLM parcel were evaluated. The 13 BLM Sensitive species evaluated were identified in the BLM Sensitive species list for Arizona (Instruction Memorandum No. AZ-2000-018) dated 21 April 2000 and are listed in Table 4.

TABLE 4. SUMMARY OF	TABLE 4. SUMMARY OF EFFECTS ON BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION	
Balloonvine Cardiospermum corindum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 	
False grama Cathestecum erectum brevifolium	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 	
Tumamoc globeberry Tumamoca macdougalii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 	
Loggerhead shrike Lanius ludovicianus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southern Arizona. 	
Rufous-winged sparrow Aimophila carpalis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. 	

TABLE 4 (CONTINUED).	SUMMARY OF EFFECTS ON E	BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Western burrowing owl Athene curnicularia hypugea	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southwestern U.S.
Texas horned lizard Phrynosoma cornutum	No Impacts.	Known populations occur outside project area.
Big free-tailed bat Nyctinomops macrotis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
California leaf-nosed bat Macrotus californicus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Fringed myotis Myotis thysandodes	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Pocketed free-tailed bat Nyctinomops femorosaccus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Spotted bat Euderma maculatum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Underwood's mastiff bat Eumops underwoodi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.

4.1 PLANTS

Balloonvine (Cardiospermum corindum)

This perennial vine is widely distributed in tropical and subtropical regions and is known from the Coyote Mountains in Pima County (Kearny and Peebles 1960). Because potential habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a

small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

False grama (Cathestecum erectum (brevifolium))

False grama is a perennial, drought-tolerant grass found on dry hills and plains of Southern Arizona and Northern Mexico. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Tumamoc globeberry (Tumamoca macdougalii)

This perennial vine occurs in shade of nurse plants along sandy washes below ~914 m (3,000 ft) in elevation. The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

4.2 BIRDS

Loggerhead shrike (*Lanius ludovicianus*)

The loggerhead shrike occurs in open country with scattered trees and shrubs, savanna, desertscrub and occasionally open woodland (AGFD 2002). In Arizona, this species usually summers throughout open parts of the state below the Transition Zone and is also periodically found along the Mexican border west of Baboquívari Mountains (Phillips et al. 1983). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Rufous-winged sparrow (Aimophila carpalis)

The rufous-winged sparrow is classified as a migratory bird and is a resident of eastern Pima County, including Avra Valley, and was once thought to be extirpated in Arizona due to overgrazing but was rediscovered in the Tucson Area in 1936. Rufous-winged sparrows generally use habitats characterized by scattered low shrubs and trees, which provide cover and foraging areas during mid-summer days. Many of these areas contain significant grassland components. Threats to the species include urban development, overgrazing, and exotic species, all of which result in losses of grassland communities utilized by this species (Pima County 2001). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However

because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western burrowing owl (Athene cunicularia hypugea)

The Western burrowing owl inhabits heavily grazed tracts of mixed-grass prairie, particularly where there are burrows created by large rodents, such as prairie dogs and Richardson ground squirrels. Distribution extends from southern Canada through the western United States to South America. Arizona is 1 of 3 states that provide important wintering areas for this species (USGS 2003). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout the southwestern United States. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.3 REPTILES AND AMPHIBIANS

Texas horned lizard (*Phrynosoma cornutum*)

The Texas horned lizard occurs from Kansas to extreme southeastern Arizona and lives mainly in sandy areas of deserts, grasslands, prairies, and scrublands (Bartlett and Bartlett 1999) where it often inhabits abandoned animal burrows (Bockstanz 1998). Because known populations occur outside of the project area, the proposed transmission line will have no significant effect on the population status of this species.

4.4 MAMMALS

Big free-tailed bat (*Nyctinomops macrotis*)

Distribution of the big free-tailed bat occurs from the southwestern United States southward through the Caribbean, Central America, and into the northern part of South America. Northern populations are known to migrate to southern Arizona and Mexico in the fall, yet this species is widely scattered throughout Arizona during the spring and summer too. In Arizona, this bat has been found in pinyon-juniper, Douglas-fir, and Sonoran desertscrub habitats, but it is believed that these locations are foraging sites. Preferred roosting sites include rock crevices and fissures of mountain cliffs in rugged, rocky areas of desertscrub habitat (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the big free-tailed bat.

California leaf-nosed bat (*Macrotus californicus*)

Distribution of the California leaf-nosed bat in the United States spans southern California, southern Nevada, and southwestern Arizona and extends southward into Mexico, to the southern tip of Baja California, northern Sinaloa, and southwestern Chihuahua. This bat lives predominantly in Sonoran and Mohave desertscrub habitats, but is occasionally found in the Chihuahuan and Great Basin deserts. Daytime roosting sites are usually mines and caves, and nighttime roosts include open buildings, cellars, bridges, porches, and mines. These bats do not hibernate or migrate; therefore, they tend to live in the same area year after year and remain active year-round (AGFD 1993, 2001d; Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the California leaf-nosed bat.

Fringed myotis (Myotis thysandodes)

Distribution of the fringed myotis ranges from southern British Columbia, Canada southward throughout the western United States, and down to southern Mexico. It occurs in a variety of habitats – from desertscrub to oak and pinyon woodlands to spruce-fir forests. Roosting sites include caves, mines, and buildings. These bats tend to roost in tight clusters and may change locations periodically in response to thermoregulatory needs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the fringed myotis.

Pocketed free-tailed bat (*Nyctinomops femorosaccus*)

The pocketed free-tailed bat ranges from the southwestern United States (including southern California, Arizona, and New Mexico, and the Trans-Pecos region of Texas), south into Mexico through Baja, Sonora, Durango, and Jalisco to, at least, Michoacan. This bat can be found in the arid lowlands of the desert Southwest, where it roosts in crevices and caves of rugged cliffs, slopes, and rock outcrops (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed and will not likely result in a trend toward federal listing or loss of viability of this species.

Spotted bat (*Euderma maculatum*)

Distribution of the spotted bat ranges throughout centralwestern North America, from southcentral British Columbia down to southern Mexico. In Arizona, its habitat ranges from low desert areas in the Southwest to high desert and riparian habitats in the northwestern part of the state. This bat has also been documented in conifer forests in northern Arizona. Roosting sites are often situated in rock crevices on high cliffs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed.

Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the spotted bat.

Underwood's mastiff bat (Eumops underwoodi)

The range of Underwood's mastiff bat is limited, from south-central Arizona, into the arid lowlands of Sonoran and western Mexico, and into Honduras. It is believed to be a year-round resident of Arizona, ranging from the Baboquívari Mountains down to Organpipe National Monument. This bat prefers Sonoran desertscrub and mesquite/grassland plant communities. Roosting tends to occur in crevices along steep cliffs and sometimes in the cracks of buildings (AGFD 1993). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of this species.

5.0 AGFD WILDLIFE OF SPECIAL CONCERN

AGFD was consulted in regards to state listed special status species and habitats that may be affected by the proposed action. Several state listed special status species and overall wildlife habitat may be affected by the proposed action. The AGFD mission is to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs. Continued consultation and input from AGFD will ensure that impacts of the proposed action are minimized and mitigation efforts are successful.

Listed in Table 5 are state special status species that may be found in the vicinity of the proposed action, based on AGFD's Heritage Data Management System (HDMS) (1 July 2002). Effects of the proposed action on the majority of these species will be avoided or minimized through mitigation efforts stipulated for federally listed species. However, additional mitigation is recommend for the Sonoran Desert tortoise as 5 individuals were located near the Tinaja Hills area during field surveys of the proposed ROW (HEG 2002, unpublished data).

TABLE 5. SUMMARY OF EFFECTS ON WILDLIFE OF SPECIAL CONCERN IN ARIZONA.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Black-bellied whistling duck Dendrocyna autumnalis	No Impacts.	No construction in perennial aquatic habitats.
Crested caracara Caracara cheriway	No Impacts.	Known populations occur outside project area.
Desert tortoise - Sonoran population Gopherus agassizii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total potential habitat within project area may be impacted. Pre-construction surveys will minimize impacts to species.
Elegant trogon Trogon elegans	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Mexican long-tongued bat Choeronycteris mexicana	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total potential habitat within project area may be impacted. Mitigation plantings of agaves will reduce impacts.
Great Plains narrow- mouthed toad Gastrophryne olivacea	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

TABLE 5 (CONTINUED). SUMMARY OF EFFECTS ON WILDLIFE OF SPECIAL CONCERN IN ARIZONA.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Mexican vine snake Oxibelis aeneus	No Impacts.	Known occurrences are outside project area.
Osprey Pandion haliaetus	No Impacts	No construction in perennial aquatic habitats.
Rose-throated becard Pachyramphus aglaiae	No Impacts.	Known occurrences are outside project area.
Thick-billed kingbird Tyrannus crassirostris	No Impacts	No potential habitat within project area.
Tropical Kingbird Tyrannus melancholicus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

Black-bellied whistling duck (*Dendrocyna autumnalis*)

The black-bellied whistling duck is "goose-like" with a long neck and long pink legs. This species has a cinnamon or chestnut breast and back with a black belly and bright coral-red bill. The total range for this species is from the Gulf coast and lower Rio Grande Valley of Texas and central Arizona south through Mexico, Central America to southern Brazil. In Arizona, the range for the black-bellied whistling duck is southeastern and central Arizona. Black-bellied whistling ducks are commonly seen in the Santa Cruz Valley, particularly in ponds near and around Nogales. The habitat for this species consists of the banks of rivers, lakes, ponds, riparian areas, and stock tanks (Brown 1985).

Because of habitat loss and apparent population declines from historic levels, the black-bellied whistling duck has been placed on the AGFD Threatened Native Wildlife of Arizona List as a candidate species. This species appears to be increasing in Arizona in urban settings at man-made ponds and at sewage treatment plants. It also appears to be stable at some private ranch ponds, which tend to be isolated from hunting pressure (Corman 1994).

Because no construction will occur in perennial aquatic habitats, the proposed transmission line will have no effect on the population status of the black-bellied whistling duck.

Crested caracara (*Caracara cheriway*)

The crested caracara is a medium sized raptor with bold black and white plumage and a bright yellow-orange face and legs. The crested caracara ranges from southern Arizona

and northern Mexico to Tierra del Fuego. In the United States, it occurs only along the southern border in Texas and Arizona, and in Florida, where there is an isolated population in the south-central peninsula. In Arizona, their range extends up from San Miguel in the Baboquivari Valley north to Quijotoa, Sells, and Coyote Pass. This raptor occurs regularly on the Tohono O'odham Indian Reservation. Small groups of crested caracara are seen in Sasabe and south of the Mexican border near Sonoyta, Sonora. This raptor is found in open habitats, typically grassland, prairie, pastures, or desert with scattered taller trees, shrubs, or cacti. The crested caracara is found in areas characterized by low-profile ground vegetation and scattered tall vegetation. Specifically in Arizona, vegetation consists of saguaro, mesquite, paloverde, cholla and acacia (Morrison 1996).

Arizona populations of crested caracara on the Tohono O'odham Reservation are likely stable because few threats exist. Reports of individual, and in some cases groups, of this raptor outside of the reservation indicate that its range within Arizona is probably as extensive as it was historically. No apparent threat currently exits to Arizona populations; however, the AGFD has listed the crested caracara as a threatened native wildlife. This species is considered vulnerable if habitat conditions worsen (Morrison 1996).

Habitat surveys did not detect the presence of any bird of prey nests along the corridor. Furthermore, no know populations of this species occur within the project area. Therefore, the proposed action will have no effect on the population status of the crested caracara.

Desert tortoise (Sonoran) (Gopherus agassizii)

The Sonoran Desert tortoise ranges from northern Sinaloa, Mexico to southern Nevada and southwestern Utah, and from southcentral California east to southeastern Arizona. The desert tortoise is divided into 2 populations for purposes of the Endangered Species Act. The threatened Mojave population occurs north and west of the Colorado River and the unlisted Sonoran population occurs south and east of the Colorado River. Within Arizona, the Sonoran Desert tortoise is found south and east of the Colorado River from Mojave County to the south, beyond the International Boundary and many scattered locations in between. The Sonoran population of the desert tortoise occurs primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub at elevations ranging from 152 to 1,615 m (500 – 5,300 ft). Burrows and shelter sites are generally below rocks and boulders, in rock crevices, under vegetation, and also in caliche caves of incised wash banks (AGFD 2001e).

Several threats to tortoise populations in the Sonoran Desert have been identified, including habitat fragmentation, habitat loss and degradation from urban and agricultural development and roads, wildfires associated with invasion of non-native grasses and forbs, illegal collection, and genetic contamination of wild populations by escaped or released captives. Although current evidence suggests that Arizona populations are stable there are substantial gaps in available data (Arizona Interagency Desert Tortoise Team 1996).

During ground surveys of the proposed transmission line corridor, 5 desert tortoise were found (HEG, unpublished data). Per recommendations of Spencer and Humphrey (1999) for any ground disturbing projects, surveys should be conducted a minimum of 48 hours prior to grading and again just prior (as it is occurring) to vegetation clearing (Desert Tortoise Council 1999). While the proposed action may have a minimal effect on the potential habitat of this species, pre-construction surveys will minimize impacts to individual tortoise and is therefore not likely to result in a trend toward listing or loss of viability.

Elegant trogon (*Trogon elegans*)

Central Corridor

The elegant trogon is a medium sized bird with a round head, large eyes, a white band on an iridescent green breast, black face and throat, red belly and undertail coverts. The total range for this bird is from southern Arizona and New Mexico south through Mexico to southern Nicaragua to northwestern Costa Rica. In Arizona, the elegant trogon is found in sky island mountains, most commonly the Atascosa, Chiricahua, Huachuca, and Santa Rita mountains. Elegant trogons are found in riparian areas consisting of sycamore, cottonwood, and oak, and also in coniferous woodlands at elevations ranging from 1,036 to 2,073 m (3,400 – 6,800 ft) (AGFD 2001f).

Population trends for the elegant trogon are not well known. No evidence indicates population declines in any of the core canyons occupied over the past few decades. Threats to this species include degradation and loss of native riparian habitat through stream diversion, groundwater withdrawal, erosion, and overgrazing (AGFD 2001f).

Because potential habitat and known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the elegant trogan.

Great Plains narrow-mouthed toad (*Gastrophryne olivacea*)

The Great Plains narrow-mouthed toad is a small, stout toad with stubby limbs, a small pointed head with a fold of skin on the back of the head. The total range for this species is from southeastern Nebraska and Missouri south through Texas to western Mexico. Within Arizona, the Great Plains narrow-mouthed toad is found in the vicinity of Santa Cruz County, Pima County, to near Casa Grande, Arizona in Pinal County. Habitat for this species in Arizona consists of mesquite semi-desert grassland communities to oak woodland communities near riparian areas at elevations ranging from sea level to around 1,250 m (4,100 ft) (AGFD 1995c).

Population trends for the Great Plains narrow-mouthed toad are currently unknown. Populations in Arizona are at the extreme northwestern edge of the species range and distribution is limited throughout its range (AGFD 1995c). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the

project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican long-tongued bat (*Choeronycteris mexicana*)

The Mexican long-tongued bat has a long, slender nose with a leaf-like structure on the base of the nose. The total range for this species is from southeastern Arizona, southwestern New Mexico, and California south through Central America to Venezuela. In Arizona, the Mexican long-tongued bat is found from the Chiricahua Mountains extending as far north as the Santa Catalina Mountains and west to the Baboquivari Mountains. Habitat for this bat is typically within canyons of mixed oak-conifer forests in mountains at elevations ranging from 1,082 to 2,231 m (3,550 – 7,320 ft) (AGFD 1994). This species do not congregate in sizeable maternity or bachelor colonies like *Leptonycteris* bats do (Hoffmeister 1986). They feed on nectar and pollen, especially from paniculate agaves (AGFD 1994).

Populations of Mexican long-tongued bats in Arizona appear to be highly variable (AGFD 1994) and there is no evidence of a long-term decline or any clear trend. The limitation of riparian zones and the distribution of food plants may limit populations of this species in Arizona and loss of riparian vegetation may be a greater threat to this species than human disturbance at particular roost sites (Pima County 2001). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during construction; however, these disturbances will be isolated and will impact only a small percentage of potential habitat. Furthermore, transplanting of agave plants also will minimize impacts. Impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican vine snake (Oxibelis aeneus)

The Mexican vine snake has an elongated head, pointed snout, and is thin bodied with an ash gray to yellow-brown and tan coloring. The total range for this species is from extreme southern Arizona south to Brazil. In Arizona, this species occurs in the Tumacacori, Pajarito, and Patagonia mountains in Santa Cruz County. Habitat for the Mexican vine snake consists of brush-covered hillsides and riparian areas with sycamore, oak, walnut and wild grape trees at elevations ranging from 914 to 1,768 m (3,000 – 5,800 ft) (AGFD 1991b).

Population trends for the Mexican vine snake are currently unknown. Populations in Arizona are at the extreme northern edge of the species range and distribution is limited, with occurrences known from Sycamore Canyon (AGFD 1991b). A potential threat is the high interest by collectors for this species (AGFD 1991b). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the Mexican vine snake.

Osprey (*Pandion haliaetus*)

This raptor is dark brown on its back and white on the underparts with a prominent dark eye stripe. The total range for the osprey is from Alaska to Newfoundland, along the Atlantic and Pacific coastlines, and in the Rocky Mountains south through central and South America. Within Arizona, the osprey occurs primarily in the White Mountains, along the Mogollon Rim, and along the Salt and Verde rivers. In southeastern Arizona, this raptor is an uncommon spring and fall transient, usually seen at ponds and reservoirs. Nesting habitat of the osprey consists of coniferous trees along rivers and lakes at elevations ranging from 1,829 to 2,377 m (6,000 – 7,800 ft) (AGFD 1997d).

Osprey population trends in Arizona are not well known. Only about 20 nest sites are known in the southwest, all within Arizona. This raptor is threatened by loss of nesting habitat and foraging perch sites. It is also threatened by recreational use of nesting habitat, shooting, and pesticide poisoning on wintering grounds (AGFD 1997d).

Because no construction will occur in perennial aquatic habitats, the proposed action will have no effect on the population status of the osprey.

Rose-throated becard (*Pachyramphus aglaiae*)

The rose-throated becard is a big-headed, thick billed bird that breeds in southeast Arizona, southern Texas (rare visitor along the Rio Grande), south through Mexico to Costa Rica. This species winters from northern Mexico south through to its breeding range. Within Arizona, rose-throated becards have been found breeding along Sonoita and Arivaca creeks, Sycamore Canyon (Atascosa Mountains), and Patagonia. Historically, this species nested in Guadalupe Canyon (east of Douglas) and near Tucson. Rose-throated becards typically inhabit marshes of Sonoran desertscrub communities of open to dense vegetation of shrubs, low trees, and succulents dominated by paloverde, prickly pear, and saguaro. This species also is found in the desert riparian deciduous woodland communities of marsh-woodlands, especially of cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of deciduous trees and shrubs along the margins. In Arizona, the rose-throated becard is found at elevations ranging from 1,082 to 1,228 m (3,550 – 4,030 ft) (AGFD 2001g).

Population trends for the rose-throated becard are currently unknown. Potential threats to this species include disturbance from bird watchers and degradation and loss of native riparian habitat through overgrazing, urban development, and groundwater depletion (AGFD 2001g). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the rose-throated becard.

Thick-billed kingbird (*Tyrannus crassirostris*)

The thick-billed kingbird is a relatively stocky flycatcher with a large head and heavy bill. This kingbird occurs from southeastern Arizona and southwestern New Mexico south through western Mexico to western Guatemala. In Arizona, thick-billed kingbirds are most often seen around Sonoita and Arivaca creeks and in Madera and Guadalupe canyons. This species may occur in mountains of Pima, Santa Cruz and Cochise counties

where there are drainages with well-developed riparian areas. Habitat for the thick-billed kingbird consists of broad-leaved, riparian forests usually with well-developed large sycamores and cottonwoods at elevations ranging from 914 to 1,981 m (3,000 - 6,500 ft) (Tibbitts 1991).

Present distribution of the thick-billed kingbirds in Arizona is very limited. Potential threats include human recreational activities, encroachment of human development into breeding habitat, woodcutting, grazing, and groundwater depletion (Tibbitts 1991). Because no potential habitat occurs within the project area, the proposed action will have no effect on the population status of the thick-billed kingbird.

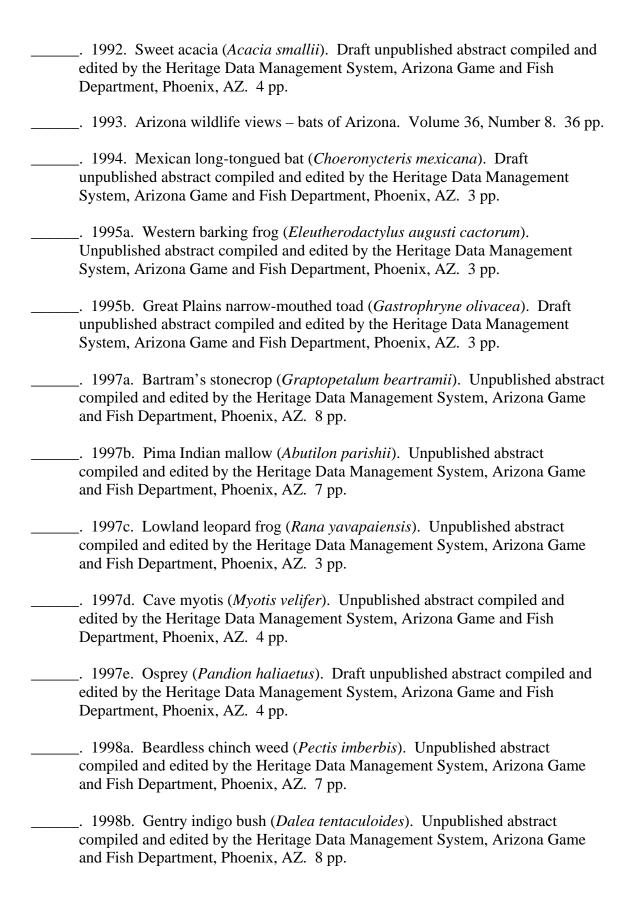
Tropical Kingbird (*Tyrannus melancholicus*)

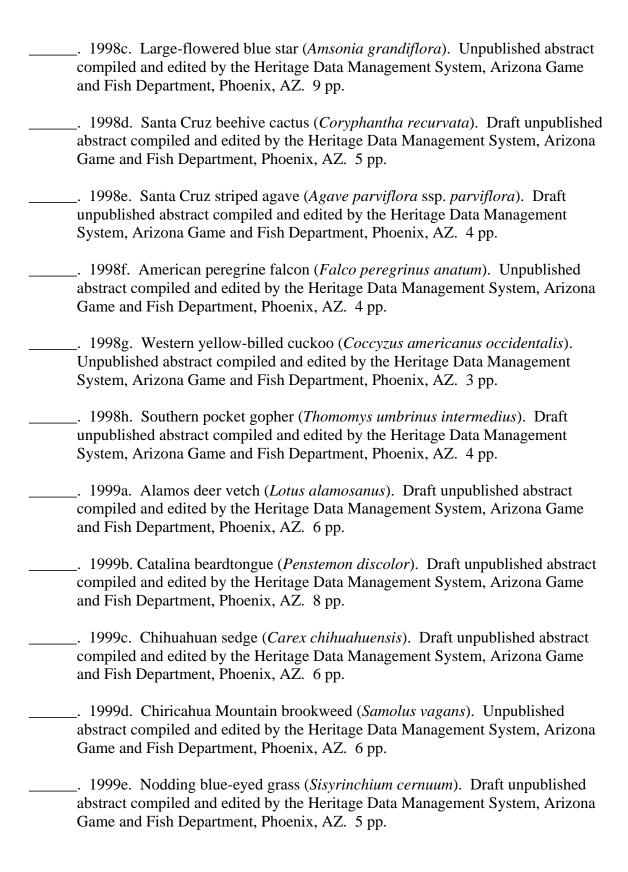
The tropical kingbird is a large tyrant-flycatcher with a large bill and long, slightly notched tail. The tropical kingbird ranges from southeastern Arizona through western and central Mexico to central Argentina. Breeding birds have been found in Tucson, along the Santa Cruz Valley from Green Valley south, east of Phoenix in the Salt River Valley, to the San Pedro Valley. This species also has been reported from Sopori Wash. The Tropical Kingbird inhabits open and semi-open areas with scattered trees and shrubs. Also found in urban areas and roadsides with tall human-made fixtures (Stouffer and Chesser 1998).

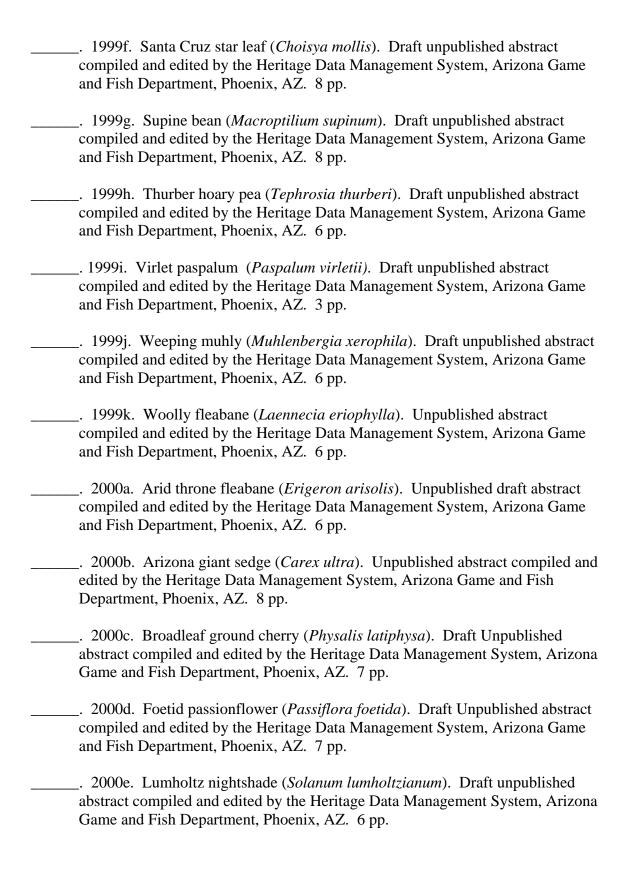
Tropical kingbirds seem to persist or even thrive in developed areas. No negative effects of human activities have been reported (Stouffer and Chesser 1998). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual tropical kingbirds, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to tropical kingbirds are not likely to result in a trend toward federal listing or loss of viability.

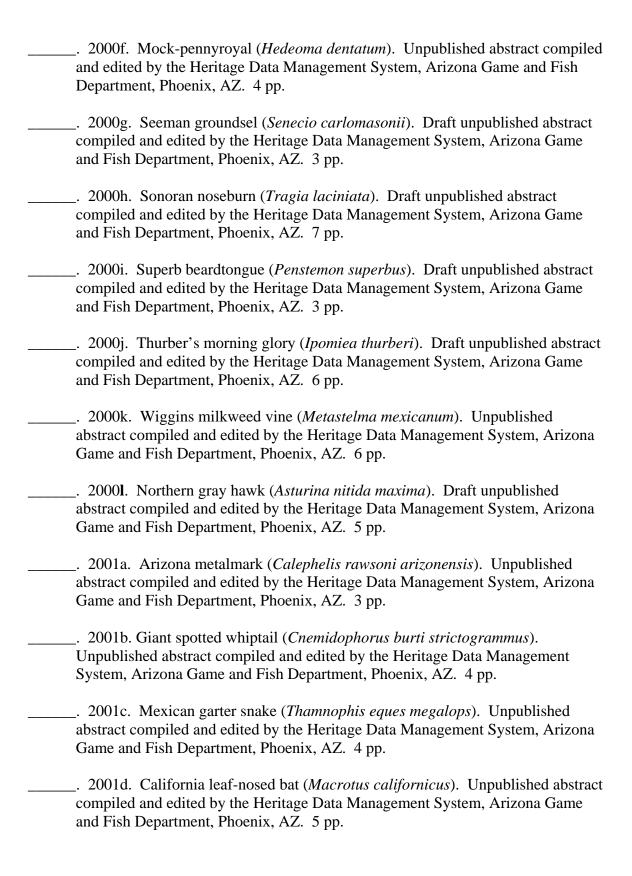
6.0 LITERATURE CITED

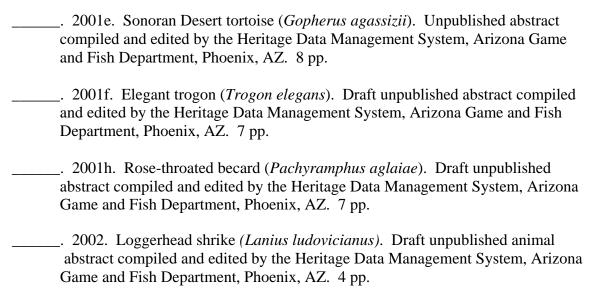
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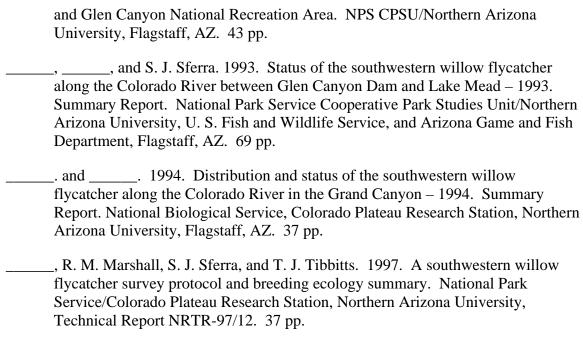
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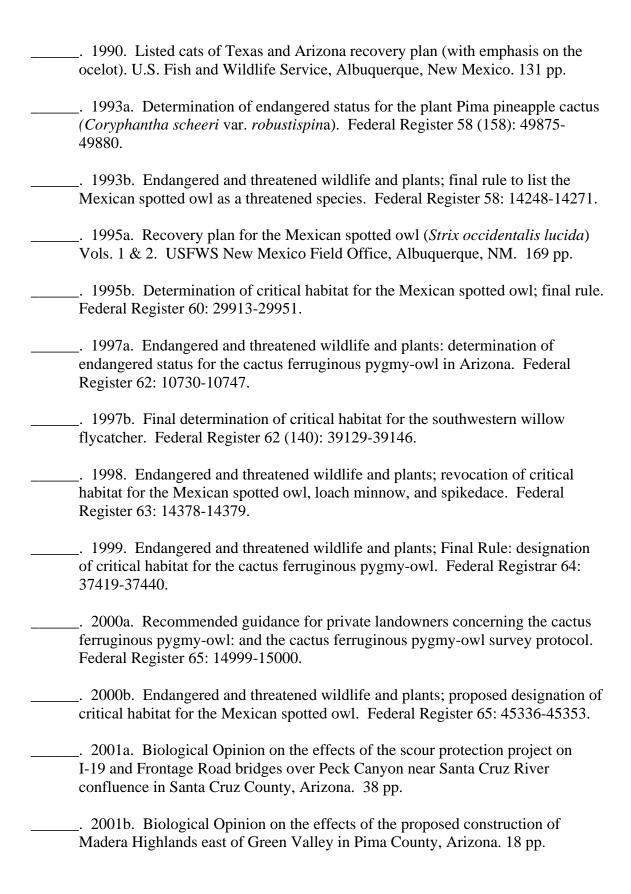


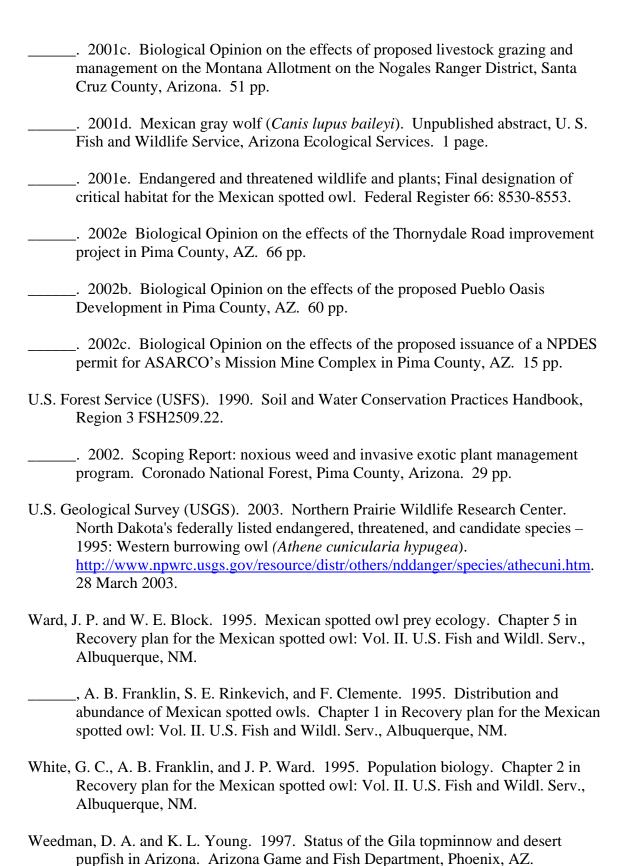
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7.0 LIST OF ACRONYMS

ACC Arizona Corporation Commission

ADEQ Arizona Department of Environmental Quality

AGFD Arizona Game and Fish Department

AOU American Ornithologists' Union

ASLD Arizona State Land Department

AUM Animal Unit per Month

BA Biological Assessment

BLM Bureau of Land Management

BMP Best Management Practices

BO Biological Opinion

CFPO Cactus Ferruginous Pygmy Owl

Citizens Communications

CNF Coronado National Forest

DBH Diameter Breast Height

DOE Department of Energy

EMA Ecosystem Management Area

ESA Endangered Species Act

GPS Global Positioning System

HDMS Heritage Data Management System

HEG Harris Environmental Group, Inc.

I-19 Interstate 19

LLNB Lesser Long-nosed Bat

MOA Memorandum of Agreement

MSO Mexican Spotted Owl

NPDES National Pollutant Discharge Elimination System

OHV Off-Highway Vehicle

PPC Pima Pineapple Cactus

RA Roads Analysis

RD Ranger District

RNA Research Natural Area

ROW Right-of-way

RU Recovery Units

SL Standard Length

SWFL Southwestern Willow Flycatcher

TEP Tucson Electric Power

UDI Undocumented Immigrants

USDOI United States Department of Interior

USFWS United States Fish and Wildlife Service

USFS United States Department of Agriculture Forest Service

YOY Young-of-the-year

APPENDIX A

Natural Resource Agencies Correspondence.

- 1. U. S. Fish and Wildlife Service, dated 14 May 2002.
- 2. Arizona Game and Fish Department, dated 25 April 2002.

APPENDIX B

Plants documented along proposed ROW of the TEP Citizens Interconnect Project, July to October 2002.

	SCIENTIFIC NAME	COMMON NAME	FAMILY
CACTUS & SUCC			
	Agave parryi	century plant	Agavaceae
	Agave schottii	shindagger	Agavaceae
	Coryphantha scheeri		, garassas
	var. robustispina	Pima pineapple cactus	Cactaceae
	Dasylirion wheeleri	sotol	Agavaceae
	Echinocereus spp.	hedgehog cactus	Cactaceae
	Echinocereus pectinatus var. rigidissimus	Arizona rainbow cactus	Cactaceae
	Ferocactus wislizenii	fishhook barrel cactus	Cactaceae
	Fouquieria splendens	ocotillo	Fouquieriaceae
	Mammillaria spp.	pincushion cactus	Cactaceae
	Nolina microcarpa	beargrass	Agavaceae
	Opuntia spp.	cholla	Cactaceae
	Opuntia spp.	prickly pear	Cactaceae
	Opuntia spinosior	walkingstick cactus	Cactaceae
	Yucca elata	soaptree yucca	Agavaceae
GRASSES			
	Bouteloua barbata or		
	B. rothrockii	six-weeks or Rothrock grama	Poaceae
	Bothriochloa barbinodis	cane beard grass	Poaceae
	Bouteloua curtipendula	side oats grama	Poaceae
	Bouteloua gracilis	blue grama	Poaceae
	Bouteloua hirsuta	hairy grama	Poaceae
	Bouteloua parryi	Parry grama	Poaceae
	Bouteloua repens	slender grama	Poaceae
	Digitaria californica	Arizona cottontop	Poaceae
	Erioneuron pulchellum	fluffgrass	Poaceae
	Hilaria belangeri	curly mesquite	Poaceae
	Leptochloa dubia	green sprangletop	Poaceae
	Muhlenbergia emersleyi	bull grass	Poaceae
	Muhlenbergia rigens	deer grass	Poaceae
	Piptochaetium fimbriatum	pinyon rice grass	Poaceae
	Sporobolus spp.	dropseed	Poaceae
FORBS			
	Abutilon incanum	Indian mallow	Malvaceae
	Allionia incarnata	trailing windmills	Nyctaginaceae
	Ambrosia confertiflora	weakleaf burr ragweed	Asteraceae
	Amoreuxia palmatiflida	Arizona yellow show	Cochlospermaceae
	Argemone sp.	prickly poppy	Papaveraceae
	Artemisia ludoviciana		Asteraceae
	Asclepias asperula	antelope horns	Asclepiadaceae
	Asclepias nummularia	tufted milkweed	Asclepiadaceae
	Asclepias tuberosa	butterfly milkweed	Asclepiadaceae
	Aspicarpa hirtella	aspicarpa	Malpighiaceae
	Boerhaavia coccinea	red spiderling	Nyctaginaceae
	Bouchea prismatica	bouchea	Verbenaceae

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	SCIENTIFIC NAME	COMMON NAME	FAMILY
FORBS (Cont.)			
`	Bouvardia glaberrima	smooth bouvardia	Rubiaceae
	Brickellia spp.	brickellbush	Asteraceae
	Chamaecrista serpens var. wrightii	sensitive pea	Fabaceae
	Cheilanthes fendleri	cloak fern	Pteridaceae
	Cheilanthes spp.	claok fern	Pteridaceae
	Chenopodium fremontii	lamb's quarter	Chenopodiaceae
	Clitoria mariana	butterfly pea	Fabaceae
	Cnidosculus angustidens	mala mujer	Euphorbiaceae
	Cologania longifolia	narrowleaf tick clover	Fabaceae
	Commelina dianthifolia	western dayflower	Commelinaceae
	Cucurbita digitata	coyote gourd	Cucurbitaceae
	Datura metaloides	sacred datura	Solanaceae
	Eleocharis spp.	spikerush	Cyperaceae
	Eriogonum wrightii	buckwheat	Polygonaceae
	Eryngium heterophylla	button snakeroot	Apiaceae
	Evolvulus alsinoides		Convolvulaceae
	Evolvulus arizonicus	Arizona blue eyes	Convolvulaceae
	Galium wrightii	northern bedstraw	Rubiaceae
	Glandularia gooddingii	verbena	Verbenaceae
	Gnaphalium leucocephalum	white cudweed	Asteraceae
	Gnaphalium wrightii	cudweed	Asteraceae
	Gomphrena sp.	globe amaranth	Amarnathaceae
	Gutierrezia spp.	snakeweed	Asteraceae
	Ipomoea barbatisepala	morning glory	Convolvulaceae
	Ipomoea coccinea	scarlet creeper	Convolvulaceae
	Ipomoea hirsutula	wooly morning glory	Convolvulaceae
	Ipomoea leptotoma	bird's foot morning glory	Convolvulaceae
	Ipomoea longifolia	long leaf morning glory	Convolvulaceae
	Isocoma tenuisecta	burroweed	Asteraceae
	Jatropha macrorhiza	Arizona desert potato	Euphorbiaceae
	Kallstroemia grandiflora	Arizona caltrop	Zygophyllaceae
	Krameria parvifolia	range ratany	Krameriaceae
	Machaeranthera spp.	spiny aster	Asteraceae
	Macroptilium gibbosifolium	variableleaf bushbean	Fabaceae
	Milla biflora	Mexican star	Liliaceae
	Oenothera rosea	evening primrose	Onagraceae
	Oxalis albicans	wild oxalis	Oxalidaceae
	Penstemon linarioides	linear leaf penstemmon	Scrophulariaceae
	Phaseolus ritensus	eggleaf stringbean	Fabaceae
	Phaseolus sp.	stringbean	Fabaceae
	Portulaca suffrutescens	portulaca	Portulacaceae
	Portulaca umbraticola	portulaca	Portulacaceae
	Proboscidea sp.	unicorn plant, devil's claw	Pedaliaceae
	Salvia subincisa	sawtooth sage	Lamiaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY
FORBS (Cont.)		C CHARLETT THE THE	- 1211222
	Schoenocrambe linearifolia	schoenocrambe	Brassicaceae
	Scirpus sp.	bulrush	Cyperaceae
	Senna covesii	desert senna	Fabaceae
	Senna hirsuta	woolly senna	Fabaceae
	Solanum douglassii	greenspot nightshade	Solanaceae
	Solanum elaeagnifolium	silverleaf nightshade	Solanaceae
	Sphaeralcea spp.	globe mallow	Malvaceae
	Tagetes sp.	marigold	Asteraceae
	Talinum angustissimum	talinum	Portulacaceae
	Talinum aurantiacum	orange fameflower	Portulacaceae
	Tetramerium hispidum	tetramerium	Acanthatceae
	Thalictrum fendleri	Fendler's meadow rue	Ranunculaceae
	Vitis arizonica	Arizona grape	Vitaceae
	Zinnia acerosa	desert zinnia	Asteraceae
REES & SHRUI	BS	•	•
	Acacia angustissima	white ball acacia	Fabaceae
	Acacia constricta	whitethorn acacia	Fabaceae
	Acacia greggii	catclaw acacia	Fabaceae
	Aloysia wrightii	oreganillo	Verbenaceae
	Arctostaphylos sp.	manzanita	Ericaceae
	Baccharis salicifolia	seep willow	Asteraceae
	Baccharis sarothroides	desert broom	Asteraceae
	Calliandra eriophylla	fairyduster	Fabaceae
	Celtis pallida	desert hackberry	Ulmaceae
	Celtis reticulata	netleaf hackberry	Ulmaceae
	Chrysothamnus teretifolius	green rabbitbrush	Asteraceae
	Dodonaea viscosa	hopbush	Sapindaceae
	Ericameria laricifolia	turpentine bush	Asteraceae
	Erythrina flabelliformis	coral bean	Fabaceae
	Eysenhardtia orthocarpa	kidney wood	Fabaceae
	Fraxinus velutina	velvet ash; Arizona ash	Oleaceae
	Gossypium thurberi	desert cotton	Malvaceae
	Guardiola platyphylla	Apache plant	Asteraceae
	Hibiscus coulteri	desert rosemallow	Malvaceae
	Indigofera spaerocarpa	Sonoran Indigo	Fabaceae
	Juglans major	Arizona walnut	Juglandaceae
	Juniperus deppeana	alligator juniper	Cupressaceae
	Lasianthaea podocephala	San Pedro daisy	Asteraceae
	Lycium spp.	wolfberry	Solanaceae
	Mimosa biuncifera	catclaw mimosa	Fabaceae
	Mimosa dysocarpa	velvet pod mimosa	Fabaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY			
TREES & SHRUBS	TREES & SHRUBS (Cont.)					
	Parkinsonia microphylla	yellow paloverde	Fabaceae			
	Populus fremontii	Fremont cottonwood	Salicaceae			
	Prosopis velutina	velvet mesquite	Fabaceae			
	Q. arizonica	Arizona white oak	Fagaceae			
	Q. garrya	silktassel	Fagaceae			
	Quercus emoryii	Emory oak	Fagaceae			
	Rhus aromatica	skunkbush	Anacardiaceae			
	Rhus choriophylla	sumac	Anacardiaceae			
	Salix exigua	coyote willow	Salicaceae			
	Tamarix pentandra	salt cedar	Tamaricaceae			
	Ziziphus obtusifolia	graythorn	Rhamnaceae			

TEP-Citizen's Interconnect Project

Environmental Training Guidelines Construction Supervisors

- Stay in the designated work areas. Approved work areas, access roads, and staging areas will be clearly marked. All project activities must remain in these areas. Do not work or trespass beyond the signed or fenced restricted work areas.
- Restrict vehicle access to public roadways and designated access roads. Crosscountry driving is prohibited.
- No driving or parking within 100 feet of ponds and tanks.
- Do not transfer water from one pond or tank to another or between any other bodies of water.
- No in-stream activity or disposal of construction debris or fill is allowed.
- Store topsoil and trench spoils behind sediment control structures at least 20 feet from any stream bank, including dry washes.
- Check equipment for leaks or heavy surface oil build-up before working in streams or washes.
- The use or transfer of hazardous materials will not be allowed within 100 feet of any stream or wash is prohibited.
- Do not litter. Dispose of trash in designated containers. Uncontained trash can attract wildlife and unwanted pests. Cigarette butts are considered litter, and should be extinguished and disposed of appropriately. All litter and construction debris must be removed from the job site daily.
- No pets or firearms. They are prohibited for job-site protection and protection of wildlife.
- Hunting is prohibited.
- Clearing will be limited to the minimum required to provide a safe construction area. Make sure you know the clearing limit, and if possible, leave plant root systems in place when clearing vegetation.
- It is illegal to harm, harass, pursue, hunt, shoot, wound, trap, kill capture, or collect wildlife officially listed as threatened or endangered. Violation of threatened and endangered special laws can result in penalties of up to \$100,000 and/or one year in jail.
- Do not approach or feed wildlife. Keep away form their burrows and nests. Do not harm or kill any wildlife encountered.
- If animal is harmed or found harmed, contact your Construction Supervisor or the Environmental Inspector. Do not attempt to move the animal yourself.

APPENDIX D

APPENDIX D. Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima County, Arizona as of 14 August 2002, excluded from further consideration.

consideration.	<u> </u>			T
COMMON				
NAME	SCIENTIFIC NAME	STATUS	Навітат	JUSTIFICATION
PLANTS				
Canelo Hills ladies' tresses	Spiranthes delitescens	Endangered	Finely grained, highly organic, saturated soils of cienegas. Potential habitat occurs in Sonora, Mexico.	No habitat present.
Huachuca water umbel	Lilaeopsis schaffneriana ssp. recurva	Endangered	An emergent aquatic plant that requires marshy wetlands.	No habitat present.
Kearney's blue star	Amsonia kearneyana	Endangered	Known only from the Baboquívari Mountains.	ROW is outside of known range.
Nichol's Turk's head cactus	Echinocactus horizonthalonius var. nicholii	Endangered	Dependent on limestone substrates in desert hills.	No habitat present.
FISH				<u> </u>
Desert pupfish	Cyprinodon macularius	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	No habitat present in area.
Gila chub	Gila intermedia	Proposed Endangered	Small streams and cienegas; prefer deeper pools with cover.	No habitat present in area.
Loach minnow	Tiaroga cobitis	Threatened	Requires perennial streams with swift water over cobble or gravel	No habitat present in area.
Sonoran Chub	Gila ditaenia	Threatened	Most commonly found in deep, permanent pools with bedrock-sand substrates and free of floating algae.	In U.S, limited to Sycamore Canyon and its tributaries.
Spikedace	Meda fulgida	Threatened	Requires perennial streams with swift velocities over sand and gravel.	No habitat present in area.
AMPHIBIANS	•		· · · · · · · · · · · · · · · · · · ·	
Sonoran tiger salamander	Ambystoma tigrinum stebbinsi	Endangered	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains at 4000-6300 ft.	ROW is outside of known range. This species is not known to occur in the Nogales RD.
Chiricahua leopard frog	Rana chiricahuensis	Threatened	Perennial pools, springs, stock tanks and ponds above 3,500' elevation.	No occupied habitat within ROW and no reintroductions planned.

APPENDIX D. Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima County, Arizona as of 14 August 2002, excluded from further consideration.

Common				
NAME	SCIENTIFIC NAME	STATUS	Навітат	JUSTIFICATION
BIRDS				
Bald eagle	Haliaeetus leucocephalus	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Winter surveys of Peña Blanca and Arivaca Lakes were conducted in 1994- 1996, 1998, 2000- 2002. No bald eagles have been observed.
California brown pelican	Pelecanus occidentalis californicus	Endangered	Coastal land and islands; species is found around many Arizona lakes and rivers.	No habitat present in area.
Masked bobwhite	Colinus virginianus ridgewayi	Endangered	Only known Arizona population has been reintroduced on Buenos Aires Natl. Wildl. Refuge	ROW is outside of known range.
Mountain plover	Charadrius montanus	Proposed Threatened	Open arid plains, short grass prairies, and cultivated farms.	No habitat present in area.
Northern apolomado falcon	Falco femoralis septentrionalis	Endangered	Grassland and savannah habitats	No recent confirmed reports for Arizona.
MAMMALS				l
Ocelot	Felis pardalis	Endangered	Prefers humid tropical & subtropical habitats; typically found at higher elevations.	ROW is outside of known range.
Jaguarundi	Felis yagouaroundi tolteca	Endangered	Deciduous forests, riparian areas, swampy grasslands, upland drysavannahs, etc.	ROW is outside of known range.
Sonoran pronghorn	Antilocapra americana sonoriensis	Endangered	Grassy desertscrub in northwestern Sonora and adjacent Arizona borderlands, mainly Yuma Co.	ROW is outside of known range.

STATUS DEFINITIONS: ENDANGERED SPECIES ACT

Endangered: Imminent jeopardy of extinction.

Threatened: Imminent jeopardy of becoming endangered.

Proposed: Proposed Rule has been published in Federal Register to list as Threatened or Endangered.

Appendix F

Harris Environmental Group, Inc.
Final Biological Assessment
TEP Proposed Sahuarita-Nogales
Transmission Line Project
Crossover Corridor (HEG 2004c)

FINAL BIOLOGICAL ASSESSMENT OF THE

TUCSON ELECTRIC POWER SAHUARITA – NOGALES TRANSMISSION LINE CROSSOVER CORRIDOR

12 April 2004

PREPARED FOR:
TUCSON ELECTRIC POWER
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EXECUTIVE SUMMARY

Tucson Electric Power (TEP) and Citizens Communications (Citizens) are proposing to build a new, dual-circuit, 345,000-volt (345-kV) transmission line from the TEP South Substation in the vicinity of Sahuarita, Arizona to interconnect with Citizens system at a Gateway Substation that TEP will construct west of Nogales, Arizona. From the Gateway Substation, the proposed transmission line will continue south across the United States-Mexico border for approximately 60 miles (mi) (98 kilometers [km]) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at the Santa Ana Substation. The proposed transmission line will improve Citizens' service in Nogales and allow for the transfer of blocks of electrical energy between the United States and Mexico. Southern Arizona and Sonora, Mexico have experienced rapid growth, and forecasts predict this growth will Citizens' customers have already experienced outages due to limited transmission facilities into the region. TEP recognizes the need to improve transmission into the southern Arizona region and proposes to assist Citizens in meeting an Arizona Corporation Commission (ACC) mandate to improve the reliability and service of its Nogales electrical system. The ACC has ordered Citizens to improve its system by the end of 2003. The TEP Sahuarita – Nogales Transmission Line, a double-circuit 345-kV transmission line will provide the additional reliability that Citizens requires while providing additional capacity into the southern Arizona region for future needs.

This Biological Assessment (BA) was prepared to meet the requirements of Section 7 of the Endangered Species Act (ESA) of 1973, 16 U.S.C. Section 1536(a)(2). Section 7 requires all federal agencies to consult with the United States Fish and Wildlife Service (USFWS) if an action may affect listed species or their designated critical habitat. Section 7 consultation is required for any project that requires a federal permit or receives federal funding. Action is defined broadly to include funding, permitting, and other regulatory actions. All activities associated with construction of the TEP Sahuarita – Nogales Transmission Line are included in the proposed action being evaluated for this BA. Because TEP has applied for a Presidential Permit to construct the transmission line across the international border, the Department of Energy (DOE) is preparing a Draft Environmental Impact Statement (DEIS) (Tetra Tech 2003) concurrently with this document.

Federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat. This is accomplished through consultation with the USFWS. If such species may be present, the applicant must conduct a BA to determine if a proposed action is likely to adversely affect listed species or designated critical habitat. The USFWS will review this BA and issue a biological opinion (BO). DOE is the permitting agency for this proposed action, and therefore the lead federal agency in Section 7 consultation with the USFWS.

The proposed action crosses a variety of land jurisdictions: including private, Arizona State Land Department (ASLD), Bureau of Land Management (BLM), and United States Department of Agriculture Forest Service (USFS). Because each jurisdiction has different requirements for environmental review of the proposed action, this document is subdivided by agency. Section 2 addresses species that receive protection under the ESA of 1973. Section 3 reviews the potential effects of the proposed action on those species classified as "Sensitive" by the USFS. Section 4 reviews the potential effects of the proposed action on those species classified as "Sensitive" by the BLM. Section 5 addresses those species that are considered "Wildlife of Special Concern" by the Arizona Game and Fish Department (AGFD). Because habitats often overlap different jurisdictions, many species have classifications within each agency. In these instances, the species is evaluated under the jurisdiction which affords the highest level of protection.

We contacted federal (USFWS) and state (AGFD) natural resource agencies to request information on possible special status species (sensitive, threatened, and endangered) that may exist on or near the proposed Crossover Corridor of the TEP Sahuarita – Nogales Transmission Line from Sahuarita to Nogales, Arizona. Agency correspondence is presented in Appendix A.

SUMMARY OF DETERMINATIONS FOR FEDERALLY LISTED SPECIES

Based on contact with the USFWS, USFS, BLM, and AGFD, 9 federally listed species may be affected by the proposed action. After reviewing the current status of these species, the environmental baseline of the project area, the effects of the proposed actions on the species as well as cumulative effects, the following determinations are made for the 9 affected species: (Table 1).

Table 1. Effects of the proposed action on federally listed species.

SPECIES	POTENTIAL EFFECT	
Mexican spotted owl	The proposed action may affect, but is not likely to	
	adversely affect this species.	
	The proposed action may affect, but is not likely to	
	adversely affect proposed critical habitat for this species.	
Cactus ferruginous pygmy-owl	The proposed action may affect and is likely to adversely	
	affect this species.	
Southwestern willow flycatcher	The proposed action may affect but is not likely to	
	adversely affect this species.	
Lesser long-nosed bat	The proposed action may affect and is likely to adversely	
	affect this species	
Chiricahua leopard frog	The proposed action may affect but is not likely to	
	adversely affect this species	
Pima pineapple cactus	The proposed action may affect and is likely to adversely	
	affect this species.	
Jaguar	The proposed action may affect but is not likely to	
	adversely affect this species.	

Table 1 continued. Effects of the proposed action on federally listed species.

SPECIES	POTENTIAL EFFECT
Gila topminnow	The proposed action may affect but is not likely to adversely
	affect this species.
Mexican gray wolf	The proposed action may affect but is not likely to adversely
	affect this species.

1.0 PROJECT DESCRIPTION

1.1 PROPOSED ACTION

The proposed TEP Crossover Corridor Sahuarita – Nogales Transmission Line will consist of twelve transmission line wires, or conductors, and two neutral ground wires that will provide lightning protection and fiber optic communication, on a single set of support structures. The transmission line will originate at TEP's existing South Substation, in the vicinity of Sahuarita, Arizona, and interconnect with Citizens system at a Gateway Substation that TEP will construct west of Nogales, Arizona. The double-circuit transmission line will continue from the Gateway Substation south to cross the United States-Mexico border and extend approximately 60 mi (98 km) into the Sonoran region of Mexico, connecting with the Comisión Federal de Electricidad (CFE, the national electric utility of Mexico) at the Santa Ana Substation. Figure 1 shows the overall proposed project location.

The South Substation in Sahuarita will be upgraded and expanded to provide interconnection between a new TEP 345-kV transmission line and the new Gateway Substation west of Nogales. The South Substation will be expanded by approximately 1.3 acres (0.53 ha) to add a switching device that will connect to the proposed transmission line, with a 100 ft (30 m) expansion of the existing fence line for the addition of the second 345-kV circuit. The new Gateway Substation will include a 345-kV to 115-kV power transformer to provide power to the local area. The new Gateway Substation will be constructed within a developed industrial park north of Mariposa Road (State Route 189), approximately 0.5 mi (0.8 km) east of the Coronado National Forest (CNF) boundary (Northeast ¼ of Section 12, Township 24 South, Range 13 East). The TEP portion of the site (the area that will be graded) is approximately 18 acres (7.3 ha) and is within the City of Nogales, Arizona. TEP has purchased the substation site and preliminary construction activities have been completed. TEP is flexible in the placement of a fiber-optic regeneration site, but it will likely be located in the area of Township 18 South, Range 12 East, approximately 10 mi (16 km) southwest of Sahuarita on private land. The fiber optic regeneration site will consist of an approximate 0.5-acre (0.2-ha) fenced yard, containing a 10 ft (3 m) by 20 ft (6 m) concrete pad with an equipment house. The cleared area for the equipment house will be approximately 20 ft (6 m) by 30 ft (9 m). There will be three 3-acre (1.2-ha) construction staging areas (located near the South and Gateway Substations and the Interstate 19 [I-19]/Arivaca Road interchange) and an 80 acre (32 ha) temporary laydown yard (also near the I-19/Arivaca Road interchange) used during construction of the proposed line.

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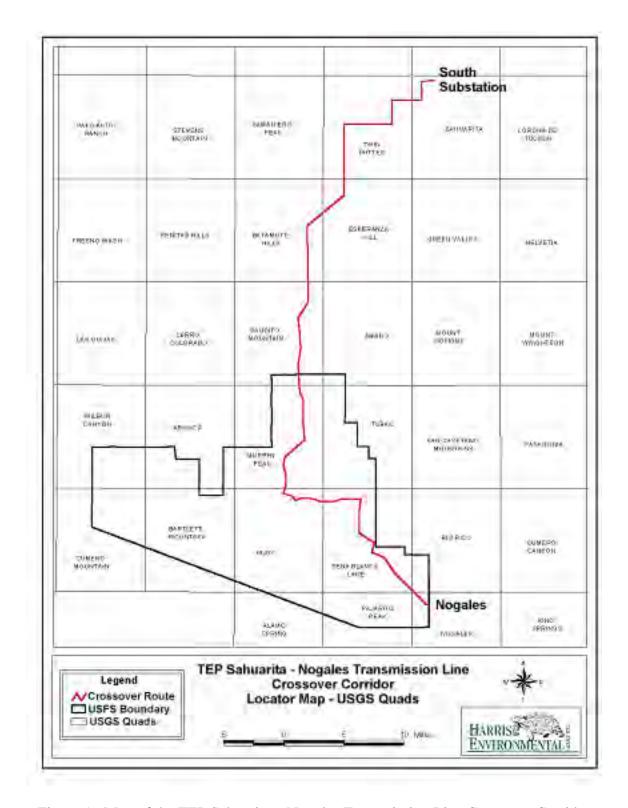
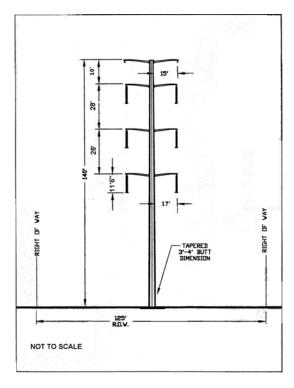


Figure 1. Map of the TEP Sahuarita – Nogales Transmission Line Crossover Corridor.

The primary support structures to be used for the transmission line are self-weathering steel single structures, or monostructures (Figure 2). Dulled, galvanized steel lattice towers (Figure 3) will be used in locations where their use will minimize overall environmental impacts, in accordance with Arizona Corporation Commission (ACC) Decision No. 64356 (ACC 2001).



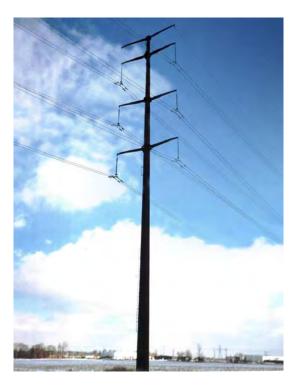


Figure 2. Monopole Transmission Line Structure Drawing and Photo.

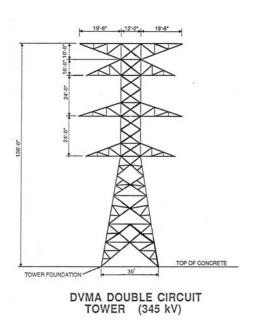




Figure 3. Lattice Tower Transmission Line Structure Drawing and Photo.

1.2 PROJECT LOCATION

The Crossover Corridor extends for approximately 65.2 mi (105 km), from the South Substation to the United States-Mexico border including 17 mi (27 km) along the EPNG gas line right-of-way (ROW). The length of the Crossover Corridor is 29.3 mi (47.2 km) within the CNF and 1.25 mi (2.01 km) on BLM land. The Crossover Corridor would require approximately 448 support structures, including approximately 196 within the CNF and 9 on BLM land.

The Crossover Corridor exits the TEP South Substation located within the incorporated area of the Town of Sahuarita and proceeds westerly for approximately 1.0 mi (1.6 km) before turning south for 1.5 mi (2.4 km). The corridor turns west across I-19 and continues through Pima County to the southwest, crossing approximately 1.25 mi (2.01 km) of federal land managed by BLM parallel to two existing TEP transmission lines (138-kV and 345-kV). The corridor turns south to parallel the EPNG gas line ROW for approximately 5.8 mi (9.3 km) and passes just east of the existing TEP Cyprus Sierrita Substation.

The Crossover Corridor continues past the Cyprus Sierrita Substation to the southwest, then turns south and enters Santa Cruz County after 6.3 mi (10 km). The corridor enters the CNF 6.0 mi (9.7 km) south of the Santa Cruz County line. The corridor passes south along the west side of the Tumacacori and Atascosa mountains. The corridor turns east through Peck Canyon for approximately 7 mi (11.3 km). At the point where Peck Canyon meets the EPNG gas line ROW, the corridor turns south parralleling the gas line. The Central Corridor continues through the CNF, paralleling the EPNG pipeline ROW to the southeast for several miles to the forest boundary. The proposed corridor exits CNF onto private land and proceeds 0.5 mi (0.8 km) east to the Gateway Substation. From the Gateway Substation, the proposed corridor returns to the west through private land and then turns south to parallel the CNF boundary. The proposed corridor meets the United States-Mexico border approximately 3,300 ft (1,006 m) west of Arizona State Highway 189 in Nogales, Arizona.

TEP will use existing access roads where feasible. Approximately 20.7 mi (33.3 km) of temporary new roads will be built for construction of the corridor on CNF (URS 2003a); spur roads off existing access roads adjacent to TEP transmission lines will provide project access on BLM land. Transmission line tensioning, pulling, and fiber-optic splicing sites will also disturb land. The total new temporary area of disturbance on CNF during construction of the corridor will be approximately 238 acres (96.3 ha) (URS 2003a). Following construction, TEP will close new roads, construction areas, and existing roads not required for project maintenance in accordance with agreements with land owners or managers (e.g., BLM or USFS). On USFS land, TEP will close existing road mileage equal to that required for project maintenance, to avoid impacting the current road density. The maintenance access required by TEP will be limited to roads to selected structures, rather than a single cleared ROW leading to the United States-Mexico border. On the CNF transmission line tensioning and pulling sites, fiber-optic splicing

sites, and construction yard areas will be obliterated within six months of the project becoming fully operational (URS 2003a).

1.3 PROJECT AREA

The project area includes the location where all construction and associated activities will occur along the ROW. Action areas are locations affected directly or indirectly by these activities and often include sites outside the immediate area of construction. Action areas are unique for each listed species and are outlined in SECTION 2.0 of this document.

Between Sahuarita and Nogales, the proposed action crosses four distinct biotic communities, or biomes (Brown 1994). A complete list of plant species documented during field surveys in 2002 is presented in Appendix B.



Figure 4. Sonoran desertscrub.

Vegetation south of the ASARCO mine transitions into the semidesert grassland biome (Figure 5). This area is dominated by grama (*Bouteloua* spp.), lovegrass (*Eragrostis* spp.), and three-awn (*Aristida* spp.) grasses, with low shrubs such as mesquite and acacia locally co-dominant. Agave (*Agave* spp.) and yucca (*Yucca* spp.) are also common in this biome. These grasslands are transected by desert riparian scrub dominated by mesquite and netleaf hackberry (*Celtis reticulata*).

The northern end of the corridor contains vegetation characteristic of the Sonoran desertscrub biome (Figure 4). This biome is typically represented by saguaro (Carnegiea gigantea), cholla and prickly pear (Opuntia spp.) cacti, ocotillo (Fouquieria splendens), mesquite, (Prosopis velutina), acacia (Acacia paloverde (Parkinsonia spp.), creosote (Larrea tridentata), triangle-leaf bursage deltoidea), and brittlebush (Encelia farinosa).



Figure 5. Semidesert grassland.



Figure 6. Madrean oak woodland.

The higher elevations (above 3,500 ft [1,067 m]) of the project area are within the madrean oak woodland biome (Figure 6). Representative plants of this biome within the project area include Mexican blue oak (*Quercus oblongifolia*) and emory oak (*Q. emoryi*) trees, side-oats grama (*B. curtipendula*), hairy grama (*B. hirsuta*), and fluffgrass (*Erioneuron pulchellum*).

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The 4th biome represented within the project area is the Sonoran deciduous riparian forest (Figure 7), which is located south of Arivaca Road in Sopori Wash and Peck Canyon. The high water table in these areas supports stands of cottonwood (*Populus fremontii*), ash (*Fraxinus pennsylvanica* ssp. *velutina*), sycamore (*Platanus wrightii*), walnut (*Juglans major*), netleaf hackberry, and willow (*Salix* spp.) trees.

The IRA within Peck Canyon encompasses 21,363 ha (52,788 ac) and was established by a Record of Decision on January 12, 2001 on the Roadless Area Conservation Final EIS.



Figure 7. Sonoran deciduous riparian forest.



Figure 8. Area burned in Walker fire.

Between 12 June and 22 June 2002, the Walker Fire, a human-caused fire, burned 16,369 ac (6,624 ha) of land along the United States-Mexico border approximately 1mi (1.6 km) west of the southern end of the Crossover Corridor. Portions of the Walker fire were very hot, especially near the international border and the upper slopes of ridges, while other areas, like Walker Canyon, burned relatively cool (T. Newman, CNF, pers. comm., 26 November 2002). While vegetation has begun to recover in some areas, other areas are highly susceptible to erosion due to reduced groundcover (Figure 8).

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1.4 Conservation Measures

PROJECT-WIDE CONSERVATION MEASURES

- 1. Environmental Training All construction supervisors will be required to attend environmental training, which will outline their obligation to obey applicable laws and regulations regarding wildlife and habitats (Appendix C).
- 2. Erosion Control Measures TEP is in consultation with CNF regarding development of Best Management Practices (BMPs) for minimizing proposed project impacts on geologic, soil, and water resources on national forest land, in accordance with the USFS "Soil and Water Conservation Practices Handbook" (USFS 1990). Specific BMPs will be identified after coordination with Arizona Department of Environmental Quality (ADEQ) and before implementation of the project, for the entire length of the selected corridor.
- 3. Fire Prevention Plan A Fire Prevention Plan is under development to minimize the risk of accidental wildfire. All construction activities will adhere to this plan and fire suppression equipment will be available to all work crews. On CNF lands, the Fire Prevention Plan will comply with Forest Service Manual 5100.
- 4. Hazardous Material Spill Response Plan A Hazardous Material Spill Response Plan is under development which will describe the measures and practices to prevent, control, cleanup, and report spills of fuels, lubricants, and other hazardous substances during construction operations. This plan will ensure that no hazardous materials are stored, dispensed, or transferred in streams, watercourses, or dry washes, and vehicles are regularly inspected and maintained to prevent leaks.
- 5. Invasive Species Control An Invasive Species Management Plan in accordance with Executive Order 13112 is under development in coordination with CNF, ASLD, and BLM to identify problem areas and mitigation measures.
- 6. Road Closure/Obliteration TEP has committed to obliterate and permanently close 1 mi (1.6 km) of existing road on CNF (to be identified by CNF) for every 1 mi (1.6 km) of proposed road used in the construction, operation, or long-term maintenance of the proposed action. TEP will monitor road closures during regularly scheduled inspection flights and/or ground inspections, and repair or replace road-closure structures as necessary following construction. Furthermore, TEP will cooperate with landowners on all ongoing road closure maintenance.

The following selective criteria and techniques for closing roads are taken from Section 1.3.2 of the Roads Analysis (URS 2003) and applies to access roads on CNF. Administrative roads will be closed to the general public but made available to TEP and its assigned contractors for the evaluation, maintenance, or upgrading of existing facilities.

Closure methods for administrative roads will include the following:

- a. Placement of heavy pipe posts with an attached, locked chain entrance on the road.
- b. Placement of heavy pipe posts with an attached, locked gate in a manner that blocks entrance on the road.
- c. Placement of a pipe barricade across the roadbed, locked in place in multiple locations in concrete sleeves.

The following methods may be used for the long-term closure of transmission line access roads used during construction and those roads required to be closed by the CNF. These roads may be reopened for emergency repair of transmission facilities, but will not be used intermittently as with administrative roads. Techniques include:

- a. Placement of boulders or other natural impediments across the road.
- b. Placement of a berm or trench across the the road.
- c. Rip, obliterate, and reseed/revegetate portions of roadbed as needed. This effort could be applied to the initial visual portion of roadway (e.g., first 100 ft [30 m]) to effectively obscure the roadway. This could be accomplished by transplanting native species of medium and large vegetation from the general area and reseeding with native grasses. By obscuring visible portions of roadway, future vehicular travel could be more effectively discouraged than by placing berms or other unnatural impediments to an otherwise visually inviting roadway.
- 7. Additional mitigation measures are outlined in Table 2.2-2 of the DEIS (Tetra Tech 2003).

SPECIES-SPECIFIC CONSERVATION MEASURES

Mexican spotted owl (MSO)

- 1. Breeding season restriction no construction activity will occur between Structures #297 and #312 of Segment 8 from 1 March to 31 August.
- 2. No trees over 9 in diameter breast height (DBH) in MSO habitat will be removed.

Cactus ferruginous pygmy-owl (CFPO)

1. Protocol surveys – 2 consecutive years of protocol surveys must be conducted before construction activities can begin within 1,969 ft (600 m) of designated habitat. If a CFPO is detected, USFWS has determined that certain continued construction activities will not harm or harass a CFPO as defined by ESA regulations. In areas where two consecutive years of protocol surveys cannot be completed, construction will occur outside of the breeding season.

Four zones are described (Zone I through Zone IV) that are based upon the distance of construction activity from a known nest or activity center. Certain levels of construction can occur within each zone without resulting in harm or harassment of the species. Situations that do not comply with the restrictions provided for each zone will require USFWS authorization before construction continues. Specific development restrictions that apply to each of the four zones are described in the sections below:

Zone I: 0 to 328 ft (100 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. Construction-related activities may continue on land that has been cleared of vegetation provided that they do not exceed the level and/or intensity of activity that was occurring during the period of time that the territory was established.
- 3. Activities that will be more intense or cause more noise disturbance than was occurring during the period of time that the territory was established cannot proceed without authorization from USFWS and relevant land management agencies.

Zone II: 328 ft (100 m) to 1,312 ft(400 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. No restrictions on the nature or type of construction activity (excluding the clearing of vegetation) from 1 August through 31 January of the following calendar year.
- 3. Construction activities during the breeding season (1 February to 31 July) cannot exceed the levels or intensity of activities that occurred at the time the territory was established.

Zone III: 1,312 ft (400 m) to 1,969 ft (600 m) from the CFPO Activity Center

- 1. No additional clearing of vegetation will be permitted without authorization from USFWS and relevant land management agencies.
- 2. No restrictions on the levels or intensity of construction activity (excluding the clearing of vegetation) at any time of the year.

Zone IV: Greater than 1,969 ft (600 m) from the CFPO Activity Center

1. No restrictions – any activity consistent with the project description provided to USFWS (as amended by supplemental reports) is allowed. For the purposes of this consultation, USFWS assumes that all construction or

- construction-related activities referred to under each zone description will be limited to those described in the project description in this BA.
- 2. All saguaros within construction areas will be transplanted or mitigated with minimum 6.5 ft (2 m) specimens. Within riparian desertscrub and deciduous riparian areas, tree and shrub removal will be minimized to the greatest extent possible.

Southwestern willow flycatcher (SWFL)

1. All damaged deciduous riparian vegetation will be mitigated with pole plantings of willow or cottonwood at a 2:1 ratio by species.

Lesser long-nosed bat (LLNB)

1. Agave within construction areas will be transplanted or replaced with similar age and size class individuals.

Chiricahua leopard frog (CLF)

1. Surveys for CLF will be conducted within Peck Canyon in the year immediately prior to construction for this species. If CLF are detected, consultation with USFWS will be reinitiated.

Pima pineapple cactus (PPC)

1. Purchase of credits in a USFWS-approved conservation bank for PPC.

Jaguar

1. Five remote cameras will be donated to the Jaguar Conservation Team to assist with monitoring of jaguar movements across the Arizona-Mexico border. These 5 cameras will all be placed within the Tumacacori EMA under permit from the CNF. If a female jaguar or cubs are documented by the Jaguar Management Team within the Tumacacori EMA, consultation with USFWS will be reinitiated.

2.0 FEDERALLY LISTED SPECIES

Special status species are plant and wildlife species that are of concern because their populations are either in jeopardy of extinction or are declining in number. The AGFD and USFWS were contacted concerning information on possible threatened and endangered species that may exist on or near the proposed action.

In a letter dated 14 May 2002, the USFWS listed 18 Endangered species, 7 Threatened species, and 2 Proposed species that occur in Pima and Santa Cruz Counties, Arizona (Table 2). Agency correspondence is presented in Appendix C. Species included in the USFWS correspondence, but excluded from evaluation are addressed in Appendix D.

Meetings with USFWS and USFS personnel were held on 9 April, 13 May, 3 December 2002, and 28 March 2003 to discuss the potential effects of the proposed action on special status species. BLM personnel also attended the 3 December 2002 meeting. A meeting with AGFD was held on 19 April 2002. Additional meetings were held with USFWS on 30 May, 6 November, and 10 December 2002, and 19 March, 16 May, 11 June, 14 July, and 11 September 2003, and 18 March 2004.

Table 2. Federally listed species that may occur near the proposed action.					
SPECIES	STATUS	<i>DRAFT</i> DETERMINATION			
Canelo Hills ladies' tresses	Endangered	No Effect			
Cactus ferruginous pygmy- owl	Endangered	May affect, likely to adversely affect			
Desert pupfish	Endangered	No Effect			
Gila topminnow	Endangered	May affect, not likely to adversely affect			
Huachuca water umbel	Endangered	No Effect			
Jaguar	Endangered	May affect, not likely to adversely affect			
Jaguarundi	Endangered	No Effect			
Kearney's blue star	Endangered	No Effect			
Lesser long-nosed bat	Endangered	May affect, likely to adversely affect			
Masked bobwhite	Endangered	No Effect			
Mexican gray wolf	Endangered	May affect, not likely to adversely affect			
Nichols turk's head cactus	Endangered	No Effect			
Northern aplomado falcon	Endangered	No Effect			
Ocelot	Endangered	No Effect			
Pima pineapple cactus	Endangered	May affect, likely to adversely affect			
Sonoran pronghorn	Endangered	No Effect			
Sonoran tiger salamander	Endangered	No Effect			
Southwestern willow flycatcher	Endangered	May affect, not likely to adversely affect			
Bald eagle	Threatened	No Effect			
California brown pelican	Threatened	No Effect			
Chiricahua leopard frog	Threatened	May affect, not likely to adversely affect			
Loach minnow	Threatened	No Effect			
Mexican spotted owl	Threatened	May affect, not likely to adversely affect			
Sonora chub	Threatened	No Effect			
Spikedace	Threatened	No Effect			
Mountain plover	Proposed	No Effect			
Gila chub	Proposed	No Effect			

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2.1 MEXICAN SPOTTED OWL (*Strix occidentalis lucida*) (Threatened)

2.1a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the MSO includes those areas of MSO habitat that may be directly impacted by construction as well as protected activity centers (PAC) within 1 mi (1.6 km) of the proposed action that may be subject to noise disturbance during construction. The entire action area for this species is within the Tumacacori EMA.

2.1b Natural History and Distribution

The MSO is one of three subspecies of spotted owl currently recognized by the American Ornithologists' Union in their most recent treatise on subspecies (A.O.U. 1957). However, Dickerman (1997), in a recent taxonomic review of *S. o. lucida*, has identified

three subspecies throughout the species' range, including resurrecting the use of *S. o. huachucae* as the subspecies in the southwestern United States and northern Mexico. Although this new revision is probably valid, the currently accepted taxonomy was followed. The MSO (Figure 9) is a medium-sized owl with a round head lacking ear tufts; light brown to dark brown plumage, and dark eyes. It has white spots on the head and nape, and white mottling on the breast and abdomen; thus, the name spotted owl (Pyle 1997). All three subspecies of spotted owl inhabit mountainous, forested regions of western North America.



Figure 9. Mexican spotted owl.

A detailed account of the spotted owl, inclusive of the three currently recognized subspecies, is given by Gutiérrez et al. (1995). Ganey (1998) presents a synthesis of what is presently known about the MSO, particularly in Arizona. The MSO Recovery Plan (USFWS 1995a) and technical supporting chapters on distribution and abundance (Ward et al. 1995), population biology (White et al. 1995), landscape analysis and metapopulation structure (Keitt et al. 1995), habitat relationships (Ganey and Dick 1995), and prey ecology (Ward and Block 1995) also are important summary documents. The following brief species account was obtained from these and other more current references.

The MSO is widely but patchily distributed in forested mountains and canyons from southern Utah and central Colorado, south into Arizona, New Mexico, extreme western Texas, and into Mexico to near Mexico City (McDonald et al. 1991, Gutiérrez et al. 1995, Ward et al. 1995, Dickerman 1997). The MSO nests, roosts, forages, and disperses in a variety of habitats in Arizona from about 3,770 ft (1,236 m) to 9,600 ft (3,150 m). Nest and roost habitats include forests and woodlands that are structurally complex, unevenly aged and multistoried, with mature or old-growth stands containing trees older than 200 years with a high (>70 percent) canopy closure, including many snags and fallen logs (Ganey and Dick 1995). According to Ganey (1998), they appear to be most common in mature and old growth forests in steep canyons, but also are found in canyons that include prominent cliffs with little forested habitat. The MSO preys on small mammals,

birds, reptiles, and insects, with woodrats (*Neotoma* spp.) and white-footed mice (*Peromyscus* spp.) constituting the bulk of its diet by biomass (Ward and Block 1995, Ganey et al. 1992, Reichenbacher and Duncan 1992).

Adult MSO are considered to have a relatively high survival rate, with an estimated probability of adult survival rate of 0.8 to 0.9 from one year to the next (White et al. 1995). Juveniles on the other hand, have a much lower survival probability rate, ranging from 0.06 to 0.29 (Ganey et al. 1998, White et al. 1995). There is a great deal of spatial and temporal variation in reproductive output, but one estimate places the general reproductive rate at 1.001 fledglings per pair (White et al. 1995). Typical of *K*-selected species (Ricklefs 1990), the MSO is long-lived with low reproductive output and generally maintains population densities near carrying capacity. The high survival rate of *K*-selected species enables MSO to maintain stable populations over time despite variable recruitment rates (White et al. 1995).

In 1993, the MSO was federally listed as a threatened species by the USFWS. The listing was based primarily on historical and ongoing habitat alteration due to timber management practices, specifically the use of even-aged silviculture, the threat of these practices continuing as prescribed in National Forest Plans, and the threat of additional habitat loss from catastrophic wildfire (USFWS 1993a).

The primary administrator of lands supporting MSO in the United States is the USFS. According to the recovery plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on land administered by USFS (USFWS 1995a). The majority of known MSO have been found within Region 3 of the USFS, which includes 11 National Forests in New Mexico and Arizona. USFS Regions 2 and 4, including two National Forests in Colorado and three in Utah, support fewer MSO.

2.1c Critical Habitat

Critical habitat was designated for the MSO in 1995 (USFWS 1995b). However, it was revoked by court order in 1998 for failing to complete the National Environmental Policy Act process (USFWS 1998a). USFWS (USFWS 2000a) again proposed to designate 13.5 million acres (5.6 million ha), mostly on USFS land, as critical habitat for the species in 2000. The final rule published in the Federal Register on 1 February 2001 designated approximately 4.6 million acres (1.9 million ha) in Arizona, Colorado, New Mexico, and Utah on federal land outside of the USFS system (USFWS 2001a). The reason given for not designating critical habitat on USFS land was that current Forest Plans conform to management guidelines outlined in the recovery plan, which have undergone consultation with the USFWS, whereas other federal agencies have yet to formally adopt these guidelines.

On 13 January 2003, a federal judge stated that the USFWS final rule designating critical habitat for the MSO violated the ESA. On 18 November 2003, the USFWS again redesignated proposed critical habitat for the MSO, including unit BR-W-13 in the

Atascosa/Pajarito Mountains. The proposed action crosses this unit of proposed critical habitat.

2.1d Current Status Statewide

In Arizona, MSO have been documented throughout much of the state except for the arid southwestern portion. The greatest concentration of owls occurs along the Mogollon Rim from the White Mountains region to the peaks near Flagstaff and Williams (Ward et al. 1995, Ganey 1998). The majority of owls are located on federal lands managed by the USFS (USFWS 1995a).

There are three Recovery Units (RU) identified in Arizona. From north to south they are the Colorado Plateau, Upper Gila Mountains, and Basin and Range-West. No current estimate of the number of MSO within its entire range is available, but between 1990 and 1993, 103 MSO sites were recorded during planned surveys and incidental observations in the Basin and Range-West RU in Arizona (USFWS 1995a).

2.1e Environmental Baseline

The proposed action occurs in the Basin and Range - West RU. Within this RU, MSO are mainly associated with steep, rocky canyons containing cliffs and stands of oak, Mexican pine, and broad-leaved riparian vegetation (Ganey and Balda 1989). Most MSO habitat in this RU occurs on the CNF.

The proposed action passes through the Tumacacori EMA of the CNF, which currently contains five PACs. The majority of the EMA crossed by the proposed action is madrean evergreen woodland; however, much of it lacks the features typically associated with MSO habitat. Range condition in areas crossed by the proposed action is moderately high with a stable or unknown trend. Native grasses dominate groundcover throughout the action area, but some non-native species, such as Lehmann's lovegrass (*Eragrostis lehmanniana*), tree of heaven (*Ailanthus altissima*), and salt cedar (*Tamarix* spp.) occur within the EMA (USFS 2002). Lehmann's lovegrass was seeded in many areas to prevent erosion (Cox et. al. 1984) but has extended in range far beyond the seeded areas (Cox and Ruyle 1986).

Livestock stocking rates for the allotments within the Tumacacori EMA range from 1,320 Animal Unit Months (AUM) in the Peña Blanca Allotment to 2,400 AUMs in the Bear Valley Allotment. Allotment Management Plans for Bear Valley and Sardinia Allotments are currently being revised.

The proposed action passes within 0.56 mi (0.9 km) of the Pine Canyon PAC (#0502017), which lies south of Peck Canyon, which wa last informally monitored in 1998, with no information on MSO pair occupancy or no surveys since then. Additionally, CNF personnel received reports of MSO calling in Sycamore Canyon north of Ruby Road in 2001.

2.1f Effects of Proposed Action on the MSO and Proposed Critical Habitat

Direct Effects

Vehicle and Powerline Collisions

Because MSO are primarily nocturnal and likely will not be active during daylight when construction occurs, the probability of MSO collisions with construction related vehicles is extremely low. To minimize the risk of powerline collisions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested practices for raptor protection on powerlines: the state of the art in 1996" (APLIC 1996). While there is always some risk of a MSO collision with powerlines, raptors have lower rates of collision with powerlines than passerine birds (McNeil et al. 1985). This reduced collision rate may be due to visual acuity, maneuverability, and non-flocking tendencies (Nobel 1995). The risk of bird collisions with towers has been associated with birds being attracted to red lights used for aircraft avoidance (Kerlinger 2000). The towers used in the proposed action will not contain any lighting. No guy wires will be used in the construction of the proposed action, further reducing the potential for collisions.

Electrocution

Because power structures and towers are attractive perching and nesting sites for some raptor species, significant raptor mortality from electrocution has been reported in North America (Harness and Wilson 2000). Electrocution occurs when a bird simultaneously touches two phase conductors or a conductor and a ground wire (Bevanger 1994). Most electrocutions occur on distribution lines (34-kV or less) rather than on transmission lines (69-kV or more), primarily because clearances between wires on distribution lines are less and distribution lines have an array of uninsulated, structure-mounted equipment (Marti 2002). To minimize the risk of raptor electrocutions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996). Furthermore, on the structures to be used in the proposed action, the distance between the power lines is at least 18 ft (5.5 m). Because the average wingspan of an adult MSO is 3.3 ft (1 m), there is no foreseeable risk of electrocution.

Construction Noise and Activity

Human activity within breeding and nesting territories may affect some raptors by altering home range movements (Anderson et al. 1990) and causing nest abandonment (Postovit and Postovit 1987). Disturbance from construction activities may discourage MSO from foraging or nesting in suitable habitat. The greatest noise disturbance will result from the use of helicopters during installation of transmission lines; however, Delaney et al. (1999) found that MSO were disturbed more by ground-based disturbance, such as chain saws, than by helicopter overflights. Ground-based disturbance could result from heavy machinery or large groups of construction personnel working near MSO habitat.

To prevent the disturbance of breeding MSOs, no construction activities will occur within 1 mi (1.6 km) of the Pine Canyon PAC during the breeding season (1 March to 31

August), as outlined in the conservation measures (SECTION 1.4). Construction during the non-breeding season will be short term in duration.

Indirect Effects

Habitat Modification and Fragmentation

Because no construction will occur within a MSO PAC, no modification or fragmentation of MSO habitat is anticipated.

Increased Legal and Unauthorized Access to MSO Habitat

Incidental encounters between MSO and non-motorized recreationists are relatively insignificant in most cases (USFWS 1995a). Most MSO appear to be relatively undisturbed by small groups (< 12 people) passing nearby (USFWS 1995a) as long as the disturbance is not for an extended period of time. The potential for hikers to disturb MSOs is greatest where hiking is concentrated in narrow canyon bottoms occupied by nesting or roosting MSOs. Noise from recreationists using off-highway vehicles (OHV) on closed access roads are much more likely to disturb MSOs, especially if their activity occurs over an extended period of time in occupied MSO habitat. Increased access to MSO habitat may subject the species to poaching or other harassment.

The road closure techniques outlined in the RA (URS 2003) should minimize unintended use of temporary construction roads but probably will not prevent it entirely. However, because only a small segment of a construction road will occur within a PAC, and forest service roads already exist within the PAC, no significant increase in unauthorized vehicular access by recreationists into occupied MSO habitat is anticipated.

Accidental Wildfire

Because of their mobility, MSO will not likely be directly impacted by wildfires. However, fire suppression efforts over the past century have created a situation that may encourage catastrophic, large-scale fires. Efforts to limit such fires are of great importance to MSO conservation. Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). The short-term effects of wildfires may affect MSO prey species through direct mortality from the fire or habitat destruction. Herbaceous plant species that serve as cover and forage for small mammals could be drastically reduced. However, because of reduced groundcover, predation upon surviving small mammals by MSO may actually increase in the short term. Furthermore, increased herbaceous production in the years following a fire may improve habitat for small mammals.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak efficacy in southern California came to similar conclusions (Green 1977).

If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of down woody material, which is capable of carrying wildfires across the landscape. Furthermore, the measures being developed for the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). The short lengths of new access roads, their distance from MSO habitat, as well as the measures outlined in the Invasive Species Management Plan, will minimize the introduction or spread of invasive species into MSO habitat.

Effects to Proposed Critical Habitat

While the proposed action passes through the boundaries of proposed critical habitat unit #BR-W-13, (Figure 20) the area where the project is located does not contain constituent elements as outlined in the 2001 critical habitat designation (USFWS 2001e).

The proposed action includes the placement of 14 structures and 12,137 linear feet (3,700 m) of new roads within unit BR-W-13 of proposed critical habitat. Therefore, the proposed Central Corridor would permanently disturb 3.4 acres (1.4 ha) and temporarily disturb 10.1 acres (4 ha) of land within proposed MSO critical habitat. These calculations are based on the assumptions listed in the Final Roads Analysis (Section 1.4) (URS 2003), including: (1) temporary disturbance at structure locations would occur in an area within a 100-foot (30.5-m) radius; (2) laydown areas were calculated as temporary disturbance; (3) the permanent area of disturbance at each structure site as 25 ft² (2.3 m²); (4) proposed new roads would be maintained for maintenance (and thus were permanent disturbance); and (5) the average width of proposed new roads would be 12 feet (3.7 m) wide.

Because the action area does not contain constituent elements of proposed critical habitat, and the conservation measures outlined above will minimize the impacts from accidental wildfire and invasive species, the impacts from the proposed action will not appreciably diminish the value of the proposed critical habitat to the survival and recovery of MSO.

2.1g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. Because the action area for this species lies entirely on USFS land, all activities are managed according to the MSO recovery plan guidelines, and future actions will be subject to the consultation requirements established under Section 7, and are not considered cumulative to the proposed action.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between

1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the MSO action area, an increase in population in Nogales, and other regional population centers may translate into an increased demand for outdoor recreation, and therefore more recreational use of USFS land.

An undetermined level of border crossings by undocumented immigrants (UDI) occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.1h Effects Determination and Incidental Take

Effects to the Species

Construction noise and activities may affect non-breeding MSO but is not likely to adversely affect the species, because construction will occur during a non-critical life stage and will be short term in duration.

Because the proposed action is not likely to adversely affect the MSO, no take is anticipated.

Effects to Critical Habitat

Removal of some vegetation in PAC #0502015 may affect, but is not likely to adversely modify proposed critical habitat for the MSO.

2.2 CACTUS FERRUGINOUS PYGMY-OWL (*GLAUCIDIUM BRASILIANUM CACTORUM*) (Endangered)

2.2a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the CFPO includes those areas of habitat below 4,000 ft (1,219 m) that may be directly impacted by construction as well as potential nesting sites within 1,312 ft (400 m) of the proposed action (USFWS 2000) that may be subject to noise disturbance during construction. In addition, an 7.08 mi (11.4 km) buffer area surrounding the project area is included in the action area because juvenile CFPO have been documented traveling up to 7.08 mi (11.4 km) during dispersal (M. Wrigley, USFWS, pers. comm., May 2001).

2.2b Natural History and Distribution:

USFWS listed CFPO in Arizona on 10 March 1997 (USFWS 1997a) as endangered. Listing was based on historical and current evidence that suggested a significant population decline of this subspecies had occurred in Arizona. USFWS considered the loss and alteration of habitat as the primary threat to the remaining population. A recovery plan for the species is currently in development by the CFPO recovery team.

CFPO (Figure 10) are small brown birds, with a cream-colored belly streaked with paler brown (Pyle 1997). The *cactorum* race; however, is described as "a well-marked, pale

grayish extreme for the species" (Phillips et al. 1964). The call for this mostly diurnal owl is heard chiefly near dawn and dusk. The best field identification features are its small size, eyespots on the nape of the neck, and long reddish-barred tail, which is often nervously wagged or twitched (Monson 1998).

Originally CFPO were described as a separate subspecies based on specimens from Arizona and Sonora, Mexico. CFPO were first documented in the United States from a collection by Lieutenant Charles E. Bendire on 24 January 1872 in the "heavy mesquite thickets along Creek" near the present day site of historic Camp Lowell, Tucson (Coues 1872, Bendire 1892).



Figure 10. Cactus ferruginous pygmy-owl.

Very little is known about the life history of CFPO in Arizona (Cartron et al. 2000a). Little or no literature currently exists concerning life history variables such as longevity, age distribution, and recruitment. Current studies undertaken by AGFD, USFWS, and The University of Arizona are examining these variables.

The diet of CFPO is not well understood, but they are believed to be prey generalists (Cartron et al. 2000a). Observations, stomach content analysis, and records of Texas pygmy-owls suggest that these owls have a diverse diet that includes mammals, birds, reptiles, and insects (Proudfoot and Beasom 1997).

CFPO nest in cavities of larger trees (typically defined as a tree with a trunk at least 6 in [15 cm] diameter at breast height [DBH]) or large columnar cactus. Cavities may be naturally formed (e.g. knotholes) or excavated by woodpeckers. CFPO do not construct their own nest holes. All currently known CFPO nest sites in Arizona are in woodpecker excavated cavities in saguaros. Historically, the species also has been documented nesting in cottonwood, paloverde, and mesquite trees in Arizona.

Nesting activity for this owl species in Arizona begins in late winter to early spring (Lesh and Corman 1995, Abbate et al. 1996). Little is known about its courtship flight behavior. Egg laying begins by late April with three to four eggs typically laid. It is uncertain if only one brood is hatched per year. Nestlings have been observed through the end of July. During nesting, the male brings food to the female and young (Glinski 1998).

Historically, CFPO occurred from the lowlands of central Arizona, south through western Mexico to the states of Colima and Michoacan, and from southern Texas south through the Mexican states of Tamaulipas and Nuevo Leon. In Arizona, the species was documented as far north as New River and Cave Creek in northern Maricopa County (Harris and Duncan 1999). Elsewhere in Maricopa County, the species has been found near the Yuma County line along the Gila River at Agua Caliente, along the Salt River at Phoenix, and near the Verde River confluence. The eastern most verifiable record was along the Gila River at Old Fort Goodwin, located approximately 2 mi (1.2 km) southwest of present day Geronimo, Graham County, Arizona (Aiken 1937). In the southeastern part of the state, the species has been documented in recent times near Dudleyville along the lower San Pedro River between 1985 and 1987 (Harris and Duncan 1999), and probably also along lower Aravaipa Creek in 1987 (Monson 1987). Other localities in south central Arizona include historical records in Pinal County near Sacaton and Blackwater on the Gila River Indian Reservation, and at Casa Grande (Harris and Duncan 1999). Near the Mexican border, the species has been found in Santa Cruz County near Patagonia and in Sycamore Canyon west of Nogales. A likely accidental sighting was documented once on 10 April 1955 in eastern Yuma County near the Mexican border at Cabeza Prieta Tanks on the Cabeza Prieta National Wildlife Refuge (Monson and Phillips 1981, Harris and Duncan 1998).

Surveys conducted by University of Arizona biologists in Sonora, Mexico found 280 CFPO during the 2000 survey season. CFPO within Sonora, Mexico and Arizona may have been the same population prior to agricultural expansion within the last 75 years. However, due to isolation, the genetic connection of the Arizona population to owls in the nearby state of Sonora, Mexico may be tenuous (USFWS 2002a).

CFPO have been documented in several habitat types in the northern portion of its range in Arizona and adjacent Mexico. In Arizona, these include streamside Sonoran riparian deciduous forest and woodland associations and Sonoran desertscrub. CFPO also inhabit Sinaloan deciduous forest and thornscrub in Mexico (not discussed here). The streamside associations include such species as cottonwood, ash, netleaf hackberry, willows, velvet mesquite, and others. The Sonoran desertscrub associations are composed of relatively

dense saguaro cactus stands associated with short trees such as paloverde, mesquite, and ironwood (*Olneya tesota*), and an open understory of triangle-leaf bursage, creosote, and various other cacti and shrubs. Throughout its range, CFPO occur at low elevations, generally below 4,000 ft (1,219 m).

CFPO found in Sonoran desertscrub habitats are typically associated with structurally diverse stands of desert riparian scrub with saguaros along washes (Wilcox et al. 2000). Such habitat is often referred to as xeroriparian vegetation (Johnson and Haight 1985). These washes have no permanent water flow. Instead, flow is intermittent and based on seasonal rainfall as well as strength and duration of individual storms. Desert riparian scrub vegetation is easily recognizable by the presence of a linear assemblage of trees and shrubs that grow along the wash. Density is higher and taller than the sparse desertscrub vegetation that typically exists in the adjacent uplands. Before listing the species as endangered, all known CFPO were documented in such Sonoran desertscrub habitat (Lesh and Corman 1995, Abbate et al. 1996).

At the northern periphery of the subspecies range in southern Arizona, CFPO distribution and preferred habitat is not well understood. It is believed CFPO require the cover of denser wooded areas with understory thickets, like riparian habitat, for nesting, foraging, and predator avoidance (Abbate et al. 2000). Riparian habitat also is known for its high density and diversity of animal species that constitute the prey base of CFPO.

A significant decline in the Arizona population has occurred over the past several decades (USFWS 1997a, Richardson et al. 2000). Loss or modification of habitat from woodcutting, agriculture, groundwater pumping, and related human activities has presumably contributed to the population decline (USFWS 1997a).

2.2c Critical Habitat

On 12 July 1999, USFWS designated approximately 731,712 acres (296,113 ha) of critical habitat supporting riverine, riparian, and upland vegetation in seven critical habitat units, located in Pima, Cochise, Pinal, and Maricopa counties of Arizona (USFWS 1999). However, on 21 September 2001, the U.S. District Court for the State of Arizona vacated this final rule designating critical habitat for CFPO, and remanded its designation back to the USFWS for further consideration. On 27 November 2002, USFWS proposed designating 1.2 million acres (485,000 ha) of critical habitat for CFPO in southern Arizona (Federal Register Vol. 67, No 229:71031-71064). The proposed action does not enter any areas proposed as critical habitat.

2.2d Current Status Statewide

USFWS determined that CFPO in Arizona were endangered because of the following factors (USFWS 1997a):

- present or threatened destruction, modification, or curtailment of its habitat or range;
- inadequacy of existing regulatory mechanisms;

• other natural and manmade factors, which include low genetic viability.

Surveys conducted statewide during the 2002 season confirmed a total of 18 adult CFPO and three nests in Arizona. Similar to the previous four years, there was greater than 50 percent fledgling mortality documented in 2002, with only one juvenile confirmed surviving dispersal (S. Richardson, USFWS, pers. comm., 3 December 2002).

One of most urgent threats to CFPO in Arizona is thought to be the loss and fragmentation of habitat (USFWS 1997a, Abbate et al. 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments directly and indirectly impacts CFPO survival and recovery (Abbate et al. 1999). In recent decades, CFPO riparian habitat has continually been modified and destroyed by agricultural development, woodcutting, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Bahre 1991, Stromberg et al. 1992, Stromberg 1993a and 1993b). Sonoran desertscrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991). Pumping of groundwater and the diversion and channelization of natural watercourses are also likely to have reduced CFPO habitat.

Proudfoot and Slack (2001) found that CFPO in northwestern Tucson may be isolated from other populations in Arizona and Mexico. Low genetic variability can lead to a reduction in reproductive success and environmental adaptability. In 1998 and 1999, two cases of sibling CFPO pairing and breeding were documented (Abbate et al. 1999). In both cases, young were fledged from the nesting attempts. These unusual pairings may have resulted from extremely low numbers of available mates within dispersal range, and/or from barriers (including fragmentation of habitat) that have influenced dispersal and limited the movement of young owls (Abbate et al. 1999).

Soule (1986) notes that very small populations are in extreme jeopardy due to their susceptibility to a variety of factors, including variations in birth and death rates that can result in extinction. In small populations such as with CFPO, each individual is important for its contribution to the genetic variability of that population.

2.2e Environmental Baseline

CFPO habitat north of Sahuarita Road consists of Sonoran desertscrub with relatively high species diversity and structural diversity, including scattered saguaro cacti containing potential nesting cavities. This area is within Survey Zone 1 (USFWS 2000) and has the highest potential for occupancy of the entire action area. Land status in this area is a mixture of private and state land. The Mission Mine Complex also is located within this section of the proposed action and grazing occurs on much of the state lands in the area.

CFPO habitat south of Sahuarita Road consists primarily of semi-desert grassland dominated by mesquite and acacia trees, mixed-cacti, ocotillo, yucca, and grasses, including non-native Lehmann's lovegrass (*Eragrostis lehmanniana*). The area is

primarily undeveloped, but does contain some existing electrical distribution lines and associated roads (Figure 11) as well as low density housing developments. These grasslands are transected by desert riparian scrub dominated by mesquite and netleaf hackberry trees. Some areas of deciduous riparian forests are also found south of Arivaca Road in Sopori Wash and Peck Canyon. Land jurisdictions in this area include private, state, BLM, and USFS.



Figure 11. Example of existing disturbance within the corridor.

CFPO surveys were conducted by Harris Environmental Group, Inc. (HEG) biologists in 2001 and 2002 (data previously submitted to USFWS) in accordance with the approved protocol (USFWS 2000). Surveys were conducted in Sonoran desertscrub habitat where saguaros were present and in desert riparian scrub and deciduous riparian habitats that contained large trees (over 6 in [15.2 cm] DBH). No surveys have been conducted in deciduous riparian habitat within Sopori Wash and Peck Canyon. Surveys were conducted at 142 call points in 2001 and 140 in 2002. No CFPOs were detected during either survey year.

The only historical records of CFPO within the Nogales Ranger District (RD) of the CNF are in Sycamore Canyon (CNF 2000) and a dispersing juvenile in the Jarillas Alloment. USFS surveys in Sycamore Canyon in 1997 and 1998 did not locate CFPO. Additionally, USFS personnel surveyed 2,300 acres (930 ha) in 1999 with negative results and conducted 58 habitat assessments for CFPO habitat (CNF 2000). The habitat assessments identified four areas that ranked high enough to warrant CFPO surveys. No CFPO have been detected during surveys of these four areas (T. Newman, CNF, pers. comm., 9 October 2002).

2.2f Effects of Proposed Action on the CFPO

Direct Effects

Vehicle and Powerline Collisions

CFPO collisions with windows and fences have been documented in the Tucson area (USFWS 2002a), and observations of low flying CFPO across roadways indicate vehicle collisions are a realistic hazard (Abbate et al. 1999). While CFPO may be active during daylight, no CFPO have been detected within the action area, therefore, CFPO collisions with construction related vehicles are unlikely.

There is a small risk of a CFPO collision with power lines, however, raptors have lower rates of collision with power lines than passerine birds (McNeil et al. 1985). This reduced collision rate may be due to the visual acuity, maneuverability, and non-flocking tendencies (Nobel 1995). To minimize the risk of powerline collisions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested"

Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996).

Electrocution

Because power structures and towers are attractive perching and nesting sites for some raptor species, significant raptor mortality from electrocution has been reported in North America (Harness and Wilson 2000). Electrocution occurs when a bird simultaneously touches two phase conductors or a conductor and a ground wire (Bevanger 1994). Most electrocutions occur on distribution lines (34-kV or less) rather than on transmission lines (69-kV or more), primarily because clearances between wires on distribution lines are less and distribution lines have an array of uninsulated, structure-mounted equipment (Marti 2002). To minimize the risk of raptor electrocutions, TEP will construct the proposed transmission line following the guidelines outlined in "Suggested Practices for Raptor Protection on Power Lines: the State of the Art in 1996" (APLIC 1996). Furthermore, on the structures to be used in the proposed action, the distance between the power lines is at least 18 ft (5.5 m). Because the average wingspan of an adult CFPO is 15 in (38 cm), there is no foreseeable risk of electrocution.

Construction Noise and Activity

Although no CFPO have been detected in the project area, short term noise disturbance and human activity associated with construction may discourage CFPO from using habitat within and adjacent to the proposed ROW. Human activity near nest sites at critical periods of the nesting cycle may cause CFPO to abandon their nests (USFWS 2002a). While CFPO may tolerate low level noise disturbances, such as those in low density residential areas (Cartron et al. 2000b), they will probably not tolerate noise levels associated with construction activities in close proximity to a nest. The greatest likelihood of noise disturbance will result from the use of helicopters during the installation of the transmission lines, but also could result from the presence of heavy machinery or large groups of construction personnel. If CFPO are not detected during the two consecutive years of protocol surveys, the potential for direct impacts to this species is minimal.

Indirect Effects

Habitat Modification and Fragmentation

The proposed action will result in the disturbance of areas that could provide potential nesting, foraging, and dispersal habitat for CFPO. Under the proposed action, the following amounts of temporary (laydown areas, tensioning and pulling sites) and permanent (proposed new roads and structure bases) habitat disturbance would occur:

Sonoran Desertscrub: Temporary = 38.9 acres

Permanent = 4.9 acres

Desert Riparian Scrub: Temporary = 29.4 acres

Permanent = 3.6 acres

Deciduous Riparian Temporary = 0.14 acres

While all large saguaros within construction sites will be transplanted, construction could temporarily degrade CFPO habitat by removing vegetation that provides forage and shelter. Elimination of groundcover plant species, rodent burrows, and native soils, as well as loss of trees and shrubs, may impact local reptile and bird populations that are important to the pygmy-owl diet. Loss of complex vegetation structure increases energy demands on owls that must forage at greater distances and risk exposure to a variety of hazards (Abbate et al. 1999). Because of the linear nature of the proposed action, these impacts will be widely distributed and relatively minor in any single area.

Increased Legal and Unauthorized Access to CFPO Habitat

Although CFPO have not been detected in the project area, recreationists may access potential CFPO habitat using temporary construction roads associated with the proposed action. While hikers and other non-motorized recreationists will create minimal disturbance, noise from Off Highway Vehicle (OHV) users are much more likely to disturb CFPO, especially if the activity occurs over an extended period of time in or near a CFPO nesting territory. Increased access to CFPO habitat may subject the species to poaching or other harassment. While TEP will prevent unauthorized access to the ROW across private land, closure of the ROW on public land, particularly state land, is not feasible. Therefore, some increase in access to potential CFPO habitat is anticipated.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, CFPO will not likely be directly impacted by wildfires. However, wildfires may destroy columnar cacti and trees that provide nesting cavities as well as affect CFPO prey species through direct mortality from the fire or habitat destruction. Herbaceous plant species that serve as cover and forage for small mammals could be drastically reduced. Because of reduced groundcover, predation upon surviving small mammals by CFPO may actually increase in the short term. Furthermore, increased herbaceous production in the years following a fire may improve habitat for small mammals in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977).

The measures outlined in the Fire Prevention Plan will minimize the risk of wildfire associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.2g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this biological assessment. While the action area for this species crosses private, state, and federal lands, the habitat with the highest potential for occupancy by CFPO occurs on state and private lands in Pima County. Future federal actions on these lands will be subject to Section 7 consultation. These actions will not be considered cumulative.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). Because of the growth rate and the development pressures from nearby Tucson and Sahuarita, it is foreseeable that land adjacent to the proposed ROW will be developed. These developments will likely include increases in associated infrastructure such as roads, groundwater use, and commercial services, all resulting in the degradation of CFPO habitat.

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase. Additionally, agriculture, recreation, OHV use, grazing, and other activities continue to occur on private and state land and adversely affect CFPO and their habitats.

2.2h Effects Determination and Incidental Take

While CFPO are not currently known to occupy the action area, the disturbance of potential habitat from construction activities and increased access may affect, and are likely to adversely affect, this species.

Take of CFPO is not anticipated because construction activities during breeding season will only occur following protocol surveys and the Conservation Measures outlined in SECTION 1.4 will minimize disturbance to potential habitat and prevent disturbance to nesting CFPO within the action area should any be detected in the future.

2.3a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential migratory habitat for the SWFL includes those areas of Sopori Wash with dense riparian habitat similar to that described by Sogge et al. (1997) that may be directly or indirectly impacted by construction. The action area for this consists of the Sopori Wash both within the proposed ROW as well as the surrounding Sopori Wash watershed.

2.3b Natural History and Distribution

SWFL (Figure 12) are small passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 5.75 in (14.6 cm) in length from the tip of the bill to the tip of the tail and weighing only 0.4 ounces (11.34 grams). This species has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two



white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark and the lower is light yellow grading to black at the tip. SWFL are riparian obligate species, nesting along rivers, streams, and other wetlands where dense growths of willow, seepwillow (*Baccharis* sp.), buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix* spp.), carrizo (*Phragmites australis*) or other plants are present, often with a scattered overstory of cottonwood and/or willow.

Figure 12. Southwestern willow flycatcher.

One of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), SWFL are neotropical migratory species that breed in the southwestern U.S. from approximately 15 May to 1 September. This species migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical range of SWFL included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

SWFL breed in dense riparian habitats from sea level in California to just over 7,000 ft (2,134 m) in Arizona and southwestern Colorado. Historic egg/nest collections and species descriptions throughout SWFL range describe the widespread use of willow for nesting (Phillips 1948, Phillips et al. 1964, Hubbard 1987, Unitt 1987, San Diego Natural History Museum 1995). Currently, SWFL primarily use Geyer willow (Salix geyeriana), Goodding willow (Salix gooddingii), boxelder, saltcedar, Russian olive (Elaeagnus angustifolio), and live oak (Quercus agrifolia) for nesting. Other plant species less commonly used for nesting include: buttonbush, black twinberry (Lonicera involucrata), cottonwood, white alder (Alnus rhombifolia), blackberry (Rubus ursinus), carrizo, and stinging nettle (Urtica spp.). Nesting SWFL exhibit a strong preference for dense

vegetation at the nest site, but high variation and density of vegetation at the patch scale (Hatten et al. 2000). Nesting sites are typically close to the edge of the vegetation patch and close to water (Allison et al. 2000). Based on the diversity of plant species composition and complexity of habitat structure, four basic nesting habitat types can be described for SWFL: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge et al. 1997).

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of SWFL territories and nests; SWFL sometimes nest in areas where nesting substrates are in standing water (Maynard 1995, Sferra et al. 1995, 1997). Hydrological conditions at a particular site can vary remarkably in the arid southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g. creation of pilot channels), where modification of subsurface flows has occurred (e.g. agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer et al. 1996). Throughout their range, SWFL arrive on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Maynard 1995, Sferra et al. 1995, 1997). Nesting begins in late May and early June, and young fledge from late June typically through mid August, but as late as early September.

SWFL are insectivores, foraging in dense shrub and tree vegetation along rivers, streams, and other wetlands. Flying insects are the most important SWFL prey item; however, they will also glean larvae of non-flying insects from vegetation (Drost et al. 1998). Drost et al. (1998) found that the major prey items of SWFL (in Arizona and Colorado), consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera), and true bugs (Hemiptera). Other insect prey taxa include leafhoppers (Homoptera: Cicadellidae), dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey include spiders (Araneae), sowbugs (Isopoda), and fragments of plant material.

2.3c Critical Habitat

Critical habitat for SWFL was originally designated on 22 July 1997 (USFWS 1997b), but on 11 May 2001, the 10th Circuit Court of Appeals set aside the critical habitat designation and instructed USFWS to issue a new designation in compliance with the court ruling. USFWS is currently soliciting information regarding areas important for the conservation of this species in order to re-propose critical habitat.

2.3d Current Status Statewide

The following status of SWFL in Arizona was summarized from Smith et al. (2002). In 2001, 177 sites covering approximately 139 mi (225 km) of riparian habitat were surveyed for SWFL in Arizona. Sites range from 98 ft (30 m) to 8,802 ft (2,683 m) in elevation and 98.5 ft (30 m) to 10 mi (16.1 km) in length. The mean site length was 1 mi (1.6 km). Fifty-two of the 177 sites were not surveyed according to protocol. This was due to time or funding limitations or because unsuitable SWFL habitat was found during the first survey. Of the 177 sites, 20 had not been previously surveyed. Most new survey

sites were located along the Colorado River (n = 9) and Gila River (n = 4). Six hundred thirty-five resident SWFL were documented within 346 territories at 46 sites. AGFD personnel and statewide cooperators recorded 311 pairs.

SWFL were documented along 11 drainages. The greatest concentrations of SWFL were found at Roosevelt Lake (40 percent) and the Winkelman Study Area (35 percent). Resident SWFL were detected at five sites that had been surveyed at least once in previous years. Resident SWFL were documented in two drainages (Virgin River and Cienega Creek) for the first time since protocol surveys began. No historical occurrence record exists for SWFL along the Virgin River and SWFL have not been reported at Cienega Creek since 1964. These colonizations yield evidence of habitat restoration potential in these drainages that can aid in recovery of the SWFL.

2.3e Environmental Baseline

The section of Sopori Wash crossed by the proposed action supports a mixed riparian assemblage with mature but discontinuous Fremont cottonwood, netleaf hackberry along the banks, and a midstory of large mesquite (Figure 13) (HEG Field Notes, C. Hisler, AGFD, pers. comm., 18 July 2002). Understory density is relatively low. Uplands surrounding Sopori Wash are characterized by semidesert grasslands and appear to be subject to grazing.



Figure 13. Riparian habitat in Sopori Wash

This reach of Sopori Wash is ephemeral and water is probably present only for short periods of time following precipitation events. Because of the patchy habitat and lack of surface water, this area would likely be used only by migratory SWFL.

The perennial areas within Peck Canyon support small clusters of ash, walnut, and netleaf hackberry, but the density of understory vegetation necessary for SWFL is generally



lacking (Figure 14). Semidesert grasslands that are subject to grazing characterize the uplands surrounding Peck Canyon. Because of the lack of habitat structure, this area likely would not function as SWFL habitat.

The nearest recent (1999) reports of SWFL are from the Santa Cruz River between Tubac and Rio Rico, approximately 6-12 mi (10-20 km) away (McCarthey et al. 1998, Paradzick et al. 1999, Paradzick et al. 2000). All of these reports were of migrant SWFL.

Figure 14. Riparian vegetation in Peck Canyon.

2.3f Effects of Proposed Action on the SWFL

Direct Effects

Because the proposed action does not impact suitable breeding habitat, no direct impacts to SWFL are anticipated.

Indirect Effects

Habitat Modification and Fragmentation

Indirect impacts to SWFL may result from modifications to potential migratory habitat from the installation of three structures and associated construction within the Sopori Wash floodplain. Roads in Sopori Wash will be limited to a width of 12 ft (4 m), which when combined with structure installation sites, will result in the disturbance of 2.58 acres (1.04 ha) of SWFL habitat. Because disturbed cottonwood and willow specimens will be mitigated at a 2:1 ratio and riparian vegetation can recover quickly following minimal disturbance, any adverse effects to SWFL habitat will be temporary.

Increased Legal and Unauthorized Access to SWFL Habitat

This section of Sopori Wash is on a private ranch, therefore, unauthorized recreational access to Sopori Wash via temporary construction roads associated with the proposed action will be minimized. Therefore, no disturbance of SWFL or habitat modification from increased access is anticipated.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). However, because new roads in this area would not be open to the public, increased risk of wildfire because of increased access will be negligible. The measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.3g Cumulative Effects

Cumulative effects include the effects of future state, local or private actions that are reasonably certain to occur in the action area considered in this biological assessment. Most land within the action area consists primarily of ASLD lands with blocks of private parcels on either side of Arivaca Road. Federal actions would on these lands be subject to Section 7 consultation; these actions would not be considered cumulative.

Although the amount of planned private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Pima County grew by 26.5 percent and Santa Cruz County by 29.3 percent (U.S. Census Bureau 2000). Because of these growth rates and the trend of rural development to occur in areas with some existing infrastructure, it is foreseeable that the private ranches adjacent to Arivaca Road could be sold and subdivided for residential homes and ranchettes. Any substantial population increase in the area also could increase demands for access to recreational land, increase groundwater pumping, and foster the development of commercial services. These impacts to the watershed could degrade the value of habitat within Sopori Wash preventing its use by a variety of species.

An undetermined level of border crossings by UDI occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase into the foreseeable future.

2.3h Effects Determination and Incidental Take

The disturbance of potential migratory habitat may affect the SWFL, but it is not likely to adversely affect the species because the disturbance will be relatively small in area and temporary.

Because the proposed action is not likely to adversely affect the species, no take of SWFL is anticipated.

2.4a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential roosting habitat for LLNB occurs in the Tumacacori and Atascosa/Pajarito mountains, and foraging habitat occurs through those portions of the proposed ROW that contain agave and saguaro cacti. Because LLNB have been documented foraging up to 40 mi (64 km) from roost sites, the action area for the LLNB consists of all potential foraging and roosting habitat within a 40 mi (64 km) buffer surrounding the proposed action.

2.4b Natural History and Distribution

LLNB (formerly Sanborn's long-nosed bat) are one of three members of American leaf-nosed bats (Family Phyllostomidae) in Arizona (Hoffmeister 1986). LLNB (Figure 15) is one of the larger Arizona bats, gray to reddish brown in color. This bat has an erect triangular flap of skin (nose leaf) at the end of a long slender nose. LLNB can be distinguished from *Macrotus* by a much longer nose, greatly reduce tail membrane, and smaller ears; and from *Choeronycteris*, which has a shorter tail, larger tail membrane, and longer, narrower nose than LLNB.



Figure 15. Lesser long-nosed bat.

LLNB occur from the southern United States to northern South America, including several islands and the adjacent mainland of Venezuela and Colombia. LLNB are found between 4 degrees to 32 degrees N latitude in semiarid to arid conditions (Nowak 1994). This bat is typically associated with their primary food source, flower nectar and fruit of columnar cacti, and flower nectar of certain agave species. Because of the seasonal nature of their food source, they must migrate to follow flowering and fruiting plants. In addition to food availability, there must be suitable roosting within commuting distance of the food source. Currently, the longest known commute distance is about 48 km (30 mi).

The primary range of this bat lies in Mexico and Central America. Occurrences in Arizona probably represent range expansion. Prior to the 1930s, there are no records of LLNB in Arizona (Cockrum 1991). Colossal Cave and the Old Mammon Mine are the most northern sites known to house colonies of these bats. However, these sites support colonies of about 5,000 individuals, versus sites in Mexico, which are as large as 150,000 individuals.

LLNB have a bi-seasonal occurrence in Arizona. The maternity season, when bats migrate to southwestern Arizona, represents a United States population of about 30,000

individuals. The other is the fall agave flowering season, located in southeastern Arizona, which attracts about 70,000 bats. Each of these areas contains three known primary roosts and some number of secondary/transient or night roosts (sheltering ten to a few hundred individuals/site).

With the exception of a small bachelor roost located in the Chiricahua Mountains, all remaining records represent small numbers (usually single individuals) at hummingbird feeders, caught in mist nets, or chance findings in residential areas. Constantine (1966) reported two immature females from Maricopa County, one in Phoenix on 30 August 1963 and the other in Glendale on 16 September 1963. The Glendale specimen was found dead. The other was hanging on a screen door (not a normal place) indicating something was likely wrong with that bat. He also reported two males from southern California: one was taken alive on 3 October 1993 outside a home in Yucaipa, the other was taken on 18 October 1996 from the outside of a building in Oceanside (Constantine 1998). LLNB also have been reported from the Aravaipa Canyon area (Cockrum 1991). Hoffmeister (1986) has a record in the Santa Catalina Mountains, but Cockrum (1991) states it was probably a transcription error because the nectar-feeding bats found there belong to the genus *Choeronycteris*. However, Cockrum (1991) does report LLNB from the Santa Catalina Mountains but only once in a mist net set in Sabino Canyon (a female in June).

The diet of LLNB in Arizona consists primarily of the nectar, pollen, and ripe fruit of columnar cacti (particularly saguaro) and agave (e.g., *Agave chrysantha*, *A. deserti*, *A. palmeri*, and *A. parryi*). LLNB have been demonstrated to be a significant pollinator of saguaros, organpipe cacti (*Stenocereus thurberi*), and agaves (Howell and Roth 1981, Alcorn et al. 1962, and McGregor et al. 1962). Generally, LLNB in Arizona forage after dusk to nearly dawn during the months of May through September. In a single night, LLNB will forage well away from their daytime roost sites. In Sonora, Mexico, bats feed on the mainland by night at Bahia Kino and roost by day on Isla Tiburon, 15 to 20 mi (24 to 32 km) away. The closest sizable densities of columnar cacti to LLNB roosts in the Sierra Pinacate, Sonora, Mexico, are found in Organpipe Cactus National Monument in Arizona, about 25 to 30 mi (40 to 48 km) away (Fleming 1991).

In Arizona, females arrive in late March and early April, then migrate northward through Mexico along a "nectar corridor" provided by columnar cacti such as saguaro and organpipe (Fleming 1991). Female LLNB usually arrive in Arizona pregnant and congregate in traditional maternity roosts at lower elevations, feeding primarily on saguaro nectar (Cockrum 1991). Adult males arrive later in the summer and, along with dispersing members of the maternity roosts, usually roost at higher elevations, especially within proximity to significant stands of flowering agave.

LLNB are gregarious and form large maternity colonies that number in the thousands (Hayward and Cockrum 1971, Hoffmeister 1986). All four of the verified LLNB maternity roosts in the United States are found in Arizona (Cockrum 1991). The largest and most important of the four is found in a mine located in Organpipe Cactus National

Monument. About 15,000 LLNB use this mine as a maternity roost. Young are typically born between mid-May and early June (Cockrum 1991, Hayward and Cockrum 1971).

While in the roost during the day, LLNB engage in various activities such as flying, suckling of young, grooming, resting, and interacting with neighbors. LLNB are particularly active during the day and any disturbance, such as aircraft or other human activities, may cause an expenditure of extra energy (Dalton and Dalton 1993, Dalton et al. 1994). Female LLNB gathered in large maternity colonies are particularly vulnerable to disturbances. Maternity colonies are more sensitive because of the vulnerability of nonvolant young, whose recruitment into the population is essential to maintain a viable population.

2.4c Critical Habitat

No critical habitat has been designated for LLNB.

2.4d Current Status Statewide

USFWS listed LLNB as endangered throughout its range in the southwestern United States and Mexico on 30 September 1988 (USFWS 1988). Loss of roost and foraging habitat, as well as direct take of individual bats during animal control programs (particularly in Mexico) have contributed to the current endangered status of the species. All available information on the species through 1994 was summarized in the Lesser Long-nosed Bat Recovery Plan approved in 1997 (Fleming 1994). The Plan indicates that the species is not in danger of extinction in Arizona or Mexico. The species still warrants some protection, as it is vulnerable to human disturbance at roost sites because of its gregarious behavior. There also is particular concern for the protection of forage plants from disturbance or destruction near roost sites.

The primary threats to LLNB populations are agave harvesting and human disturbance of roosting and maternity colonies. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial to LLNB (Fleming 1995). The USFWS determined that the LLNB was endangered because of the following factors (USFWS 1988):

- A long term decline in population,
- Reports of absence from previously occupied sites
- Decline in the pollination of certain agaves.

Known major roost sites include 16 large roosts in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. Disturbance of these roosts, or removal of the food plants associated with them, could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

2.4e Environmental Baseline

LLNB roosts are not known within the proposed corridor, but field surveys did locate small caves and crevices nearby that could serve as LLNB day roosts (HEG 2002, unpublished data). Furthermore, unsurveyed caves, mineshafts, and adits, which may provide suitable roost sites, occur within the Tumacacori-Atascosa mountains. The two closest known LLNB roost sites are the Cave of the Bells in the Santa Rita Mountains, approximately 32 km (20 mi) to the west, and a cave in the Patagonia Mountains, approximately 56 km (35 mi) to the west. Both of these roost sites are within the known flight distance to the proposed action and may utilize the proposed corridor for foraging.

Saguaro cacti occur within the proposed corridor north of Duval Mine Road and agaves are present in varying densities south of Arivaca Road. While the exact densities of agaves and saguaro cacti were not determined for this BA, CNF estimates that Palmer's agave is widely scattered over 1 million acres (400,000 ha) at densities of 10 to 200 per acre, generally between the elevations of 3,000 ft (914 m) and 6,000 ft (1,829 m) (USFWS 2002b).

The northern portion of the proposed action is primarily undeveloped but does contain some existing electrical distribution lines as well as low density housing developments near Sahuarita Road. The Mission Mine Complex also is located within this section of the project area and the proposed action passes through the Tumacacori EMA of the CNF. Range condition in areas crossed by the proposed action is moderately high with a stable or unknown trend. While agaves have persisted in areas grazed for more that 100 years, mortality through direct herbivory and trampling is known to occur. There is a forest-wide study to determine the effects of livestock grazing on agaves currently underway (USFWS 2001b). Livestock stocking rates for the allotments within the Tumacacori EMA range from 1,320 AUMs in the Peña Blanca Allotment to 2400 AUMs in the Bear Valley Allotment. Allotment Management Plans for Bear Valley and Sardinia Allotments are currently being revised.

2.4f Effects of Proposed Action on the LLNB

Direct Effects

Construction Noise and Activity

Although LLNB roosts have not been detected within the proposed corridor, short term noise disturbance and human activity associated with construction activities may disturb LLNB if they are present in undetected roosts adjacent to the proposed corridor. The greatest likelihood of noise disturbance will result from the use of helicopters during the installation, but could also result from the presence of heavy machinery or large groups of construction personnel in close proximity to an undetected roost. The consequences of disturbance to small numbers of LLNB in day roost will be less serious than disturbance of large aggregations of bats at one location.

Indirect Effects

Habitat Modification

Indirect effects to LLNB may result from the potential reduction in forage resources (agaves and saguaro cacti) during construction of temporary access roads or the installation of transmission structures. Because agaves and saguaro cacti are unevenlydistributed and the nectar provided by them are seasonally and geographically separated, the loss of significant numbers of either species may alter LLNB foraging patterns and roost selection within the action area. Even if the loss of a high density patch of flowering agaves does not cause the abandonment of a roost, bat survivorship may be reduced through increased foraging flight distances, related energy expenditures, and increased exposure to predators. Because of the linear nature of the proposed action, however, these impacts will be widely distributed and relatively minor in any single area.

Although all agave and saguaro disturbed as a result of the proposed action will be transplanted immediately outside of the construction zone, the long term survival and future flowering of these specimens is uncertain. Agaves are typically easy to cultivate in warm climates with well drained soils (Gentry 1982), but no long term studies of agave transplant survival have been conducted. Transplantation of saguaro is a common practice within southern Arizona, but preliminary results from a 10 year study indicate that smaller saguaros (<16 ft [5 m] tall) are more successfully transplanted than larger saguaros (HEG, unpublished data).

Even in areas where no agave or saguaro presently exist, dormant seeds may be present in the soil. Construction activities associated with the proposed action may compact soil and alter water infiltration, which may prohibit seed germination.

Increased Legal and Unauthorized Access to LLNB Habitat

Because LLNB are sensitive to human disturbance, (to the point of temporarily abandoning a day roost after a single human intrusion) increased human access to roost sites could negatively impact LLNB. The presence of new roads on state land will not likely result in disturbance to undetected roosts because few sites in this area support the rock outcropings, caves, and mine shafts necessary for LLNB roosts. The greatest potential for undetected roosts occurs on CNF land. The road closures on CNF land outlined in SECTION 1.4 and in the RA (URS 2003) will minimize the probability of increased human access and disturbance of LLNB in undetected roosts in these areas.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human caused ignitions in some areas (Gucinski et al. 2001). Agaves in desert grasslands have evolved with fire, but unnaturally high fire frequency and intensity can lead to the decline or elimination of agave populations. Furthermore, agave mortality from fire may affect the abundance and distribution of blooming agaves for a number of years, especially if there is high mortality within certain age and size classes.

New roads also may act as firebreaks and improve the response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in

southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of supplying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in LLNB habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.4g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. The action area for this species crosses private, state, and federal land. Future federal actions on USFS land will be subject to Section 7 consultation but these actions will not be considered cumulative. Because the action area for this species includes a 40 mi (64 km) buffer, some of the future planned actions on private and state land in southern Pima County and much of Santa Cruz County may be considered cumulative.

Although the amount of this future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). In the same time period, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000).

An undetermined level of border crossings by UDI occurs within the action area resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase. Additionally, agriculture, recreation, OHV use, grazing, and other activities continue to occur on private and state land that adversely affect LLNB and their habitats.

2.4h Incidental Take

The potential disturbance of LLNB in undetected roosts from construction noise and potential mortality of transplanted forage species may affect, and is likely to adversely affect, this species.

No take of LLNB is anticipated as a result of the proposed action for the following reasons. First, noise disturbance will likely impact small numbers of individuals and will be short term in duration, and secondly, changes in agave and saguaro distribution will not be significant in any single location.

2.5a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. The action area for the CLF consists of all cienegas, pools, livestock tanks, and streams at elevations above 3,200 ft (975 m) in the Tumacacori and Atascosa/Pajarito mountains. The action area also includes the entire watersheds of these aquatic systems and lies almost entirely on CNF land. That portion of the action area not on CNF land is a considerable distance downstream of the proposed action.

2.5b Natural History and Distribution

CLF (Figure 16) are distinguished from other members of the leopard frog (*Rana pipiens*) complex by a combination of characters, including a distinctive pattern on the rear of the

thigh consisting of small, raised, cream-colored spots or tubercles on a dark background, dorsolateral folds that were interrupted and deflected medially, stocky body proportions, relatively rough skin on the back and sides, and often green coloration on the head and back (Platz and Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of one to two seconds in duration (Davidson 1996, Platz and Mecham 1979).



Figure 16. Chiricahua leopard frog.

CLF are riparian habitat generalists, occupying springs, cienegas, canals, small creeks, mainstem rivers, lakes and livestock tanks at elevations of 3,281 ft (1,000 m) to 8,890 ft (2,710 m). These frogs are found in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of Chihuahua, northern Durango and northern Sinaloa (Platz and Mecham 1984, Degenhardt et al.1996, Sredl et al. 1997). Adult CLF are the most aquatic of all Arizona leopard frogs, requiring aquatic habitats for larval forms and semi-aquatic habitats for adult forms. CLF may breed anytime, but breeding in late spring and early summer is most common. Eggs are oviposited in shallow water attached to vegetation, or on bottom substrate. Tadpoles can metamorphose in as few as three months, but may overwinter and metamorphose the following spring. Because time from hatching to metamorphosis is shorter in warm water than cold water, water permanency is probably more important at higher elevations.

Heterogeneous habitat is important for leopard frog populations; shallow water with emergent vegetation is important for breeding and deeper water provides escape cover for adults. In Arizona, slightly more than half of known historic localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl et al. 1997). Sixty-three percent of extant populations in Arizona occupy stock tanks (Sredl and Saylor 1998). Although stock tanks provide refugia for frog populations and are important for this species in many areas, such tanks support only small

populations and these habitats are very dynamic. Tanks often dry out during drought, and flooding may destroy downstream impoundments or cause siltation, either of which may result in loss of aquatic communities and extirpation of frog populations. Periodic maintenance to remove silt from tanks also may cause a temporary loss of habitat and mortality of frogs.

CLF are rarely found in aquatic sites inhabited by non-native fish, bullfrogs (*Rana catesbiana*), and/or crayfish (*Oronectes virilis*). However, in complex systems or large aquatic sites, CLF may coexist with low densities of non-native predators (Bloomquist et al. 2002).

Where the species is extant, sometimes several small populations are found in close proximity, suggesting metapopulations are important for preventing regional extirpation (Sredl et al. 1997). Disruption of metapopulation dynamics is likely an important factor in regional loss of populations (Sredl et al. 1997, Sredl and Howland 1994). CLF populations are often small and their habitats are dynamic, resulting in a relatively low probability of long-term population persistence. However, if populations are relatively close together and numerous, extirpated sites can be recolonized.

The range of the species is divided into two parts, including: (1) a southern group of populations (the majority of the range) located in mountains and valleys south of the Gila River in southeastern Arizona, extreme southwestern New Mexico, and Mexico; and (2) northern montane populations in west central New Mexico and along the Mogollon Rim in central and eastern Arizona (Platz and Mecham 1979). Historical records exist for Pima, Santa Cruz, Cochise, Graham, Apache, Greenlee, Gila, Coconino, Navajo, and Yavapai counties in Arizona, and Catron, Grant, Hidalgo, Luna, Soccoro, and Sierra counties in New Mexico (Sredl et al. 1997, Degenhardt et al. 1996). The distribution of the CLF in Mexico is unclear. The species has been reported from northern Sonora, Chihuahua, and Durango (Hillis et al. 1983, Platz and Mecham 1979, 1984) and, more recently, from Aguascalientes. However, Webb and Baker (1984) concluded that frogs from southern Chihuahua were not CLF. The taxonomic status of *chiricahuensis*-like frogs in Mexico from southern Chihuahua to Aguascalientes is unclear and in this region another leopard frog, *Rana montezumae*, may be mistaken for the CLF.

Recent evidence suggests a chytridiomycete skin fungi is responsible for observed declines of frogs, toads, and salamanders in portions of Central America (Panama and Costa Rica), South America (Atlantic coast of Brazil, Ecuador, and Uruguay), Australia (eastern and western states), New Zealand (South Island), Europe (Spain and Germany), Africa (South Africa, "western Africa", and Kenya), Mexico (Sonora), and the United States (8 states) (Speare and Berger 2000, Longcore et al. 1999, Berger et al. 1998). Ninety-four species of amphibians have been diagnosed as infected with the chytrid Batrachochytrium dendrobatidis. In Arizona, chytrid infections have been reported from four populations of CLF, as well as populations of Rio Grande leopard frog (Rana berlandieri), Plains leopard frog (Rana blairi), lowland leopard frog (Rana yavapaiensis), Tarahumara frog (Rana tarahumarae), canyon treefrog (Hyla arenicolor), and Sonora tiger salamander (Ambystoma tigrinum stebbinsi) (Davidson et al. 2000, Sredl

and Caldwell 2000, Morell 1999). The disease was recently reported from a metapopulation of CLF from New Mexico; that metapopulation may have been extirpated.

The role of the fungi in the population dynamics of CLF is undefined; however, it may well prove to be an important contributing factor in observed population decline. Rapid death of recently metamorphosed frogs in stock tank populations of CLF in New Mexico was attributed to post-metamorphic death syndrome (Declining Amphibian Populations Task Force 1993). Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and CLF in Arizona and Sonora. However, in both cases, symptoms of moribund frogs matched those of chytridiomycosis. Chytrids were recently found in a specimen of Tarahumara frog collected during a die off in 1974 in Arizona. This earliest record for chytridiomycosis corresponds to the first observed mass die-offs of ranid frogs in Arizona (USFWS 2002c).

2.5c Critical Habitat

No critical habitat has been designated for this species.

2.5d Current Status Statewide

USFWS listed this species as threatened throughout its range in the southwestern United States and in Mexico on 13 June 2002 (USFWS 2002c). Potential threats to the species include disease, predation and possibly competition by non-native organisms, including fishes in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs, tiger salamanders (*Ambystoma tigrinum stebbinsi*), crayfish, and several other species of fishes, including, in particular, catfishes (*Ictalurus* spp. and *Pylodictus oliveris*) and trout (*Oncorhynchus* spp. (=*Salmo*) and *Salvelinus* spp.) (USFWS 2002c). For instance, in the Chiricahua region of southeastern Arizona, Rosen et al. (1996a) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported CLF. All waters, except three that supported introduced vertebrate predators, lacked CLF.

Human factors affecting the species include modification or destruction of habitat through water dams, water diversions, groundwater pumping, introduction of non-native organisms, woodcutting, mining, contaminants, urban and agricultural development, road construction, overgrazing and altered fire regimes. Additional human factors include over-collection for commercial and scientific purposes.

In Arizona, the species is extant in seven of eight major drainages of historical occurrence (Salt, Verde, Gila, San Pedro, Santa Cruz, Yaqui/Bavispe, and Magdalena river drainages), but appears to be extirpated from the Little Colorado River drainage on the northern edge of the range. Within the extant drainages, the species was not found recently in some major tributaries and/or from river mainstems. For instance, the species was not reported from 1995 to the present from the following drainages or river mainstems where it historically occurred: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River

mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek.

USFWS reports that CLF were observed at 87 sites in Arizona from 1994 to 2001, including 21 northern sites and 66 southern sites (USFWS 2002c). Many of these sites have not been revisited in recent years; however, evidence suggests some populations have been extirpated in the Galiuro and Chiricahua mountains. In 2000, the species was also documented for the first time in the Baboquivari Mountains, Pima County, Arizona (USFWS 2002c).

Intensive and extensive surveys were conducted by AGFD in Arizona from 1990 to 1997 (Sredl et al. 1997). Included were 656 surveys for ranid frogs within the range of the CLF in southeastern Arizona. Rosen et al. (1994, 1996a, 1996b), Hale (1992), Wood (1991), Clarkson and Rorabaugh (1989), and others have also extensively surveyed wetlands in southeastern Arizona. It is unlikely that many additional populations will be found there. A greater potential exists for locating frogs at additional sites in the northern region of Arizona, as several new populations have been discovered on the Coconino National Forest in 2000 and 2001 (USFWS 2002c).

The latest information for Arizona (USFWS 2002c) indicates the species is extant in all major drainages in Arizona and New Mexico where it occurred historically. However, it has not been found recently in many rivers, valleys, and mountains ranges, including the following in Arizona: White River, East Clear Creek, West Clear Creek, Silver Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, Sonoita Creek, Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. In many of these regions CLF were not found for a decade or more despite repeated surveys.

2.5e Environmental Baseline

The action area for this species lies within the Tumacacori EMA of the CNF. Within this EMA, CLF are present in Sycamore Canyon, Peña Blanca Spring, Hank & Yank Tank, and Bear Valley Tank (J. Rorabaugh, USFWS, pers. comm., 1 Oct. 2002). The population in Sycamore Canyon is probably a source of immigrants to other suitable areas within the EMA (USFWS 2001b). Sycamore Canyon also is the only aquatic habitat within the EMA confirmed to contain the chytrid fungus (J. Rorabaugh, USFWS, pers. comm., 1 Oct. 2002). While there are 17 historical records of CLF in the Pajarito/Atascosa Mountains (USFWS 2001b), there are currently no plans for reintroducing CLF into any aquatic habitats in CNF (J. Rorabaugh, USFWS, pers. comm., 1 Oct. 2002).

Watershed condition is a function of percent ground cover present to dissipate rain and prevent excess erosion. The Crossover Corridor approaches within 1,312 ft (400 m) of Red Spring and within 2 mi (3.2 km) of a total of 4 mapped springs (URS 2002). In addition to stock tanks scattered throughout the Tumacacori EMA, a number of perennial pools occur within Peck Canyon, however, the function (i.e. percent ground cover present

to dissipate rain and prevent excess erosion) of the Peck Canyon watershed is unsatisfactory.

Protocol surveys were not conducted for CLF along the proposed ROW in 2002 because of fire closures and permit issues. Protocol surveys for CLF will be conducted in Peck Canyon in the year prior to construction. If CLF are documented, consultation with USFWS will be reinitiated.

2.5f Effects of Proposed Action on the CLF

Direct Effects

There are no recent records of CLF within the vicinity of the Crossover Corridor and no reintroductions are planned, therefore, no direct effects to CLF are anticipated.

Indirect Effects

Habitat Modification

Some modifications to perennial pools within Peck Canyon may occur as a result of increased erosion and while no reintroductions of CLF into this area are planned, vehicle traffic in the stream bottom may change the stream morphology precluding natural recolonization by the species. BMPs will minimize erosion into aquatic systems along this proposed ROW.

Transport of Disease Agents

Sycamore Canyon, 2.5 mi (4.2 km) from the proposed action, is the only aquatic habitat within the EMA confirmed to contain the chytrid fungus, therefore, increase in the risk of disease transport is unlikely.

Increased Legal and Unauthorized Access to CLF Habitat

Recreationists may access potential CLF habitat by use of roads constructed for the proposed action, even after the roads have been closed and revegetated. Unmanaged OHVs may damage riparian vegetation, increase siltation in pools, compact soils, and disturb water in stream channels. Increased human access to these aquatic habitats also may lead to the introduction of non-native predators to streams and stock tanks. The absence of CLF reintroduction plans, the long-term monitoring, and maintenance of road closures will minimize the probability of unauthorized access and thereby minimize any adverse effects associated with such access.

Accidental Wildfire

There is a minimal risk from accidental wildfire associated with the proposed action. Any fire would have to spread a significant distance before impacting occupied CLF habitat. Numerous roads that could serve as firebreaks and afford firefighting accessibility occur between the proposed action and CLF habitat. Furthermore, the measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.5g Cumulative Effects

Cumulative effects include the effects of future state, local or private actions that are reasonably certain to occur in the action area considered in this BA. The action area for this species crosses private, state, and federal land. Future federal actions on USFS land would be subject to Section 7 consultation but these actions would not be considered cumulative. Because the action area for this species includes the entire watersheds of the aquatic habitats on the CNF, some of the future planned actions on private and state land in Santa Cruz County may be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite being downstream of occupied and potential CLF habitat, an increase in regional population translates into an increased demand for outdoor recreation, and therefore more recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and competition at water sources. These border crossings are likely to continue or increase into the foreseeable future.

2.5h Effects Determination and Incidental Take

The transport of sediment into potential habitat and changes in stream morphology may affect CLF, but are not likely to adversely affect the species because any impacts would be attenuated over the time it would take the species to naturally recolonize the area.

Because the proposed action is not likely to adversely affect the species, no take of CLF is anticipated.

2.6 PIMA PINEAPPLE CACTUS (*Coryphantha scheeri* var. *robustispina*) (Endangered)

2.6a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for the PPC includes those areas of the proposed ROW from the TEP South Substation to an elevation of 4,600 ft (1,402 m) in the foothills of the Tumacacori Mountains.

2.6b Natural History and Distribution

PPC (Figure 17) are small, round cacti with finger-like projections. Adult cacti range in size from 1.8 in (4.6 cm) to 18 in (46 cm) in height. At the tip of each projection or

tubercle is a rosette of 10 to 15 straw-colored spines with one central hooked spine. Plants can be single or multi-stemmed and produce bright yellow flowers after summer rains (Roller 1996).

Populations of PPC are known to occur south of Tucson, in Pima and Santa Cruz counties, Arizona and in adjacent northern Sonora, Mexico. It is distributed at low densities within the Altar and Santa Cruz Valleys, as well as in low lying areas connecting these valleys.



Figure 17. Pima pineapple cactus.

PPC populations are generally found in open patches within semidesert grassland and Sonoran desertscrub plant communities (Brown 1994). They are typically found on flat alluvial bajadas that are comprised of granitic material and are most abundant within the ecotone between the grassland and desertscrub biomes (Roller 1996). This plant is found at elevations between 2,362 (720 m) and 4,593 ft (1,400 m). Typically, PPC are not found in washes or riparian areas.

2.6c Critical Habitat

No critical habitat has been designated for this species.

2.6d Current Status Statewide

USFWS listed PPC as endangered throughout its range on 25 October 1993 (58 FR 49875). Habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution, the rarity fo this plant species, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations, all are factors that contribute to the current endangered status of this species. Due to the limited information on PPC population distributions under current habitat conditions, it is difficult to determine the current status of the plant statewide. USFWS has insufficient data to determine if the majority of populations of PPC can be sustained under current reduced

and fragmented conditions. PPC densities vary throughout its range with the highest densities occurring south of Tucson through the Santa Cruz Valley (to Amado and surrounding developed parts of Green Valley and Sahuarita, and parts of the San Xavier District of the Tohono O'odham Nation). Continued urbanization, farm and crop development, mine expansion, and invasion of non-native species are primary threats to PPC populations. Overgrazing by livestock, illegal plant collection, and fire-related interactions involving non-native Lehmann's lovegrass also may have negative impacts on PPC (USFWS 1993).

2.6e Environmental Baseline

The environmental baseline for the PPC evaluates the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat and ecosystem within the action area. Based on monitoring results, the status of the PPC appears to have been recently affected by threats that completely alter or considerably modify more than one-third of the species surveyed habitat and have caused the elimination of nearly 60 percent of documented locations (USFWS 2001c). Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to negatively impact PPC habitat.

The Crossover Corridor is primarily undeveloped but contains some existing electrical distribution lines and associated roads and is in close proximity to low density housing developments, and the Mission Mine Complex. A majority of the corridor also parallels the previously disturbed EPNG gas line. While portions of the existing EPNG gas line access road appear relatively unused and support early successional plants, other areas are severely eroded and virtually impassable by motor vehicles.

Surveys for PPC were conducted using an approved survey protocol (Roller 1996) by establishing a belt transect across identified potential habitat with each surveyor covering a 16.4 to 23 ft (5 to 7 m) swath. One survey pass of the entire corridor was conducted with more intensive area searches around confirmed PPC locations. Surveys on state, private, and BLM land covered a 200 ft (61 m) wide area centered on the proposed structure alignment. On the CNF, the coverage was expanded to 750 ft (229 m) wide. All detected PPC locations were recorded using a Global Positioning System (GPS) unit.

2.6f Effects of Proposed Action on the PPC

Direct Effects

Because the precise locations of structures and access roads can be modified to avoid sensitive resources, the proposed action will not result in the loss of any individual PPC. All known individual PPC near construction areas and along main access routes will be clearly marked and protected to avoid impacts.

Indirect Effects

Modification of Habitat

The construction of new access roads and the installation of structures will alter PPC seed sources in unoccupied, but potential PPC habitat. Construction vehicles will compact

soil, changing water infiltration rates, and road construction will dramatically alter soil structure and seed source depth. Areas around structure sites and many access roads will be temporary and will regenerate as potential PPC habitat in the future. Recent observations indicate that PPC may readily establish in recently disturbed habitats (USFWS 2002c), but these areas must be allowed to recover for years or possibly decades.

To determine the extent of proposed disturbance to PPC habitat, recent aerial photography was used to eliminate areas not suitable for PPC, including slopes over 15 percent, washes, and previously disturbed areas such as roads, buildings, mining disturbance, etc. Based on this analysis, the ROW was divided into habitat classes based upon density of PPC in each area. The habitat classes are as follows: Class A = 0.3 PPC/acre; Class B = 0.1 - 0.3 PPC/acre; Class $C = 0^* - 0.09$ PPC/acre.

To mitigate for the potential loss of PPC habitat, TEP will purchase credits in a USFWS-approved conservation bank for PPC.

Indirect Effects

Increased Legal and Unauthorized Access to PPC Habitat

Much of the proposed corridor through PPC habitat parallels existing electrical distribution lines with existing utility access roads. Some new access roads, however, will be constructed, potentially resulting in unintended access into previously undisturbed PPC habitat (especially by OHV users). Off-road travel could directly impact additional PPC or impede seedling establishment through changes in soil characteristics. Where possible, TEP will review the potential for closure of roads on private land to limit unauthorized access to the ROW.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). It is widely regarded that most succulent species are negatively impacted by fire and are not fire adapted (Rogers and Steele 1980, McLaughlin and Bowers 1982). Plants die by direct heating of the fire or later through indirect fire effects such as grazing of spineless plants, post-fire increase in plant tissue temperature, or the introduction of disease or infestation into weakened plants (Thomas 1991). The sparse distribution of this species across the landscape can mean that loss of just a few individuals to fire can greatly affect the range and density of local PPC populations.

New roads may act as natural firebreaks and improve response times of firefighters to wildfires, thereby preventing fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak efficacy in southern California came to similar conclusions (Green 1977).

The measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape and may serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move away from the roadside into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires. An increased risk of fire in CFPO habitats could be detrimental to the species because it would eliminate essential features, such as saguaros and desert tree species, which are not fire adapted. Fire stimulates Lehmann's lovegrass, which in turn stimulates more fire, the result is an increase in the fire return interval at the expense of native plant species (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.6g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this biological assessment. Under Section 9 of the Act, the taking of listed animals is specifically prohibited, regardless of land ownership status. For listed plants, these prohibitions and the protection they afford do not apply. Listed plant species are protected only from deliberate removal from Federal land. There is no protection against removal or destruction of plants by a landowner on private land under the ESA.

Although the amount of future private development within the action area is unknown, many rural areas of Arizona are experiencing substantial growth. Pima County grew by 26.5 percent between 1990 and 2000 (U.S. Census Bureau 2000). Because of these growth rates and the development pressures of nearby Tucson and Sahuarita, Arizona, it is foreseeable that some lands adjacent to the proposed ROW will be developed. These developments will likely include increases in associated infrastructure such as roads, groundwater use, and commercial services, all resulting in the degradation of PPC habitat.

An undetermined level of border crossings by UDI occurs within the action area and results in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase into the foreseeable future. Additionally, PPC habitat is adversely affected by continual agriculture, recreation, OHV use, grazing, and other activities on private and state land.

2.6h Effects Determination

Construction activities and increased access may affect, and are likely to adversely affect PPC within the ROW, potential PPC habitat, and seedling establishment. The adverse affects to the species will be mitigated through the purchase of mitigation bank credits.

2.7a Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Because of the large movements possible by the jaguar and historical records for the species in a variety of habitats, the action area for the jaguar considered for the proposed action includes most of western Santa Cruz and southern Pima counties.

2.7b Natural History and Distribution

Jaguars (Figure 18) are the largest species of cat now native to the Western Hemisphere. Jaguars are large muscular cats with relatively short massive limbs, a deep-chested body, and cinnamon-buff in color with many black spots. Its range in North America includes Mexico and portions of the southwestern United States (Hall 1981). A number of jaguar records are known for Arizona, New Mexico, and Texas. Additional reports exist for California and Louisiana. Records of the jaguar in Arizona and New Mexico have been attributed to the subspecies *Panthera onca arizonensis*. The type specimen of this subspecies was collected in Navajo County, Arizona, in 1924 (Goldman 1932). Nelson

and Goldman (1933) described the distribution of this subspecies as the mountainous parts of eastern Arizona north to the Grand Canyon, the southern half of western Mexico, northeastern Sonora, and. southeastern California. The records for Texas have been attributed to another subspecies P. o. veraecrucis. Distribution of this subspecies was described by Nelson and Goldman (1933) as the Gulf slope of eastern and southeastern Mexico from the coast region of Tabasco, north through Vera Cruz and Tamaulipas, to central Texas. Swank and Teer (1989) indicated the historical range of the jaguar included portions of Arizona, New Mexico, and These authors consider the current range to be central Mexico through Central America and into South America as far as northern Argentina.

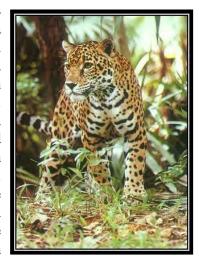


Figure 18. Jaguar.

Swank and Teer (1989) stated the United States no longer contains established breeding populations of jaguar, which probably disappeared from the United States in the 1960s. According to these authors, the jaguar prefers a warm tropical climate and is usually associated with water, and rarely found in extensive arid areas. Goldman (1932) believed the jaguar was a regular, but not abundant, resident in southeastern Arizona. Hoffmeister (1986) considered the jaguar an uncommon resident species in Arizona. He concluded that the reports of jaguars between 1885 and 1965 indicated a small but resident population once occurred in southeastern Arizona. Brown (1983a) suggested the jaguar in Arizona ranged widely throughout a variety of habitats from Sonoran desert scrub through subalpine conifer forest. Most of the records were from Madrean evergreen-woodland, shrub-invaded semidesert grassland, and along rivers.

Brown (1983a) presented an analysis suggesting there was a resident breeding population of jaguars in the southwestern United States at least into the 20th century. USFWS (1990) recognized that the jaguar continues to occur in the American southwest as an occasional wanderer from Mexico. Currently, breeding population of jaguar are unknown in the United States.

In Arizona, the gradual decline of the jaguar appeared to be concurrent with predator control associated with land settlement and the development of the cattle industry (Brown 1983a, USFWS 1990). Lange (1960) summarized the jaguar records from Arizona, and between 1885 and 1959 the reports consisted of 45 jaguars killed, six sighted, and two recorded by sign. Brown (1991) related that the accumulation of all known records indicated a minimum of 64 jaguars were killed in Arizona after 1900.

2.7c Critical Habitat

No critical habitat has been designated for this species.

2.7d Current Status Statewide

Jaguar were initially listed as endangered from the United States - Mexico border southward to include Mexico and Central and South America (37 FR 6476, 1972; 50 CFR 17.11, August 1994). As a result of a petition, the jaguar was proposed as endangered in the United States (59 FR 35674; July 13, 1994). In a Federal Register notice dated 22 July 1997, the jaguar was listed as an endangered species in the United States (62 FR 39147).

The most recent records of jaguars in the United States are from Arizona. In 1971, a jaguar was taken east of Nogales and in 1986 one was taken from the Dos Cabezas Mountains. The latter reportedly had been in the area for about a year before it was killed. AGFD (1988) cited two recent reports of jaguars in Arizona. The individuals were considered to be transients from Mexico. One report (1987) was from an undisclosed location. The other report was from 1988, when tracks were observed for several days prior to the treeing of a jaguar by hounds in the Altar Valley, Pima County. An unconfirmed report of a jaguar at the Coronado National Memorial was made in 1991. In 1993, an unconfirmed sighting of a jaguar was reported for Buenos Aires National Wildlife Refuge. In March 1996, the presence of a jaguar was confirmed through photographs made in the Peloncillo Mountains of Arizona and New Mexico (Glenn 1996). AGFD reported a jaguar sighting in the Baboquívari Mountains in 1996, and in the fall of 1997, one was reported from the Cerro Colorado Mountains of southern Arizona. A jaguar was recently documented (December 2001) in the Atascosa Mountains within about 2 mi (3 km) of the proposed action.

2.7e Environmental Baseline

The Tumacacori EMA is the location of recent reports of jaguars in the United States. This area continues to include the most likely habitat that will support the existence of jaguars in the United States. Many of the larger canyon bottoms in the Tumacacori EMA contain substantial cover and could act as travel corridors for dispersing jaguars. It is believed that all recent sightings of jaguars in Arizona are males dispersing north from

the northern most breeding population in Mexico in an effort to find unoccupied habitat (B. VanPelt, AGFD, pers. comm., 3 October 2002). Because no breeding pairs are thought to exist north of the United Sates-Mexico border, conservation of the Mexican population is vital to the future presence of jaguars in Arizona.

Under the leadership of AGFD and New Mexico Department of Game and Fish, a conservation agreement and strategy has been prepared to address the conservation of the jaguar in Arizona and New Mexico. This agreement established an interstate/intergovernmental Jaguar Conservation Team under a Memorandum of Agreement (MOA). This MOA has been signed by various state and federal cooperators and local and tribal governments with land and wildlife management responsibilities in the geographic area of concern. The Jaguar Conservation Agreement and Strategy serves as a mechanism for implementation of actions for the protection and conservation of the jaguar, while providing a template for the recovery of the species until a recovery plan is prepared and adopted.

The Conservation Agreement established procedures for reporting and evaluating jaguar sightings and compiling distribution and occurrence information, investigation of livestock depredation, evaluation of habitat suitability, development of education materials, and other activities. The Jaguar Conservation Agreement also provides for participation by interested private citizens and organizations. CNF grazing allotment permitees are participating in this process.

The December 2001 sighting mentioned earlier came from a remote camera operated under the direction of the Jaguar Conservation Team (S. Schwartz, AGFD, pers. comm., 17 September 2002). Currently, 14 remote cameras are positioned along the United States-Mexico border in an attempt to document movement of jaguars in and out of Arizona (J. Childs, Jaguar Conservation Team, pers. comm., 3 October 2002).

2.7f Effects of Proposed Action on the Jaguar

Direct Effects

Construction Noise and Activity

Because jaguars are primarily nocturnal, disturbance from construction activities, even in suitable dispersal habitat, is unlikely. The greatest likelihood of noise disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise disturbance will be widely distributed and relatively short term in any location. Any jaguar within the action area will likely avoid construction sites. The use of additional remote cameras to monitor the United States-Mexico border south of the proposed action also will minimize the possibility of construction activities affecting breeding jaguars.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Some studies have shown that a few large areas of low road density, even in a landscape of high

average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Because construction activities within riparian corridors or other major canyons will be minimal and widely distributed, no adverse impacts to the composition or structure of jaguar movement corridors or fragmentation of habitat is anticipated. Furthermore, access and construction roads for the proposed action commonly are spurs off existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches.

While access roads and structure site construction could degrade the habitats of jaguar prey species, effects on the prey base are difficult to quantify. The primary jaguar prey species in Arizona is deer (*Odocoileus* spp.), which have relatively large home ranges. Road-avoidance behavior (up to distances of 300 ft [90 m] to 600 ft [180 m]) is common in large mammals (Lyon 1983), including those species that may serve as prey for jaguars. Because of the linear nature of the proposed action, impacts to deer habitat will be widely distributed and relatively minor in any single area.

Increased Legal and Unauthorized Access to Jaguar Habitat

Jaguars appear to be relatively tolerant of some level of human activity (B. VanPelt, AGFD, pers. comm., 3 October 2002) and have been documented using areas that have recreational and agricultural activities occurring on a regular basis. However, increased human access to potential jaguar habitat through the use of temporary proposed construction roads could reduce the quality of the habitat. The road closure techniques outlined in the SECTION 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, jaguars will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. The fire prevention measures being developed for the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.6g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by jaguars occurs on USFS land in Santa Cruz County. Future federal actions on these lands will be subject to Section 7 consultation; these actions will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.6h Effects Determination and Incidental Take

Construction noise and activity associated with the proposed action may affect the jaguar, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration.

Because the proposed action is not likely to adversely affect the jaguar, no take is anticipated.

2.8a Action Area

The action area includes all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. In streams, the action area is often much larger than the area of the proposed action because impacts in the watershed may be concentrated in the stream and actions within the stream may be carried downstream well outside of the immediate project area. The action area for the Gila topminnow is the entire Santa Cruz River watershed.

2.8b Natural History and Distribution

The Gila topminnow (Figure 19) was originally described by Baird and Girard (1853) as *Heterandria occidentalis* from a specimen collected in 1851 from the Santa Cruz River near Tucson. It was redescribed by Hubbs and Miller (1941) as *Poeciliopsis occidentalis*. As with all species in the family Poeciliidae, the Gila topminnow exhibits sexual dimorphism. Both males and females are tan to olive-bodied and usually white on the belly. Scales of the dorsum are darkly outlined and the fin rays contain melanophores, although lacking in dark spots. Dominant sexually mature males are often blackened,



Figure 19. Gila topminnow

with some gold on the pre-dorsal midline, orange at the base of the gonopodium, and exhibits bright yellow pelvic, pectoral, and caudal fins (Minckley 1973). Females remain drab in coloration upon reaching maturity and throughout their life. All male poeciliids have a modified anal fin (gonopodium) used to fertilize the female internally.

Habitat requirements of *P. o. occidentalis* are broad. The species prefers shallow, warm, fairly quiet water; however, they can become acclimated to a much wider range of conditions. Both lentic habitats and lotic habitats with moderate current are easily tolerated. Temperatures from near freezing under ice to 98.6 degrees F (37 degrees C) have been reported, with a maximum tolerance of 109.4 degrees F (43 degrees C) for brief periods (Heath 1962). Gila topminnows can live in a wide range of water chemistries, with recorded pH values from 6.6 to 8.9, dissolved oxygen readings from 2.2 to 11 milligrams/liter (Meffe et al. 1983), and salinities from very dilute to sea water (Schoenherr 1974). The widespread historic distribution of Gila topminnows throughout rivers, streams, marshes, and springs of the Gila River Basin is evidence for their tolerance of these environmental extremes. One reestablished population (Mud Springs) survived for 16 years in a simple cement-watering trough before being moved.

Meffe et al. (1983) reported that topminnows can tolerate almost total loss of water by burrowing into the mud for 1-2 days. Preferred habitats contain dense mats of algae and debris, usually along stream margins or below riffles, with sandy substrates sometimes covered with organic mud and debris (Minckley 1973). Topminnows are usually found in the upper third of the water column and young show a preference for the warmest and

shallowest areas (Forrest 1992). Simms and Simms (1992) found topminnows occupying pools, glides, and backwaters more frequently than marshes or areas of fast flow.

According to Schoenherr (1974), the spring-heads presently occupied by Gila topminnows are questionable as preferred habitat. Destruction of historically occupied habitats such as the marshes, sloughs, backwaters, and edgewaters of larger rivers and presence of non-native fish in such habitats that remain has undoubtedly forced Gila topminnow out of their preferred historic habitats and into the spring-heads and smaller erosive creeks we see them in today. Their tolerance of conditions in these habitats has allowed them to maintain populations with less impact from non-native fishes.

Gila topminnows are viviparous fish, meaning embryos grow and mature within the female and are born living. Eggs are fertilized internally through deposition of spermatophores (packets of sperm) into the female genital pore by the male gonopodium. Female Gila topminnow can store spermatozoa for several months, and may produce up to 10 broods after being isolated from males (Schultz 1961). Female Gila topminnows also exhibit superfetation in which 2 or more groups of embryos at different stages develop simultaneously. Females of the genus *Poeciliopsis* generally carry only 2 stages, although some P. o. occidentalis females have been shown to carry 3 stages for a few days when population densities are low. The mean interval between broods is 21.5 days (Schoenherr 1974). Brood size ranges from 1-31 dependent upon female standard length (SL) (Constantz 1974; Schoenherr 1974, 1977). Under optimum laboratory conditions, *Poeciliopsis* can produce 10 broods per year at intervals of 7 to 14 days (Schultz 1961). Sexual maturity can be attained as early as 2 months or as late as 11 months following birth, dependent upon the season of birth (Schultz 1961; Constantz 1976, 1979; Schoenherr 1974).

Breeding occurs primarily during January through August, but in thermally constant springs, young may be produced throughout the year (Heath 1962; Minckley 1973; Schoenherr 1974). During the peak of the breeding season up to 98 percent of mature females are pregnant (Minckley 1973). Dominant males turn black, defend territories, and court females. Smaller subordinate males do not turn black or defend territories. Instead, they take on a "sneaking" mating strategy where they attempt to mate with uncooperative females while the dominant male is busy elsewhere. Subordinate males have a longer gonopodium, which may have an adaptive benefit for this type of mating strategy (Constantz 1989). However, if the larger territorial males are removed, smaller males will become dominant, take on breeding coloration, and defend territories (Constantz 1975; Schoenherr 1977). Brood size and the onset of breeding in topminnows can be influenced by several factors including food abundance, photoperiod, temperature, predation upon the population, and female size. Increased food supply and larger female size are believed to contribute to the greater fecundity seen in topminnows from Monkey Spring canal compared with topminnows from Monkey Spring headspring (Constantz 1974, 1979; Schoenherr 1974, 1977). Sex ratios in stabilized populations nearly always favor females, varying from 1.5 to 6.3 per male (Schoenherr 1974).

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Gila topminnows are opportunistic omnivorous feeders, having a gut length 1.5 to 2 times SL of the individual (Schoenherr 1974). They have weakly spatulate dentition characteristic of an omnivorous diet. Primary food items include detritus, vegetation, amphipods, ostracods, insect larvae, and rarely, other fish (Schoenherr 1974; Gerking and Plantz 1980; Meffe et al. 1983; Meffe 1984).

Gerking and Plantz (1980) noted that Gila topminnows prefer to eat large prey, but prey sizes are limited by mouth size. Schoenherr (1974) observed that individual fishes in complex habitats with several food resources present will select and focus on different items. He suggested that variation in feeding among individuals prevents over-utilization of a single resource, thus enhancing survival potential of the species.

In the United States, this species currently occurs in the Gila River drainage, Arizona, particularly in the upper Santa Cruz River, Sonoita and Cienega creeks, and the middle Gila River. The Gila topminnow is restricted to 14 natural localities in Arizona. In Mexico, the species occurs in the Río Sonora, Río de la Concepción, and Santa Cruz River but are not listed under the ESA. Gila topminnows occupy a variety of habitats, including: springs, cienegas, permanent and interrupted streams, and margins of large rivers. Habitat alteration and destruction, and introduction of predatory non-native fish, (principally western mosquitofish [Gambusia affini]) is the main reason for decline of the Gila topminnow.

2.8c Critical Habitat

No critical habitat has been designated for this species.

2.8d Current Status Statewide

The United States population of the Gila topminnow was federally listed as an endangered species in 1967 (USDOI 1967). The original recovery plan for Gila topminnow listed 10 extant natural populations: Monkey Spring, Cottonwood Spring, Sheehy Spring, Sharp Spring, Santa Cruz River near Lochiel, Redrock Canyon, Cienega Creek, Sonoita Creek (presumably including localities above and below Patagonia Lake), Salt Creek, and Bylas Springs (USFWS 1984). Gila topminnows were also known from Middle Spring (also known as SII or Second Spring) on the San Carlos Apache Indian Reservation (Meffe et al. 1983). Middle Spring was considered part of the Bylas Springs complex in the earlier recovery plan.

Since 1984, Gila topminnows have been discovered or rediscovered at 4 additional locations: North Fork of Ash Creek in 1985 (Jennings 1987), Fresno Canyon in 1992, Santa Cruz River north of Nogales in 1994, and Coal Mine Canyon in 1996 (Weedman and Young 1997). However, Gila topminnow were last collected from the North Fork of Ash Creek in 1985 and from Sheehy Spring in 1987. They have also been very rare or absent during recent surveys (last 5 years) of Sonoita Creek above Patagonia Lake and Santa Cruz River near Lochiel. Mosquitofish are quite common in both areas. Topminnows were extirpated from 1 of the original 10 localities, Salt Creek, by mosquitofish (Marsh and Minckley 1990), but the stream was renovated and restocked

with Gila topminnows from Middle Spring. Subsequently, mosquitofish were found in the stream and it was again renovated and restocked with topminnows from Bylas Spring. Thus, there are 14 naturally occurring localities (considering Sonoita Creek above and below Patagonia Lake as 2 separate localities) currently known to support Gila topminnows in the United States.

Eleven of the naturally occurring locations currently supporting Gila topminnows are in the Santa Cruz River system: Redrock Canyon, Cottonwood Spring, Monkey Spring, upper Sonoita Creek, Fresno Canyon, Coal Mine Canyon, lower Sonoita Creek, Santa Cruz River north of Nogales, Cienega Creek, Sharp Spring, and the upper Santa Cruz River. The 2 remaining localities (Bylas Springs and Middle Spring) and Salt Creek are next to the Gila River on the San Carlos Apache Indian Reservation. Bylas Springs has been unsuccessfully poisoned twice to remove mosquitofish (Meffe et al. 1983; Brooks 1985; Marsh and Minckley 1990). Another attempt at renovation of Bylas Springs was done by USFWS Arizona Fishery Resource Office and has so far been successful. The population at Middle Spring was eliminated by lack of water during the summer of 1989, but was recently reestablished (following construction of additional pool habitat) with Gila topminnows from the original Middle Spring population held at Roper Lake State Park. Salt Creek has also been renovated and restocked with topminnows originally from Bylas Spring.

As part of past recovery actions, more than 200 Gila topminnow reintroductions or natural dispersals from reintroductions have occurred at 175 wild locations. For this count, a wild location refers to an area that does not have a mailing address, in contrast with a captive population that does (following Simons 1987). Eighteen wild populations remained in 1997, 17 of which are in historic range (Weedman and Young 1997). Seven of these populations are secure enough that they should persist into the foreseeable future. Minckley and Brooks (1985), Brooks (1985, 1986), Simons (1987), Bagley et al. (1991), Brown and Abarca (1992), and Weedman and Young (1997) describe the plight of reestablished and captive populations of Gila topminnows.

Gila topminnows also have been stocked into many captive locations for propagation or conservation. Twelve captive populations were known to persist in 1997. The following publicly maintained populations are large enough to provide individuals for reintroductions, although one is known to be mixed with topminnows from more than one natural population (Arizona-Sonora Desert Museum, Boyce-Thompson Arboretum (mixed), Dexter National Fish Hatchery and Technology Center, Roper Lake State Park, Arizona State University, and Hassayampa River Preserve).

2.8e Environmental Baseline

Gila topminnow currently occupy the Santa Cruz River in its perennial reaches, as far north as Chavez Siding Road. This reach of the river was also occupied by longfin dace (*Agosia chrysogaster*), desert sucker (*Catostomus clarki*), Sonora sucker (*Catostomus insignis*), green sunfish (*Lepomis cyanellus*), and mosquitofish as recently as 1997 (USFWS 2001d). No Gila topminnows occur on the Tumacacori EMA and there are

currently no plans for reintroductions in any locations (CNF 2000; D. Duncan, USFWS, pers. comm., 1 October 2002).

2.8f Effects of Proposed Action on the Gila topminnow

Direct Effects

The effects of the proposed action on this species are not anticipated to include direct effects to individual Gila topminnow because no construction will occur within occupied habitat.

Indirect Effects

Habitat Modification

Some indirect impacts to Gila topminnow habitat from erosion are possible from the construction of the proposed action. While the removal of vegetation for construction of access roads will increase surface runoff and sediment transport, and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997), the implementation of BMPs will help control erosion. However, unusually large precipitation events may temporarily overwhelm BMPs and result in some increase in sediment transport. Nevertheless, the distance of the proposed action from the Santa Cruz River will minimize the amount of sediments reaching Gila topminnow habitat.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Roads constructed for the proposed action also may allow the establishment or increased density of non-native grasses, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Wildfires could remove groundcover that is important in dissipating rainfall energy and reducing erosion.

However, new roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining what suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape.

The measures outlined in the Fire Prevention Plan being developed will minimize the risks of wildfires associated with the proposed action. Measures outlined in the Invasive Species Management Plan also will minimize the introduction or spread of invasive species that may facilitate fires.

2.8g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal land, the habitat with the highest potential for occupancy by Gila topminnow occurs on private land in Santa Cruz County. Most future actions on private land will not be subject to Section 7 consultation.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew by 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of national forest lands.

An undetermined level of border crossings by UDI also occurs within the action area, resulting in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.7h Effects Determination and Incidental Take

The transport of sediments into the Santa Cruz River may affect the Gila topminnow; however, any increase in sediments will be relatively small because of the distance of the proposed action from occupied habitat. Therefore, it is not likely to adversely affect the species.

Because the proposed action is not likely to adversely affect the species, no take of Gila topminnow is anticipated.

2.9 MEXICAN GRAY WOLF (*Canis lupus baileyi*) (Endangered)

2.9a. Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for Mexican gray wolf is found within portions of Santa Cruz County containing oak and pine/juniper savannas above 4,000 ft (1,200 m). Wolves may travel long distances during hunting expeditions, typically in an irregular circle 20 mi (34 km) 60 mi (68 km) in diameter. The action area for the Mexican gray wolf considered for the proposed action includes all potential habitat and travel corridors in western Santa Cruz and southern Pima County.

2.9b. Natural History and Distribution

Mexican gray wolves (Figure 20) are the smallest and southernmost of the 5 subspecies of gray wolf in North America. The Mexican gray wolf is a large dog-like carnivore with a mixed brown, rust, black, gray, and white. This species has a distinct white lip line, chin, and throat. Adults weigh between 50-90 lbs (23-41 kg) (Hoffmeister 1986). The historic range was from southeastern Arizona, southwestern New Mexico, southwestern



Texas, and south through the Sierra Madre of Mexico. The Mexican gray wolf is the southernmost occurring and most endangered subspecies in North America. This wolf is the last subspecies of gray wolf known to occur in the Arizona-New Mexico area. The last known naturally occurring U.S. specimen was found in New Mexico in 1970 (USFWS 2001d).

Figure 20. Mexican gray wolf.

Historically, Mexican gray wolf habitat was montane woodlands, presumably because of the favorable combination of cover, water, and prey availability. Most wolf collections came from pine, oak, and pinyon/juniper woodlands, and intervening or adjacent grasslands above 1,372 m (4,500 ft) (Brown 1983b). Wolves avoided desertscrub and semi-desert grasslands, but wooded riparian corridors were probably used for travelling and hunting (Parsons 1996).

These are social animals in the dog family that live and travel in packs of 7 to 30 animals depending upon prey size and availability. Mexican gray wolves prey upon a variety of animals from mice and squirrels to deer and elk. Territory size can range from 30 (78 km² to 500 mi² (1,295 km²) or more. Packs are led by a pair of dominant animals that control most of the breeding. Breeding season lasts from late winter to early spring, and the dominant female produces up to 6 pups for the pack. The wolves care for the pups communally.

During the late 1800s through the mid 1900s, extensive hunting, trapping, and poisoning efforts at local, state, and federal levels resulted in the extirpation of this species from the United States portion of its range. Reintroduction efforts of captive bred wolves are under way in the Blue Range Recovery Area of eastern Arizona and New Mexico. Fourteen packs have been released to date.

2.9c Critical Habitat

No critical habitat has been designated for this species.

2.9d Current Status Statewide

Mexican gray wolves were listed as endangered by the USFWS in 1976 (41 FR 17736) without critical habitat. In 1998, an experimental, non-essential population was designated for the southwest (63 FR 1763) and a reintroduction program was initiated. Eleven wolves from captive breed stock were reintroduced into the Apache National Forest in southeastern Arizona under the experimental, non-essential designation in an effort to re-establish the subspecies to a portion of its historic range. A Recovery Plan for this subspecies was completed in 1982 and revisions are currently in progress (USFWS 2001d).

Mexican gray wolf populations steadily declined in Arizona because of predator control programs and conflicts with livestock interests. Pressure to control wolves became a priority beginning in the 1920s when this subspecies was nearly eliminated from the state and prevention of wolves from entering from Mexico was undertaken. In 1921 and 1922, a reported 58 wolves were taken by trapping or poisoning in Arizona. By 1924, reported takings dropped to 29 and by 1936, to 5. After 1952, only 2 wolves were reported taken in Arizona, 1 in 1958 and another in 1960 (Hoffmeister 1986). Reports of Mexican gray wolves living in the wild in Arizona continued into the early 1970s (USFWS 1982).

Similar predator control programs in Mexico reduced populations and may have eliminated the wolf by the 1980s. Surveys conducted in Mexico in the early 1990s did not confirm Mexican gray wolf populations in the wild (Parsons 1996).

2.9e Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consideration.

The Tumacacori EMA contains some areas of montane and riparian woodlands that may serve as dispersal corridors for Mexican gray wolves. If wolf populations exist in the mountains of Sonora, these corridors may be used as hunting and dispersal corridors. There are currently no plans to reintroduce the Mexican gray wolf into southern Arizona and, because of the distance and fragmentation of intervening habitat, it is unlikely that current experimental populations in northern Arizona could disperse into Santa Cruz County.

2.9f Effects of Proposed Action on the Mexican Gray Wolf

Direct Effects

Construction Noise and Activity

Because the only wild populations of Mexican gray wolves in Arizona occur in the Apache National Forest, disturbance from construction of the proposed action, even in suitable dispersal habitat, is highly unlikely. In the event that populations of wolves exist in Mexico and could disperse into southern Arizona, the greatest likelihood of disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise or construction disturbance will be widely distributed and relatively minor in any single area.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Gray wolves (*Canis lupus*) in Wisconsin are limited to places with pack-area mean road densities of 0.7 mi/1 mi² (1.1 km/1 km²) or less (Mladenoff et al. 1995). Some studies have shown that a few large areas of low road density, even in a landscape of high average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Access and construction roads for the proposed action commonly are spurs from existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches. Furthermore, construction activities within montane woodlands, riparian corridors or major canyons will be minimal and widely distributed, resulting in negligible impacts to the composition or structure of Mexican gray wolf habitat.

Increased Legal and Unauthorized Access to Mexican Gray Wolf Habitat

Gray wolves experience negative interactions with humans and roads are a key facilitator (Thiel 1985). Increased human access to potential wolf habitat through the use of temporary proposed construction roads could reduce the quality of the habitat and human interactions may increase mortality (Mech 1973). The road closure techniques outlined in the SECTION 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, wolves will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining suppression strategies were used, both in firefighter access and because roads were widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban

1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. Fire prevention measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.9g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this biological assessment. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by Mexican gray wolf occurs on USFS land in Santa Cruz County. Future federal actions will be subject to Section 7 consultation and will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area and results in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase into the foreseeable future.

2.9h Incidental Take

Construction noise and activity associated with the proposed action may affect the Mexican gray wolf, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration. Because the proposed action is not likely to adversely affect the Mexican gray wolf, no take is anticipated.

3.0 USFS SENSITVE SPECIES

USFS special status species are plant and wildlife species that are of concern because their populations are declining in size. We contacted federal (USFWS) and state (AGFD) natural resource agencies requesting information on possible special status species (sensitive, threatened and endangered) that may exist on or near the proposed Crossover Corridor of the TEP Sahuarita – Nogales Transmission Line. Agency correspondence is presented in Appendix B.

In a letter dated 2 May 2002, AGFD listed 23 USFS Sensitive species that are known to occur within 3 mi (4.8 km) of the proposed corridor or may be expected to occur along the corridor if suitable habitat exists. The information listed in the letter was based on AGFD Heritage Data Management System. In addition, 18 USFS sensitive species known to occur within 5 mi (8 km) to 10 mi (16 km) of the proposed corridor have been included (AGFD letter dated 25 April 2002). AGFD species abstracts and other literature were reviewed for species' historical ranges and habitat preferences and field reconnaissance surveys were conducted along the entire corridor. However, species-specific surveys were impractical because of ongoing drought conditions in the project area, therefore the potential presence of sensitive species was assumed in all areas containing potential habitat. The 43 USFS Sensitive species that may occur on or near the proposed Central Corridor are listed in Table 3.

TABLE 3. SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Alamos Deer Vetch Lotus alamosanus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arid Throne Fleabane Erigeron arisolis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arizona Giant Sedge Carex ultra	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arizona Metalmark Calephelis rawsoni arizonensis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Mitigation plantings of host species will reduce impacts.
American Peregrine Falcon Falco peregrinus anatum	No Impacts	Known occurrences and potential habitat are outside project area.
Bartram's Stonecrop Graptopetalum bartramii	No Impacts.	Known populations occur outside project area.
Beardless Chinch Weed Pectis imberbis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Species is adapted to disturbances.

TABLE 3 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Broadleaf ground cherry Physalis latiphysa	No Impacts.	Known populations occur outside project area.
Catalina Beardtongue Penstemon discolor	No Impacts.	Known populations occur outside project area.
Cave Myotis Myotis velifer	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Chiltepine Capsicum annuum var.glabriusculum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Chihuahuan Sedge Carex chihuahuensis	No Impacts.	Known populations occur outside project area.
Chiricahua Mountain Brookweed Samolus vagans	No Impacts.	No construction in perennial aquatic habitats.
Five-Stripped Sparrow Aimophila quinquestriata	No Impacts.	Potential habitat and know occurrences are outside project area.
Foetid Passionflower Passiflora foetida	No Impacts.	Known populations occur outside project area.
Gentry Indigo Bush Dalea tentaculoides	No Impacts.	Known populations occur outside project area.
Giant Spotted Whiptail Cnemidophorus burti strictogrammus	No Impacts.	Known populations occur outside project area.

TABLE 3 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Large-Flowered Blue Star Amsonia grandiflora	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Lowland Leopard Frog Rana yavapaiensis	No Impacts.	Known populations occur outside project area.No construction in perennial aquatic habitats.
Lumholtz Nightshade Solanum lumholtzianum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Mexican Garter Snake Thamnophis eques megalops	No Impacts.	No construction in perennial aquatic habitats.Minimal impacts to riparian habitat.
Mock-Pennyroyal Hedeoma dentatum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Nodding Blue-eyed Grass Sisyrinchium cernuum	No Impacts.	Known populations occur outside project area.
Northern Gray Hawk Asturina nitida maxima	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Mitigation and avoidance of riparian vegetation. Populations within Arizona appear stable.
Pima Indian mallow Abutilon parishii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Santa Cruz Beehive Cactus Coryphantha recurvata	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Santa Cruz Star Leaf Choisya mollis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

TABLE 3 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Santa Cruz Striped Agave Agave parviflora ssp. parviflora	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Plants occur throughout Nogales Ranger District. Mitigation plantings of agave will reduce impacts.
Seeman Groundsel Senecio carlomasonii	No Impacts.	Known populations occur outside project area.
Sonoran Noseburn Tragia laciniata	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Southern Pocket Gopher Thomomys umbrinus intermedius	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Superb Beardtongue Penstemon superbus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Supine Bean Macroptilium supinum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	Pre-construction surveys will be conducted and, if necessary, mitigation measures will be coordinated with USFS personnel.
Sweet Acacia Acacia smallii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Three-nerved scurf-pea Pediomelum pentaphyllum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Thurber Hoary Pea Tephrosia thurberi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.

TABLE 3 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Thurber's Morning-glory Ipomoea thurberi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Virlet Paspalum Paspalum virletti	No Impacts.	Known populations occur outside project area.
Weeping Muhly Muhlenbergia xerophila	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Western Barking Frog Eleutherodactylus augusti cactorum	No Impacts.	Known populations occur outside project area.
Western Yellow-billed Cuckoo Coccyzus americanus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Wiggins Milkweed Vine Metastelma mexicanum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Populations within Arizona appear stable. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Wooly Fleabane Laennecia eriophylla	No Impacts.	Known populations occur outside project area.

3.1 PLANTS

Alamos deer vetch (*Lotus alamosanus*)

Alamos deer vetch is a perennial herb found in southern Arizona, and Sonora, Chihuahua, and Durango, Mexico. Within Arizona, this plant is found in Sycamore Canyon and the Pajarito Mountains of Santa Cruz County, and near Garden Valley in Maricopa County. This plant is considered a wetland obligate species that is restricted to stream banks in canyons at elevations ranging from 3,500 ft (1,067 m) to 5,500 ft (1,676 m) (AGFD 1999a). Within the Nogales RD, this plant occurs in the Sycamore Canyon and Peña Blanca Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

Population trends for Alamos deer vetch are unknown (AGFD 199a). The proposed transmission line may cross potential Alamos deer vetch habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, viable populations occur outside of the project area, including the Gooding RNA. There may be an impact to individual plants during development of the line; however, disturbance will be limited to a few individuals and is not likely to result in a trend toward federal listing or loss of viability.

Arid throne fleabane (*Erigeron arisolis*)

Arid throne fleabane is an annual to short-lived perennial forb that occurs in Arizona, southwestern New Mexico and Sonora, Mexico. Within Arizona, this plant is found in Apache, Cochise, Pima, and Santa Cruz counties. This species is typically found on moist rocky soils in grasslands, grassy openings within oak woodlands, and roadsides at elevations between 4,200 ft (1,280 m) and 5,500 ft (1,676 m) (AGFD 2000a). On the CNF Nogales RD, it has been documented from Box Canyon and Ruby Roads (T. Newman, CNF, pers. comm., 20 August 2002).

Arid throne fleabane favors moist areas in grasslands and grassy openings in oak woodlands, areas also favored by livestock for grazing (AGFD 2000a). The proposed transmission line parallels Ruby Road, a known location for this species. Placement of the transmission line may impact individual arid throne fleabane, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Arizona giant sedge (*Carex ultra*)

Arizona giant sedge is the largest sedge found in Arizona. Its range includes southeast Arizona, extreme southwest New Mexico (Hidalgo County, Indian Springs in the Pelocillos) and Mexico (Sonora and Coahila). Within Arizona, this sedge is found in Cochise, Graham, Pinal, Yavapai, Pima (Santa Rita Mountains and the Rincon Valley), and Santa Cruz counties (Santa Rita and Atascosa mountains). Typically only 1 patch per mountain has been found. Like other sedges, this plant is associated with moist soil near perennial wet springs and streams and undulating rocky-gravelly terrain at

elevations ranging from 2,040 ft (622 m) to 6,000 ft (1,829 m) (AGFD 2000b). Within the Nogales RD, Arizona giant sedge is found in Sycamore Canyon and Mule Ridge in the Atascosa Mountains, and at Deering Spring and Big Casa Blanca Canyon in the Santa Rita Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

Small populations of this sedge are vulnerable to local disturbance of aquatic or riparian habitat (AGFD 2000b). The proposed transmission line may cross potential Arizona giant sedge habitat; however, no construction will occur in perennial aquatic habitats and construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Bartram's stonecrop (*Graptopetalum bartramii*)

Bartram's stonecrop is a small succulent perennial found in southern Arizona and Chihuahua, Mexico (one record). In Arizona, this plant occurs in Santa Cruz County within the Patagonia, Santa Rita, and Tumacacori Mountains, in Pima County within the Baboquivari, Dragoon, and Rincon mountains, and in Cochise County within the Chiricahua Mountains. Habitat for Bartram's stonecrop consists of cracks in rocky outcrops within shrub live oak-grassland communities located on the sides of rugged canyons. This plant is usually found in heavy litter cover and shade where moisture drips from rocks at elevations ranging from 3,900 ft (1,189 m) to 6,700 ft (2,042 m) (AGFD 1997a). Bartram's stonecrop plants are found on the west side of the Nogales RD in Tres Amigos Gulch; Sycamore, Peña Blanca, Alamo, and Peñasco canyons; in the vicinity of Montana Peak and Peña Blanca Lake (T. Newman, CNF, pers. comm., 20 August 2002).

Bartram's stonecrop populations are typically small and isolated. Illegal collection of the plant is the main management issue at this time. Other factors that may affect populations include mining and mineral exploration, habitat alteration due to livestock grazing, trampling by cattle and recreationists, and road construction and maintenance. The proposed transmission line crosses over known Bartram's stonecrop populations within the Nogales RD. Placement of the transmission line may impact individual Bartram's stonecrop, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to Bartram's stonecrop are not likely to result in a trend toward federal listing or loss of viability.

Beardless chinch weed (*Pectis imberbis*)

Beardless chinch weed is a perennial herb that is found in southern Arizona, western Chihuahua and eastern Sonora, Mexico. Within Arizona, this plant can be found in Cochise, Pima, and Santa Cruz counties (within Santa Cruz County it is found along Ruby Road in the Atascosa Mountains and in the Red Rock area of Canelo Hills). Habitat for this species consists of open areas in grassland and oak-grassland

communities. Beardless chinch weed has an extremely broad habitat range and can be found at elevations from 4,000 ft (1,219 m) to 5,000 ft (1,524 m) (AGFD 1998a).

Populations of beardless chinch weed may be susceptible to impacts from grazing and road maintenance activities but the species is adapted to disturbances and grows along road cuts (AGFD 1998a). The proposed transmission line crosses over known beardless chinch weed populations within the Nogales RD. Placement of the transmission line may impact individual beardless chinch weed, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to beardless chinch weed are not likely to result in a trend toward federal listing or loss of viability.

Broad-leaf ground cherry (*Physalis latiphysa*)

Broad-leaf ground cherry is an herbaceous annual found in southern Arizona. This plant can be found in the San Bernardino Valley of Cochise County, the Pinaleno Mountains of Graham County, in the vicinity of Arivaca Creek in Pima County, and the Santa Cruz River of Santa Cruz County. Habitat for the broad-leaf ground cherry consists of washes, often in the shade of shrubs and boulders, desertscrub vegetation, and grasslands at elevations ranging from 3,000 ft (914 m) to 4,500 ft (1,372 m) (AGFD 2000c). There are no known sites for this plant in the Nogales RD. The nearest locations are northwest of Arivaca Lake and in the vicinity of Tubac on the Santa Cruz River (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of broad-leaf ground cherry (AGFD 2000c). The proposed transmission line does not cross known broad-leaf ground cherry populations within the Nogales RD, therefore placement of the transmission line will not impact this species.

Catalina beardtongue (Penstemon discolor)

Catalina beardtongue is a perennial herbaceous sub-shrub found in southern Arizona. This shrub is found in Cochise, Graham, Pinal, Pima (within the Santa Catalina Mountains), and Santa Cruz counties (within the Atascosa and Tumacacori mountains). Habitat for Catalina beardtongue consists of bare rock outcrops, barren soil outcrops, and bedrock openings in chapparal or pine-oak woodlands at elevations ranging from 4,120 ft (1,256 m) to 7,600 ft (2,316) (AGFD 1999b). On the Nogales RD, this shrub occurs in the upper end of Peck Canyon, Corral Nuevo, and the adjacent Bartalo Mountain (Cedar Canyon), typically on whitish volcanic ash (T. Newman, CNF, pers. comm., 20 August 2002).

Rock climbers threaten some populations of this plant but few other threats exist (AGFD 1999b). The proposed transmission line does not cross known Catalina beardtongue populations within the Nogales RD, therefore placement of the transmission line will not impact this species.

Chiltepine (*Capsicum annuum* var.*glabriusculum*)

Chiltepine is an herbaceous to woody perennial shrub that is found in south Texas, southern New Mexico, southern Arizona, and south to tropical America. Within Arizona, a few populations of this plant are found in the Chiricahua, Tumacacori, Baboquivari, and Ajo Mountains. This plant occurs in protected, frost-free canyons in oak woodlands of slopes at less than 4,500 ft (1,372 m) elevation (typically found at elevations ranging from 3,600 ft [1,097 m] to 4,400 ft [1,341 m]). Chiltepine plants grow under nurse shrubs and usually are associated with rock ledges and outcrops. Within the Nogales RD, there are populations in the Tumacacori Mountains and Cobre Ridge area, and there are suspected populations on the west side of the RD (AGFD 1991a; T. Newman, CNF, pers. comm., 20 August 2002).

This plant is declining in some areas because of drought, overgrazing, and local over-collection of berries (AGFD 1991a). Placement of the transmission line may impact individual chiltepine plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to chiltepine are not likely to result in a trend toward federal listing or loss of viability.

Chihuahuan sedge (*Carex chihuahuensis*)

Chihuahuan sedge is a grass-like perennial plant that occurs in southeastern Arizona, New Mexico (Hidalgo County), and Mexico (Sonora and Chihuahua). Within Arizona, this plant ranges from Cochise, Graham, Gila, Pima (Santa Catalina, San Luis, and Rincon mountains), and Santa Cruz counties (Atascosa and Santa Rita mountains, and the Santa Cruz River). Chihuahuan sedge can be found in wet soils along streambeds and in shallower draws of pine-oak forests and riparian woodlands. It also is found in wet meadows, cienegas, marshy areas, and canyon bottoms from 1,100 ft (335 m) to 8,000 ft) (AGFD 1999c). Within the Nogales RD, this plant has been found near Arivaca Lake (on private land), Sycamore Canyon, and south of Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement on the population status of Chihuahuan sedge (AGFD 1999c). The proposed transmission line does not cross known Chihuahuan sedge populations within the Nogales RD, therefore placement of the transmission line will not impact this species.

Chiricahua Mountain brookweed (Samolus vagans)

Chiricahua Mountain brookweed is a perennial herb found in southeastern Arizona, western Chihuahua, and eastern Sonora, Mexico. This plant apparently reaches its southern limit in southern Sonora, Mexico. Within Arizona, this species is found in the Huachuca Mountains of Cochise County, the Rincon, Santa Catalina, and Santa Rita mountains of Pima County, and the Canelo Hills and Pajarito mountains of Santa Cruz County. The Chiricahua Mountain brookweed is confined to areas with permanent water, such as springs, seeps, and in and along streams at elevations ranging from 1,219 to 2,195 m (4,000 – 7,200 ft) (AGFD 1999d). Within the Nogales RD, this plant occurs in Florida

Canyon of the Santa Rita Mountains and in Sycamore Canyon of the Atascosa Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Chiricahua Mountain brookweed (AGFD 1999d). Because no construction will occur within perennial aquatic habitats, the proposed action will have no effect on the population status of the Chiricahua Mountain brookweed.

Foetid passionflower (*Passiflora foetida*)

The foetid passionflower is a herbaceous vine found in southeastern Texas and the Rio Grande Valley, southern Arizona, and southward throughout Mexico, Central and South America, and the West Indies. Within Arizona, this species is found in the Baboquivari Mountains, Arivaca, and Las Guijas Mountains of Pima County and in California Gulch and the Bartlett Mountains of Santa Cruz County. In Arizona, this plant occurs on hillsides and canyons of the Lower Sonoran zone from 1,067 to 1,707 m (3,500 – 5,600 ft) in elevation (AGFD 2000c). Within the Nogales RD, foetid passionflowers have been recorded in the California Gulch and Holden Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of foetid passionflower (AGFD 2000c). Because the known populations of this plant occur outside of the proposed TEP transmission line corridor, there will be no effect on the population status of the foetid passionflower.

Gentry indigo bush (*Dalea tentaculoides*)

The Gentry indigo bush is an herbaceous perennial shrub found primarily in southern Arizona, but its range may extend into Mexico. Within Arizona, this shrub is found in the Sycamore Canyon drainage of the Atascosa Mountains, in the Pajarito Mountains of Santa Cruz County, and within the Baboquivari Mountains (1930s record) and Mendoza Canyon (1965 record) of Pima County. Gentry indigo bush is typically found along canyon bottoms on cobble terraces subject to occasional flooding and seems to prefer disturbance-prone environments at elevations ranging from 1,097 to 1,341 m (3,600 – 4,400 ft) (AGFD 1998b). Historic collection records indicate that this plant may grow on rocky hillsides. Within the Nogales RD, this plant has been recorded in Sycamore Canyon, in the vicinity of Peñasco Canyon, Kaiser Canyon, and north of Manzanita Mountain (T. Newman, CNF, pers. comm., 20 August 2002).

Potential threats to Gentry indigo bush populations are cattle grazing, recreational foot traffic, and flooding events that eliminate terraces occupied by this species (AGFD 1998b). Because known locations of this plant occur outside of the proposed TEP transmission line corridor, the proposed TEP transmission line will have no effect on the population status of the Gentry indigo bush.

Large-flowered blue star (*Amsonia grandiflora*)

The large-flowered blue star is an herbaceous perennial that is found in northern Sonora and Durango, Mexico, and southern Arizona. Within Arizona, this plant is found in the Patagonia, Atascosa/Pajarito mountains of Santa Cruz and Pima counties. Habitat for this

species consists of canyon bottoms in oak woodlands typically dominated by Emory oak and Mexican blue oak; however, site-specific qualities are inconsistent. Large-flowered blue star plants have adapted to rock fall disturbance and are typically found at elevations ranging from 1,189 to 1,372 m (3,900 4,500 ft) (AGFD 1998c). Within the west side of the Nogales RD, this plant occurs at Peña Blanca and Arivaca Lakes, Sycamore Canyon, Chiminea Canyon, California Gulch, and near Ruby (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of large-flowered blue star are rare, with only 15 to 20 populations within 2 mountain ranges as the total world distribution, but populations seem to be stable. This plant is highly susceptible to disturbance, and expanding development in the Nogales area (AGFD 1998c) may impact populations. The proposed TEP transmission line crosses near a known large-flowered blue star population in Peña Blanca Canyon, and some individual plants, comprising a small percentage of the total population, may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Lumholtz nightshade (Solanum lumholtzianum)

The Lumholtz nightshade is an herbaceous annual that is found in southern Arizona and northern Mexico. Within Arizona, this plant is found in the Arivaca and San Luis Mountains of Pima County and the Patagonia, Atascosa, and Santa Rita Mountains of Santa Cruz County. Lumholtz nightshade plants are typically found in washes and low ground near wet depressions and along stream banks from 914 to 1,402 m (3,000 – 4,600 ft) elevation in desert grassland plant communities. This plant is also often found in disturbed, weedy areas (AGFD 2000d). Within the Nogales RD, this nightshade is found in the vicinity of Arivaca, Ruby, California Gulch, Nogales, Cobre Ridge, and Oro Blanco Wash (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Lumholtz nightshade (AGFD 2000d). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mock-pennyroyal (*Hedeoma dentatum*)

The mock-pennyroyal is an herbaceous perennial plant found in southeastern Arizona and northern Sonora, Mexico. Within Arizona, this plant is found in the Chiricahua, Huachuca, Mule, Whetstone, and Winchester mountains of Cochise County, the Pinaleno Mountains of Graham County, the Baboquivari, Rincon, and Santa Cruz mountains of Pima County, and the Atascosa, Mustang, Pajarito, and Santa Rita mountains of Santa Cruz County. Habitat for this plant consists of oak woodland, oak-pine forest, and pine forest. It can be found on open roadcuts, steep rocky outcrops, and gravelly slopes in

wooded canyons with open to full sunlight at elevations ranging from 1,173 to 2,500 m (3,850 – 8,200 ft) (AGFD 2000e).

Populations of mock-pennyroyal seem to be restricted to a relatively small geographic area, and populations are apparently small. Because habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Nodding blue-eyed grass (Sisyrinchium cernuum)

Nodding blue-eyed grass is a perennial forb with grass-like leaves that occurs in southeastern Arizona, west Texas, and Mexico. Within Pima and Santa Cruz counties, Arizona it occurs in the Pajarito, Santa Rita, Atascosa, and Rincon mountains as well as Sycamore Canyon. This species can be found in desert grassland and pine-oak woodlands from 1,006 to 2,438 m (3,300 – 8,000 ft) in elevation along streams in partial shade and in canyon bottoms. It grows in wet soil by seeps, pools, or springs in desert scrub. It has also been found on sandy stream banks. On the Nogales RD, this plant has been found at 1,189 m (3,900 ft) in Sycamore Canyon on the west side and at 1,402 m (4,600 ft) in Big Casa Blanca Canyon in the Santa Rita Mountains (AGFD 1999e). The known location of this plant in Sycamore Canyon is within the Goodding RNA, located approximately 1.6 km (1 mi) west of the proposed ROW (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of nodding blue-eyed grass (AGFD 1999e). However, this species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD. The proposed transmission line will not cross over or near known locations of this plant within the Goodding RNA. Therefore, placement of the TEP transmission line from Sahuarita to Nogales will have no impact on the nodding blue-eyed grass.

Santa Cruz beehive cactus (*Coryphantha recurvata*)

The Santa Cruz beehive cactus is a succulent perennial that occurs in southern Arizona and northern Sonora (about 20 km [12.4 mi] south of the international border), Mexico. Within Arizona, this species occurs in western Santa Cruz County from Nogales and the Tumacacori Mountains west to the Atascosa/Pajarito mountains. Santa Cruz beehive cacti are found in alluvial soils of valleys and foothills in grassland and oak woodland habitats from 1,219 to 1,829 m (4,000 – 6,000 ft). These plants are either on rocky hillsides with high grass cover or in rock crevices where runoff accumulates and provides a more favorable moisture relationship than the surrounding soils (AGFD 1998d). Within the Nogales RD known plant locations have increased since 1997 (813 plant clumps in 1997, 807 plant clumps in 1998, and 175 in 1999) (T. Newman, CNF, pers. comm., 20 August 2002).

Accessible populations of the Santa Cruz beehive cactus have declined due to collection, but the status of populations beyond accessible areas is unknown (AGFD 1998d). The proposed TEP transmission line crosses over several known Santa Cruz beehive cactus populations within the Nogales RD. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz star leaf (Choisya mollis)

The Santa Cruz star leaf is a perennial shrub that occurs in southern Arizona within the Atascosa, Pajarito, and Tumacacori mountains of Santa Cruz County. Santa Cruz star leaf plants are found primarily within madrean evergreen woodland communities from 1,067 to 1,524 m (3,500 – 5,000 ft) in elevation. This plant is usually found in canyon bottoms and slopes, usually in the shade of oaks and other trees, or rock outcrops (AGFD 1999f). Santa Cruz star leaf plants have been found throughout the eastern portion of the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Santa Cruz star leaf are typically found in rugged and remote mountainous areas where human activity is low and the likelihood of disturbance or removal of plants is minimal. However, the species population trend is unknown and existing populations are relatively rare, have a restricted range, and are only found within specific habitats (AGFD 1999f). The proposed TEP transmission line will cross areas with known populations of Santa Cruz star leaf. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz striped agave (*Agave parviflora* ssp. *parviflora*)

Santa Cruz striped agave is a small perennial succulent found in southern Arizona and northern Mexico. Within Arizona, this species is found near Arivaca in Pima County, and in the Las Guijas, Pajarito, Patagonia, Santa Rita, and Atascosa mountains of Santa Cruz County. Habitat for this agave consists of rocky or gravelly slopes of middle elevation mountains, in desert grassland or oak woodlands. This plant appears to prefer soils on rounded ridge-tops where grasses and shrubs are sparse and soil is bare or nearly so (AGFD 1998e). Santa Cruz striped agave have been found throughout the Nogales RD (primarily within the Atascosa, Pajarito, San Luis, and Las Guijas mountains), and in recent years the documented number of individual plants and number of locations has increased for this area (T. Newman, CNF, pers. comm., 20 August 2002).

Some populations of Santa Cruz striped agave have declined due to illegal collection and loss of habitat due to mining and road construction. Livestock grazing has caused degradation of habitat and browsing of flower stalks (AGFD 1998e). The proposed TEP transmission line crosses areas with known populations of Santa Cruz striped agave and there may be an impact to individual plants during development of the line. Placement of the transmission line may impact individual plants, however because of the linear nature

of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area and transplanting of agave plants in project area will minimize impacts. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Seeman groundsel (Senecio carlomasonii)

The seeman groundsel is a perennial herb or subshrub found in southern Arizona and Mexico (Sonora, Chihuahua, Nayarit). Within Arizona, this plant is found in the Chiricahua and Huachuca mountains of Cochise County, the Baboquivari and Santa Rita mountains of Pima County, and the Santa Rita, Pajarito, and Peña Blanca mountains of Santa Cruz County (AGFD 2000f). Within the Nogales RD, seeman groundsel have been recorded in the Peña Blanca Lake and Sycamore Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of seeman groundsel (AGFD 2000f). A potential threat to seeman groundsel habitat may be trampling by hikers. The proposed transmission line will not cross over or near known locations of this plant, therefore, placement of the TEP transmission line will have no impact on the population status of the seeman groundsel.

Sonoran noseburn (*Tragia laciniata*)

Sonoran noseburn is an herbaceous perennial that occurs in southern Arizona, Mexico (Sonora and Chihuahua), and possibly New Mexico. Within Arizona this plant can be found in Cochise County in the Huachuca Mountains and Canelo Hills, in Pima County in the Santa Rita Mountains, and in Santa Cruz County in the Atascosa Mountains (Sycamore Canyon), Patagonia Mountains, Pajarito Mountains, Canelo Hills (O'Donnell Canyon), and Santa Rita Mountains. Sonoran noseburn typically occur at elevations of 1,067 to 1,722 m (3,500 – 5,650 ft) along streams and canyon bottoms, on shaded hillsides within the upper parts of the Lower Sonoran and Upper Sonoran biotic communities, and open woodland areas (AGFD 2000g). This species has been found in canyons, along streams, and near roadways of the Nogales RD (AGFD 2000g).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Sonoran noseburn (AGFD 2000g). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Superb beardtongue (*Penstemon superbus*)

The superb beardtongue is a perennial herbaceous forb found in southeastern Arizona, New Mexico, and Mexico (Chihuahua). Within southern Arizona, this species is found in Pima County in the Santa Catalina and Santa Rita mountains, and in Santa Cruz County within the Tumacacori Mountains. This plant is generally found in rocky canyons, dry

hillsides, and along washes in sandy or gravelly soils at elevations between 945 and 1,676 m (3,100 – 5,500 ft) (AGFD 2000h). Within the Nogales RD, it has been found in Rock Corral Canyon and Box Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of superb beardtongue (AGFD 2000h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Supine bean (*Macroptilium supinum*)

The supine bean is a perennial herb that grows in colonies and produces underground fruits. The total range for this species includes Santa Cruz County, Arizona, south into Mexico, including the states of Sonoran and Nayarit. Within Arizona, this plant can be found in the Atascosa/Pajarito, San Luis, and Patagonia Mountains, and the southern portion of the Santa Cruz River drainage in Santa Cruz County (much of this area is within the Nogales RD). Supine bean are typically found along ridge tops and gentle slopes of rolling hills in semi-desert grassland or grassy openings in oak-juniper woodlands at elevations between 1,097 and 1,494 m (3,600 – 4,900 ft) (AGFD 1999g).

There are currently an estimated 12 populations of this species in Arizona. Populations range from small (around 20 individuals) to relatively large (around 3,500 individuals). A 43% decline in a monitored population was recorded from 1989 to 1993. This decline was apparently due to low reproductive output and poor recruitment, although the reasons for these are unknown (AGFD 1999g). Possible threats to this species include degradation of habitat due to livestock grazing, off-road vehicle activity, recreation (camping and hiking), Border Patrol activities, utility corridor and road construction/maintenance, and home building (AGFD 1999g).

Because of the recent decline in monitored populations and drought conditions noted in 2002, additional surveys will be conducted prior to construction in potential supine bean habitat. If populations of this species are found in the vicinity of construction, consultation with USFS biologists will be initiated to minimize impacts. Development of the proposed TEP transmission line is likely to have an impact on this species. However, once additional surveys are completed, impacts are likely to be limited to individual plants and not whole populations. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Sweet acacia (Acacia smallii)

The sweet acacia is a woody perennial spiny shrub or small tree found in Texas, Arizona, and California south to Argentina. Within Arizona, this species is found in the Baboquivari Mountains of Pima County and Sycamore Canyon and Atascosa Mountains of Santa Cruz County. Sweet acacia are typically found in the lower slopes of canyons of

riparian areas in desert grassland communities from elevations ranging from 1,067 to 1,219 m (3,500 - 4,000 ft) (AGFD 1992).

Population trends for the sweet acacia are unknown (AGFD 1992). The proposed TEP transmission line may cross potential sweet acacia habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Three-nerved scurf-pea (*Pediomelum pentaphyllum*)

Three-nerved scurf-pea is an herbaceous perennial found in southeastern Arizona, Hidalgo County New Mexico, western Texas, and Chihuahua, Mexico. Within Arizona, this plant occurs in desert grasslands in sandy substrates and loamy soils. Three-nerved scurf-pea are generally found in bare areas between other plants in elevations ranging from 1.098 to 1,373 m (3,600 to, 4,500 feet) (AGFD 2001a). Within the Nogales RD, this plant is known to occur from Peñasco Canyon (in the Sycamore Canyon watershed) and Peck and Pine Canyons (Middle Santa Cruz watershed) (T. Newman, CNF, pers. comm., 20 August 2002).

The impact of common management practices such as grazing, burning, mowing, herbicide use, and mechanical soil disturbance on this species is unknown (AGFD 2001a). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Thurber hoary pea (*Tephrosia thurberi*)

The Thurber hoary pea is a perennial shrub that occurs in southern Arizona and Mexico (northern Sonora and southwestern Chihuahua). Within Arizona, this plant can be found in Cochise, Santa Cruz, and Pima counties. On the Nogales RD, Thurber hoary pea plants are found in the Santa Rita and Atascosa mountains. This species typically occurs on rocky slopes among oaks, pines, junipers, manzanitas, open hilltops, and grasslands at elevations between 1,067 and 2,134 m (3,500 – 7,000 ft) (AGFD 1999h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber hoary pea (AGFD 1999h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Thurber's morning-glory (Ipomoea thurberi)

Thurber's morning-glory are perennial herbaceous vines that are found in southern Arizona and Mexico (Chihuahua and Sonora). Within Arizona, this plant is found in the Huachuca and Mule Mountains of Cochise County, the Santa Rita Mountains of Pima County, and in the vicinity of Nogales, the Canelo Hills, and the Patagonia and Atascosa/Pajarito mountains of Santa Cruz County. Habitat in Arizona typically consists of rocky hillsides and canyon slopes in madrean evergreen woodland and semi-desert grassland communities in elevations between 1,158 and 1,570 m (3,800 – 5,150 ft) (AGFD 2000i). On the Nogales RD, this morning glory has been found in the vicinity of Peña Blanca Lake, east of Peñasco Canyon, and Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber's morning-glory (AGFD 2000i). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Virlet paspalum (*Paspalum virletti*)

The virlet paspalum is a perennial grass found in southeastern Arizona and Mexico (Sonora and San Luis Potosi). Within Arizona, this grass is found in the Huachuca Mountains of Cochise County, and in the Pajarito Mountains and Sycamore Canyon of Santa Cruz County. This grass is found in sandy soils of canyon bottoms in semi-desert grassland communities and grassy areas within madrean evergreen woodland communities at elevations ranging from 1,067 to 1,737 m (3,500 – 5,700 ft) (AGFD 1999i). In the Nogales RD, the only known location for this grass is in Sycamore Canyon growing in a sandy canyon bottom (T. Newman, CNF, pers. comm., 20 August 2002).

This species is rare in Arizona, where it is known from only 2 widely separated populations. There is no information on the potential effects of land use activities, such as utility placement, on the population status of virlet paspalum (AGFD 1999i). Known locations of this plant occur outside of the proposed TEP transmission line corridor; therefore, placement of the line is not likely to impact the virlet paspalum.

Weeping muhly (Sycamore Canyon muhly) (Muhlenbergia xerophila)

Weeping muhly is a perennial herbaceous grass found only in southern Arizona. Populations occur in the Santa Catalina, Rincon, Santa Rita, Tumacacori, and Baboquivari mountains of Pima County, and in Sycamore Canyon within the Pajarito Mountains of Santa Cruz County. Weeping muhly most often grow in crevices of cliffs, bedrock, and other rocks along canyon bottoms. This grass is also known from rocky canyon slopes in oak, pine-oak, and riparian woodlands at elevations between 1,073 and 1,829 m (3,520 – 6,000 ft) (AGFD 1999j).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of weeping mully (AGFD 1999j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wiggins milkweed vine (*Metastelma mexicanum*)

Wiggins milkweed vine is a perennial herbaceous vine with a woody base found in southeastern Arizona to southern Sonora, Mexico. Within Arizona, this vine occurs around the Nogales and Ruby areas, Sycamore Canyon area, and Patagonia Mountains of Santa Cruz County, and Baboquivari, Coyote, and Catalina mountains of Pima County. This vine is typically found on open slopes within open oak woodland on granite soils of juniper flats at elevations between 1,067 and 1,554 m (3,500 – 5,100 ft) (AGFD 2000j). Wiggins milkweed vine has been found in several locations within the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of Wiggins milkweed vine within Arizona appear to be stable. This vine depends on surrounding vegetation for microhabitat and will be affected by any disturbance to area habitat (AGFD 2000j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wooly fleabane (*Laennecia eriophylla*)

Wooly fleabane is a perennial herb found in southeastern Arizona and northern Mexico (Sonora and Chihuahua). In Arizona, wooly fleabane occurs in the Atascosa Mountains, Pajarito Mountains, Santa Rita Mountains, Canelo Hills, and in the vicinity of Sonoita Creek in Santa Cruz County. This species is typically found in gravelly soil of rocky slopes and ridges with dense grass cover in semi-desert grassland, dry oak woodland, and pine-oak woodland communities at elevations between 1,292 and 1,722 m (4,240 – 5,650 ft) (AGFD 1999k). There are known locations of wooly fleabane in the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Population sizes of this plant are usually very small, with typically no more than 40 plants found in any of the populations known from Arizona. Population numbers fluctuate with the amount and timing of summer rains from year to year. This species was probably more common before its habitat was altered by excessive grazing (AGFD 1999k). Known locations of this plant and potential habitat occur outside of the proposed TEP transmission line corridor; therefore, placement of the line is not likely to impact the wooly fleabane.

3.2 Invertebrates

Arizona metalmark (Calephelis rawsoni arizonensis)

The Arizona metalmark is a small, brown butterfly with bands of blue metallic markings on the upper and underside of the body. This butterfly occurs in Arizona, and from the Animas Mountains in southwestern New Mexico southward to Sonora, Mexico. The southern limits of its range are poorly defined to date. In Arizona, this species is known from as far north as Gila County then southward through Graham, Cochise, Pima, and Santa Cruz counties in most of the mountains therein. Arizona metalmark butterflies occur mostly above the desert floor in mountain foothills. Within these mountains, it is found in riparian canyons in oak woodland or more arid regions at elevations from 716 to 1,676 m (2,350 – 5,500 ft). Canyons with standing water for a major portion of the year appear to contain populations of this species as long as *Agave* spp. are present for larvae development (AGFD 2001a). There is no information on the potential effects of land use activities, such as utility placement, on the population status of Arizona metalmark (AGFD 2001a).

Placement of the transmission line may indirectly impact individuals of this species through habitat modification, however because the species is widely distributed across southern Arizona, only a small percentage of Arizona metalmarks may be impacted. Furthermore, transplanting of agave plants also will minimize impacts. Impacts are not likely to result in a trend toward federal listing or loss of viability.

3.3 BIRDS

American peregrine falcon (Falco peregrinus anatum)

The American peregrine falcon subspecies is a medium-sized raptor that nests from central Alaska south to Baja California, Sonora, and the highlands of Central Mexico. Within Arizona, this raptor breeds wherever sufficient prey is available near cliffs. These raptors are rare or absent as breeders in the southwestern quarter of Arizona. Optimum habitat for peregrine falcons consists of steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats supporting avian prey species in abundance. These raptors may also be found in less optimal habitat consisting of small broken cliffs in ponderosa pine forests or large sheer cliffs in very xeric areas. The presence of an open expanse is critical. American peregrine falcons can be found at elevations ranging from 122 to 2,743 m (400 – 9,000 ft) (Glinski 1998, AGFD 1998f). Peregrine falcon nests were found on Ramanote Peak and along Sycamore Canyon (CNF 2000). Both these nests are at least 1.6 km (1 mi) from the proposed ROW. In 2002, another nest was found on Castle Rock, which is within the MSO PAC and within 0.3 km (0.18 mi) of proposed structures. The seasonal restrictions in effect for MSO (SECTION 1.4) will prevent breeding season disturbance of peregrines on Castle Rock.

American peregrine falcons have been found in great numbers in Arizona as well as in areas that will have formerly been considered marginal habitat. This trend suggests that populations in Arizona may have reached levels saturating the optimal habitat available (AGFD 1998f). Placement of the proposed transmission line is not likely to disturb known nesting peregrine falcons. If new nest sites are encountered during construction, conservation measures will be developed in coordination with CNF biologists to prevent

adverse effects. Development of the TEP line is not likely to result in a trend toward federal listing or loss of viability of this species.

Five-stripped sparrow (Aimophila quinquestriata)

The five-stripped sparrow is found in western portions of northern Sinaloa and Sonora, Mexico and the southeastern most portions of Arizona. This sparrow is primarily found in Mexico, but its range reaches into southeastern Arizona. Here, it is rarely found during breeding season, and there are only a few winter records. Five-stripped sparrow habitat is highly specialized, consisting of tall, dense shrubs on rocky, semi-desert hillsides and canyon slopes (New Mexico Game and Fish Department and the Fish and Wildlife Information Exchange 2000). Within the Nogales RD, this sparrow has been recorded within Sycamore Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of five-stripped sparrow have declined because of habitat loss, fragmentation, and degradation (New Mexico Game and Fish Department and the Fish and Wildlife Information Exchange 2000). The proposed TEP transmission line will not cross Sycamore Canyon where these sparrows have been observed. This species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD.

Northern gray hawk (*Asturina nitida maxima*)

The gray hawk is a medium-sized raptor with a gray back, black tail with 2 or 3 white bands, and a finely barred gray and white chest, abdomen, and thighs (Glinski 1998). The gray hawk prefers Sonoran riparian deciduous forest and woodland plant communities and can be found along the Santa Cruz and San Pedro rivers, Sonoita Creek, and Sopori Wash. This species also has been reported from the Hassayampa and Salt rivers. This hawk species is migratory and usually arrives in Arizona in mid-March and returns south during winter months (AGFD 2000k). Gray hawks prefer cottonwood, mesquite, and hackberry woodlands with a prey base of lizards, especially the whiptail lizard (*Cnemidophorus* spp.).

The current population trend for gray hawks is considered stable by the AGFD (2000k). Potential nesting habitat exists along small portions of the proposed TEP transmission line corridor along Sopori Wash and within Peck Canyon. Individual gray hawks may be indirectly impacted by habitat modification from construction activity related to transmission line placement; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, riparian plants within Sopori Wash will be mitigated to facilitate habitat recovery and disturbance to riparian vegetation in Peck Canyon will be avoided through the use of helicopters. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western yellow-billed cuckoo (Coccyzus americanus occidentalis)

The western yellow-billed cuckoo is a long and slender bird with short, dark legs that nests from southern California through the northeastern United States, south through the United States to the Florida Keys, Central America and southern Baja California, Mexico. This species winters from South America to central Argentina and Uruguay.

Within Arizona, western yellow-billed cuckoo are found in southern and central Arizona and the extreme northeast portion of the state. This species is typically found in streamside areas with cottonwood, willow groves, and larger mesquite bosques (AGFD 1998g). This species has been observed in Sopori Wash and Sycamore, Peck, and Peña Blanca canyons (AGFD 1998g; CNF 2000; P. Titus, T. Furgason, SWCA, pers. comm.16 October 2002).

Populations of western yellow-billed cuckoo have been reduced; a general decline is occurring in all areas with known populations (AGFD 1998g). This species is sensitive to habitat fragmentation and degradation of riparian woodlands due to agricultural and residential development (Hughes 1999). The proposed transmission line may cross potential cuckoo habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

3.4 REPTILES AND AMPHIBIANS

Giant spotted whiptail (*Cnemidophorus burti strictogrammus*)

The giant spotted whiptail is a long, slender lizard found in southeastern Arizona, extreme southwest New Mexico, and northern Sonora, Mexico. Within southeastern Arizona, this lizard is found in Cochise County; the Santa Catalina, Santa Rita, Baboquívari, and Pajarito mountains and in the vicinity of Oracle in Pima County; and in Pinal County. Giant spotted whiptail lizards inhabit mountain canyons, arroyos, and mesas in arid and semi-arid regions, entering lowland deserts along stream courses. They are found in dense shrubby vegetation, often among rocks near permanent and intermittent streams at elevations ranging from near sea level to 1,372 m (4,500 ft). Open areas of bunch grass within these riparian habitats are also occupied (AGFD 2001b).

Giant spotted whiptail populations are thought to be stable and some populations are locally abundant even though this species is limited in distribution (AGFD 2001b). Because the known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the giant spotted whiptail.

Lowland leopard frog (*Rana yavapaiensis*)

The lowland leopard frog is found in low elevations in the drainage of the lower Colorado River and its tributaries in Nevada, California, Arizona, New Mexico, northern Sonora and extreme northeast Baja California, Mexico (probably extirpated from California and Nevada). Within Arizona, this frog has been found in the Virginia River drainage in the extreme northwestern part of the state, in the Colorado River near Yuma, and west, central, and southeast Arizona south of the Mogollon Rim. This frog frequents desert, grassland, oak, and oak-pine woodland in permanent pools of foothill streams, rivers, and permanent stock tanks. They typically stay close to water at elevations ranging from 244 to 1,676 m (800 – 5,500 ft) (AGFD 1997b). Within the Nogales RD, this frog has been recorded in Pesquiera and Alamo canyons, California Gulch, Adobe,

Temporal Gulch, Big Casa Blanca, Box Canyon, and Gardner Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Lowland leopard frog populations are considered stable in central Arizona but declining in southeast Arizona, and populations have been extirpated from southwestern Arizona. Potential threats to this species are manipulation to major watercourses, water pollution, introduced species (fish, bullfrogs, and crayfish), heavy grazing, and habitat fragmentation (AGFD 1997b). Because no construction will occur within perennial aquatic habitats and known populations occur outside project area, the proposed transmission line will have no significant effect on the population status of the lowland leopard frog.

Mexican garter snake (*Thamnophis eques megalops*)

The Mexican garter snake ranges from southeastern Arizona and extreme southwestern New Mexico, southward into the highlands of western and southern Mexico, to Oaxaca. Within Arizona, this snake occurs in the southeast corner of the state from the Santa Cruz Valley east and generally south of the Gila River. Valid records (post 1980) have recorded this snake in the San Rafael and Sonoita grasslands area and from Arivaca. Mexican garter snakes are most abundant in densely vegetated desert grassland habitat surrounding cienegas, cienega-streams, stock tanks, and in or near water along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. This snake is generally found at elevations ranging from 914 to 1,524 m (3,000 – 5,000 ft) but may reach elevations of 2,591 m (8,500 ft) (AGFD 2001c).

Populations of Mexican garter snakes are decreasing, with extirpations at several localities since 1950 as habitat has changed and introduced predators have invaded. Management concerns for this species include predation by introduced bullfrogs and predatory fishes, urbanization and lowered water tables, and habitat destruction, including that due to overgrazing (AGFD 2001c). Because no construction will occur within perennial aquatic habitats and construction within riparian habitats will be minimized, the proposed transmission line will have no significant effect on the population status of the Mexican garter snake.

Western barking frog (*Eleutherodactylus augusti cactorum*)

The western barking frog is a secretive terrestrial frog found in extreme southern Arizona, southeast New Mexico, and central Texas south to the Isthmus of Tehuantepec. In Arizona, this frog historically occurred in Pima and Santa Cruz counties within the Santa Rita and Pajarito mountains. Habitat consists of rocky hillsides of canyons in woodland vegetation at elevations between 1,158 and 2,134 m (3,800 – 7,000 ft). Permanent water is not a necessary component of western barking frog habitat. There are very few records of this species in Arizona, and none have been recorded within the Nogales RD (AGFD 1995b).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of western barking frogs (AGFD 1995b). Because known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the western barking frog and is not likely to result in a trend toward listing or loss of viability.

3.5 Mammals

Cave myotis (*Myotis velifer*)

The cave myotis is a large bat found in the southwestern half of Arizona and the immediate adjacent parts of California, Nevada, New Mexico, and the northern third of Sonora, Mexico. Within Arizona, this bat is found south of the Mogollon Plateau from Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation, and the Chiricahua Mountains south to Mexico. Cave myotis have not been recorded in the extreme southwestern part of the state and are found in small numbers in southeastern Arizona in the winter. This bat typically prefers desertscrub habitats of creosote, brittlebush, paloverde, and cacti but they sometimes can be found up in pine-oak communities. Cave myotis roost in caves, tunnels, mineshafts, under bridges, and sometimes buildings within a few kilometers of a water source (AGFD 1997c).

Cave myotis colonies are vulnerable at the roost sites, especially maternity roosts, because the congregate in large numbers (AGFD 1997c). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the cave myotis.

Southern pocket gopher (*Thomomys umbrinus intermedius*)

The southern pocket gopher is a small gopher found in extreme southeastern Arizona and southwestern New Mexico, south into Mexico. Within Arizona, this gopher is found primarily in the southern most portion of the state in the oak belt of the Santa Rita, Patagonia, Atascosa, Pajarito, and Huachuca mountains. Southern pocket gophers have been found at Peña Blanca Spring in gravelly soil along a broad wash. Elsewhere, this species is generally found on rocky slopes within open oak woodlands in the lower parts of mountain ranges from 1,372 to 2,743 m (4,500 – 9,000 ft) in elevation. There has been only 1 record for the southern pocket gopher within the Nogales RD, specifically at Peña Blanca Canyon in the Atascosa/Pajarito mountains. However, it is suspected that this species has a much wider range (AGFD 1998h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of southern pocket gopher (AGFD 1998h). Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.0 BLM SENSITIVE SPECIES

Criteria for BLM Sensitive species include those that are:

- 1. Under status review by the USFWS, or
- 2. Whose numbers are declining so rapidly that Federal listing may become necessary, or
- 3. With typically small and widely dispersed populations,
- 4. Those inhabiting ecological refugia or other specialized or unique habitats.

The potential impacts to BLM Sensitive species were determined based on the habitat conditions within the BLM lands crossed by the proposed action, the life history of the species, and the proposed construction methods. Only those species that have a potential of occurring on or near the BLM parcel were evaluated. The 13 BLM Sensitive species evaluated were identified in the BLM Sensitive species list for Arizona (Instruction Memorandum No. AZ-2000-018) dated 21 April 2000 and are listed in Table 4.

TABLE 4. SUMMARY OF EFFECTS ON BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Balloonvine Cardiospermum corindum False grama Cathestecum erectum brevifolium	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability. May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Tumamoc globeberry Tumamoca macdougalii	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Loggerhead shrike Lanius ludovicianus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southern Arizona.
Rufous-winged sparrow Aimophila carpalis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

TABLE 4 (CONTINUED).	SUMMARY OF EFFECTS ON E	BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Western burrowing owl Athene curnicularia hypugea	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southwestern U.S.
Texas horned lizard Phrynosoma cornutum	No Impacts.	Known populations occur outside project area.
Big free-tailed bat Nyctinomops macrotis	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
California leaf-nosed bat Macrotus californicus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Fringed myotis Myotis thysandodes	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Pocketed free-tailed bat Nyctinomops femorosaccus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Spotted bat Euderma maculatum	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Underwood's mastiff bat Eumops underwoodi	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.

4.1 PLANTS

Balloonvine (Cardiospermum corindum)

This perennial vine is widely distributed in tropical and subtropical regions and is known from the Coyote Mountains in Pima County (Kearny and Peebles 1960). Because potential habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

False grama (*Cathestecum erectum* (*brevifolium*))

False grama is a perennial, drought-tolerant grass found on dry hills and plains of Southern Arizona and Northern Mexico. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Tumamoc globeberry (Tumamoca macdougalii)

This perennial vine occurs in shade of nurse plants along sandy washes below ~914 m (3,000 ft) in elevation. The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

4.2 BIRDS

Loggerhead shrike (*Lanius ludovicianus*)

The loggerhead shrike occurs in open country with scattered trees and shrubs, savanna, desertscrub and occasionally open woodland (AGFD 2002). In Arizona, this species usually summers throughout open parts of the state below the Transition Zone and is also periodically found along the Mexican border west of Baboquívari Mountains (Phillips et al. 1983). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Rufous-winged sparrow (Aimophila carpalis)

The rufous-winged sparrow is classified as a migratory bird and is a resident of eastern Pima County, including Avra Valley, and was once thought to be extirpated in Arizona due to overgrazing but was rediscovered in the Tucson Area in 1936. Rufous-winged sparrows generally use habitats characterized by scattered low shrubs and trees, which provide cover and foraging areas during mid-summer days. Many of these areas contain significant grassland components. Threats to the species include urban development, overgrazing, and exotic species, all of which result in losses of grassland communities utilized by this species (Pima County 2001). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western burrowing owl (*Athene cunicularia hypugea*)

The Western burrowing owl inhabits heavily grazed tracts of mixed-grass prairie, particularly where there are burrows created by large rodents, such as prairie dogs and Richardson ground squirrels. Distribution extends from southern Canada through the western United States to South America. Arizona is 1 of 3 states that provide important wintering areas for this species (USGS 2003). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout the southwestern United States. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.3 REPTILES AND AMPHIBIANS

Texas horned lizard (*Phrynosoma cornutum*)

The Texas horned lizard occurs from Kansas to extreme southeastern Arizona and lives mainly in sandy areas of deserts, grasslands, prairies, and scrublands (Bartlett and Bartlett 1999) where it often inhabits abandoned animal burrows (Bockstanz 1998). Because known populations occur outside of the project area, the proposed transmission line will have no significant effect on the population status of this species.

4.4 MAMMALS

Big free-tailed bat (*Nyctinomops macrotis*)

Distribution of the big free-tailed bat occurs from the southwestern United States southward through the Caribbean, Central America, and into the northern part of South America. Northern populations are known to migrate to southern Arizona and Mexico in the fall, yet this species is widely scattered throughout Arizona during the spring and summer too. In Arizona, this bat has been found in pinyon-juniper, Douglas-fir, and Sonoran desertscrub habitats, but it is believed that these locations are foraging sites. Preferred roosting sites include rock crevices and fissures of mountain cliffs in rugged, rocky areas of desertscrub habitat (AGFD 1993, Harvey et al. 1999). The proposed TEP

transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the big free-tailed bat.

California leaf-nosed bat (Macrotus californicus)

Distribution of the California leaf-nosed bat in the United States spans southern California, southern Nevada, and southwestern Arizona and extends southward into Mexico, to the southern tip of Baja California, northern Sinaloa, and southwestern Chihuahua. This bat lives predominantly in Sonoran and Mohave desertscrub habitats, but is occasionally found in the Chihuahuan and Great Basin deserts. Daytime roosting sites are usually mines and caves, and nighttime roosts include open buildings, cellars, bridges, porches, and mines. These bats do not hibernate or migrate; therefore, they tend to live in the same area year after year and remain active year-round (AGFD 1993, 2001d; Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the California leaf-nosed bat.

Fringed myotis (Myotis thysandodes)

Distribution of the fringed myotis ranges from southern British Columbia, Canada southward throughout the western United States, and down to southern Mexico. It occurs in a variety of habitats – from desertscrub to oak and pinyon woodlands to spruce-fir forests. Roosting sites include caves, mines, and buildings. These bats tend to roost in tight clusters and may change locations periodically in response to thermoregulatory needs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the fringed myotis.

Pocketed free-tailed bat (*Nyctinomops femorosaccus*)

The pocketed free-tailed bat ranges from the southwestern United States (including southern California, Arizona, and New Mexico, and the Trans-Pecos region of Texas), south into Mexico through Baja, Sonora, Durango, and Jalisco to, at least, Michoacan. This bat can be found in the arid lowlands of the desert Southwest, where it roosts in crevices and caves of rugged cliffs, slopes, and rock outcrops (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed and will not likely result in a trend toward federal listing or loss of viability of this species.

Spotted bat (*Euderma maculatum*)

Distribution of the spotted bat ranges throughout centralwestern North America, from southcentral British Columbia down to southern Mexico. In Arizona, its habitat ranges from low desert areas in the Southwest to high desert and riparian habitats in the northwestern part of the state. This bat has also been documented in conifer forests in northern Arizona. Roosting sites are often situated in rock crevices on high cliffs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the spotted bat.

Underwood's mastiff bat (Eumops underwoodi)

The range of Underwood's mastiff bat is limited, from south-central Arizona, into the arid lowlands of Sonoran and western Mexico, and into Honduras. It is believed to be a year-round resident of Arizona, ranging from the Baboquívari Mountains down to Organpipe National Monument. This bat prefers Sonoran desertscrub and mesquite/grassland plant communities. Roosting tends to occur in crevices along steep cliffs and sometimes in the cracks of buildings (AGFD 1993). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of this species.

5.0 AGFD WILDLIFE OF SPECIAL CONCERN

AGFD was consulted in regards to state listed special status species and habitats that may be affected by the proposed action. Several state listed special status species and overall wildlife habitat may be affected by the proposed action. The AGFD mission is to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs. Continued consultation and input from AGFD will ensure that impacts of the proposed action are minimized and mitigation efforts are successful.

Listed in Table 5 are state special status species that may be found in the vicinity of the proposed action, based on AGFD's Heritage Data Management System (HDMS) (1 July 2002). Effects of the proposed action on the majority of these species will be avoided or minimized through mitigation efforts stipulated for federally listed species. However, additional mitigation is recommend for the Sonoran Desert tortoise as 5 individuals were located near the Tinaja Hills area during field surveys of the proposed ROW (HEG 2002, unpublished data).

TABLE 5. SUMMARY OF EFFECTS ON WILDLIFE OF SPECIAL CONCERN IN ARIZONA.		
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION
Black-bellied whistling duck Dendrocyna autumnalis	No Impacts.	No construction in perennial aquatic habitats.
Crested caracara Caracara cheriway	No Impacts.	Known populations occur outside project area.
Desert tortoise - Sonoran population Gopherus agassizii Elegant trogon Trogon elegans	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability. May impact individuals of this	 Only small percentage of total potential habitat within project area may be impacted. Pre-construction surveys will minimize impacts to species. Minimal impacts to riparian habitat. Only small percentage of total population
	species, but is not likely to result in a trend toward federal listing or loss of viability.	 within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Great Plains narrow- mouthed toad Gastrophryne olivacea	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

TABLE 5 (CONTINUED).	SUMMARY OF EFFECTS ON WILL	OLIFE OF SPECIAL CONCERN IN ARIZONA.
COMMON NAME Scientific Name	EFFECTS DETERMINATION	JUSTIFICATION

Mexican long-tongued bat Choeronycteris mexicana	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Only small percentage of total potential habitat within project area may be impacted. Mitigation plantings of agaves will reduce impacts.
Mexican vine snake Oxibelis aeneus	No Impacts.	Known occurrences are outside project area.
Osprey Pandion haliaetus	No Impacts	No construction in perennial aquatic habitats.
Rose-throated becard Pachyramphus aglaiae	No Impacts.	Known occurrences are outside project area.
Thick-billed kingbird Tyrannus crassirostris	No Impacts	No potential habitat within project area.
Tropical Kingbird Tyrannus melancholicus	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	 Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

Black-bellied whistling duck (*Dendrocyna autumnalis*)

The black-bellied whistling duck is "goose-like" with a long neck and long pink legs. This species has a cinnamon or chestnut breast and back with a black belly and bright coral-red bill. The total range for this species is from the Gulf coast and lower Rio Grande Valley of Texas and central Arizona south through Mexico, Central America to southern Brazil. In Arizona, the range for the black-bellied whistling duck is southeastern and central Arizona. Black-bellied whistling ducks are commonly seen in the Santa Cruz Valley, particularly in ponds near and around Nogales. The habitat for this species consists of the banks of rivers, lakes, ponds, riparian areas, and stock tanks (Brown 1985).

Because of habitat loss and apparent population declines from historic levels, the black-bellied whistling duck has been placed on the AGFD Threatened Native Wildlife of Arizona List as a candidate species. This species appears to be increasing in Arizona in urban settings at man-made ponds and at sewage treatment plants. It also appears to be stable at some private ranch ponds, which tend to be isolated from hunting pressure (Corman 1994).

Because no construction will occur in perennial aquatic habitats, the proposed transmission line will have no effect on the population status of the black-bellied whistling duck.

Crested caracara (*Caracara cheriway*)

The crested caracara is a medium sized raptor with bold black and white plumage and a bright yellow-orange face and legs. The crested caracara ranges from southern Arizona and northern Mexico to Tierra del Fuego. In the United States, it occurs only along the

southern border in Texas and Arizona, and in Florida, where there is an isolated population in the south-central peninsula. In Arizona, their range extends up from San Miguel in the Baboquivari Valley north to Quijotoa, Sells, and Coyote Pass. This raptor occurs regularly on the Tohono O'odham Indian Reservation. Small groups of crested caracara are seen in Sasabe and south of the Mexican border near Sonoyta, Sonora. This raptor is found in open habitats, typically grassland, prairie, pastures, or desert with scattered taller trees, shrubs, or cacti. The crested caracara is found in areas characterized by low-profile ground vegetation and scattered tall vegetation. Specifically in Arizona, vegetation consists of saguaro, mesquite, paloverde, cholla and acacia (Morrison 1996).

Arizona populations of crested caracara on the Tohono O'odham Reservation are likely stable because few threats exist. Reports of individual, and in some cases groups, of this raptor outside of the reservation indicate that its range within Arizona is probably as extensive as it was historically. No apparent threat currently exits to Arizona populations; however, the AGFD has listed the crested caracara as a threatened native wildlife. This species is considered vulnerable if habitat conditions worsen (Morrison 1996).

Habitat surveys did not detect the presence of any bird of prey nests along the corridor. Furthermore, no know populations of this species occur within the project area. Therefore, the proposed action will have no effect on the population status of the crested caracara.

Desert tortoise (Sonoran) (*Gopherus agassizii*)

The Sonoran Desert tortoise ranges from northern Sinaloa, Mexico to southern Nevada and southwestern Utah, and from southcentral California east to southeastern Arizona. The desert tortoise is divided into 2 populations for purposes of the Endangered Species Act. The threatened Mojave population occurs north and west of the Colorado River and the unlisted Sonoran population occurs south and east of the Colorado River. Within Arizona, the Sonoran Desert tortoise is found south and east of the Colorado River from Mojave County to the south, beyond the International Boundary and many scattered locations in between. The Sonoran population of the desert tortoise occurs primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub at elevations ranging from 152 to 1,615 m (500 – 5,300 ft). Burrows and shelter sites are generally below rocks and boulders, in rock crevices, under vegetation, and also in caliche caves of incised wash banks (AGFD 2001e).

Several threats to tortoise populations in the Sonoran Desert have been identified, including habitat fragmentation, habitat loss and degradation from urban and agricultural development and roads, wildfires associated with invasion of non-native grasses and forbs, illegal collection, and genetic contamination of wild populations by escaped or released captives. Although current evidence suggests that Arizona populations are stable there are substantial gaps in available data (Arizona Interagency Desert Tortoise Team 1996).

During ground surveys of the proposed transmission line corridor, 5 desert tortoise were found (HEG, unpublished data). Per recommendations of Spencer and Humphrey (1999) for any ground disturbing projects, surveys should be conducted a minimum of 48 hours prior to grading and again just prior (as it is occurring) to vegetation clearing (Desert Tortoise Council 1999). While the proposed action may have a minimal effect on the potential habitat of this species, pre-construction surveys will minimize impacts to individual tortoise and is therefore not likely to result in a trend toward listing or loss of viability.

Elegant trogon (*Trogon elegans*)

The elegant trogon is a medium sized bird with a round head, large eyes, a white band on an iridescent green breast, black face and throat, red belly and undertail coverts. The total range for this bird is from southern Arizona and New Mexico south through Mexico to southern Nicaragua to northwestern Costa Rica. In Arizona, the elegant trogon is found in sky island mountains, most commonly the Atascosa, Chiricahua, Huachuca, and Santa Rita mountains. Elegant trogons are found in riparian areas consisting of sycamore, cottonwood, and oak, and also in coniferous woodlands at elevations ranging from 1,036 to 2,073 m (3,400 – 6,800 ft) (AGFD 2001f).

Population trends for the elegant trogon are not well known. No evidence indicates population declines in any of the core canyons occupied over the past few decades. Threats to this species include degradation and loss of native riparian habitat through stream diversion, groundwater withdrawal, erosion, and overgrazing (AGFD 2001f).

The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual trogons, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Great Plains narrow-mouthed toad (*Gastrophryne olivacea*)

The Great Plains narrow-mouthed toad is a small, stout toad with stubby limbs, a small pointed head with a fold of skin on the back of the head. The total range for this species is from southeastern Nebraska and Missouri south through Texas to western Mexico. Within Arizona, the Great Plains narrow-mouthed toad is found in the vicinity of Santa Cruz County, Pima County, to near Casa Grande, Arizona in Pinal County. Habitat for this species in Arizona consists of mesquite semi-desert grassland communities to oak woodland communities near riparian areas at elevations ranging from sea level to around 1,250 m (4,100 ft) (AGFD 1995c).

Population trends for the Great Plains narrow-mouthed toad are currently unknown. Populations in Arizona are at the extreme northwestern edge of the species range and distribution is limited throughout its range (AGFD 1995c). The proposed transmission line may cross potential habitat for this species; however, construction within riparian

habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican long-tongued bat (*Choeronycteris mexicana*)

The Mexican long-tongued bat has a long, slender nose with a leaf-like structure on the base of the nose. The total range for this species is from southeastern Arizona, southwestern New Mexico, and California south through Central America to Venezuela. In Arizona, the Mexican long-tongued bat is found from the Chiricahua Mountains extending as far north as the Santa Catalina Mountains and west to the Baboquivari Mountains. Habitat for this bat is typically within canyons of mixed oak-conifer forests in mountains at elevations ranging from 1,082 to 2,231 m (3,550 – 7,320 ft) (AGFD 1994). This species do not congregate in sizeable maternity or bachelor colonies like *Leptonycteris* bats do (Hoffmeister 1986). They feed on nectar and pollen, especially from paniculate agaves (AGFD 1994).

Populations of Mexican long-tongued bats in Arizona appear to be highly variable (AGFD 1994) and there is no evidence of a long-term decline or any clear trend. The limitation of riparian zones and the distribution of food plants may limit populations of this species in Arizona and loss of riparian vegetation may be a greater threat to this species than human disturbance at particular roost sites (Pima County 2001). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during construction; however, these disturbances will be isolated and will impact only a small percentage of potential habitat. Furthermore, transplanting of agave plants also will minimize impacts. Impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican vine snake (Oxibelis aeneus)

The Mexican vine snake has an elongated head, pointed snout, and is thin bodied with an ash gray to yellow-brown and tan coloring. The total range for this species is from extreme southern Arizona south to Brazil. In Arizona, this species occurs in the Tumacacori, Pajarito, and Patagonia mountains in Santa Cruz County. Habitat for the Mexican vine snake consists of brush-covered hillsides and riparian areas with sycamore, oak, walnut and wild grape trees at elevations ranging from 914 to 1,768 m (3,000 – 5,800 ft) (AGFD 1991b).

Population trends for the Mexican vine snake are currently unknown. Populations in Arizona are at the extreme northern edge of the species range and distribution is limited, with occurrences known from Sycamore Canyon (AGFD 1991b). A potential threat is the high interest by collectors for this species (AGFD 1991b). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the Mexican vine snake.

Osprey (*Pandion haliaetus*)

This raptor is dark brown on its back and white on the underparts with a prominent dark eye stripe. The total range for the osprey is from Alaska to Newfoundland, along the Atlantic and Pacific coastlines, and in the Rocky Mountains south through central and South America. Within Arizona, the osprey occurs primarily in the White Mountains, along the Mogollon Rim, and along the Salt and Verde rivers. In southeastern Arizona, this raptor is an uncommon spring and fall transient, usually seen at ponds and reservoirs. Nesting habitat of the osprey consists of coniferous trees along rivers and lakes at elevations ranging from 1,829 to 2,377 m (6,000 – 7,800 ft) (AGFD 1997d).

Osprey population trends in Arizona are not well known. Only about 20 nest sites are known in the southwest, all within Arizona. This raptor is threatened by loss of nesting habitat and foraging perch sites. It is also threatened by recreational use of nesting habitat, shooting, and pesticide poisoning on wintering grounds (AGFD 1997d).

Because no construction will occur in perennial aquatic habitats, the proposed action will have no effect on the population status of the osprey.

Rose-throated becard (*Pachyramphus aglaiae*)

The rose-throated becard is a big-headed, thick billed bird that breeds in southeast Arizona, southern Texas (rare visitor along the Rio Grande), south through Mexico to Costa Rica. This species winters from northern Mexico south through to its breeding range. Within Arizona, rose-throated becards have been found breeding along Sonoita and Arivaca creeks, Sycamore Canyon (Atascosa Mountains), and Patagonia. Historically, this species nested in Guadalupe Canyon (east of Douglas) and near Tucson. Rose-throated becards typically inhabit marshes of Sonoran desertscrub communities of open to dense vegetation of shrubs, low trees, and succulents dominated by paloverde, prickly pear, and saguaro. This species also is found in the desert riparian deciduous woodland communities of marsh-woodlands, especially of cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of deciduous trees and shrubs along the margins. In Arizona, the rose-throated becard is found at elevations ranging from 1,082 to 1,228 m (3,550 – 4,030 ft) (AGFD 2001g).

Population trends for the rose-throated becard are currently unknown. Potential threats to this species include disturbance from bird watchers and degradation and loss of native riparian habitat through overgrazing, urban development, and groundwater depletion (AGFD 2001g). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the rose-throated becard.

Thick-billed kingbird (*Tyrannus crassirostris*)

The thick-billed kingbird is a relatively stocky flycatcher with a large head and heavy bill. This kingbird occurs from southeastern Arizona and southwestern New Mexico south through western Mexico to western Guatemala. In Arizona, thick-billed kingbirds are most often seen around Sonoita and Arivaca creeks and in Madera and Guadalupe canyons. This species may occur in mountains of Pima, Santa Cruz and Cochise counties

where there are drainages with well-developed riparian areas. Habitat for the thick-billed kingbird consists of broad-leaved, riparian forests usually with well-developed large sycamores and cottonwoods at elevations ranging from 914 to 1,981 m (3,000 - 6,500 ft) (Tibbitts 1991).

Present distribution of the thick-billed kingbirds in Arizona is very limited. Potential threats include human recreational activities, encroachment of human development into breeding habitat, woodcutting, grazing, and groundwater depletion (Tibbitts 1991). Because no potential habitat occurs within the project area, the proposed action will have no effect on the population status of the thick-billed kingbird.

Tropical Kingbird (*Tyrannus melancholicus*)

The tropical kingbird is a large tyrant-flycatcher with a large bill and long, slightly notched tail. The tropical kingbird ranges from southeastern Arizona through western and central Mexico to central Argentina. Breeding birds have been found in Tucson, along the Santa Cruz Valley from Green Valley south, east of Phoenix in the Salt River Valley, to the San Pedro Valley. This species also has been reported from Sopori Wash. The Tropical Kingbird inhabits open and semi-open areas with scattered trees and shrubs. Also found in urban areas and roadsides with tall human-made fixtures (Stouffer and Chesser 1998).

Tropical kingbirds seem to persist or even thrive in developed areas. No negative effects of human activities have been reported (Stouffer and Chesser 1998). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual tropical kingbirds, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to tropical kingbirds are not likely to result in a trend toward federal listing or loss of viability.

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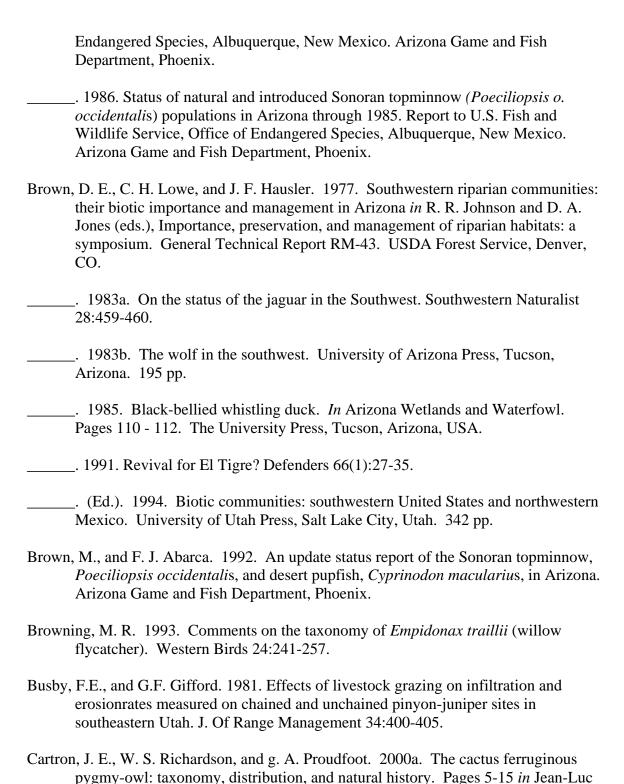
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7.0 LIST OF ACRONYMS

ACC Arizona Corporation Commission

ADEQ Arizona Department of Environmental Quality

AGFD Arizona Game and Fish Department

AOU American Ornithologists' Union

ASLD Arizona State Land Department

AUM Animal Unit per Month

BA Biological Assessment

BLM Bureau of Land Management

BO Biological Opinion

CFPO Cactus Ferruginous Pygmy Owl

Citizens Communications

CLF Chiricahua Leopard Frog

CNF Coronado National Forest

DBH Diameter Breast Height

DOE Department of Energy

EMA Ecosystem Management Area

ESA Endangered Species Act

GPS Global Positioning System

HDMS Heritage Data Management System

HEG Harris Environmental Group, Inc.

I-19 Interstate 19

IRA Inventoried Roadless Area

LLNB Lesser Long-nosed Bat

MOA Memorandum of Agreement

MSO Mexican Spotted Owl

NPDES National Pollutant Discharge Elimination System

OHV Off-highway vehicle

PAC Protected Activity Center

PPC Pima Pineapple Cactus

RA Roads Analysis

RNA Research Natural Area

ROW Right-of-way

RU Recovery Units

SL Standard Length

SWFL Southwestern Willow Flycatcher

TEP Tucson Electric Power

USDOI United States Department of Interior

USFWS United States Fish and Wildlife Service

USFS United States Department of Agriculture Forest Service

YOY Young-of-the-year

APPENDIX A

Plants documented along proposed ROW of the TEP Citizens Interconnect Project, July to October 2002.

SPECIES			Family	
	Scientific Name	Common Name		
CACTUS & SUCCULENTS	Agave parryi	century plant	Agavaceae	
	Agave schottii	shindagger	Agavaceae	
	Coryphantha scheeri var. robustispina	Pima pineapple cactus	Cactaceae	
	Dasylirion wheeleri	sotol	Agavaceae	
	Echinocereus spp.	hedgehog cactus	Cactaceae	
	Echinocereus pectinatus var. rigidissimus	Arizona rainbow cactus	Cactaceae	
	Ferocactus wislizenii	fishhook barrel cactus	Cactaceae	
	Fouquieria splendens	ocotillo	Fouquieriaceae	
	Mammillaria spp.	pincushion cactus	Cactaceae	
	Nolina microcarpa	beargrass	Agavaceae	
	Opuntia spp.	cholla	Cactaceae	
	Opuntia spp.	prickly pear	Cactaceae	
	Opuntia spinosior	walkingstick cactus	Cactaceae	
	Yucca elata	soaptree yucca	Agavaceae	
GRASSES	Bouteloua barbata or B. rothrockii	six-weeks or Rothrock grama	Poaceae	
	Bothriochloa barbinodis	cane beard grass	Poaceae	
	Bouteloua curtipendula	side oats grama	Poaceae	
	Bouteloua gracilis	blue grama	Poaceae	
	Bouteloua hirsuta	hairy grama	Poaceae	
	Bouteloua parryi	Parry grama	Poaceae	
	Bouteloua repens	slender grama	Poaceae	
	Digitaria californica	Arizona cottontop	Poaceae	
	Erioneuron pulchellum	fluffgrass	Poaceae	
	Hilaria belangeri	curly mesquite	Poaceae	
	Leptochloa dubia	green sprangletop	Poaceae	
	Muhlenbergia emersleyi	bull grass	Poaceae	
	Muhlenbergia rigens	deer grass	Poaceae	
	Piptochaetium fimbriatum	pinyon rice grass	Poaceae	
	Sporobolus spp.	dropseed	Poaceae	

SPECIES			Family
	Scientific Name	Common Name	
FORBS	Abutilon incanum	Indian mallow	Malvaceae
	Allionia incarnata	trailing windmills	Nyctaginaceae
	Ambrosia confertiflora	weakleaf burr ragweed	Asteraceae
	Amoreuxia palmatiflida	Arizona yellow show	Cochlospermacea
	Argemone sp.	prickly poppy	Papaveraceae
	Artemisia ludoviciana		Asteraceae
	Asclepias asperula	antelope horns	Asclepiadaceae
	Asclepias nummularia	tufted milkweed	Asclepiadaceae
	Asclepias tuberosa	butterfly milkweed	Asclepiadaceae
	Aspicarpa hirtella	aspicarpa	Malpighiaceae
	Boerhaavia coccinea	red spiderling	Nyctaginaceae
	Bouchea prismatica	bouchea	Verbenaceae
	Bouvardia glaberrima	smooth bouvardia	Rubiaceae
	Brickellia spp.	brickellbush	Asteraceae
	Chamaecrista serpens var. wrightii	sensitive pea	Fabaceae
	Cheilanthes fendleri	cloak fern	Pteridaceae
	Cheilanthes spp.	claok fern	Pteridaceae
	Chenopodium fremontii	lamb's quarter	Chenopodiaceae
	Clitoria mariana	butterfly pea	Fabaceae
	Cnidosculus angustidens	mala mujer	Euphorbiaceae
	Cologania longifolia	narrowleaf tick clover	Fabaceae
	Commelina dianthifolia	western dayflower	Commelinaceae
	Cucurbita digitata	coyote gourd	Cucurbitaceae
	Datura metaloides	sacred datura	Solanaceae
	Eleocharis spp.	spikerush	Cyperaceae
	Eriogonum wrightii	buckwheat	Polygonaceae
	Eryngium heterophylla	button snakeroot	Apiaceae
	Evolvulus alsinoides		Convolvulaceae

SPECIES			Family
	Scientific Name	Common Name	
Forbs (Cont.)	Evolvulus arizonicus	Arizona blue eyes	Convolvulaceae
, ,	Galium wrightii	northern bedstraw	Rubiaceae
	Glandularia gooddingii	verbena	Verbenaceae
	Gnaphalium leucocephalum	white cudweed	Asteraceae
	Gnaphalium wrightii	cudweed	Asteraceae
	Gomphrena sp.	globe amaranth	Amarnathaceae
	Gutierrezia spp.	snakeweed	Asteraceae
	Ipomoea barbatisepala	morning glory	Convolvulaceae
	Ipomoea coccinea	scarlet creeper	Convolvulaceae
	Ipomoea hirsutula	wooly morning glory	Convolvulaceae
	Ipomoea leptotoma	bird's foot morning glory	Convolvulaceae
	Ipomoea longifolia	long leaf morning glory	Convolvulaceae
	Isocoma tenuisecta	burroweed	Asteraceae
	Jatropha macrorhiza	Arizona desert potato	Euphorbiaceae
	Kallstroemia grandiflora	Arizona caltrop	Zygophyllaceae
	Krameria parvifolia	range ratany	Krameriaceae
	Machaeranthera spp.	spiny aster	Asteraceae
	Macroptilium gibbosifolium	variableleaf bushbean	Fabaceae
	Milla biflora	Mexican star	Liliaceae
	Oenothera rosea	evening primrose	Onagraceae
	Oxalis albicans	wild oxalis	Oxalidaceae
	Penstemon linarioides	linear leaf penstemmon	Scrophulariaceae
	Phaseolus ritensus	eggleaf stringbean	Fabaceae
	Phaseolus sp.	stringbean	Fabaceae
	Portulaca suffrutescens	portulaca	Portulacaceae
	Portulaca umbraticola	portulaca	Portulacaceae
	Proboscidea sp.	unicorn plant, devil's claw	Pedaliaceae

SPECIES			Family
	Scientific Name	Common Name	
Forbs (Cont.)	Salvia subincisa	sawtooth sage	Lamiaceae
	Schoenocrambe linearifolia	schoenocrambe	Brassicaceae
	Scirpus sp.	bulrush	Cyperaceae
	Senna covesii	desert senna	Fabaceae
	Senna hirsuta	woolly senna	Fabaceae
	Solanum douglassii	greenspot nightshade	Solanaceae
	Solanum elaeagnifolium	silverleaf nightshade	Solanaceae
	Sphaeralcea spp.	globe mallow	Malvaceae
	Tagetes sp.	marigold	Asteraceae
	Talinum angustissimum	talinum	Portulacaceae
	Talinum aurantiacum	orange fameflower	Portulacaceae
	Tetramerium hispidum	tetramerium	Acanthatceae
	Thalictrum fendleri	Fendler's meadow rue	Ranunculaceae
	Vitis arizonica	Arizona grape	Vitaceae
	Zinnia acerosa	desert zinnia	Asteraceae

SPECIES			Family
	Scientific Name	Common Name	
TREES & SHRUBS	Acacia angustissima	white ball acacia	Fabaceae
	Acacia constricta	whitethorn acacia	Fabaceae
	Acacia greggii	catclaw acacia	Fabaceae
	Aloysia wrightii	oreganillo	Verbenaceae
	Arctostaphylos sp.	manzanita	Ericaceae
	Baccharis salicifolia	seep willow	Asteraceae
	Baccharis sarothroides	desert broom	Asteraceae
	Calliandra eriophylla	fairyduster	Fabaceae
	Celtis pallida	desert hackberry	Ulmaceae
	Celtis reticulata	netleaf hackberry	Ulmaceae
	Chrysothamnus teretifolius	green rabbitbrush	Asteraceae
	Dodonaea viscosa	hopbush	Sapindaceae
	Ericameria laricifolia	turpentine bush	Asteraceae
	Erythrina flabelliformis	coral bean	Fabaceae
	Eysenhardtia orthocarpa	kidney wood	Fabaceae
	Fraxinus velutina	velvet ash; Arizona ash	Oleaceae
	Gossypium thurberi	desert cotton	Malvaceae
	Guardiola platyphylla	Apache plant	Asteraceae
	Hibiscus coulteri	desert rosemallow	Malvaceae
	Indigofera spaerocarpa	Sonoran Indigo	Fabaceae
	Juglans major	Arizona walnut	Juglandaceae
	Juniperus deppeana	alligator juniper	Cupressaceae
	Lasianthaea podocephala	San Pedro daisy	Asteraceae
	Lycium spp.	wolfberry	Solanaceae
	Mimosa biuncifera	catclaw mimosa	Fabaceae
	Mimosa dysocarpa	velvet pod mimosa	Fabaceae

	SPECIES		
	Scientific Name	Common Name	
TREES & SHRUBS	Parkinsonia microphylla	yellow palo verde	Fabaceae
	Populus fremontii	Fremont cottonwood	Salicaceae
	Prosopis velutina	velvet mesquite	Fabaceae
	Q. arizonica	Arizona white oak	Fagaceae
	Q. garrya	silktassel	Fagaceae
	Quercus emoryii	Emory oak	Fagaceae
	Rhus aromatica	skunkbush	Anacardiaceae
	Rhus choriophylla	sumac	Anacardiaceae
	Salix exigua	coyote willow	Salicaceae
	Tamarix pentandra	salt cedar	Tamaricaceae
	Ziziphus obtusifolia	graythorn	Rhamnaceae

TEP-Citizen's Interconnect Project

Environmental Training Guidelines for Construction Supervisors

- Stay in the designated work areas. Approved work areas, access roads, and staging areas will be clearly marked. All project activities must remain in these areas. Do not work or trespass beyond the signed or fenced restricted work areas.
- Restrict vehicle access to public roadways and designated access roads. Crosscountry driving is prohibited.
- No driving or parking within 100 feet of ponds and tanks.
- Do not transfer water from one pond or tank to another or between any other bodies of water.
- No in-stream activity or disposal of construction debris or fill is allowed.
- Store topsoil and trench spoils behind sediment control structures at least 20 feet from any stream bank, including dry washes.
- Check equipment for leaks or heavy surface oil build-up before working in streams or washes.
- The use or transfer of hazardous materials will not be allowed within 100 feet of any stream or wash is prohibited.
- Do not litter. Dispose of trash in designated containers. Uncontained trash can attract wildlife and unwanted pests. Cigarette butts are considered litter, and should be extinguished and disposed of appropriately. All litter and construction debris must be removed from the job site daily.
- No pets or firearms. They are prohibited for job-site protection and protection of wildlife.
- Hunting is prohibited.
- Clearing will be limited to the minimum required to provide a safe construction area. Make sure you know the clearing limit, and if possible, leave plant root systems in place when clearing vegetation.
- It is illegal to harm, harass, pursue, hunt, shoot, wound, trap, kill capture, or collect wildlife officially listed as threatened or endangered. Violation of threatened and endangered special laws can result in penalties of up to \$100,000 and/or one year in jail.
- Do not approach or feed wildlife. Keep away form their burrows and nests. Do not harm or kill any wildlife encountered.
- If animal is harmed or found harmed, contact your Construction Supervisor or the Environmental Inspector. Do not attempt to move the animal yourself.

APPENDIX C

Natural Resource Agencies Correspondence.

- 1. U. S. Fish and Wildlife Service, dated 14 May 2002.
- 2. Arizona Game and Fish Department, dated 25 April 2002.

APPENDIX D

APPENDIX D. Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima County, Arizona as of 14 August 2002, excluded from further consideration.

COMMON	SCIENTIFIC			
NAME	NAME	STATUS	Habitat	JUSTIFICATION
PLANTS				
Canelo Hills ladies' tresses	Spiranthes delitescens	Endangered	Finely grained, highly organic, saturated soils of cienegas. Potential habitat occurs in Sonora, Mexico, but no populations have been found.	No habitat present.
Huachuca water umbel	Lilaeopsis schaffneriana ssp. recurva	Endangered	An emergent aquatic plant that requires marshy wetlands.	No habitat present.
Kearney's blue star	Amsonia kearneyana	Endangered	Known only from the Baboquivari Mountains.	ROW is outside of known range.
Nichol's Turk's head cactus	Echinocactus horizonthalonius var. nicholii	Endangered	Dependent on limestone substrates in desert hills.	No habitat present.
FISH				
Desert pupfish	Cyprinodon macularius	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	No habitat present in area.
Gila chub	Gila intermedia	Proposed Endangered	Small streams and cienegas; prefer deeper pools with cover.	No habitat present in area.
Loach minnow	Tiaroga cobitis	Threatened	Requires perennial streams with swift water over cobble or gravel	No habitat present in area.
Sonoran Chub	Gila ditaenia	Threatened	Most commonly found in deep, permanent pools with bedrock-sand substrates and free of floating algae.	In U.S, limited to Sycamore Canyon and its tributaries.
Spikedace	Meda fulgida	Threatened	Requires perennial streams with swift velocities over sand and gravel.	No habitat present in area.
AMPHIBIANS				
Sonoran tiger salamander	Ambystoma tigrinum stebbinsi	Endangered	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains at 4000-6300 ft.	ROW is outside of known range. This species is not known to occur in the

APPENDIX D. Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima County, Arizona as of 14 August 2002, excluded from further consideration.

COMMON	SCIENTIFIC	STATUS	Habitat	JUSTIFICATION
NAME BIRDS	NAME	SIAIUS	Habitat	JUSTIFICATION
Bald eagle	Haliaeetus leucocephalus	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Winter surveys of Peña Blanca and Arivaca Lakes were conducted in 1994, 1995, 1996, 1998, 2000, 2001, and 2002. No bald eagles have been observed.
California brown pelican	Pelecanus occidentalis californicus	Endangered	Coastal land and islands; species is found around many Arizona lakes and rivers.	No habitat present in area.
Masked bobwhite	Colinus virginianus ridgewayi	Endangered	Only known Arizona population has been re- introduced on Buenos Aires Natl. Wildl. Refuge	ROW is outside of known range.
Mountain plover	Charadrius montanus	Proposed	Open arid plains, short grass prairies, and cultivated farms.	No habitat present in area.
Northern apolomado falcon	Falco femoralis septentrionalis	Endangered	Grassland and savannah habitats.	No recent confirmed reports for Arizona.
MAMMALS				
Ocelot	Felis pardalis	Endangered	Prefers humid tropical & subtropical habitats; typically found at higher elevations.	ROW is outside of known range.
Jaguarundi	Felis yagouaroundi tolteca	Endangered	Deciduous forests, riparian areas, swampy grasslands, upland drysavannahs, etc.	ROW is outside of known range.
Sonoran pronghorn	Antilocapra americana sonoriensis	Endangered	Grassy desertscrub in northwestern Sonora and adjacent Arizona borderlands, mainly Yuma Co.	ROW is outside of known range.

STATUS DEFINITIONS: ENDANGERED SPECIES ACT

Endangered: Imminent jeopardy of extinction.

<u>Threatened</u>: Imminent jeopardy of becoming endangered.

Proposed: Proposed Rule has been published in Federal Register to list as Threatened or Endangered.

Appendix G

NEPA Disclosure Statement for Preparation of the Tucson Electric Power Company Sahuarita-Nogales Transmission Line Draft Environmental Impact Statement CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

	. /	
(a)	$\overline{}$	Offeror and any proposed subcontractor have no financial or other
		interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.

2.

3.

Certified by:

Olay B. Lysy;
Signature

Diey B. Lysy; Geotechnical Services
Printed Name and Title Manager

Terracon Consultants
Company

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE TUCSON ELECTRIC POWER COMPANY SAHUARITA-NOAGLES TRANSMISSION LINE ENVIRONMENTAL IMPACT STATEMENT

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

	(a) X	Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.	
	(b)	Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.	
Finan	cial or Othe	er Interests	
1.			
2.			
3.			
		Certified by:	
		Thomas Furgason / Printed Name and Title	
		SWCA, Inc. Company	
		July 14, 2003 Date	

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(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.

2.

3.

Certified by:

Mark E. Smith

Signature

Program Manager

Printed Name and Title

Tetra Tech, Inc.

Company

7·14·03

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE TUCSON ELECTRIC POWER COMPANY SAHUARITA-NOGALES TRANSMISSION LINE ENVIRONMENTAL IMPACT STATEMENT

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 18026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)." 46 FR 18026-10838 at 10831.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: [check either (a) or (b) to assure consideration of your proposal].

(a)	x	Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.
(b)		Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.

2.

3.

Signatura

Gary K. Jacobs
Birector, Environmental Sciences Division
Printed Name and Title

GT-Battelle, LLC

Company

Certified by:

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE TUCSON ELECTRIC POWER COMPANY SAHUARITA-NOGALES TRANSMISSION LINE ENVIRONMENTAL IMPACT STATEMENT

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows; (check either [a] or [b] to assure consideration of your proposal).

- (a) Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.
- (b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.

2.

Certified by

Signature

Printed Name and Title

.....

Date

Appendix H

Proposed New Amendments to the Land and Resource Management Plan for the Coronado National Forest (1986, as amended)

H.1 INTRODUCTION

Each administrative component of the National Forest System (national forests and grasslands) is managed under the governance of a Land and Resource Management Plan (commonly referred to as a "Forest Plan") established under direction specified in the National Forest Management Act (16 U.S.C. 1604). The National Forest Management Act at 16 U.S.C. 1604(f)(4), provides a process for updating forest plans to keep them current with changes in management direction and resource conditions, and to accommodate subsequently proposed projects. These updates, known as amendments, may be adopted at any time during the planning period covered by a Forest Plan and may address a wide range of issues or changes to management direction needed to keep the forest plan current. As noted in the National Forest Management Act regulations, "[forest plans may] be amended in any manner whatsoever after final adoption after public notice. (16 U.S.C. 1604(f)(4))

Concurrently with the National Environmental Policy Act (NEPA) review of a proposed action, the USFS conducts a separate review to determine whether or not a proposed action and its alternatives are consistent with the governing forest plan. (16 U.S.C. 1604(i) If the proposed action or any alternative is inconsistent, the Forest Supervisor may propose to amend the Forest Plan to accommodate implementation of the proposal. (16 U.S.C.(f)(4)) Additionally, the Forest Supervisor is the responsible official for rendering a final decision on whether or not a proposed amendment is acceptable. At his or her discretion, the potential environmental impacts of a proposed amendment must be evaluated, either as part of the NEPA review of the proposed project to which it is related, or separately, in a stand-alone NEPA review. (16 U.S.C. 1604(g))

H. 2 CONSISTENCY REVIEW AND DETERMINATION

This Final Environmental Impact Statement (EIS) for Tucson Electric Power Company's Sahuarita-Nogales Transmission Line discloses the effects of constructing, operating, and maintaining a 345-kV electric transmission line across National Forest System lands administered by the Coronado National Forest, Nogales Ranger District. In addition to the Final EIS analysis of potential environmental impacts, the USFS examined the no-action alternative and implementation of each of the action alternatives (Western, Central Options 1 and 2, Crossover Options 1 and 2 transmission line corridors), for consistency with the Coronado National Forest Land and Resource Management Plan (Forest Plan;1986, as amended) (see Figure H.2-1). This consistency review was necessary for the USFS to comply with the requirements at 36 CFR 219.10(e), "... the Forest Supervisor shall ensure that, subject to valid existing rights, all outstanding and future permits, contracts, cooperative agreements, and other instruments for occupancy and use of affected lands are consistent with the plan."

The consistency review resulted in a determination that certain aspects of implementing each of the action alternatives would result in conditions that are <u>not consistent</u> with direction in the Forest Plan. To make the alternatives consistent with the Forest Plan, the Forest Supervisor determined that the following amendments, in general, would be necessary:

- 1. Establish new utility corridor in the Tumacacori Ecosystem Management Area of the Nogales Ranger District, Coronado National Forest.
- 2. Establish utility corridor width for segments of existing utility corridor in the Tumacacori Ecosystem Management Area that currently have only route direction and length defined.
- 3. Establish utility corridor width for some newly-designated utility corridor routes within the Tumacacori Ecosystem Management Area, Nogales Ranger District, Coronado National Forest.
- 4. Revise the visual quality objectives in portions of Management Areas 1, 3, 4, and 7B in the Tumacacori Ecosystem Management Area, Nogales Ranger District, Coronado National Forest.

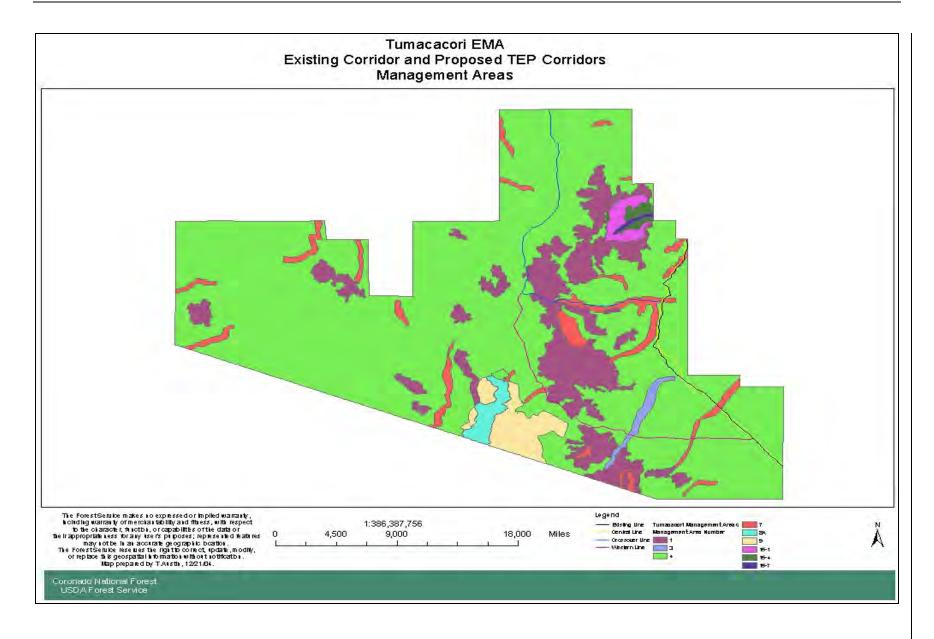


Figure H.2-1. Tumacacori EMA Existing Corridor and Proposed TEP Corridors Management Areas.

Before any of the action alternatives may be implemented, amendments to the Forest Plan shown in Table H-1 shall be necessary. Section H.3 provides a specific description of each amendment associated with the action alternatives.

Table H-1. Summary of Proposed New Forest Plan Amendments by Alternative

Type of Amendment	No Action	Western Corridor	Central Corridor	Central Corridor	Crossover Corridor	Crossover Corridor
Designate additional acreage as utility corridor	No change to the configuration of the existing utility corridor in the Tumacacori Ecosystem Management Area	Designate an additional 27 miles of ½-mile (0.4 km)- wide utility corridor encompassing 4,320 acres (1,748	Option 1) Designate an additional 2 miles of ¼-mile (0.4 km)-wide utility corridor encompassing 320 acres (129 hectares)	No change to the configuration of the existing utility corridor in the Tumacacori Ecosystem Management Area	Option 1) Designate an additional 19 miles of ½-mile (0.4 km)- wide utility corridor encompassing 3,040 acres (1,230 km to 200 km to 20	Option 2) Designate an additional 17 miles of ¼-mile (0.4 km)- wide utility corridor encompassing 2,720 acres (1,101 hectares)
Change visual quality objectives	No change to the existing visual quality objective standards in the Tumacacori Ecosystem Management Area	hectares) Change visual quality objectives for 2,245 acres (909 hectares) of the Tumacacori Ecosystem Management Area	Change visual quality objectives for 1,121 acres (454 hectares) of the Tumacacori Ecosystem Management Area	Change visual quality objectives for 1,121 acres (454 hectares) of the Tumacacori Ecosystem Management Area	hectares) Change visual quality objectives for 1,506 acres (609 hectares) of the Tumacacori Ecosystem Management Area	Change visual quality objectives for 1,506 acres (609 hectares) of the Tumacacori Ecosystem Management Area

H.3 THE AMENDMENTS

H.3.1 Amendments Associated with Western Corridor Alternative

The proposed Western Corridor route passes through undeveloped National Forest System lands west of the Tumacacori and Atascosa Mountains in the Tumacacori EMA, then gradually turns east to its point of connection with an existing utility corridor where it would be co-located with the El Paso Natural Gas Company (EPNG) pipeline. The Western Corridor is approximately 29 miles (mi) (47 kilometers[km]) long and ¼-mi (0.4 km) wide [approximately 660 feet (ft) (201 meters[m])] on either side of a centerline. For evaluation of National Forest Management Act consistency, this proposed route was divided into two segments (Figure 1):

- 1. <u>Segment A</u>: Segment A is approximately 27 mi (43 km) in length. It would establish a new utility corridor where none now exists and establish a corridor width not previously specified in the Forest Plan.
- 2. <u>Segment B</u>: Segment B is approximately 2 mi (3 km) in length and is concurrent with the route of an existing utility corridor depicted in the Forest Plan. Segment B encompasses approximately 320 acres (129 hectares [ha]). For this segment, the Forest Plan would be amended to establish a corridor width not previously specified in the Forest Plan.

Amendment to Establish New Utility Transportation Corridor

Parts of the Western Corridor route would cross National Forest System lands that are not designated by the Forest Plan for use as a utility corridor. Building and operating an electrical transmission line in these areas would <u>not be consistent</u> with Forest Plan direction. Specifically, to bring the Western Corridor alternative into compliance with Forest Plan direction, the Forest Plan Transportation System and Utilities Corridor Map (Figure H.3.1-1) would be modified to depict the establishment of a new utility corridor of approximately 27 mi (43 km) having a width of ¼-mi (0.4-km) [approximately 660 ft (201 m) on either side of a centerline], which follows the route described as the Western Corridor alternative.

Amendment to Change Visual Quality Objectives in Management Areas 1, 3, 4, and 7B

Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, in the Western Corridor route <u>would not be consistent</u> with Forest Plan direction for attainment of visual quality objectives. Specifically, the Forest Plan would require an amendment to change the visual quality objectives in Management Areas 1, 3, 4, and 7B on 2,245 acres (909 ha) of the Tumacacori EMA. Table H-2 details the changes to Forest Plan text required to bring the Western Corridor into compliance with Forest Plan direction. For each row in Table H-2, the existing text in the Forest Plan would be deleted and replaced by the specified amended text.

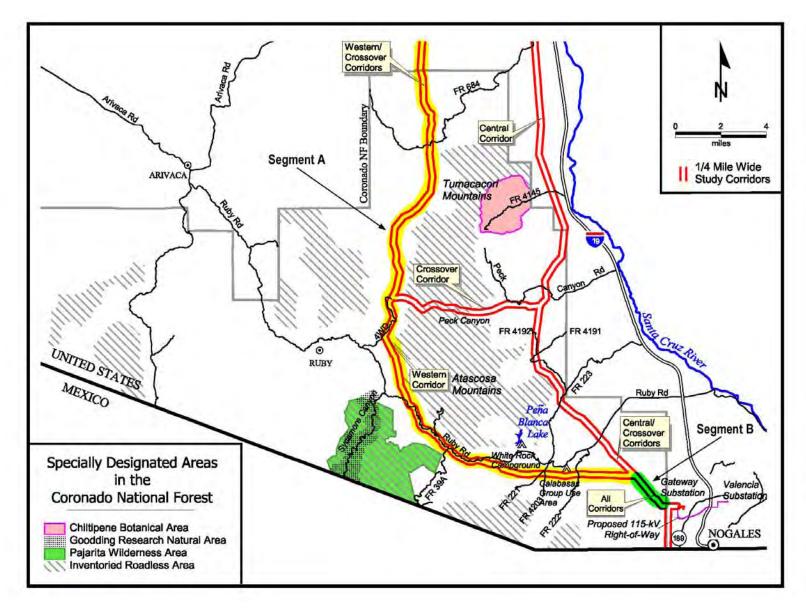


Figure H.3-1. Western Corridor on the Coronado National Forest.

Table H-2 Comparison of Current and Amended Forest Plan Text Proposed Western Corridor Alternative

Forest Plan	Current Forest Plan Amended		
Reference	Text	Text	
Management Area 1	Manage the following acres at the indicated	Manage the following acres at the indicated	
Page 47	visual quality objectives:	visual quality objectives:	
Visual Resource			
Management	12,710 acres Retention 13%	12,498 acres Retention 13%	
	51,819 acres Partial Retention 53%	51, 819 acres Partial Retention 53%	
	33, 265 acres Modification 33%	33,265 acres Modification 33%	
	978 acres Maximum Modification 1%	1,190 acres Maximum Modification 1%	
Management Area 3	Manage the following acres at the indicated	Manage the following acres at the indicated	
Page 55	visual quality objectives:	visual quality objectives:	
Visual Resource			
Management	8,125 acres Retention 55%	8,076 acres Retention 55%	
	3,988 acres Partial Retention 27%	3, 988 acres Partial Retention 27%	
	2,659 acres Modification 18%	2,659 acres Modification 18%	
		49 acres Maximum Modification < 0.4%	
Management Area 4	Manage the following acres at the indicated	Manage the following acres at the indicated	
Page 62	visual quality objectives:	visual quality objectives:	
Visual Resource			
Management	135,201 acres Retention 12%	133,892 acres Retention 12%	
	406,144 acres Partial Retention 36%	405,534 acres Partial Retention 36%	
	440,208 acres Modification 39%	440,208 acres Modification 39%	
	146,736 acres Maximum Modification 13%	148,655 acres Maximum Modification 13%	
Management Area	Manage the following acres at the indicated	Manage the following acres at the indicated	
7B	visual quality objectives:	visual quality objectives:	
Page 71			
Visual Resource	6,165 acres Retention 36%	6,100 acres Retention 36%	
Management	5,651 acres Partial Retention 33%	5,651 acres Partial Retention 33%	
	4,281 acres Modification 25%	4.281 acres Modification 25%	
	1,027 acres Maximum Modification 6%	1,092 acres Maximum Modification 6%	

H.3.2 Amendments Associated with Central Corridor Alternative (Option 1)

The transmission line route designated as the Central Corridor (Option 1) follows an existing utility corridor designated in the Forest Plan, except for a length of about 2 miles where it diverts from the utility corridor to avoid crossing the Tumacacori Inventoried Roadless Area (IRA). The existing utility corridor contains the El Paso Natural Gas Company's underground natural gas pipeline. This corridor route generally follows the route of the EPNG pipeline right-of-way (ROW), though the pipeline deviates from the corridor in some locations.

The gas pipeline meets the current visual quality objectives in the Forest Plan because its structures are primarily underground, with little surface disturbance and few visual intrusions on the landscape. Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, <u>would not</u> be consistent with Forest Plan direction for visual quality objectives.

The Central Corridor (Option 1) route is approximately 15 mi (24 km) long and ¼-mi (0.4 km) wide [approximately 660 ft (201 m) on either side of a centerline]. For National Forest Management Act consistency purposes, this proposed route is divided into three segments (Figure 2):

1. <u>Segment A</u>: Segment A is approximately 6.7 mi (10.8 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities

Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40- km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

- 2. Segment B: Segment B (Option 1) is approximately 1.9 mi (3.1 km) in length and encompasses approximately 304 acres (123.0 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
- 3. <u>Segment C</u>: Segment C as is approximately 6.5 mi (10.5 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

4.

Specifically, before the Central Corridor (Option 1) route could be implemented, the Forest Plan would require amendment to establish a new utility transportation corridor in the Tumacacori EMA and to change the visual quality objectives in Management Areas 4 and 7B on 1,121 acres (454 hectares) of the Tumacacori EMA.

Amendment to Establish New Utility Transportation Corridor

To bring the Central Corridor (Option 1) route into compliance with Forest Plan direction, the Forest Plan Transportation System and Utilities Corridor Map (Figure H.3.2-1) would be modified to depict the route for the Central Corridor (Option 1) and the ¼-mi (0.4 kilometer) width of the utility corridor.

Amendment to Change Visual Quality Objectives in Management Areas 4 and 7B

Installation of a fully aboveground facility, such as the proposed transmission line and associated facilities in the Central Corridor (Option 1) route <u>would not be consistent</u> with Forest Plan direction for attainment of visual quality objectives. Specifically, the Forest Plan would require an amendment to change the visual quality objectives in Management Areas 4 and 7B on 1,121 acres (454 ha) of the Tumacacori EMA. Table H-3 details the changes to Forest Plan text required to bring the Central Corridor (option 1) alternative into compliance with Forest Plan direction. For each row in Table H-3, the existing text in the Forest Plan would be deleted and replaced by the amended text.

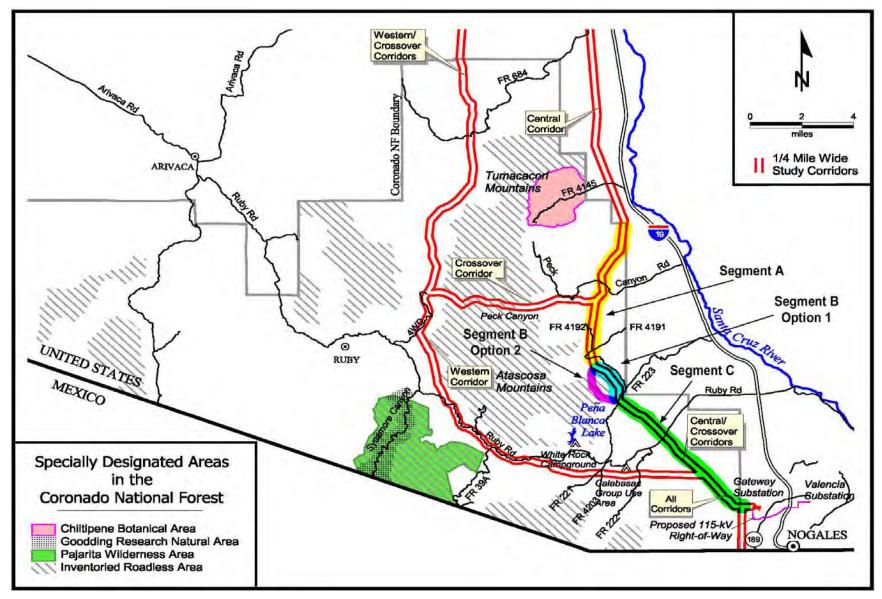


Figure H.3.2-1 Specially Designated Areas in the Coronado National Forest

Table H-3. Comparison of Current and Amended Forest Plan Text Central Corridor (Option 1) Alternative

Forest Plan	Current Forest Plan	Amended
Reference	Text	Text
Management Area 4	Manage the following acres at the indicated	Manage the following acres at the indicated
Page 62	visual quality objectives:	visual quality objectives:
Visual Resource		
Management	135,201 acres Retention 12%	135,080 acres Retention 12%
	406,144 acres Partial Retention 36%	406,114 acres Partial Retention 36%
	440,208 acres Modification 39%	439,346 acres Modification 39%
	146,736 acres Maximum Modification 13%	147,749 acres Maximum Modification 13%
Management Area 7B	Manage the following acres at the indicated	Manage the following acres at the indicated
Page 71	visual quality objectives:	visual quality objectives:
Visual Resource		
Management	6,165 acres Retention 36%	6,111 acres Retention 36%
	5,651 acres Partial Retention 33%	5,646 acres Partial Retention 33%
	4,281 acres Modification 25%	4.233 acres Modification 25%
	1,027 acres Maximum Modification 6%	1, 134 acres Maximum Modification 6%

H.3.3 Amendments Associated with Central Corridor (Option 2)

The Central Corridor (Option 2) route follows an existing designated utility corridor that is presently occupied by an underground natural-gas pipeline. The general route of this corridor, which passes through the Tumacacori EMA, is depicted on the Forest Plan Transportation System and Utilities Corridor Map (see Figure H.3.3-1), however, the width of the corridor is not identified. As depicted, this utility corridor generally follows the route of the EPNG pipeline ROW with slight deviations at a few locations. The gas pipeline meets the current visual quality objectives in the Forest Plan because its structures are primarily underground, with little surface disturbance and few visual intrusions on the landscape. The Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan.

Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, <u>would not be consistent</u> with Forest Plan direction for attainment of visual quality objectives. Specifically, before the Central Corridor (Option 2) alternative could be implemented, the Forest Plan would require an amendment to the Forest Plan to change the visual quality objectives in Management Areas 4 and 7B on 1,121 acres (454 ha) of the Tumacacori EMA.

Amendment to Change Visual Quality Objectives in Management Areas 4 and 7B

Table H-4 details the changes to Forest Plan text required to make implementation of the Central Corridor (Option 2) alternative consistent with Forest Plan direction. For each row in Table H-4, the existing text in the Forest Plan would be deleted and replaced by the amended text.

Table H-4. Comparison of Current and Amended Forest Plan Text Central Corridor (Option 2)

Alternative

Forest Plan	Current Forest Plan	Amended
Reference	Text	Text
Management Area 4	Manage the following acres at the indicated	Manage the following acres at the indicated
Page 62	visual quality objectives:	visual quality objectives:
Visual Resource		
Management	135,201 acres Retention 12%	135,080 acres Retention 12%
	406,144 acres Partial Retention 36%	406,114 acres Partial Retention 36%
	440,208 acres Modification 39%	439,346 acres Modification 39%
	146,736 acres Maximum Modification 13%	147,749 acres Maximum Modification 13%
Management Area	Manage the following acres at the indicated	Manage the following acres at the indicated
7B	visual quality objectives:	visual quality objectives:
Page 71		
Visual Resource	6,165 acres Retention 36%	6,111 acres Retention 36%
Management	5,651 acres Partial Retention 33%	5,646 acres Partial Retention 33%
	4,281 acres Modification 25%	4.233 acres Modification 25%
	1,027 acres Maximum Modification 6%	1, 134 acres Maximum Modification 6%

H. 3.4 Amendments Associated with Crossover Corridor (Option 1) Alternative

The transmission line route designated as the Crossover Corridor (Option 1) traverses undeveloped National Forest System lands west of the Atascosa Mountains to a point where it turns east to cross through Peck Canyon to a connection point along the utility corridor designated in the Forest Plan and occupied by the underground EPNG pipeline. This route modifies the location of the existing Forest Plan corridor to avoid crossing the Tumacacori IRA.

The portion of the Crossover Corridor (Option 1) co-located with the existing utility corridor meets the visual quality objectives in the Forest Plan because its structures are primarily underground, with little surface disturbance and few visual intrusions on the landscape. Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, would not be consistent with Forest Plan direction for visual quality objectives in the portions of the corridor coincident with the mapped corridor in the Forest Plan, or the portions of the corridor where establishment of new utility transportation corridor would be required.

Specifically, before the Crossover Corridor (Option 1) route could be implemented, the Forest Plan would require amendments to establish a new utility corridor in the Tumacacori EMA and to change the visual quality objectives in Management Areas 1, 3, 4 and 7B on 1,506 acres (609 ha) of the Tumacacori EMA.

The Crossover Corridor (Option 1) route is approximately 30 mi (48 km) in length and ¼-mi (0.4 km) in width [approximately 660 ft (201 m) on either side of a centerline]. For National Forest Management Act consistency review, this proposed route was divided into five segments (Figure H.3.4-1):

- 1. Segment A: Segment A is approximately 10.7 mi (17.2 km) in length and encompasses approximately 1,712 acres (692.8 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor, Segment A, in Figure 2.1-6 and the corridor width would be established as ¼-mile (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
- 2. <u>Segment B</u>: Segment B is approximately 7 mi (11.3 km) in length and encompasses approximately 1,120 acres (453.2 ha). For this segment, the Forest Plan would be amended by

modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor Segment B, in Figure 2.1-6 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

- 3. <u>Segment C</u>: Segment C is approximately 3.2 mil (5.2 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
- 4. Segment D: Segment D (Option 1) is approximately 1.9 mi (3.1 km) in length and encompasses approximately 304 acres (123.0 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Segment D (Option 1), in Figure 2.1-6 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
- 5. <u>Segment E</u>: Segment E is approximately 6.5 mi (10.5 km) in length and encompasses approximately 1,040 acres (420.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mile (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

Amendment to Establish New Utility Transportation Corridor

To bring the Crossover Corridor (Option 1) route into compliance with Forest Plan direction, the Forest Plan Transportation System and Utilities Corridor Map (Figure H.3.4-1) would be modified to depict the route for the Crossover Corridor (Option 1) and the ½-mi (0.4 kilometer) width [approximately 660 ft (201 m) on either side of a centerline] of the corridor.

Amendment to Change Visual Quality Objectives in Management Areas 1, 4, and 7B

Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, in the Crossover Corridor (Option 1) route <u>would not be consistent</u> with Forest Plan direction for attainment of visual quality objectives. Specifically, the Forest Plan would require an amendment to change the visual quality objectives in Management Areas 1, 4, and 7B on 1,506 acres (609 ha) of the Tumacacori EMA. Table H-5 details the changes to Forest Plan text required to bring the proposed action into compliance with Forest Plan direction. For each row in Table H-5, the existing text in the Forest Plan would be deleted and replaced by the amended text.

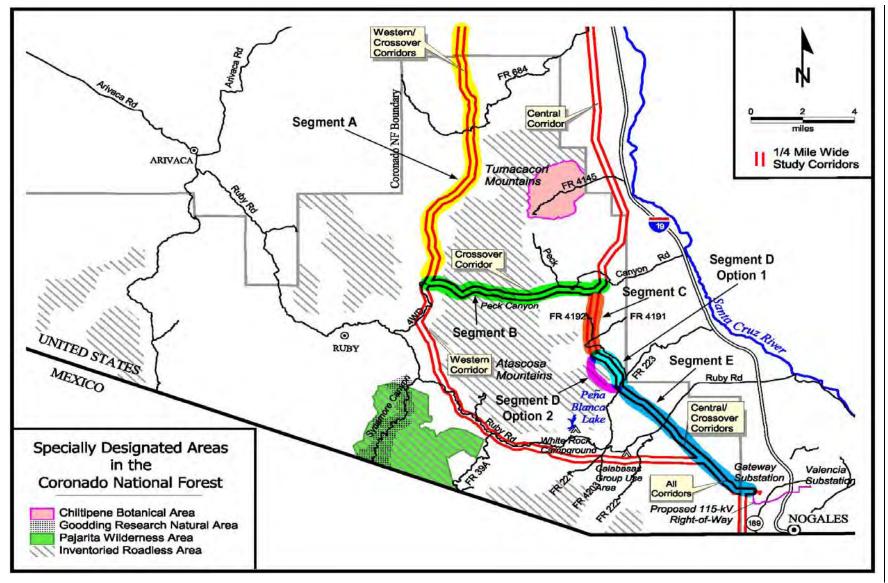


Figure H.3.4-1 Forest Plan Transportation System and Utilities Corridor Map

Table H-5. Comparison of Current and Amended Forest Plan Text Crossover Corridor (Option 1)
Alternative

Forest Plan	Current Forest Plan	Amended			
Reference	Text	Text			
Management Area 1	Manage the following acres at the indicated	Manage the following acres at the indicated			
Page 47	visual quality objectives: visual quality objectives:				
Visual Resource					
Management	12,710 acres Retention 13%	12,710 acres Retention 13%			
	51,819 acres Partial Retention 53%	51, 818 acres Partial Retention 53%			
	33,265 acres Modification 33%	33,265 acres Modification 33%			
	978 acres Maximum Modification 1%	979 acres Maximum Modification 1%			
Management Area 4	Manage the following acres at the indicated	Manage the following acres at the indicated			
Page 62	visual quality objectives:	visual quality objectives:			
Visual Resource					
Management	135,201 acres Retention 12%	135,161 acres Retention 12%			
	406,144 acres Partial Retention 36%	405,840 acres Partial Retention 36%			
	440,208 acres Modification 39%	439,372 acres Modification 39%			
	146,736 acres Maximum Modification 13%	147,916 acres Maximum Modification 13%			
Management Area	Manage the following acres at the indicated	Manage the following acres at the indicated			
7B	visual quality objectives:	visual quality objectives:			
Page 71					
Visual Resource	6,165 acres Retention 36%	6,165 acres Retention 36%			
Management	5,651 acres Partial Retention 33%	5,651 acres Partial Retention 33%			
	4,281 acres Modification 25%	3,957 acres Modification 23%			
	1,027 acres Maximum Modification 6%	1,351 acres Maximum Modification 8%			

H. 3.4 Amendments Associated with Crossover Corridor (Option 2) Alternative

The transmission line route designated as the Crossover Corridor (Option 2) traverses undeveloped National Forest System lands west of the Atascosa Mountains to a point where it turns east to cross through Peck Canyon to a connection point along the utility corridor designated in the Forest Plan and occupied by the underground EPNG pipeline. This route follows the location of the existing Forest Plan corridor and crosses the Tumacacori IRA

The portion of the Crossover Corridor (Option 2) co-located with the existing utility corridor meets the visual quality objectives in the Forest Plan because its structures are primarily underground, with little surface disturbance and few visual intrusions on the landscape. Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, would not be consistent with Forest Plan direction for visual quality objectives in the portions of the corridor coincident with the mapped corridor in the Forest Plan, or the portions of the corridor where establishment of new utility transportation corridor would be required.

Specifically, before the Crossover Corridor (Option 2) route could be implemented, the Forest Plan would require amendments to establish a new utility corridor in the Tumacacori Ecosystem Management Area and to change the visual quality objectives in Management Areas 1, 3, 4 and 7B on 1,506 acres (609 ha) of the Tumacacori EMA.

The Crossover Corridor (Option 2) route is approximately 30 mi (48 km) in length and ¼-mi (0.4 km) in width [approximately 660 ft (201 m) on either side of a centerline]. For National Forest Management Act consistency review, this proposed route was divided into five segments (see Figure 5):

1. Segment A: Segment A is approximately 10.7 mi (17.2 km) in length and encompasses approximately 1,712 acres (692.8 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor

in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor, Segment A, in Figure 2.1-6 and the corridor width would be established as ¼-mi (0.40-km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

- 2. Segment B: Segment B is approximately 7 mi (11.3 km) in length and encompasses approximately 1,120 acres (453.2 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor Segment B, in Figure 2.1-6 and the corridor width would be established as ¼-mile (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
- 3. Segment C: Segment C is approximately 3.2 mi (5.2 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40-km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
- <u>4.</u> <u>Segment D</u>: Segment D (Option 2) is approximately 1.9 mi (3.1 km) in length and follows the existing corridor through a portion of the Tumacacori IRA.
- <u>5.</u> Segment E: Segment E is approximately 6.5 mi (10.5 km) in length and encompasses approximately 1,040 acres (420.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mile (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

Amendment to Establish New Utility Transportation Corridor

To bring the Crossover Corridor (Option 2) route into compliance with Forest Plan direction, the Forest Plan Transportation System and Utilities Corridor Map (see Figure 4) would be modified to depict the route for the Crossover Corridor (Option 2) and the ¼-mi (0.4 km) width [approximately 660 ft (201 m) on either side of a centerline] of the corridor.

Amendment to Change Visual Quality Objectives in Management Areas 1, 4, and 7B

Placement of fully aboveground structures, such as the proposed transmission line and associated facilities, in the Crossover Corridor (Option 2) route <u>would not be consistent</u> with Forest Plan direction for attainment of visual quality objectives. Specifically, the Forest Plan would require an amendment to change the visual quality objectives in Management Areas 1, 4, and 7B on 1,506 acres (609 ha) of the Tumacacori EMA. Table H-6 details the changes to Forest Plan text required to bring the proposed action into compliance with Forest Plan direction. For each row in Table H-6, the existing text in the Forest Plan would be deleted and replaced by the amended text.

Table H-6. Comparison of Current and Amended Forest Plan Text Crossover Corridor (Option 2) Alternative

Forest Plan	Current Forest Plan	Amended				
Reference	Text	Text				
Management Area 1	Manage the following acres at the indicated	Manage the following acres at the indicated				
Page 47	visual quality objectives: visual quality objectives:					
Visual Resource						
Management	12,710 acres Retention 13%	12,710 acres Retention 13%				
	51,819 acres Partial Retention 53%	51, 818 acres Partial Retention 53%				
	33,265 acres Modification 33%	33,265 acres Modification 33%				
	978 acres Maximum Modification 1%	979 acres Maximum Modification 1%				
Management Area 4	Manage the following acres at the indicated	Manage the following acres at the indicated				
Page 62	visual quality objectives:	visual quality objectives:				
Visual Resource						
Management	135,201 acres Retention 12%	135,161 acres Retention 12%				
	406,144 acres Partial Retention 36%	405,840 acres Partial Retention 36%				
	440,208 acres Modification 39%	439,372 acres Modification 39%				
	146,736 acres Maximum Modification 13%	147,916 acres Maximum Modification 13%				
Management Area	Manage the following acres at the indicated	Manage the following acres at the indicated				
7B	visual quality objectives:	visual quality objectives:				
Page 71						
Visual Resource	6,165 acres Retention 36%	6,165 acres Retention 36%				
Management	5,651 acres Partial Retention 33%	5,651 acres Partial Retention 33%				
	4,281 acres Modification 25%	3,957 acres Modification 23%				
	1,027 acres Maximum Modification 6%	1,351 acres Maximum Modification 8%				

DETERMINATION OF NATIONAL FOREST MANAGEMENT ACT SIGNIFICANCE OF THE PROPOSED AMENDMENTS

H. 4 INTRODUCTION

National Forest Management Act regulations at 36 CFR 219.10(f) state: "Based on an analysis of the objectives, guidelines, and other contents of the forest plan, the Forest Supervisor shall determine whether a proposed amendment would result in a significant change in the [forest] plan." Forest Service Handbook 1909.12, Chapter 5.32 – The Forest Service Land and Resource Management Planning Handbook – provides the framework for proposing and analyzing changes to Forest Plans, including the process to be used when determining if a change is significant or not significant from the perspective of the National Forest Management Act. Four factors are evaluated to make the significance determination with respect to the National Forest Management Act:

- 1. Timing
- 2. Location and size
- 3. Goals, objectives, and outputs
- 4. Management prescriptions

Analysis of the Timing Factor

The timing factor examines when a Forest Plan should be amended. Both the age of the underlying documents and the duration of the amendment are relevant considerations. Forest Service Handbook 1909.12 indicates that, the later the change (in the period covered by the forest plan), the less significant the change is likely to be.

The Coronado National Forest is currently outside of the planning period expected in its 1986 Forest Plan². The Forest Plan was originally considered for revision in 2001. However, national direction published in the *Federal Register* in November 2001 delayed the scheduled revision until 2004, with an implementation date of 2009. The expected implementation period for Tucson Electric Power Company's proposal is between 2005 and 2009, within the timeframe that the Coronado National Forest would continue to be governed by direction in the existing Forest Plan. Initiating an amendment process for this proposal would allow implementation to occur before the expected completion of a Forest Plan revision.

Designate Additional Acreage as a Utility Corridor

Because Forest Plan revision is scheduled to be completed sometime during or shortly before implementation of any of the action alternatives, it is determined that, with respect to the timing factor, the designation of additional acreage as a utility corridor in a Forest Plan amendment would not be significant.

Change Visual Quality Objectives

Because Forest Plan revision is scheduled to be completed sometime during or shortly before implementation of any of the action alternatives, it is determined that, with respect to the timing factor, an amendment to change visual quality objectives <u>would not be significant</u>.

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¹ The concept of "significance" from the perspective of the National Forest Management Act differs from the definition and concept of this word as it is applied under the National Environmental Policy Act. The majority of this Final Environmental Impact Statement applies the concept used in the National Environmental Policy Act; however, this appendix is devoted to describing "significance" from the perspective of the National Forest Management Act and its implementing regulations and policy.

² USFS TBD

Analysis of the Location and Size Factors

The key to determining National Forest Management Act significance with respect to the location and size factors is context — "the relationship of the affected area to the overall planning area." The smaller the area affected, the less likely the change is to be significant. With respect to a Forest Plan amendment, the appropriate planning area to consider when determining significance is the entire Coronado National Forest. The amendments proposed in this analysis would apply to all National Forest System lands under primary jurisdiction of the Forest Service within the Coronado National Forest. They are not applicable to non-Forest System lands or private inholdings located within the boundaries of the Coronado National Forest.

Designate Additional Acreage as a Utility Corridor

The Final EIS analyzes four action alternatives and one no action alternative. As shown in Table H-7, the Western, Central, and Crossover alternatives would increase the number of acres allocated to utility corridor designations in the Forest Plan. Table H-7 also indicates that the Central Corridor (Option 2) alternative and the No Action Alternative would leave the Forest Plan unchanged.

Table H-7. Net Change in Forestwide Utility Corridor Allocations by Alternative

1 able 1.	Table 11-7. Net Change in Forestwide Curity Corridor Anocadons by Alternative									
	Forestwide Utility Corridor Allocation	No Action	Western Corridor	Central Corridor (Option 1)	Central Corridor (Option 2)	Crossover Corridor (Option 1)	Crossover Corridor (Option 2)			
Length of Utility Corridor Forestwide										
Estimated miles Estimated kilometers	35 56	0 0	62 100	37 60	35 56	54 87	52 84			
Difference (miles) Difference (km)	0	0	+ 27 + 43	+ 2 + 4	0	+ 19 + 31	+ 17 + 27			
Total Acres Designated Utility Corridor Forestwide		·								
Estimated acres Estimated hectares	5,600 2,266	0 0	9,920 4,014	5,920 2,396	5.600 2,266	8,640 3,496	8,320 3,367			
Difference (acres) Difference (hectares	0 0	0 0	+ 4,320 + 1,748	+ 320 + 130	0	+ 3,040 + 1,230	+ 2,720 + 1,101			
Percent (%) change	0	0	+ 77	+ 6	0	+ 54	+ 48			

As demonstrated by the values in Table H-7, the proposed Western Corridor and the Crossover Corridor (Options 1 and 2) would more than double the number of acres designated as utility corridor Forestwide. The proposed Central Corridor (Options 1 and 2) would increase utility corridor acreage by less than 10 percent.

It is determined, with respect to the location and size criteria, that deviating from the present location of the utility corridor along the Central Corridor (Option 2) route to designate additional acreage as utility corridor would not require a significant amendment of the Forest Plan. It is further determined that

designating additional acreage as utility corridor to accommodate the Western and Crossover Corridor (Options 1 and 2) routes <u>would constitute a significant amendment</u> of the Forest Plan.

Change Visual Quality Objectives

The Forest Plan established visual quality objectives for each management area. Existing and proposed visual quality objectives for the alternative routes are displayed in Table H-8.

Table H-8. Proposed Changes To Visual Quality Objectives By Management Area And Alternative.

Visual Quality Objective Classification	Existing V Quality Ol	Visual	No Action Changes to Visual Quality Objectives	Western Corridor Changes to Visual Quality Objectives		Central (Chang Visual (Objec (Opti	Corridor ges to Quality ctives	Central Corridor Changes to Visual Quality Objectives (Option 2)		Crossover Corridor Changes to Visual Quality Objectives (Option 1)		Crossover Corridor Changes to Visual Quality Objectives (Option 2)		
Management Area 1														
	Acres	%		Acres	%					ACRES	%	ACRES	%	
R	12,710	13	Not Applicable	12,498	13	Route does not cross		Route does not cross		12,710	13	12,710	13	
PR	51,819	53		51,819	53	Manageme		Management Area 1		51,818	53	51,818	53	
M	33,265	33		33,265	33	Manageme	iii Aica i			33,265	33	33,265	33	
MM	978	1		1,190	1					979	1	979	1	
Management Area 3														
	Acres	%		Acres	%									
R	8,125	55	Not Applicable	8,076	55	D . 1		D		Route does not		Route does not cross		
PR	3,988	27		3,988	27	Route does		ot cross Area 3 Route does not cross Management Area 3		cross Management				
M	2,659	18		2,659	18	Manageme	ant Area 5					Management Area 3		
MM	N/A	N/A		49	< 0.4									
						gement Area								
	Acres	%		Acres	%	Acres	%	Acres	%	ACRES	%	ACRES	%	
R	135,201	12		133,892	12	135,080	12	135,080	12	135,161	12	135,161	12	
PR	406,144	36	Not Applicable	405,534	36	406,114	36	406,114	36	405,840	36	405,840	36	
M	440,208	39		440,208	39	439,346	39	439,346	39	439,372	39	439,372	39	
MM	146,736	13		148,665	13	147,749	13	147,749	13	147,916	13	147,916	13	
						ement Area								
	Acres	%	Not Applicable	Acres	%	Acres	%	Acres	%	ACRES	%	ACRES	%	
R	6,165	36		6,100	36	6,111	36	6,111	36	6,165	36	6,165	36	
PR	5,651	33		5,651	33	5,646	33	5,646	33	5,651	33	5,651	33	
M	4,281	25		4,281	25	4,233	25	4,233	25	3,957	23	3,957	23	
MM	0	0		1,092	6	1,134	6	1,134	6	1,351	8	1,351	8	

able, R = Retention, PR = Partial Retention, M = Modification

Table H-8 displays how visual quality objectives would change by management area for each proposed corridor route. With respect to the Western and Central Corridors (Options 1 and 2), the distribution of acres in each visual quality objective category changes slightly, but there is no change in the overall percentage of acres assigned to each class over the Forest as a whole. Because there is no substantive change to the percentage of acres in the visual quality objectives crossed by the Central (Options 1 and 2) or Western Corridors, it is determined that the change that does occur would not be significant with respect to the size and location factors.

In the case of the Crossover Corridor (Options 1 and 2) in Management Area 7B, there is a two percent (2 percent) increase in the number of acres designated as Maximum Modification. Note that in all circumstances, the changes are to a lower visual quality objective class. Management Area 7B, which represents dry riparian areas, is managed to perpetuate the unique wildlife or vegetative species that occur in such habitats. The total number of these acres across the Forest is small compared with other management areas, explaining why even a small change results in a higher accompanying percentage change. Because the percentage of acres in Management Area 7B changes to a lower visual quality objective in the Crossover Corridor (Options 1 and 2), it is determined that this change would constitute a significant amendment of the Forest Plan with respect to the size and location factors.

Analysis of the Goals, Objectives, and Outputs Factors

The goals, objectives, and outputs factor involves the determination of "whether the change alters the long-term relationship between the level of goods and services in the overall planning area" (FSH 1909.12, Section 5.32.3(c)).

Designate Additional Acreage as a Utility Corridor

As shown in Figure H.4-1, the Forest Plan Transportation System and Utilities Corridor Map depicts an array of utility corridor designations across the Coronado National Forest. The Western, Central (Option 1), and Crossover Corridor(Options 1 and 2) alternatives would establish additional utility corridor in the Tumacacori EMA. The Central Corridor (Option 2) and the No Action Alternatives would not change the present allocations to this use. While establishing new utility corridor in the Tumacacori EMA will not change any specified goals, objectives, or outputs documented in the Forest Plan, as shown in Table H-7, establishment would change an "implied output" of land allocation dedicated to utility corridor use.

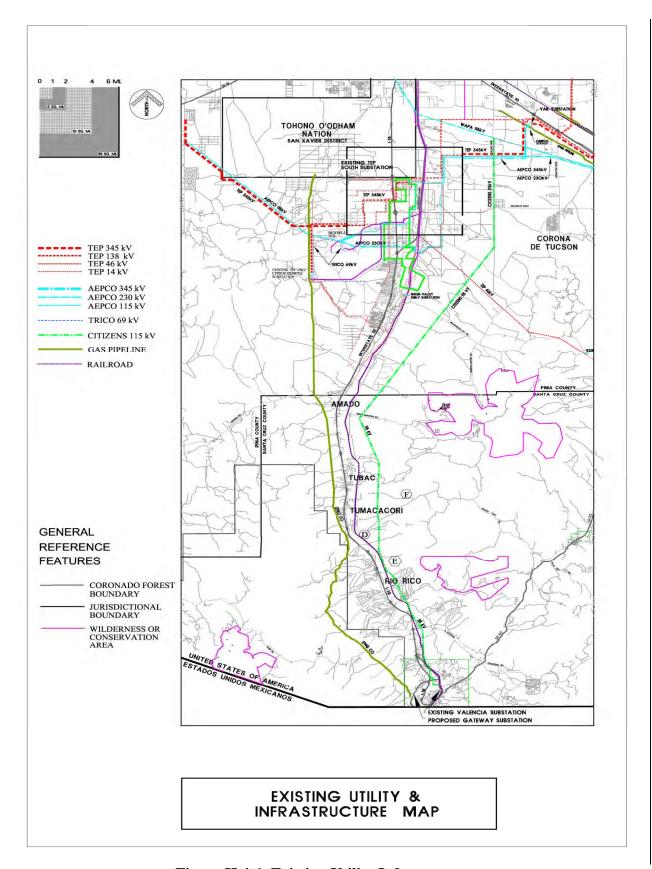


Figure H.4-1 Existing Utility Infrastructure

It is determined that the proposed changes would not alter the goals, objectives, and outputs in the Forest Plan. Implementing the Central Corridor (Option 2) alternative or taking no action would not affect the amount of utility corridor designation Forestwide. Implementing the Western Corridor and Crossover Corridor (Options 1 and 2) would increase by more than one half the amount of land allocated to utility corridor use across the Forest. Implementing the Central Corridor (Option 1) alternative would also increase the amount of land allocated to utility corridor use.

It is determined that the addition of acres of land allocated for utility corridor use by the Central Corridor (Option 1) alternative route <u>would not significantly change</u> the implied output of land allocated to utility corridor use. It is determined that the additional acres of land allocated to utility corridor use by the Crossover Corridor (Options 1 and 2) Alternative route <u>would significantly change</u> the implied output of land allocated to utility corridor. It is further determined that the additional acres of land allocated to utility corridor use by the Western Corridor Alternative route <u>would significantly change</u> the implied output of land allocated to utility corridor use.

Change Visual Quality Objectives

Depending on the route under consideration, the proposed routes for the transmission line pass through one or more of the following Management Areas in the Tumacacori EMA.

- Management Area 1 Visual Resources and Semi-Primitive Dispersed Recreation
- Management Area 3 Dispersed Recreation
- Management Area 4 Livestock Grazing (Level D, Game Habitat, and Fuelwood Harvest)
- Management Area 7B Unique Resources Including Riparian Areas (Dry Riparian Areas and Washes)

Standards and guidelines for Management Areas 1, 3 and 7 require that "visual quality objectives will be met." Standards and guidelines for Management Area 4 require that "visual quality objectives will be met or exceeded."

Implementation of the Western and Central (options 1 and 2) alternatives would change the visual quality of each of the proposed routes. Designation of additional acreage as utility corridor would not, in and of itself, constitute a change in visual quality because utilities may be installed underground, as is the case with the existing underground gas pipeline located in the utility corridor. However, construction of an aboveground transmission line will degrade visual quality of the area and result in a need to change the visual quality objectives established in the Forest Plan.

As demonstrated in Table H-8, an aboveground transmission line would reduce visual quality objectives in all management areas for each alternative. However, in all cases except the Crossover Corridor (Options 1 and 2), the changes are not large enough to affect the percentage of acreage of each visual quality objective category designated in the Forest Plan. With respect to altering the visual quality of the area and the need to lower visual quality objectives for the action alternatives, it is determined that the reduction in visual quality objectives would not constitute a significant amendment of the Forest Plan. With respect to altering the visual quality of the area, the need to lower visual quality objectives for Crossover Corridor (Options 1 and 2), it is determined that the reduction in visual quality objectives would constitute a significant amendment of the Forest Plan.

Analysis of the Management Prescription Factor

The management prescriptions factor considers two criteria: (1) "whether the change in a management prescription is only for a specific situation or whether it would apply to future decisions throughout the planning area," and (2) "whether or not the change alters the desired future condition of the land and

resources or the anticipated goods and services to be produced." (Forest Service Handbook 1909.12, section 5.32(d))

Designate Additional Acreage as a Utility Corridor

With regard to criteria (1) above, a decision to adopt the proposed amendments would not apply to future decisions throughout the planning area. The decision would apply only to those lands selected as the route of the transmission line and would not predetermine any future decisions. With regard to criteria (2) above – and prefaced by the preceding discussion about goals, objectives, and outputs – designation of additional acreage of utility corridor would not alter the desired future condition of the land and resources or the goods and services expected to be produced. Therefore, it is determined that, with respect to altering management prescriptions, the proposed changes would not constitute a significant amendment of the Forest Plan.

Change Visual Quality Objectives

With regard to criteria (1), the proposed amendment would apply to future decisions, but only on those lands selected as the route of the transmission line, not to decisions throughout the planning area. With regard to criteria (2), the changes in visual quality objective classification would not alter the Forest-wide desired future condition of the land and resources or the anticipated goods and services to be produced. Therefore, with respect to altering management prescription, the proposed changes <u>would not</u> constitute a significant amendment of the Forest Plan.

Table H-9 summarizes the conclusions from the National Forest Management Act analysis of significance for each route proposed in the Final Environmental Impact Statement for the Nogales-Sahuarita Transmission Line proposal.

Table H-9.	Summary	of NFMA	Significance	Analysis.
	, o			

NFMA Significance Criteria	No Action	Western Corridor	Central Corridor (Option 1)	Central Corridor (Option 2)	Crossover Corridor (Option 1)	Crossover Corridor (Option 2)	
		Designate Ad	ditional Acreage as U	tility Corridor			
Timing	No amendment No significance determination	Not significant	Not significant	Not significant	Not significant	Not significant	
Location and Size	No amendment No significance determination	Significant	Not significant	Not significant	Significant	Significant	
Goals, Objectives, and Outputs	No amendment No significance determination	Significant	Not Significant	Not Significant	Significant	Significant	
Management Prescriptions	No amendment No significance determination	Not Significant	Not significant	Not significant	Not significant	Not significant	
Change Visual Quality Objectives							
Timing	No amendment No significance determination	Not significant	Not significant	Not significant	Not significant	Not significant	
Location and Size	No amendment No significance determination	Not significant	Not significant	Not significant	Significant	Significant	
Goals, Objectives, and Outputs	No amendment No significance determination	Not significant	Not significant	Not significant	Significant	Significant	
Management Prescriptions	No amendment No significance determination	Not significant	Not significant	Not significant	Not significant	Not significant	

Based on the information summarized in Table H-10, and a review of the National Forest Management Act significance in light of the criteria set forth in Forest Service Handbook 1909.12, Chapter 5.32, construction of an aboveground transmission line, as proposed in the TEP EIS, <u>would</u> result in changes to the Land and Resource Management Plan for the Coronado National Forest (1986, as amended) requiring futher amendment of the Forest Plan.

The Forest Plan shall be amended to allocate additional acreage to utility corridor use and to change visual quality objectives in Management Areas 1, 3, 4, or 7B of the Tumacacori EMA, as appropriate for the selected implementation alternative. These changes constitute a combination of significant and non-significant amendments from a National Forest Management Act perspective. Therefore, environmental documentation for the amendments for the Nogales- Sahuarita Transmission Line proposal must follow the environmental analysis and public notification processes described for an environmental impact statement, as defined in the NEPA implementing regulations at 40 CFR 1500 and will be subject to Forest Service appeal regulations at 36 CFR 215.

/s/ Jeanine A. Derby	March 2004
JEANINE A. DERBY	Date
Forest Supervisor	

Appendix I

USFS Visual Impacts Reports

APPENDIX I CONTENTS

- I-2: USFS Report: Proposed TEP Powerline Project Analysis Using Visual Quality Objectives; April 30, 2004
- I-11: Proposed TEP Powerline Visibility from Tumacacori & Tubac Historic Sites; August 10, 2004
- I-12: Proposed TEP Power Line Cumulative Effects on Visual Resources; April 28, 2004

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File 2380 **Date:** April 30, 2004

Code:
Route File
To:

Subject: Proposed TEP Powerline - Project Analysis Using Visual Quality Objectives

To: Teresa Ann Ciapusci

Purpose of this Report

The Tucson Electric Power Company Sahuarita-Nogales Transmission Line Draft Environmental Impact Statement (July 2003) includes an analysis of visual resources using the Forest Service's Scenery Management System (SMS). This report supplements the DEIS by providing a brief analysis of the project using the Visual Quality Objectives (VQOs) in the Coronado National Forest Plan.

Background

In recent years, there has been conflicting direction regarding the assessment of scenic resources on the Coronado National Forest. The *Coronado National Forest Plan* refers to VQO maps created under the 1974 Visual Management System, yet since the mid 1990s National Forests have been directed to use the improved Scenery Management System (Reynolds, 2380, August 22, 1994; McDougle, 2380, March 10, 1997; and Furnish, 1920/2380, June 11, 2001). In 2001, SMS mapping of Scenic Classes, which show the relative importance of scenic resources Forest-wide, was completed for the Coronado National Forest. The proposed TEP power line provided an opportunity to implement Scenery Management at the project level, as intended and directed, and therefore was utilized for this analysis.

Although on-the-ground maps for the two systems are quite different, the components of both systems are similar and analysis (affected environment, environmental consequences, mitigation, etc.) for the TEP proposal yields largely the same results. A Forest Plan amendment would be required to achieve forest plan consistency under either system.

Introduction

This report provides information about the proposed project using the VQOs in the Forest Plan. It is not meant to be a complete parallel for the visual resource sections in the *DEIS*. Much of the information contained in the DEIS is the same under either system. The landscape character and existing condition descriptions in Chapter 3 are appropriate for both systems, as are the descriptions of short and long-term impacts to visual resources, the simulations, and the mitigation measures described in Chapter 4. Additionally, the Cumulative Impacts and Unavoidable and Adverse Environmental Impacts sections (Chapters 5 and 6) are basically the same under either system.

Affected Environment

The proposed power line routes pass through Management Areas 1, 3, 4, and 7. Standards and guidelines for Management Areas 1, 3, and 7 require that "Visual quality objectives will be met" (see *Management Emphasis and Intensity*, and *Management Practice Activity Visual Resource Management A03*, on pages 47, 55, 67, and 71). Standards and guidelines for Management Area 4 require that "Visual quality objectives will be met or exceeded" (see *Management Emphasis and Intensity*, and *Management Practice Activity Visual Resource Management A03*, on page 62).

Visual Quality Objectives are based on two components:

- 1. Variety Class: A measure of the visual variety or diversity of landscape character. The three variety classes are A (Distinctive), B (Common), and C (Minimal).
- 2. Sensitivity Levels and Distance Zones: Sensitivity Levels are a measure of the viewer interest in scenic qualities of a landscape. The three levels are 1 (Highest), 2 (Average), and 3 (Lowest). Distance Zones include Foreground (up to 1/2 mile), Middleground (1/2 mile to 5 miles), and Background (over 5 miles).

The entire project area is rated Variety Class A and B.

There are no maps of Sensitivity Levels for the forest. However, a review of the VQO maps indicates that Ruby Road, Pena Blanca Lake, I-19, Arivaca Road, Arivaca Lake, and one area on the western edge of Nogales, AZ, were identified as Sensitivity Level 1 areas. A project-level review of these Sensitivity Levels confirms that, with the exception of the area near Nogales, AZ (where no visually sensitive public use area exists), all are appropriate. It is not clear whether any Sensitivity Level 2 travelway or areas were identified in the VQO mapping. A project-level review reveals that a number of travelways would qualify: FR 684, FR 4145, Peck Canyon Rd., FR 4191 and 4192, FR 223, FR 221, FR 4203, FR 222, FR 39A, the trail to Atascosa Lookout, the road from Ruby Rd. to Corral Nuevo, the road from Ruby Rd. to Trail #40, and Trail #40. All other roads and trails are considered Sensitivity Level 3.

Existing visual quality objectives for the proposed power line routes are Retention, Partial Retention, and Modification. The Western Corridor route would be approximately 0.4 mile from the Pajarita Wilderness, which has a VQO of Preservation.

Definitions for these VOOs are:

Preservation: Management activities, except for very low visual impact recreation

facilities, are prohibited.

Retention: Management activities should not be evident to the casual forest visitor. Partial Retention: Management activities must be visually subordinate to the characteristic

landscape.

Modification: Management activities may dominate the characteristic landscape, but

must, at the same time, utilize naturally established form, line, color, and

texture.

Table 1: Proposed Power Line Routes and Visual Quality Objectives by Miles

VQO	Western Corridor	Central Corridor	Crossover Corridor
Retention	10.12	1.10	1.10
Partial Retention	16.68	4.28	14.97
Modification	2.62	9.68	13.06
Total-Miles	29.42	15.06	29.13

The attached map shows existing VQOs and the 3 proposed routes.

Environmental Consequences

None of the three proposed routes would meet current VQOs. The power line would be evident to casual forest visitors, and in foreground locations it would dominate the landscape.

The Western and Crossover Corridors have greater impacts on visual resources than the Central Corridor, due to their longer routes across the Forest and the fact that both impact large areas where the existing visual resources are in excellent condition. The Western Corridor has the greatest impact on visual resources due to its substantial visibility from Ruby Road. The Western Corridor also would be visible from the Pajarita Wilderness. Of the proposed routes, the Central Corridor has the least impacts on visual resources because it has the shortest length on National Forest System lands, impacts Ruby Road only at one crossing, and impacts landscapes where the existing visual condition has already been compromised by the existing natural gas pipeline and nearby off-forest activities such as private development and I-19.

If construction of a power line is approved, a Forest Plan amendment changing the Visual Quality Objectives for portions of the corridors would be required for Forest Plan consistency. See the attached maps showing proposed VQOs for each route.

The rationale for proposed VQOs is as follows:

- 1. The corridor width where VQOs would be changed would be 1/4 mile wide (i.e., 1/8 mile on each side of the power line). Although the visual impact of the line is wider, lowering VQOs for a relatively narrow corridor will best protect remaining visual resources.
- 2. In areas where the power line would be viewed in the foreground from Sensitivity Level 1 and 2 travelways, the VQO would be changed to Maximum Modification. Maximum Modification allows management activities that dominate the characteristic landscape, but activities should appear as natural occurrences when viewed as background. Foreground was mapped at 1/2 mile.
- 3. In areas where the power line would be viewed in middleground or background, and where the power line is not visible from visually sensitive travelways, existing VQOs of Partial Retention and Modification would likely be met; therefore VQOs for these areas would not be changed, provided that no new permanent access roads would be required.
- 4. In the area of VQO Retention on the western edge of Nogales, AZ, the proposed VQO for the power line corridor would be changed to Partial Retention. This area is not viewed in the foreground from any Sensitivity Level 1 or 2 travelways, but there may be views of this area from lesser-used public roads and/or from residential areas off-Forest; therefore the power line would not meet the existing VQO of Retention, but would likely meet Partial Retention.

Table 2: Proposed Power Line Routes and Visual Quality Objectives by Acres

Changes in Acres of VQOs	Western Corridor		Central Corridor		Crossover Corridor	
VQO	Existing	Proposed	Existing	Proposed	Existing	Proposed
R	1,629	60	175	0	184	9
PR	2,624	2,055	680	645	2,422	2,103
M	448	342	1,560	649	2,060	1,049
MM	0	2,245	0	1,121	0	1,506
Total	4,702	4,702	2,415	2,415	4,667	4,667

Mitigation

Mitigating measures will not cause the project to meet VQOs, but will lessen the overall visual impact of facilities. Recommendations include:

- 1. Use self-weathering monopoles and non-specular wire.
- 2. If any lattice structures must be used on National Forest System lands, avoid placing them where they will be seen in the foreground from any Concern Level 1 or 2 travelway.
- 3. Minimize clearing vegetation. Protect trees, shrubs, and groundcover wherever possible.
- 4. Naturalize all areas disturbed by this project. This includes all areas damaged by construction activities and obliteration of all new roads resulting from this project (not just the initial visible portions). Naturalization shall include restoration of natural grades, placing boulders and rocks to control vehicular access, tilling soil, and revegetating with native plant species and patterns from the surrounding landscape (seed and/or plants). Boulders shall be set into the ground 1/3-1/2 of their size to look natural, not simply placed on grade. If the public continues to use disturbed areas after naturalization, additional work may be required by the Forest Service.
- 5. Minimize permanent access roads, and design them with great care, following the contours of the land to minimize clearings, and reduce cut and fill slopes. Construct cut and fill slopes at 3:1 or flatter to allow for revegetation even if this initially results in greater disturbed areas. Any gates or fences required for restricting public access to permanent access roads shall be selected to blend with landscape colors; avoid shiny materials and keep signs small.
- 6. At the end of the proposed project operation time, or when facilities are no longer being used, remove all facilities from National Forest land, restore natural topography, and revegetate all clearings and disturbed areas at no expense to the Government.

/s/ Debby Kriegel

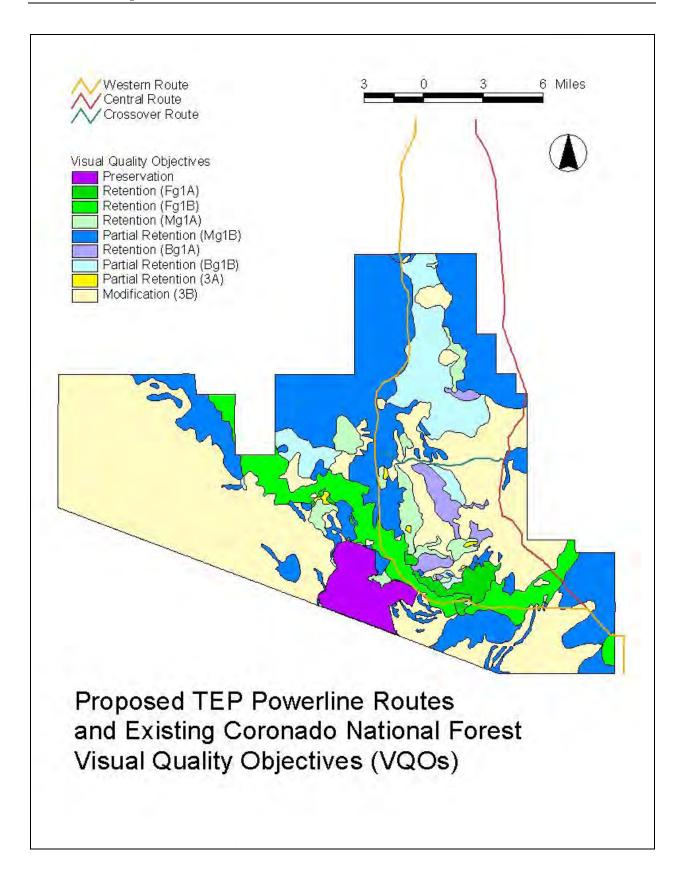
DEBBY KRIEGEL

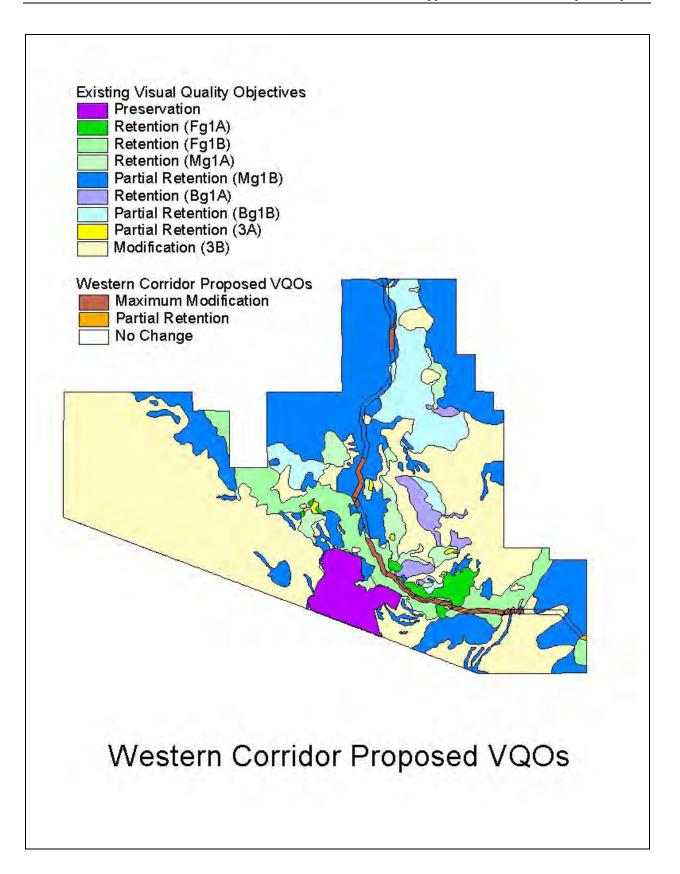
Forest Landscape Architect

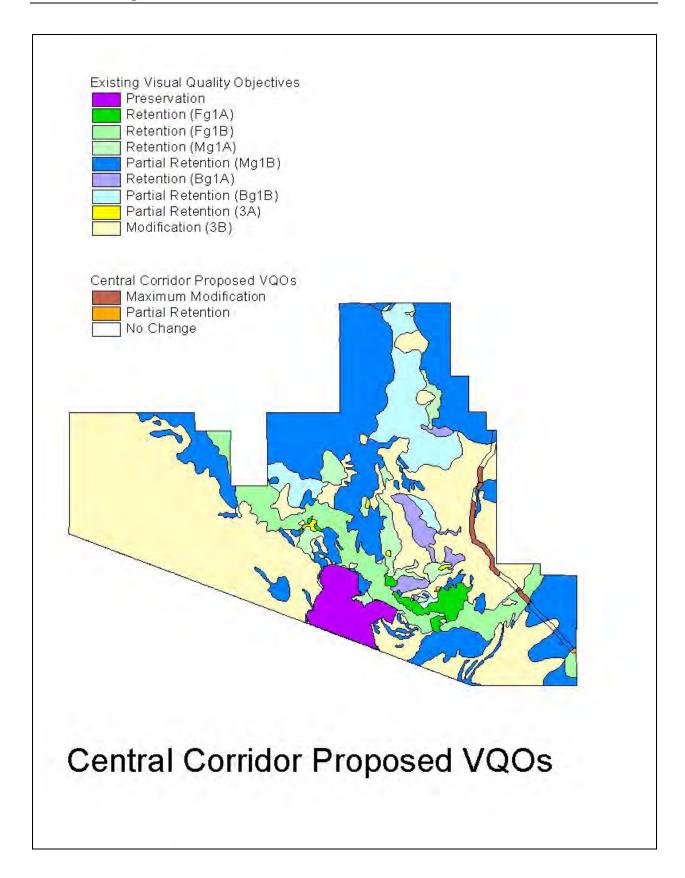
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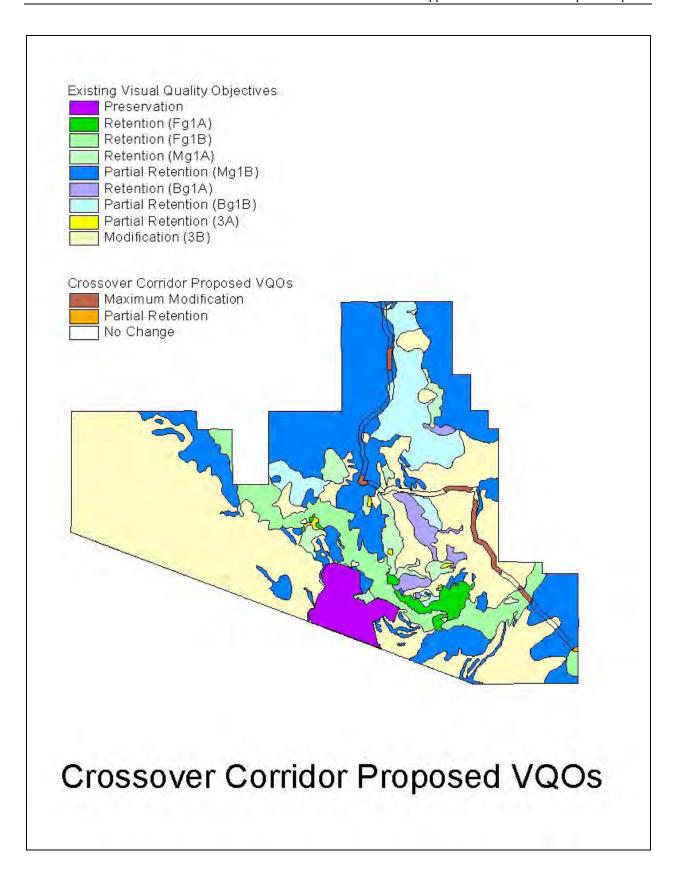
Existing VQOs and the 3 proposed power line routes.

Proposed VQOs for Western, Central, and Crossover Corridors.









United States Department of Agriculture Forest Service Coronado National Forest 300 W. Congress St. Tucson, AZ 85701 (520) 670-4552 TDD (520) 670-4584 FAX (520) 670-4567

File

2380

Date:

August 10, 2004

Code:

Route File

To:

Subject:

Proposed TEP Powerline - Visibility from Tumacacori & Tubac Historic Sites

To:

George Asmus Teresa Ciapusci

Introduction

Due to concerns about the possible visibility of the Central Corridor from historic sites in Tumacacori and Tubac, this morning I completed a field review of these sites.

Tumacacori National Monument is managed by the National Park Service. Tubac Presidio State Historic Park is managed by Arizona State Parks. Both areas contain parking areas, buildings, and outdoor walkways and facilities.

I visited each site, took photographs, and spoke with staff about views from the sites. Additionally, I drove along the I-19 frontage road from the Tumacacori-Carmen interchange south of Tumacacori, north past the Tubac interchange and Tubac, to the Chavez Siding intertchange (approx. 6 miles total). This gave me a better overall impression of viewsheds along this route that is used by visitors to the historic sites.

It should be noted that the Central Corridor nearest these sites is <u>not</u> located on National Forest land, but rather lies between I-19 and the National Forest boundary. The route enters National Forest land approximately 2 miles south of Tumacacori. However, due to the fact that it is difficult to determine exactly where National Forest land begins, the following analysis is based on any potential views (on or off the Coronado National Forest) of the proposed powerline from these locations.

Tumacacori National Monument

Views from the Monument toward the Central Corridor from this area are mostly blocked by trees, buildings west of the frontage roads, I-19 (which is elevated through this area), and hills just west of I-19. There are limited views of the distant mountains. The most open views toward the Central Corridor are from the south end of the parking area and from the outdoor "fiesta grounds" at the north end of the site. However, it is very unlikely that the proposed powerline would be visible from these areas. Views from other locations within the monument are largely blocked by the monument's buildings and walls.

Tubac Presidio State Historic Park

Views toward the Central Corridor from this area are blocked by vegetation, other buildings, and topography. Views toward the Central Corridor are most open from the parking lot and entrance. There is one narrow, distant view from within the site where it is possible that the powerline would be visible,

but this area already includes a house and a powerline. Most views from within the site are blocked by structures, and most viewsheds from the area include a variety of development, including buildings, roads, fences, and other powerlines.

Frontage Road

Most views from the Carmen interchange north to the Tubac interchange are blocked by topography. There are some small areas north of Tumacacori where topography does not block views and travelers might get a glimpse of the powerline looking west out their side windows. These occur at approximately 0.4, 0.8, and 2.4-2.7 miles north of the Tumacacori historic site.

North of the Tubac interchange views are much more open; topography and vegetation do little to block views toward the Central Corridor. In these areas the powerline might be visible. However, these viewsheds are far from pristine; homes, roads, and other powerlines are clearly visible.

Summary

Although the Central Corridor is very visible from many other locations, it is unlikely that the line would be visible from the Tumacacori and Tubac historic sites.

/s/ Debby Kriegel

DEBBY KRIEGEL Forest Landscape Architect United States Department of Agriculture Forest Service Coronado National Forest 300 W. Congress St. Tucson, AZ 85701 (520) 670-4552 TDD (520) 670-4584 FAX (520) 670-4567

File 2380 **Date:** April 28, 2004

Code:
Route File
To:

Subject: Proposed TEP Power Line - Cumulative Effects on Visual Resources

To: Teresa Ann Ciapusci

This report provides an analysis of cumulative effects of the proposed TEP powerline, when added to past, present, and reasonably foreseeable future actions, on visual resources. The analysis uses the 1974 Visual Resource Management System (rather than the updated Scenery Management System) to tie with direction included in the *Coronado National Forest Plan*.

Introduction

People need natural-appearing landscapes to serve as psychological and physiological "safety valves,"...Once plentiful natural-appearing landscapes are becoming more scarce.

Landscape Aesthetics, A Handbook for Scenery Management, USDA Forest Service, 1995

Before proceeding further, three general concepts should be noted:

1. Most impacts to visual resources are cumulative

Scenery is different than many resources. When vegetation is removed, for example, it grows back in a given number of years; additional vegetation removal after that point would have no cumulative effects. Projects that result in permanent changes to landscape character (including utility lines) tend to be progressive, never returning to the original character unless the facilities are removed. As projects are added to landscapes, there tends to be a gradual decline in visual quality. And generally there is no precise point at which one additional project is "too much."

2. Visual resource boundaries are difficult to define

Unlike soils in a specific watershed, visual resource boundaries are not clearly defined. As people travel through a landscape they experience a sequence of viewsheds. Looking at cumulative effects for just one project area or viewshed only tells part of the story. However, the bigger picture is generally beyond the scope of any given project. For the TEP power line, there are at least two scales to consider: the Tumacacori & Atascosa Mountains Ecosystem Management Area and the entire Coronado National Forest. See the section "Analysis Area Scales" below.

3. <u>Seemingly small projects can have large effects on visual quality and small project impacts add up to big ones</u>

The impacts of a single project at the Forest scale are often relatively insignificant, but cumulative effects of many small projects over the decades and across the landscape can become an enormous issue as visual quality diminishes.

Additionally, projects with relatively small footprints can impact vast viewsheds. For example, the proposed TEP power line lies within a narrow corridor, yet would impact numerous viewsheds. And at a broader scale, cumulative effects are substantial. On the Coronado National Forest, like National Forest lands nation-wide, there is a slow, creeping loss of natural landscapes and scenic integrity, though individual projects may have relatively little impact. The cumulative effects of the TEP power line on visual resources may seem relatively small; just one new utility line running through thousands of acres of natural-appearing landscapes. But both individual and cumulative impacts of relatively small projects on visual quality can be significant. If acreage was the only criteria, then scattering skyscrapers across the Forest would technically be a tiny impact to scenery, but obviously this would dramatically change the landscape across millions of acres. The Mt. Graham International Observatory provides an example; it occupies a mere 8.6 acres, but impacts visual quality for an enormous viewshed, extending 50 or more miles away.

Forest Plan Direction

The *Coronado National Forest Plan* provides limited guidance for evaluation of cumulative effects on visual resources. Two relevant items include:

- 1. Recommendation (page 28): "Inventory the Existing Visual Condition (EVC)". This would establish a benchmark to evaluate changes through time.
- 2. Monitoring Visual Quality (page 93): "If visual quality objective acres in Retention or Partial Retention is reduced 20%, the ID Team will evaluate and make recommendations to management." This would set a threshold for cumulative impacts.

The EVC mapping was not completed, but an Existing Scenic Integrity inventory (the equivalent Scenery Management System mapping) is currently underway and should be available by Fall 2004. Therefore, determination of whether or not 20% of R or PR areas has been impacted is not available. The remainder of this report will be based on a qualitative, rather than quantitative, analysis. This is quite normal for a resource like visual quality.

Analysis Area Scales

As previously mentioned, boundaries for visual resources are hard to define. For the proposed TEP power line, analysis at two scales is appropriate:

The Tumacacori Ecosystem Management Area (EMA)

The landscapes of an entire EMA, in this case one that includes two mountain ranges, is a logical scale to examine. Due to the basin and range geology of southeastern Arizona, sky island mountains rise above the desert and serve as focal points for travelers, often visible from many miles away and from numerous travelways inside and off National Forest System lands. Cumulative effects analysis for this EMA will also include impacts on private lands adjacent to the Forest boundary.

Landscapes across the Coronado National Forest

Many of the public comments for the TEP power line relate to visual beauty of the region and the Coronado National Forest in general (*Tucson Electric Power Company Sahuarita-Nogales Tramsmission Line Draft Environmental Impact Statement*, page 1-11, 1.3.1 Issues Within Scope of the EIS), so a brief analysis of cumulative effects for this scale is included.

This broader view analysis could be expanded to include all large blocks of natural landscapes across southeastern Arizona (i.e., the sky island landscapes). This might also include National Park Service and BLM lands, other Federal conservation lands, and even areas protected by State and local jurisdictions. A brief analysis of these lands follows:

- National Park Service lands include Saguaro National Park, Chiricahua National Monument, and Coronado National Monument. These lands provide natural, public landscapes, and their visual resources are generally better protected than those on the Coronado. However, Saguaro West is relatively small and nearly surrounded by private development, and Chiricahua and Coronado National Monuments are relatively small, so at best these provide only limited protection of natural landscapes.
- Bureau of Land Management lands constitute extensive acres in southeastern Arizona, but are mainly low elevation and generally less unique landscapes, and much BLM land is scattered in small pieces.
- Other Federal conservation areas include the San Pedro Riparian National Conservation area, which is a relatively narrow strip of protected land, Buenos Aires National Wildlife Refuge, which is undoubtedly being impacted by illegal immigrant activity from Mexico, and Military and Indian Reservation lands, which afford little protection for visual resources. Therefore, these lands provide limited long-term protection of natural landscapes available to for public enjoyment.
- State Trust lands, which are not protected, and local (City & County) lands which are scattered and small.

Hence, the analysis is focused back to the Coronado National Forest.

Past Actions

It is extremely rare that constructed facilities are removed from National Forest System lands, and many of these types of management actions result in long-term changes. Therefore cumulative effects to visual resources grow with each passing year and decade. Visual resources across the Forest have been subjected to extensive impacts as a result of past projects.

The Tumacacori Ecosystem Management Area

Compared to many parts of the Coronado National Forest, including the nearby Santa Rita Mountains, this EMA has had relatively few past actions that have negatively impacted visual resources. Existing roads and trails are used as viewing platforms and therefore are generally not considered negative elements, and recreation facilities (such as at Pena Blanca Lake and Calabasas Group Site) have not resulted in major impacts to visual resources. Mining activity, especially at Ruby Townsite (private land), and small mines along California Gulch and Warsaw Gulch, and at the end of Rock Corral Rd., impact visual quality. Most visitors to this EMA traveling on major roadways would not notice impacts from wildcat roads or OHV damage, though some of this has occurred. The existing underground gas pipeline creates a linear clearing across the landscape. Some of the most extensive impacts here are created by illegal aliens traveling north from Mexico, including direct impacts such as non-system trails and

discarded debris, and resulting actions from U.S. Border Patrol enforcement activities, such as cross country travel, road improvements, and security measures (e.g., RVS towers) along the International Boundary. Fortunately, little of this activity is visible from sensitive public travelways.

It should be noted that visual resources in this EMA that would be impacted by powerline construction, particularly by the Western and Crossover Corridors, are currently in such good condition that one Arizona Congressman has publicly stated an intent to propose legislation to establish an additional Wilderness Area within the Tumacacori EMA.

Landscapes across the Coronado National Forest

Landscapes across the Coronado are still generally natural-appearing, but places where visitors can experience pristine viewsheds are becoming increasingly rare. Although a comprehensive list is not available, impacts to visual quality include astrophysical facilities on mountaintops, utility structures such as communication towers and power lines, mining activities, catastrophic wildfires, administrative facilities, wildcat roads, OHV damaged areas, and developments on private lands within and adjacent to Forest boundaries (in fact, the increasing population of southern Arizona has not only resulted in development of lands up to the Coronado National Forest's boundaries, but actually led to the need for the proposed project).

Present and Ongoing Action

The Tumacacori Ecosystem Management Area

The effects of the proposed TEP powerline cannot be fully mitigated (e.g., by placing the line underground) and therefore would continue the decline in visual quality in this EMA. Additionally, this project is unlike many past, present, and future actions because of its extensive impacts. It sets a precedence for visual impacts by introducing an urban-type facility that is out of character with the valued Forest landscape in a part of the forest with very high visual integrity, and it creates a footprint that crosses across many miles of National Forest System land.

Another ongoing impact to natural landscapes in the area is the urban growth and development that continues to spread across the valleys and lower elevations as Tucson, Green Valley, and other communities continue to grow. Development of lands between I-19 and the Forest boundary will continue to impact visual quality. And impacts from Mexican nationals crossing into the U.S., and related Border Patrol activities, will only worsen, further degrading natural public landscapes.

Landscapes across the Coronado National Forest

The effects of the proposed TEP power line cannot be fully mitigated (e.g., by removing similar facilities elsewhere on the Coronado) and therefore would continue the decline in visual quality at a Forest-wide scale.

Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions described below are limited to those on the April 1, 2004 Coronado National Forest's Schedule of Proposed Actions (SOPA) list.

The Tumacacori Ecosystem Management Area

A possible future project with similar impacts to visual resources is a proposal from the Power Company of New Mexico (PNM) to construct a 345 KV power line. If constructed, this project would further reduce visual quality in the EMA.¹

Landscapes across the Coronado National Forest

Proposed future projects that would negatively affect visual resources Forest-wide include:

- 1. Greaterville placer mining (Santa Rita Mountains)
- 2. Greaterville road relocation (Santa Rita Mountains)
- 3. Alpha Calcit mine (Dragoon Mountains)
- 4. Red Mountain power line (Canelo Hills)

Summary

Evidence is increasing that the most devastating environmental effects may result not from the direct effects of a particular action, but from the combination of individually minor effects of multiple actions over time.

<u>Considering Cumulative Effects Under the National Environmental Policy Act</u>, Council On Environmental Quality, 1997

The Forest Plan Visual Quality Objectives were established to assure that management actions would not cross the threshold of acceptability for visual resource impacts. Past projects have impacted visual quality, the proposed TEP power line will not meet Forest Plan VQOs, and there are known additional actions which will further reduce visual quality.

The Coronado National Forest Plan (p. 41, item 4) states: "Existing utility and transportation corridors will continue to be used for those types of uses. Every attempt should be made to locate new utilities within those existing corridors that meet the visual quality objective...". Although none of TEP's proposed corridors meet VQOs, the Central Corridor has less cumulative effect on visual resources partly because it follows an existing utility corridor (with the exception of the deviation around an inventoried roadless area). Cumulative effects from the Crossover Corridor, and especially the Western Corridor, are greater because these routes not only accelerate the cumulative loss of natural landscapes by impacting large and relatively pristine areas, but also because either would create an additional new utility corridor.

/s/ Debby Kriegel

DEBBY KRIEGEL Forest Landscape Architect

¹ In October 2004, PNM indicated that it would be preparing a letter to the DOE withdrawing their Presidential Permit application (see Section 5.2.1 of the TEP Final EIS).

Appendix J

Arizona Corporation Commission Documents

APPENDIX J CONTENTS

ACC Decision 62011; November 2, 1999

ACC Decision 64356; January 15, 2002

ACC Decision 66615; December 9, 2003

Staff Report Analyzing TEP and UniSource Energy Services Response to Decision No. 66615; May 27, 2004

Staff Sufficiency Assessment of TEP and UniSource Energy Services Response to Decision No. 66615; May 20, 2004

Instructions for Accessing TEP and Citizens Communications Company Certificate of Environmental Compatibility and Line Siting Committee, Docket No. L-00000C-01-0111 and L-00000F-01-0111

COPY

BEFORE THE PRESENTATION COMMISSION DOCKETED

CARL J. KUNASEK CHAIRMAN JIM IRVIN COMMISSIONE

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JIM IRVIN

COMMISSIONER

WILLIAM A. MUNDELL

COMMISSIONER

DOCKETED BY

IN THE MATTER OF SERVICE QUALITY ISSUES, ANALYSIS OF TRANSMISSION ALTERNATIVES AND PROPOSED PLAN OF ACTION IN THE SANTA CRUZ ELECTRIC DIVISION OF CITIZENS UTILITIES COMPANY.

DOCKET NO. E-01032A-99-0401

DECISION NO. <u>\$20/1</u>

OPINION AND ORDER

DATE OF HEARING:

September 8, 1999

PLACE OF HEARING:

Phoenix, Arizona

PRESIDING OFFICER:

Barbara M. Behun

APPEARANCES:

Mr. Craig A. Marks, Associate General Counsel, Craig Utilities Company, on behalf of Citizens Utilities Company;

Mr. Walter W. Meek, President, Arizona Utility Investors Association; and

Mr. Peter Breen, Staff Attorney, on behalf of the Utilities Division of the Arizona Corporation Commission.

BY THE COMMISSION:

Having considered the entire record herein and being fully advised in the premises, the Arizona Corporation Commission ("Commission") finds, concludes, and orders that:

FINDINGS OF FACT

- 1. On October 20, 1998, Citizens Utilities Company, its divisions and subsidiaries ("Citizens") filed with Docket Control of the Commission a notice of intent to form a holding company.
- 2. Decision No. 61383 (January 29, 1999) directed Citizens to file an analysis of alternatives and Plan of Action to rectify the service problems in the Santa Cruz Electric Division, for approval at Open Meeting, and ordered that a hearing be held regarding Citizens' request.
 - 3. By Procedural Order dated February 24, 1999, the holding company matter was

¹ The application was filed as Docket Nos. E-01032A-98-0611, et al.

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scheduled for hearing on May 10, 1999.

- 4. Upon request by Citizens, the hearing was continued to September 8, 1999.
- 5. On October 27, 1998, the City of Nogales, Arizona filed a Complaint against Citizens concerning electrical outages in Nogales, Arizona.
- 6. Decision No. 61793 (June 29, 1999) dismissed the Complaint, with direction that Citizens would provide a planned service date and cost-benefit analysis for system components of a second transmission line in the Plan of Action to be filed in compliance with Decision No. 61383.
- 7. Intervention has been granted to the Arizona Payphone Association, the Residential Utility Consumer Office, and the Arizona Utility Investors Association ("AUIA").
- 8. On June 6, 1999, Citizens filed a letter in this docket, indicating that the proposed separation would not take place.
- 9. On June 16, 1999, Citizens requested clarification of procedural issues, due to the cancellation of the anticipated separation.
 - 10. A Procedural Conference was held on July 12, 1999.
- 11. By Procedural Order dated July 15, 1999, the holding company docket was closed and this docket opened to resolve the Commission's concerns with respect to Citizens' Santa Cruz Electric Division. The hearing remained scheduled for September 8, 1999.
- 12. On August 9, 1999, the Commission's Utilities Division Staff ("Staff") and Citizens filed a Settlement Agreement regarding Citizens' Plan of Action.
- 13. On August 20, 1999, Staff and Citizens filed testimony in support of the Settlement Agreement.
- 14. A hearing was held on September 8, 1999, before a duly appointed Hearing Officer of the Commission, at which Citizens and Staff appeared through counsel and presented evidence. The AUIA appeared through its President, but did not present evidence.
- 15. The Settlement Agreement commits Citizens to a Plan of Action that is in compliance with Decision Nos. 61383 and 61793 and incorporates Staff recommendations contained in pre-filed testimony for those proceedings. The Settlement Agreement states that the Plan of Action includes Citizens' submittal of April 15, 1999, as supplemented on May 7, 1999 and July 13, 1999.

- 16. The Settlement Agreement requires Citizens to build a second transmission line to serve its customers in Santa Cruz County by December 31, 2003.
- 17. Citizens has agreed to file for a Certificate of Compatibility for the new line by November 11, 2000. The scheduled in-service date for the line is to be accelerated if an Environmental Impact Statement is not required. The Settlement Agreement also establishes a framework for penalties applicable if Citizens fails to perform in accordance with its proposed schedule.
- 18. If Citizens sells or divests its Santa Cruz Electric Division, the Settlement Agreement requires the acquiring entity to fulfill Citizens' obligations for the second transmission line as a condition of the Commission's approval of the sale.
- 19. The Settlement Agreement preserves Staff's right to challenge any capital expenditure Citizens accrues in the course of constructing its Plan of Action for the Santa Cruz Electric Division filed for these proceedings. Staff has already noted some expenditure concerns in prior testimony.
- 20. The parties agreed that a ruling on expenditures should be postponed until Citizens files to recover its investment cost from customers.
- 21. As agreed to by the parties, Item No. 7 in the Settlement Agreement should refer to Docket No. E-1032A-99-0401, not Docket No. E-1032A-99-041.

CONCLUSIONS OF LAW .

- 1. Citizens is an Arizona public service corporation within the meaning of Article XV, Section 2, of the Arizona Constitution and A.R.S. § 40-246.
- 2. The Commission has jurisdiction over Citizens and over the subject matter of this docket.
- 3. Citizens' Plan of Action as filed on April 15, 1999, and supplemented on May 7, 1999 and July 13, 1999, complies with Decision Nos. 61383 and 61793.
- 4. The Settlement Agreement filed by the parties on August 9, 1999 is in the public interest and will be adopted by the Commission, with the correction as indicated in Findings of Fact No. 21.

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ORDER

IT IS THEREFORE ORDERED the Settlement Agreement filed on August 9, 1999 by Commission Staff and Citizens Utilities Companies shall be, and is hereby, adopted by the Commission, with the correction indicated in Findings of Fact No. 21.

IT IS FURTHER ORDERED that Citizens Utilities Company is ordered to comply with the requirements of the Settlement Agreement.

IT IS FURTHER ORDERED that this Decision shall become effective immediately.

BY ORDER OF THE ARIZONA CORPORATION COMMISSION.

COMMISSIONER

COMMISSIONER

IN WITNESS WHEREOF, I, BRIAN C. McNEIL, Executive Secretary of the Arizona Corporation Commission, have hereunto set my hand and caused the official seal of the Commission to be affixed at the Capitol, in the City of Phoenix, this Znd day of Noumber 1999.

BRIAN C. MENEIL

EXECUTIVÉ SECRETARY

DISSENT BMB:dap

DECISION NO. 62011

BEFORE THE ARIZONA CORPORATION COMMISSION

CARL J. KUNASEK
CHAIRMAN
JIM IRVIN
COMMISSIONER
WILLIAM A. MUNDELL
COMMISSIONER

IN THE MATTER OF SERVICE QUALITY ISSUES, ANALYSIS OF TRANSMISSION ALTERNATIVES AND PROPOSED PLAN OF ACTION THE SANTA CRUZ ELECTRIC DIVISION OF CITIZENS UTILITIES COMPANY

DOCKET NO. E-01032A-99-0401

SETTLEMENT AGREEMENT BETWEEN COMMISSION STAFF AND CITIZENS UTILITIES COMPANY

Citizens Utilities Company ("Citizens") and the Arizona Corporation

Commission Staff ("Staff") agree as follows concerning Citizens' Plan of Action to
address service quality issues in its Santa Cruz Electric Division, Citizens' Analysis
of Transmission Alternatives and Citizens' Schedule to construct a second
transmission line to serve its Santa Cruz Electric Division Customers.

- 1. Citizens' Plan of Action, as filed on April 15th, 1999, and supplemented on May 7th, 1999, and July 13th, 1999, complies with Decision Nos. 61383 and 61793.
- 2. Cltizens will proceed with planning, permitting, and constructing a second transmission line to serve its Santa Cruz Electric Division Customers, subject to the siting process and schedule that Citizens filed on July 13th, 1999. Presently the preferred alternative is the Bicknell-Valencia route, but the parties recognize that completion of transmission studies and environmental approvals may identify another route as the route to be constructed.
- 3. Citizens will file for a Certificate of Environmental Compatability by November 11, 2000. Citizens will endeavor to place the second transmission line In service by four years after the date of a Commission Order approving this Settlement Agreement. If an Environmental Impact Statement is not needed,

- a Citizens will endeavor to achieve an in-service date of 39 months after the date of a Commission Order approving this Settlement Agreement.

4. Delay Penalties

- a. If the second transmission line is not placed in service by December 31, 2003, then Citizens will owe a penalty of \$30,000/ month for each full month of delay after December 31, 2003. This penalty represents liquidated damages for Citizens' failure to fulfil its obligations under this Agreement and will be for the benefit of Citizens' Arizona electric customers. Citizens will compute and owe the penalty no later than 30 days after the transmission line's actual in-service date. If the transmission line is not in service by December 31, 2004, then on January 31, 2005, Citizens will compute and owe the accrued penalty for the previous year. Citizens' obligation will then continue in a like manner on each January 31, thereafter, until the transmission line is actually in service. In the year the transmission line is actually placed in service, Citizens will then compute and owe the penalty no later than 30 days after the transmission line's actual in-service date.
- b. No later than each date in the preceding paragraph by which Citizens is to compute and owe a penalty, Citizens will file with the Commission its proposal as to which of Citizens' electric customers will receive the benefit of the penalty amount and how the benefit will be distributed (e.g., bill credit, credit to PPFAC bank balance, refund, or other methodology). The Commission will then determine by Order the appropriate recipients and distribution methodology.
- c. If Citizens believes that circumstances beyond its reasonable control (such as an unavoidable delay in obtaining a Certificate of Environmental Compatability, court injunction, or other good cause, are responsible for the delay, Citizens may apply -- no later than December 31, 2003 -- with the Commission to delay the December 31, 2003, date or to

waive the penalty. If Citizens makes such a filing, Staff and any other interested party may file a response either supporting, not objecting to, or objecting to Citizens' application. The Commission will then determine the appropriate relief, if any.

- 5. The Commission should condition any sale or divestiture of Citizens' Santa Cruz Electric Division upon the acquiring entity's satisfactory commitment that it will fulfill Citizens' obligations set forth in paragraphs 2, 3 and 4 of this Agreement.
- 6. Staff's signature on this Settlement Agreement in no way implies that any capital expenditure that Citizens has made or will make in Santa Cruz County was or is necessarily the least-cost option to resolve Santa Cruz County electric service issues. In a future Citizens rate case, Staff may challenge the prudence of any particular capital expenditure made for that purpose. Other than as expressly set forth in this Settlement Agreement, Citizens' signature in no way implies that Citizens agrees with the statements made in Staff's testimony dated July 16, 1999. Citizens or a successor may take any position concerning the prudence of any particular capital expenditure made in Santa Cruz County to resolve Santa Cruz County electric service issues.
- 7. This Agreement resolves all outstanding issues pending in Docket No. 401
 E-01032A-99-041. If this Agreement is not accepted by the Commission, none of the Parties compromise or otherwise waive the positions they have taken or may take on any of the issues addressed in their prefiled testimony to date.
- 8. The provisions of this Agreement are not severable and are effective only after the Commission enters an order approving this Agreement without modification. If this Agreement is not approved by the Commission in the form submitted, it is deemed withdrawn, and its stipulations are void.
 - The Parties urge the Commission to approve this Agreement.
 Signatures follow next page:

DATED August 9, 1999

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Citizens Utilities Company

By: Daniel J. McCarthy CAM

Title: Vice President

Staff of the Arizona Corporation Commission

By: Fay T. Wallymon

Title: ACTING DIRECTOR Utilities DIVISION

BEFORE THE ARIZONA CORPORATION COMMISSION

WILLIAM A. MUNDELL
Chairman
JIM IRVIN
Commissioner
MARC SPITZER
Commissioner

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Angeles Corporation Commission DOCKETED

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TOOKETED BY

IN THE MATTER OF THE JOINT APPLICATION OF TUCSON ELECTRIC POWER COMPANY AND CITIZENS COMMUNICATIONS COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY FOR A PROPOSED 345 KV TRANSMISSION LINE SYSTEM FROM TUCSON ELECTRIC POWER COMPANY'S EXISTING SOUTH 345 KV SUBSTATION IN SEC. 36. T.16S., R.13E. SAHUARITA. ARIZONA, TO THE PROPOSED GATEWAY 345/115 KV SUBSTATION IN SEC. 12, T.24S... R.13E., NOGALES, ARIZONA WITH A 115 KV) INTERCONNECTION TO THE CITIZENS COMMUNICATIONS COMPANY'S 115 KV VALENCIA SUBSTATION IN NOGALES. ARIZONA, WITH A 345 KV TRANSMISSION LINE FROM THE PROPOSED GATEWAY SUBSTATION SOUTH TO THE INTER-NATIONAL BORDER IN SEC. 13, T.24S... R.13E.

DOCKET NOS. L-00000C-01-0111 L-00000F-01-0111

DECISION NO. 64356

The Arizona Corporation Commission ("Commission") has conducted its review, as prescribed by A.R.S. § 40-360.07. Pursuant to A.R.S. § 40-360.07(B), the Commission, in compliance with A.R.S. § 40-360.06 and in balancing the broad public interest, the need for an adequate, economical and reliable supply of electric power with the desire to minimize the effect thereof on the environment and ecology of this state:

The Commission finds and concludes that the Certificate of Environmental Compatibility ("CEC") issued by the Arizona Power Plant and Transmission Line Siting Committee is granted as modified and amended by this Order.

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DECISION NO. 64356

The Commission modifies Condition Number 6 as follows:

6. Applicants shall implement the mitigation measures and impact avoidance recommendations set forth in the Harris Report and those recommended in the additional Harris Report studies. Applicants shall also continue to completion those studies that are ongoing as identified in the Harris Report.

The Commission modifies Condition Number 8 as follows:

8. Applicants shall retain an archaeologist satisfactory to the State Historical Preservation Office (SHPO). The archaeologist is to be on site during construction activities to advise applicant in connection with any additional archeological and related studies that may be required and to manage cultural and historical preservation efforts for archaeological sites that may be affected by the construction of the Project transmission lines. The archaeologist shall meet and confer with representatives of local Native American Nations and local historical societies to determine any sensitive areas and determine if and how they can be avoided or mitigated.

The Commission modifies Condition Number 9 as follows:

9. Applicants shall retain a biologist satisfactory to the Arizona Game and Fish Department. The biologist is to be on-site during construction activities in connection with any additional biological and related studies that may be required and to advise Applicants in connection with mitigation efforts for any endangered, threatened and sensitive species that may be affected by the construction of the Project transmission line.

The Commission modifies Condition Number 11 as follows:

- 11. In the final design and construction of the transmission line, Applicants shall:
 - (a) use structures of a non-reflective nature that are to the greatest extent possible consistent with the terrain and vegetation through which they are installed.
 - (b) use non-specular conductors and dulled structures of a self-weathering material and color suitable to the terrain and vegetation

- (c) use monopoles except in locations where use of lattice towers would minimize detrimental impacts upon the total environment.
- (d) When making specific easement routing decisions as to the ultimate pathway to be followed for the construction of the transmission line, the applicant shall make the minimization of any detrimental impact upon the total environment the deciding factor as between different pathways within the corridor approved by this decision.

The Commission modifies Condition Number 16 as follows:

16. Applicants shall comply with the recommendations, mitigation measures, and actions to reduce or prevent environmental impact included in the EIS.

The Commission modifies the CEC to add the following two conditions:

- 29. The Applicants, their successor(s) or assignee(s) shall submit a self-certification letter annually, identifying which conditions contained in the CEC as amended, have been met. Each letter shall be submitted to the Utilities Division Director on August 1, beginning in 2002, describing conditions which have been met as of June 30. Attached to each certification letter shall be documentation explaining, in detail, how compliance with each condition was achieved. Copies of each letter, along with the corresponding documentation, shall also be submitted to the Arizona Attorney General and the Directors of the Arizona Department of Environmental Quality, Department of Water Resources, and Department of Commerce Energy Office.
- The authority to construct facilities granted by this Commission Decision shall be revoked and the associated CEC rendered null and void in its entirety if (a) the Applicants, their successor(s) or assignee(s) legally challenge any condition herein, or (b) fail to comply with any condition herein as determined by the Commission.

The Commission further modifies the CEC to add the following Ordering Paragraph:

The preferred alternative central route, cited in the Application at page 12, section 4.2.5.2, and the alternative eastern route, cited in the Application at page 13, section 4.2.5.3 are hereby denied.

APPROVED AS AMENDED BY ORDER OF THE DISSENT

ARIZONA CORPORATION COMMISSION.

IN WITNESS WHEREOF, I, BRIAN C. McNEIL, Executive Secretary of the Arizona Corporation Commission, have hereunto set my hand and caused the official seal of the Commission to be affixed at the Capitol, in the City of Phoenix, this 15th day of Jonuary, 2002.

BRIAN C. MCNEIL

EXECUTIVE SECRETARY

DECISIONERSON NO. 64356

BEFORE THE POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE JOINT APPLICA-TION OF TUCSON ELECTRIC POWER COMPANY AND CITIZENS COMMUNICA-TIONS COMPANY, OR THEIR ASSIGNEE(S). FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY FOR A PROPOSED 345kV TRANSMISSION LINE SYSTEM FROM TUCSON ELECTRIC POWER COMPANY'S EXISTING SOUTH 345kV SUBSTATION IN SEC.36, T.16S., R.13E., SAHUARITA, ARIZONA, TO THE PROPOSED GATEWAY 345/115kV SUBSTATION IN SEC.12, T.24S., R.13E., NOGALES, ARIZONA, WITH A 115kV INTERCONNECT TO THE CITIZENS COMMUNICATIONS COMPANY'S 115kV VALENCIA SUBSTATION IN NOGALES, ARIZONA, WITH A 345kV TRANSMISSION LINE FROM THE PROPOSED GATEWAY SUBSTATION SOUTH TO THE INTER-NATIONAL BORDER IN SEC.13, T.24S., R.13E.

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Case No. 111

Docket No. L-00000C-01-0111 L-00000F-01-0111

DECISIONNO. 64356

AMENDED CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY

Pursuant to notice given as provided by law, the Arizona Power Plant and Transmission Line Siting Committee (the "Committee") held public hearings in Nogales, Arizona, on May 7 and 8, 2001, and in Phoenix, Arizona, on May 17, 2001, June 11, 2001, June 18, 2001. July 16, 2001, August 14, 2001 and October 4, 2001 in conformance with the requirements of Arizona Revised Statutes Sections 40-360, et seq., for the purpose of receiving evidence and deliberating on the Joint Application of Tucson Electric Power Company ("TEP") and Citizens Communications Company ("Citizens") (collectively, "Applicants") for a Certificate of Environmental Compatibility in the above-captioned case (the "Application").

DECISION NO. 64356

The following members or designees of members of the Committee were present for the hearing on the Application:

Margaret Trujillo

Laurie A. Woodall, Esq., Chai	r - Designee for Arizona Attorney General Janet Napolitano
Richard Tobin	Designee for the Arizona Department of Environmental Quality
Mark McWhirter	Designee for the Director of the Energy Office of the Arizona Department of Commerce
Ray Williamson	Arizona Corporation Commission ("ACC")
A. Wayne Smith	Appointed Member
Jeff McGuire	Appointed Member
Sandie Smith	Appointed Member
Mike Whalen	Appointed Member
Michael Palmer	Appointed Member

Applicant TEP was represented by Raymond S. Heyman. Esq., of Roshka Heyman & DeWulf, PLC and Marcus G. Jerden, Esq. of the TEP Legal Department. Applicant Citizens was represented by Michael M. Grant. Esq., of Gallagher & Kennedy. There were sixteen (16) intervenors: (1) the City of Nogales, represented by Jose L. Machado. Esq., City Attorney: (2) Santa Cruz Valley Citizens Council, Inc., represented by Steven J. Duffy, Esq.: (3) Santa Cruz County, represented by Holly J. Hawn, Esq., and Martha S. Chase. Esq.: (4) Arizona Center for Law in the Public Interest, represented by Timothy M. Hogan, Esq.; (5) Public Service Company of New Mexico, represented by Thomas H. Campbell, Esq.: (6) Arizona Utility Investors Association: (7) the Sonoita Crossroads Community Forum; (8) Sky Island

Appointed Member

Intervenor Arizona Utility Investors Association did not retain counsel to represent it in these proceedings. Mr. Walter M. Meek, a member of the Arizona Utility Investors Association, participated in the proceeding, pro se.

Alliance: (9) Maricopa Audubon Society: (10) the Sierra Club – Rincon Group; (11) Noble E. Rose, on behalf of the Green Valley Community Coordinating Council: (12) Marshall and Lucy Magruder; (13) William L. and Ellen L. Kurtz: (14) Emilio E. Falco, Ph.D., and Jean A. Titilah: (15) Jean England Neubauer; and (16) the Center for Biological Diversity. In addition, the ACC Utilities Division participated in this proceeding, represented by Teena Wolfe, Esq. and Janet Wagner. Esq.

At the conclusion of the hearing and deliberations, the Committee, having received and considered the Application, the appearances of Applicants and all intervenors, the evidence, testimony and exhibits presented by Applicants and all intervenors, the comments made by persons making limited appearances and the comments of the public, and being advised of the legal requirements of Arizona Revised Statutes.

Sections 40-360 to 40-360.13, upon motion duly made and seconded, voted to grant Applicants the following Certificate of Environmental Compatibility (Case No. 111):

Applicants and their assignees are granted a Certificate of Environmental Compatibility authorizing the construction of (i) a double circuit. 345kV transmission line running from TEP's existing South Substation to the new TEP Gateway Substation: (ii) the Citizens/TEP 345kV interconnection; (iii) the new Citizens' Gateway 345/115kV Substation and approximately three miles of 115kV transmission line to complete the second line to Citizens' existing Valencia Substation; and (iv) approximately two miles of 345kV transmission line to interconnect with the Comisión Federal de Electricidad ("CFE") transmission system at the United States/Mexico border as described more fully in Section 4.2 of the Application.

Applicants and their assignees are granted a Certificate of Environmental Compatibility for the preferred 345kV westerly route (the "Preferred Route"), which is described more fully in Section 4.2.5.1 of the Application.

² At the telephonic procedural conference held on April 30, 2001, the Green Valley Community Coordinating Council withdrew its intervention.

Applicants and their assignees also are granted this Certificate of Environmental Compatibility for construction of Citizens' 115kV line in a 1,000 foot wide corridor on either side of the alignments described in the first two paragraphs of Section 4.2.5.4 of the Application together with an alternative to construct a parallel single-circuit line for the final approximately 0.4 miles of the Preferred Citizens' Route.

In addition. Applicants and their assignees are granted this Certificate of Environmental Compatibility for construction of the substation facilities, which are described more fully in Section 4.2.1.3 of the Application.

The Certificate of Environmental Compatibility is granted upon the following conditions:

- Applicants shall obtain all required approvals and permits necessary to construct the Project.
- 2. Applicants shall comply with all existing applicable laws, environmental control standards and regulations, ordinances, master plans and regulations of the United States, the State of Arizona, Pima and Santa Cruz Counties, the City of Nogales, the Town of Sahuarita, the Tohono O'Odham Nation, and any other governmental entities having jurisdiction.
- As to the Preferred Route. Applicants shall construct the Project transmission lines only within the corridor more fully described in Exhibit
 attached hereto (the "Route Corridor").
- 4. Applicants shall meet and confer with landowners who are within or adjacent to the Route Corridor and other interested parties in order to develop a plan for specific pole locations that will mitigate the environmental and visual impact of the Project transmission lines within the Route Corridor.

<u>.</u>:

- 5. Applicants shall, prior to construction of the Project transmission lines, conduct the studies recommended in the Report of The Harris Environmental Group, Inc. attached to the Joint Application as Exhibit C ("Harris Report") and attached hereto as Exhibit 2.
- 6. Applicants shall implement the mitigation measures set forth in the Harris Report and those recommended in the additional Harris Report studies. Applicants shall also continue to completion those studies that are ongoing as identified in the Harris Report.
- 7. Applicants shall file with the ACC, in this docket, the findings of the additional Harris Report studies.
- 8. Applicants shall retain an archaeologist to be on site during construction activities to advise them in connection with any additional archaeological studies that may be required and any mitigation efforts for archaeological sites that may be affected by the construction of the Project transmission lines. The archaeologist shall meet and confer with representatives of local tribes and historical societies to determine sensitive areas and mitigation options.
- 9. Applicants shall retain a biologist to be on site during construction activities in connection with any additional biological studies that may be required and to advise them in connection with any mitigation efforts for any species that may be affected by the construction of the Project transmission lines.

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10. Applicants shall consult with the State Historic Preservation Office to advise them in connection with any mitigation efforts for any historical sites affected by the construction of the Project transmission lines and any historical sites identified and made known to them (any information on historical sites in the record of Case No. 111 is deemed known to the applicant).

11. In the final design and construction of the transmission line.

Applicants shall:

- (a) use structures of a non-reflective nature that are to the greatest extent possible consistent with the terrain and vegetation through which they are installed.
- (b) use non-specular conductors and dulled structures of a self-weathering material and color suitable to the terrain and vegetation.
- 12. Before construction on this project may commence, the Applicants must file a construction mitigation and restoration plan with ACC Docket Control. Applicants shall, within one year of completion of the Project, rehabilitate to its original state any area disturbed by construction of the Project, except for any road that may be necessary to access the transmission lines for maintenance and repair.

The goals of the Plan will be to:

- Avoid impacts where practical:
- Where impacts are unavoidable, minimize impacts; and

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 Focus on site preparation to facilitate natural processes of revegetation.

Other key elements of the Plan are to:

- Emphasize final site preparation to encourage natural revegetation:
- Avoid (i.e., reserve), where practical, mature native trees:
- Stipulate a maximum construction corridor width:
- Preserve topsoil and plant materials from the right-of-way before grading, and respread over the right-of-way after construction is complete:
- Imprint the restored right-of-way to provide indentations to catch
 seed and water;
- Implement best management practices to protect the soil;
- Apply restoration methods that have been shown to work in the desert environment:
- Prevent the spread of noxious weeds or other undesirable species;
 and
- Apply methods to discourage unauthorized off-highway-vehicle
 (OHV) use of right-of-way.
- 13. In connection with the Western Systems Coordinating Council review process, TEP shall provide to the ACC Utilities Division requested

technical information regarding any interconnection plans between TEP and CFE.

14: TEP shall notify the ACC Utilities Division, within thirty (30) days of execution, of the existence of any agreement between TEP and CFE and shall provide any technical studies performed to investigate the interconnection between TEP and CFE.

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- 15. Applicants shall file with the ACC, in Docket no. L-00000C-01-0111; and L-00000F-01-0111. a copy of the federal Environmental Impact Statement ("EIS") and associated Records of Decision, when completed, for the Project.
- 16. Applicants shall comply with the recommendations of the EIS.
- 17. This authorization to construct the Project will expire three years from the date the Certificate of Environmental Compatibility is approved by the ACC. Applicants shall have the right to apply to the ACC for an extension of this time limitation.
- 18. All transmission structures shall be placed a minimum of 100 feet from the edge of existing gas pipeline right of way.
- 19. Common structures shall not be used to double circuit the new 115 kV transmission line approved herein with Citizens' existing 115 kV transmission line.
- 20. Distribution substation feeder tie lines shall not be attached to structures supporting the 115 kV lines approved herein. Applicants or their assigns

21. Citizens shall make necessary systems improvements to ensure continuity of service in the event of an outage on the new 115 kV transmission line approved herein and shall submit system improvement plans to the ACC Utilities Division six months from the date this Certificate of Environmental Compatibility is approved by the ACC.

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- 22. Applicants shall participate as a consulting party with the lead federal agency, the State Historic Preservation Office ("SHPO"), and the state and federal land managing agencies in the federal compliance process (*i.e.*, 36 C.F.R. 800) to reach a finding of the effect and to resolve adverse effects, if any.
- 23. Should federal involvement in any part or all of this project be removed or not occur, the Applicants shall continue to consult with SHPO in the state compliance process to reach a determination of impact and resolve impacts, if any.
- 24. The Applicants shall ensure consultation with Indian tribes regarding the potential impacts to historic properties, particularly traditional cultural places, that may be present within, or adjacent to, the proposed corridor, and resolve adverse effects, if any. Such consultation shall be done in a sensitive manner respectful of tribal sovereignty and concerns regarding confidentiality.

25. The Applicants shall include in the geographic area affected by the project (i.e., area of potential effect), the final right-of-way and buffer zone, new and existing access roads, material source pits (if any), and equipment staging areas.

- 26. The Applicants shall sponsor the necessary studies to complete the historical site identification effort as part of the federal or state compliance process. This may include a cultural resources survey, archaeological testing, or ethnographic study performed under the direction of professionals that meet the Secretary of the Interior's qualification standards and permitting requirements of the appropriate land-managing entities.
- 27. If historic property cannot be avoided. Applicants shall sponsor the necessary studies or take the appropriate actions to lessen or mitigate the impacts as part of the federal or state compliance process. This may include archaeological data recovery (i.e., excavations), archival research and structure documentation.
- 28. After construction, Applicants, in conjunction with the land-managing agency, if any, shall allow Arizona Site Stewards, a volunteer-staffed SHPO program, to periodically inspect the sites present within the corridor for vandalism or damage.

GRANTED this 29th day of October 2001.

ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

LAURIE A. WOODALL

Chairman

DECISION NO. 64356

BEFORE THE ARIZONA CORPORATION COMMISSION

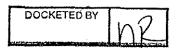
2 MARC SPITZER
Chairman
3 WILLIAM A. MUNDELL
Commissioner
4 JEFF HATCH-MILLER
Commissioner
5 MIKE GLEASON
Commissioner

KRISTIN K. MAYES

Commissioner

Arizona Corporation Commission DOCKETED

DEC 0.9 2003



IN THE MATTER OF SERVICE QUALITY ISSUES, ANALYSIS OF TRANSMISSION ALTERNATIVES AND PROPOSED PLAN OF ACTION IN THE SANTA CRUZ ELECTRIC DIVISION OF CITIZENS UTILITIES COMPANY (NOW THE SANTA CRUZ DIVISION OF UNISOURCE ELECTRIC)

DOCKET NO. E-01032A-99-0401 66615

DECISION NO.

<u>ORDER</u>

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Open Meeting
December 2 and 3, 2003

14 Phoenix, Arizona

BY THE COMMISSION:

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FINDINGS OF FACT

- 1. In Decision No. 62011 (November 2, 1999), the Commission approved a Settlement Agreement between Citizens Communications Company ("Citizens") and Staff of the Utilities Division ("Staff") which mandated the construction of a second transmission line to Nogales, Arizona by December 31, 2003. The purpose of the second transmission line is to improve the reliability of service to Citizens' customers in Santa Cruz County. The Settlement Agreement states that Citizens would pay a penalty of \$30,000 per month for each full month of delay in the construction after December 31, 2003. The Settlement Agreement also allows for Citizens to file for a delay in the construction date and/or the waiver of the penalty no later than December 31, 2003.
- 2. In Decision No. 64356 (January 15, 2002), the Commission granted Joint Applicants Tucson Electric Power Company ("TEP") and Citizens a Certificate of Environmental Compatibility ("CEC") to construct the proposed Gateway 345 kV and 115 kV Transmission Project ("Gateway Project") for the preferred western route, which had been granted by the Arizona Power Plant and

Transmission Line Siting Committee ("Committee"). The Gateway Project incorporated the second transmission line required by the Commission in Decision 62011. Need for the Gateway Project was established in that docket.

- 3. Staff testified as to the need for the second transmission line in both proceedings (Docket Nos. E-01032A-99-0401 and L-00000C-01-0111/L-00000F-01-0111). Customers of Citizens in Santa Cruz County had been experiencing more outages over a greater period of time such that construction of a second transmission line is essential in order for an acceptable quality of service to be achieved. Staff testified that continuity of service could not be assured for residents of Santa Cruz County as long as a radial transmission line is the sole means of connecting Citizens' Santa Cruz Electric Division Facilities to the western electric grid. During the hearings under Docket No. L-00000C-01-0111/L-00000F-01-0111, Citizens offered a load forecast as exhibit RAC-2 and testified that Santa Cruz County load could exceed the 60 MW rating of the existing 115 kV line as early as the summer of 2003.
- (4.) A second transmission line to Citizens' electric service area is required and is the only means to resolve the service reliability problem to Santa Cruz County.
- 5. The Gateway Project approved in Decision No. 64356 addresses the service reliability problem in Santa Cruz County and offers added benefits, such as improved reliability with an additional 345 kV transmission line and an interconnection with Mexico.
- 6. On August 5, 2003, TEP and Citizens filed a Joint Application for Delay of the In-Service Deadline or, in the Alternative, Waiver of Penalties and For Other Appropriate Relief ("Joint Application") under this Docket. The Joint Application requests for a delay in the in-service date of the second transmission line from December 31, 2003, and a waiver in the penalty provision of the Settlement Agreement approved in Decision 62011. The reasons for the delay cited in the Joint Application are to obtain the required approvals from federal agencies. The Joint Application states that because the western route approved by the Commission in Decision No. 64356 crosses a substantial amount of federal land, including portions of the Coronado National Forest, the approval of a land-use plan amendment for U.S. Forest Service lands and a right-of-way permit from the U.S. Forest Service are required. Furthermore a Final Environmental Impact Statement ("EIS") is also

required. The federal agencies involved in approving the Gateway Project include the Department of Energy ("DOE"), the Bureau of Land Management ("BLM"), the U.S. Forest Service ("USFS"), and the US International Boundary Water Commission ("USIBWC")...

- 7. Substantial efforts have been made by TEP and Citizens to construct the Gateway Project since receiving a CEC from the Commission. These efforts include, but are not limited to, (1) substation design and site work; (2) design of the 115 kV and 345 kV interconnections; and (3) preliminary engineering, routing and environmental work for the lines and contacts with landowners regarding surveying right of way and easement paths and acquisition.
- 8. TEP and Citizens cite that the delays in the federal EIS process are beyond their control. The federal EIS process began in August, 2000. However, the federal EIS efforts were impacted by numerous local and national events, including, but not limited to the September 11, 2001 terrorist attacks, the anthrax scare and the forest fires, which lead to the closing of the Coronado National Forest in 2002 and a competing Public Service Company of New Mexico transmission project. The above circumstances adversely impacted the federal EIS process and contributed to delays for the Gateway Project.
- 9. On October 10, 2003, TEP and UniSource Electric, Inc. ("UNS Electric") filed their supplement to the Joint Application. Citizens sold its electric assets to UniSource Energy Corporation, which then formed UNS Electric. Unisource Energy Corporation is also the parent holding company for TEP. The CEC for Citizens has since been transferred to UNS Electric. The supplement proposes to provide short-term relief until the second transmission line is constructed and becomes operational by (1) installing 25 MVAR capacitor banks on the 115 kV system to support system voltage in the Nogales area and (2) installing an emergency tie between TEP's existing 46 kV line and the Kantor substation. TEP claims these two actions when coupled with operation of the Valencia generating units in Nogales are expected to enable service restoration capability to 70 MW of load in Santa Cruz County following a transmission line outage. The existing transmission line is currently rated at 60 MW.
- 10. Staff believes the improvements proposed by TEP and UNS Electric are needed and would likely be required even with the addition of the second line to Nogales. While the

generating units, the improvements will not obviate the interruption of service to Santa Cruz County when the outage of the existing transmission line occurs.

11. The Settlement Agreement approved in Decision No. 62011 committed Citizens to

improvements will be able to serve load in excess of 60 MW without relying on the Valencia

- 11. The Settlement Agreement approved in Decision No. 62011 committed Citizens to Plan of Action as filed by Citizens on April 15, 1999, and supplemented on May 7 and July 13, 1999 and incorporating Staff recommendations contained in pre-filed testimony of those proceedings. The Plan of Action included construction, operation and maintenance of new distribution infrastructure, improved restoration of service following transmission outages by use of newly developed restorative switching protocol, maintaining a distribution system operation center with remote supervisory control and data acquisition ("SCADA") capability and placing the Valencia generating units in standby mode during storm season.
- 12. Staff believes that UniSource Energy Corporation's acquisition of Citizens' Santa Cruz electric assets will offer operational improvements by relying on the operational expertise and close proximity of field personnel from TEP. Staff recommends that TEP and UNS Electric update the Plan of Action to take full advantage of such opportunities per Decision No. 66028. Staff recommends that TEP and UNS Electric submit an updated "Outage Response Plan" within ninety (90) days of the effective date of this order that addresses the following:
 - Can Citizens operating procedures be improved to shorten the restoration time for transmission outage events utilizing TEP's operations center and field personnel?
 - b. Are any of the following improvements cost effective as interim restoration of service solutions to the construction of a second transmission line?
 - i. A limited number of automated or remote controlled distribution feeder ties between substations.
 - ii. Improved remote electronic dispatch control capability of the Valencia generator or improved generator controls.
 - c. What refinements are appropriate in Citizens' RAC-2 peak load forecast? Please define the annual hours of exposure when load is forecast to exceed the capacity of the existing transmission line.
 - d. Is the proposed interconnection with Mexico at the Gateway substation an interim service restoration solution for delay of the proposed South to Gateway transmission line through the Coronado National Forest?

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13. Staff further recommends that Staff would then file a subsequent report commenting on the sufficiency of the updated Outage Response Plan within thirty (30) days of the updated Outage

to TEP's 46 kV line?

Response Plan being filed by TEP and UNS Electric.

How much emergency service is available from TEP via a Kantor feeder tied

- 14. Staff recommends that the in-service/need date for the second transmission line required by Decision No. 62011 not be changed. The fact, that the required in-service date is not going to be achieved does not negate the need for the line.
- Staff further recommends that the penalties that would become effective January 1, 2004 be waived until June 1, 2004. Staff believes TEP and UNS Electric have made substantial efforts to construct the second transmission line by December 31, 2003. Furthermore, Staff believes the reasons for the delay are attributable to the circumstances that impacted the federal EIS and permitting processes and obtaining all of the requisite federal approvals. Staff recommends a waiver until June 1, 2004, so that TEP and UNS Electric have sufficient time to investigate, budget and update the Citizens Plan of Action to reflect the added value of their operational expertise and personnel, as well as affording an opportunity for the DOE to publish the Final EIS in the Federal Register reflecting the recommended action of each of the cooperating federal agencies.
- 16. Staff further recommends that prior to June 1, 2004, this matter appear on a subsequent open meeting so that the Commission could (1) determine sufficiency of the TEP and UNS Electric updated Outage Response Plan; (2) receive updates on the federal process; (3) address further waiving of the penalty for a prescribed period beyond June 1, 2004; and (4) establish a process for (a) reviewing the TEP and UNS Electric Outage Response Plan such that it remains sufficient, (b) providing further updates on the federal process, and (c) addressing future waivers of the penalty beyond the prescribed period.
- It is reasonable to require TEP and UNS Electric to submit the updated "Critical 17. Response Plan" described in Findings of Fact No. 12 within sixty (60) days of the effective date of this order.

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CONCLUSIONS OF LAW

- 1. TEP and UNS Electric are public service corporations within the meaning of Article XV, Section 2 of the Arizona Constitution.
- 2. The Commission has jurisdiction over TEP and UNS Electric and over the subject matter of this docket.
- 3. Staff's recommendations in Findings of Fact Nos. 12, 13, 14, 15 and 16 are reasonable, in the public interest and should be adopted.
- 4. It is reasonable to require TEP and UNS Electric to submit the updated "Critical Response Plan" described in Findings of Fact No. 12 within sixty (60) days of the effective date of this order.
- 5. There is good cause justifying waiver of the \$30,000 per month penalty included in the Settlement Agreement approved in Decision No. 62011 until June 1, 2004, pending an updated Outage Response Plan.

ORDER

IT IS THEREFORE ORDERED that the \$30,000 per month penalty in the Settlement Agreement that was approved in Decision No. 62011 shall be waived until June 1, 2004.

IT IS FURTHER ORDERED that the in-service/need date for the second transmission line shall remain December 31, 2003.

IT IS FURTHER ORDERED that TEP and UNS Electric shall submit an updated "Outage Response Plan" within sixty (60) days of the effective date of this order that addresses the following:

- a. Can Citizens operating procedures be improved to shorten the restoration time for transmission outage events utilizing TEP's operations center and field personnel?
- b. Are any of the following improvements cost effective as interim restoration of service solutions to the construction of a second transmission line?
 - i. A limited number of automated or remote controlled distribution feeder ties between substations.
 - ii. Improved remote economic dispatch control capability of the Valencia generator or improved generator controls.
- c. What refinements are appropriate in Citizens' RAC-2 peak load forecast? Please define the annual hours of exposure when the load is forecast to exceed the capacity of the existing transmission line.

d. Is the proposed interconnection with Mexico at the Gateway substation an interim service restoration solution for delay of the proposed South to Gateway transmission line through the Coronado National Forest?

e. How much emergency service is available from TEP via a Kantor feeder tied to TEP's 46 kV line?

IT IS FURTHER ORDERED that Staff of the Utilities Division shall file a Report within thirty (30) days of the filing of the updated Outage Response Plan by TEP and UNS Electric, which comments on the sufficiency of the updated Outage Response Plan.

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Decision No.

IT IS FURTHER ORDERED that prior to June 1, 2004, that this matter be placed on a subsequent open meeting be held in order to (1) determine sufficiency of the TEP and UNS Electric updated Outage Response Plan; (2) receive updates on the federal process; (3) address further waiver of the penalty for a prescribed period beyond June 1, 2004; and (4) establish a process for (a) reviewing the TEP and UNS Electric Outage Response Plan such that it remains sufficient, (b) providing further updates on the federal process, and (c) addressing future waivers of the penalty beyond the prescribed period.

IT IS FURTHER ORDERED that this Decision shall become effective immediately.

BY THE ORDER OF THE ARIZONA CORPORATION COMMISSION

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CHAIRMÁN	COMMISSIONER
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COMMISSIONER	COMMISSIONER
•	IN WITNESS WHEREOF, I BRIAN C. McNEIL, Executive Secretary of the Arizona Corporation Commission, have hereunto, set my hand and caused the official seal of this Commission to be affixed at the Capitol, in the City of Phoenix, this

DISSENT:

DISSENT:

EGJ:JDS:lhm\JDG

1 2	SERVICE LIST FOR: CITIZENS UTILITIES COMPANY DOCKET NO. E-01032A-99-0401
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2004-MAY 27 P 2: 55,

AZ CORP COMMISSION:

BOOGUMENT CONTROL

TO:

Docket Control

FROM:

Ernest & Johnson

Director

Utilities Division

DATE:

May 27, 2004

RE:

STAFF REPORT ANALYZING TUCSON ELECTRIC POWER AND UNISOURCE ENERGY SERVICES RESPONSE TO DECISION NO. 66615 REGARDING THE TEP AND CITZENS COMMUNICATION COMPANY JOINT APPLICATION

FOR DELAY OF IN-SERVICE DATE OR WAIVER OF PENALTIES

(DOCKET NO. E-01032A-99-0401)

Attached is an Arizona Corporation Commission Staff ("Staff") Report regarding the sufficiency of the Tucson Electric Power Company ("TEP") and UniSource Energy Services ("UES") response to Commission Decision No. 66615. This report supplements and augments a March 11, 2004 Staff Report and considers both the February 9, 2004 filed TEP and UES response and their April 30, 2004 supplemental response with an associated May 3, 2004 errata.

The April 30, 2004 filed TEP and UES supplemental response satisfactorily responds to deficiencies noted by Staff in its March 11, 2004 Staff Report regarding the companies' prior response to questions raised by the Commission in Decision No. 66615. The TEP and UES supplemental response also satisfactorily:

- 1. Updates the power plant operations procedure and the transmission service restoration procedures previously approved as elements of Citizens' Outage Response Plan, and
- 2. Modifies the UES Switching Procedures by refining the expected time required to restore service following a transmission line outage with the proposed 46 kV TEP emergency feeder tie to Kantor and all proposed remote controlled transmission and/or distribution feeder switching improvements.

It is Staff's opinion that TEP and UES have taken all reasonable steps in their Outage Response Plan to improve their ability to restore service following an existing transmission line outage. On this basis, Staff finds the TEP and UES Outage Response Plan to be sufficient. However, the Commission ordered UES' predecessor, Citizens, to build facilities that assure electric customers in Santa Cruz County have reliable service founded on the principle of continuity of service for outage of a transmission line as opposed to restoration of service. This requirement can only be achieved via a second transmission line to Nogales. Even with the new transmission line, a Reliability Must Run ("RMR") condition is expected to exist in Santa Cruz County by the summer of 2008 per the new UES forecast. In fact, the RMR operation of the Valencia generating units becomes inadequate when the Santa Cruz County load reaches



approximately 75 MW. According to the UES forecast (Exhibit 2) the 75 MW load level may be experienced by the summer of 2010.

Therefore, Staff recommends that this matter appear on an open meeting so the Commission may make a determination that the TEP and UES updated Outage Response Plan for Santa Cruz County is sufficient. Staff further recommends the Commission approve and order the following items:

- 1. Continued waiver of penalties, first authorized by Decision No. 66615, retroactive to June 1, 2004, conditioned upon achievement of the following improvements solely under the control of the applicants:
 - a. UES documented construction completion and operation of 25 megavolt-amperes reactive ("MVAR") of new shunt capacitors dispersed among feeders originating from each UES distribution substation in Santa Cruz County by July 1, 2004.
 - b. TEP demonstrated remote control startup of Valencia generating units and synchronization with the Western Interconnection transmission system by July 1, 2004.
 - c. TEP demonstrated remote emergency restorative switching capability to serve Kantor and Cañez substations from Canoa and remote switching for service restoration to Sonoita and Valencia substations via Valencia generators by July 1, 2004.
 - d. TEP documented construction completion of a 46 kV emergency tie line, of at least 20 megawatt ("MW") capacity, between the TEP Canoa Substation and the UES Kantor Substation. (\$1.9 million by August 31, 2004)
 - e. TEP documented completion of GIS data conversion to Smallworld (July 2004), STORMS (October 2004), and Outage Management System (December 2004) software by January 1, 2005.
- 2. Waiver of penalties after August 1, 2004 be further conditioned upon completion of the following processes which are not solely under the control of the applicants:
 - a. The annual TEP and UES self-certification letter due to the Commission on August 1 per Certificate of Environmental Compatibility ("CEC") Condition 29 must include:
 - i. Documentation by TEP and UES of how they have expended every reasonable effort to expedite the timely resolution of the Federal EIS and permitting processes.
 - ii. Documentation by TEP and UES of how they have expended every reasonable effort to expedite and timely obtain from all state, county and

local governmental agencies, especially the State Land Department, all required approvals and permits necessary to construct the project as defined in Condition 1 of their CEC.

- b. Given that the second transmission line to Nogales will not be constructed by January 15, 2005, the Commission expects TEP and UES to seek an extension of time for their CEC before it expires. According to Condition 17 of the CEC granted by Decision No. 64356, TEP and UES authorization to construct the subject transmission facilities expires three years from the date (January 15, 2002) the CEC was approved by the Commission.
- c. Any TEP and UES request for extension of time of their CEC granted by Decision No. 64356 must be accompanied by:
 - i. Filing of a completed Federal Final EIS and associated Records of Decision from the various Federal Agencies with the Commission in accordance with Condition 15 of their CEC, and
 - ii. Revised project completion dates reflecting the outcome of the federal, state and local permitting processes.
- 3. Waiver of the storm season spinning reserve requirement of Valencia generating units approved by Decision No. 62011 shall become effective once the above conditions 1.a through 1.d are all met.
- 4. Waiver of monthly black start testing of turbines once they are tested in accordance with Southwest Reserve Sharing Group ("SRSG") requirements and are found to be in compliance as documented by correspondence from SRSG and continue to be so tested.
- 5. TEP and UES shall commence data collection and retention to document annual distribution system reliability indices System Average Interruption Frequency Index ("SAIFI") System Average Interruption Duration Index ("SAIDI") and Customer Average Interruption Duration Index ("CAIDI") as defined by Institute of Electrical and Electronic Engineers ("IEEE") 1366, on an on-going basis for each distribution feeder and distribution substation. Such data must also be aggregated to establish the distribution system reliability indices for each division or geographical sub-region of their respective service areas. This annual reliability data is to be made available upon request by Staff.
- 6. TEP and UES shall document, upon request of Commission Staff, enforcement of its customer power factor requirements and all system improvements made to assure appropriate system voltage control within Western Electricity Coordinating Council ("WECC") and National Electric Safety Code ("NESC") requirements.

7. RMR Studies are to be performed and solutions necessary to resolve system RMR deficiencies currently forecast for 2008 are to be determined and reported as part of the TEP and UES ten year transmission plan by January 31, 2005.

The above recommendations presume an on-going process for continued Commission oversight of TEP and UES compliance with its order to construct a second transmission line to serve electric customers in Santa Cruz County and the City of Nogales. The proposed process is founded on the principle that a waiver of penalty granted to TEP and UES in Decision No. 66615 will continue in effect as long as TEP and UES comply with the conditions recommended above. Compliance with conditions requiring demonstration of construction and operation of new facilities will be verified by the Utilities Division Engineering Staff. Compliance with conditions requiring documentation by TEP and UES will be determined by the Utilities Division Compliance Office. TEP or UES failure to satisfactorily comply with any of the above recommended conditions may warrant the Commission initiating new proceedings to rescind the waiver of penalties.

EGJ:JDS:rdp

Originator: Jerry D. Smith

Attachment: Original and thirteen copies

Service List for: TUCSON ELECTRIC POWER COMPANY and UNISOURCE ENERGY SERVICES Docket No. E-01032A-99-0401

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STAFF REPORT UTILITIES DIVISION ARIZONA CORPORATION COMMISSION

STAFF SUFFICIENCY ASSESSMENT OF TEP AND UNISOURCE ENERGY SERVICES RESPONSE TO DECISION NO. 66615 DOCKET NO. E-01032A-99-0401

TEP AND UNISOURCE ENERGY SERVICES
APPLICATION FOR A DELAY OF IN-SERVICE DATE
OR WAIVER OF PENALTIES

MAY 20, 2004

STAFF ACKNOWLEDGMENT

This report concerns the Tucson Electric Power ("TEP") and Citizens Communication Company ("Citizens") application for delay of in-service date or waiver of penalties, Docket No. E-01032A-99-0401 and was prepared by Jerry Smith. Subsequent to the original application, UniSource Energy Services ("UES") acquired the Citizens Communications Company electric facilities in Arizona in August 2003. This Staff Report provides an analysis of the TEP and UES response to Commission questions contained in Decision No. 66615. It also addresses the sufficiency of the applicants' updated power plant and transmission service restoration procedures previously approved as elements of Citizens' Outage Response Plan.

Mr. Smith was Staff's witness in all other proceedings regarding this matter and for the siting of the required second transmission line to Nogales. He was responsible for the review and analyses of the companies' application, review of the Commission's records of each company, determining their compliance with Commission policies/rules and reviewing customer complaints filed with the Commission regarding this matter. Mr. Smith also performed the engineering and technical analysis, and recommended action appropriate for pending delays in the construction of a second transmission line to serve Santa Cruz County in a prior Staff Report dated October 31, 2003. This report also supplements the Staff findings documented in a Staff Report filed on March 11, 2004.

Jerry D. Smith Electric Utility Engineer

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PURPOSE OF STAFF REPORT

This Staff Report supplements and augments a March 11, 2004 Staff Report and has a four fold purpose. It critiques Tucson Electric Power Company ("TEP") and UniSource Energy Services, Inc. ("UES") responses to Commission questions posed in Decision No. 66615. Secondly, it contains Staff's comments on the sufficiency of TEP's and UES' updated Outage Response Plan for Santa Cruz County filed on April 30, 2004. This report also gives an update on the various federal processes to permit the proposed transmission line from TEP's South Substation to the new TEP Gateway Substation and from Gateway Substation to UES' Valencia Substation in Nogales, Arizona. Finally, this report recommends a process that will a) assure that the TEP and UES Outage Response Plan remains sufficient, b) provides for future updates on the federal permitting processes and c) addresses a means of administering future waiver of penalties first prescribed in Decision No. 66615.

CRITIQUE OF RESPONSES TO COMMISSION QUESTIONS

On February 9, 2004, TEP and UES filed a response to Commission Decision No. 66615. Subsequently, Staff filed a Staff Report on March 11, 2004, that recommended that TEP and UES file supplemental information by April 30, 2004 to:

- 1. Resolve deficiencies, noted by Staff in its March 11, 2004 report, in the TEP and UES response to questions raised by the Commission in Decision No. 66615.
- 2. Update the power plant operations procedure and the transmission service restoration procedures previously approved as elements of Citizens' Outage Response Plan.
- 3. Modify the UES Switching Procedures by refining the time required to restore service following a transmission line outage with the proposed 46 kV TEP emergency feeder tie to Kantor and all proposed remote controlled transmission and /or distribution feeder switching improvements.

TEP and UES did file supplemental information on April 30, 2004 as requested. Staff has reviewed the TEP and UES supplement response to the Commission's questions raised in Decision No. 66615 and offers the following observations and comments.

a. Can Citizens' operating procedures be improved to shorten the restoration time for transmission outage events utilizing TEP's operations center and field personnel?

Several items reported by TEP and UES will directly affect their ability to improve operating procedures for Santa Cruz County. Integrating operational control of UES' facilities via TEP's operation centers and utilizing both TEP and UES field personnel has the potential to shorten the service restoration time following transmission outage events. The updated UES Service

Restoration Procedures (Exhibit 1) now incorporates the operational effects of integrating the following operational tasks from TEP's operation control centers:

Table 1
Integration of UES into TEP's Operation Control Centers

Task		Time Savings	Est. Cost	When	
Remote monitoring and control of Santa Cruz County substations.		5-10 minutes	\$60,000	May 2004	
Remote startup, control & synchronization Of Valencia generating units.		45 minutes	\$40,000	May 2004	
GIS data conversion to: Small V	World		+	July 2004	
STO	RMS	-	+	Oct. 2004	
Outage Management System (C	OMS)	***	\$300,000	Dec. 2004	

Completion of the above operational integration improvements is critical if a reduction in time to restore service to customers following outage of the existing transmission line serving Santa Cruz County is to be achieved.

The updated UES Service Restoration Procedures (Exhibit 1) now reflects restorative time savings achievable with the remote control of distribution feeders and the startup and control of the Valencia units from the TEP control centers. In addition, TEP proposes to construct a 46 kV emergency tie line between Canoa Substation and the UES Kantor Substation to facilitate service restoration to Kantor and Cañez substations during the interim time it takes to construct the second transmission line to Nogales. Table 2 is provided below to document the restoration time benefits that UES customers will experience from each of these capital investments.

Table 2
Service Restoration Time (Minutes)
Following Outage of Existing 115 kV Transmission Line

Substation	Existing	Table 1 Improvements	46 kV Emergency Tie Addition	Second Line to Nogales
Valencia	110	45	45	0*
Sonoita	150	55	55	0*
Cañez	190	60	10	10
Kantor	245	65	5	5

Notes:

- 1. Source TEP and UES Supplemental Response, April 30, 2004, page 9.
- 2. Assumes evening or weekend event for "existing" restoration time.
- * Continuity of service for transmission line outage

- b. Are any of the following improvements cost effective as interim restoration of service solutions to the construction of a second transmission line?
 - i. A limited number of automated or remote controlled distribution feeder ties between substations.
 - ii. Improved remote electronic dispatch control capability of the Valencia generators or improved generator controls.

Staff agrees with the TEP and UES assessment that the operational time savings documented in Table 1 do warrant and justify the estimated capital expenditures associated with the proposed operational integration improvements. The \$400,000 of operational integration costs result in significant reductions in the interim service restoration times. This is evident when comparing the restoration times in the "Existing" and "Table 1 Improvements" columns of Table 2. The operational integration improvements of Table 1 have long term system and customer service benefits that go beyond just restoring service following a transmission outage. They allow real time monitoring and control of the UES transmission and distribution system for daily operation; planned switching for maintenance and repairs; and emergency response for all types of outages.

Implementation of TEP's remote starting capability of the Valencia units and remote control of transmission and distribution devices also result in a 65 minute improvement in the service restoration of the Valencia Substation. In turn, these operational integration improvements yield a 95 minute service restoration time improvement for the Sonoita Substation. However, these service restoration improvements are merely an interim benefit to customers served from the Valencia and Sonoita Substations. With the construction of the second transmission line, Valencia and Sonoita Substation customers can expect continuity of service for outage of a transmission line.

The interim service restoration improvements for Valencia and Sonoita are not affected by the construction of a 46 kV emergency tie line to Kantor. However, Kantor and Cañez substation customers do benefit from TEP's contemplated use of the new 46 kV TEP emergency feeder tie to restore service. The cost of this emergency tie is estimated to be \$1.9 million. It will enable service to be restored within 5 to 10 minutes to the two substations following any outage of the existing transmission line to Nogales. With a 46 kV emergency tie, service restoration to Kantor and Cañez can proceed concurrently with efforts to restore service at Valencia and Sonoita. This represents an additional 60 minute and 50 minute service restoration time savings, respectively, over the time otherwise required to restore service from Sonoita once it is re-energized. These service restoration time savings are a long term benefit that will exist for Kantor and Cañez even when the second transmission line is constructed to Nogales. This long term benefit seems to marginally justify the \$1.9 million expenditure for a 46 kV emergency tie line. This expenditure is off-set by all avoided operational cost of the Valencia generation units for standby or emergency service. Staff continues to believe the 3 to 4 hours presently required to restore

¹ TEP and UES Supplemental Response, April 30, 2004, page 10.

² ibid, page 9.

³ Table 2: Table 1 Improvements vs. 46 kV Emergency Tie.

service to Kantor and Cañez customers following a transmission line outage is an unacceptable level of service.

e. How much emergency service is available from TEP via a 46 kV line to Kantor?

TEP reports that it could provide approximately 20 MW of emergency service to UES via a new 46 kV tie line with Kantor Substation. However, due to longstanding TEP two-county financing limitations, the 46 kV switch must remain normally open between the two systems. This means such service is strictly of a service restoration character and cannot assure continuity of customer service for outage of the existing 115 kV line to Nogales. Given that the Valencia generating units are rated at 46 MW, the maximum load that could then be served for outage of the existing transmission line is 67 MW with the construction of the 46 kV emergency tie.

c. What refinements are appropriate in Citizens' RAC-2 peak load forecast? Please define the annual hours of exposure when load is forecast to exceed the capacity of the existing transmission line.

TEP has refined Citizens' RAC-2 peak load forecast for UES customers in Santa Cruz County (Exhibit 2). The "normal" forecast is similar to Citizens' RAC-2 forecast, but UES's "high" forecast is somewhat lower. TEP and UES report their "high" forecast incorporates the most recent peak and corresponding weather history and utilizes actual load and weather data for the years 1999 – 2003. Weather in Nogales during July 2003 reportedly was the hottest in ten years. According to UES the most recent data indicates a weather impact of 0.84 MW per cooling degree-day for Santa Cruz County customers' peak load. Utilization of this factor with extreme weather produced an UES "high" forecast of 64.4 MW for 2004. Forecasted customer and sales growth were applied by TEP to the UES 2004 "high" forecast to obtain "high" forecast peak load for future years.

TEP and UES provided in their Supplemental Response the annual hours of exposure when the UES load is forecast to exceed the UES load serving capability. An estimate of the number of hours that the UES "normal" forecast Santa Cruz County load will exceed 60 MW and 67 MW, respectively, are indicated in the following table.

Table 3
Annual Duration (Hours)
Load Exceeds Service Capability

Load Capability (MW)	2004	2005	2006	2007
60	10	58	116	182
67	0	0	0	5

Notes:

⁴ TEP and UES Supplemental Response, April 30, 2004, pages 10 and 11.

- 1. The existing transmission line limitation was estimated to be 60 MW in RAC-2.
- 2. The 67 MW limit assumes 46 MW of generation and 20 MW of emergency tie.
- d. Is the proposed interconnection with Mexico at the Gateway substation an interim service restoration solution for delay of the proposed South to Gateway transmission line through the Coronado National Forest?

TEP and UES report⁵ that construction of the Gateway Substation to Valencia Substation 115 kV line and the 345 kV Gateway interconnection with Mexico could legally proceed once a Presidential Permit is issued by the U. S. Department of Energy ("DOE"). Such construction is not dependent upon permitting by the Bureau of Land Management ("BLM") or U.S. Forest Service ("USFS") because such facilities do no traverse federal lands. However, such an interconnection with Mexico would require an agreement with Comisión Federal de Electricidad ("CFE") that owns and operates the national electric utility of Mexico. TEP and UES doubt that such an agreement with CFE is likely for an interconnection that is solely for emergency restoration of the UES system.

TEP and UES also report a variety of technical obstacles to establishing an interconnection with Mexico solely for the purpose of restoring service to Santa Cruz County. They cite concerns about the capacity of the Mexican system in Nogales, Sonora. While there is sufficient capacity in Santa Ana, it would require construction of approximately 60 miles of 345 kV line in Mexico at a cost of approximately \$60 million. The CFE would have to see merit in the proposed emergency interconnection to justify such an expenditure.

Staff agrees with the legal and technical conclusions offered by TEP and UES. It appears an interconnection with Mexico at Gateway Substation is not economically justified without the commercial benefits of mutual wholesale power exchanges. Such an interconnection is only achievable once the northern Sonora portion of Mexico's system is operated in synchronism with the Western Interconnection grid of the United States. Therefore Staff does not consider the interconnection with Mexico as a viable interim service restoration solution for Santa Cruz County.

SUFFICIENCY OF UPDATED OUTAGE RESPONSE PLAN

The Citizens Outage Response Plan approved and adopted by the Commission in Decision No. 62011 included power plant operations procedures and three procedures for restoring transmission service following a transmission line outage. TEP and UES have updated the UES Service Restoration Procedures for loss of the 115 kV line to Nogales to reflect utilization of 1) the proposed 46 kV emergency feeder tie to Kantor, 2) automated or remote controlled switching devices that enable service restoration without depending on dispatching of field personnel, and 3) remote controlled startup and synchronization of the Valencia generating units. These

⁵ Ibid, pages 11-12.

TEP and UES Docket No. E-01032A-99-0401 Page 6

procedures are provided as Staff Exhibit 1. The TEP and UES updated procedures reflect significant reductions in the time to restore service following an existing 115 kV transmission line outage.

The UES reliability must-run ("RMR") generation study report (Exhibit 3) indicates that the pre-Gateway Simultaneous Import Limit ("SIL") is 65 MW. However, UES is expending \$270,000 to install 24.6 MVARs of shunt capacitors dispersed on feeders of each UES substation by June 1, 2004. This increases the pre-Gateway SIL to 70 MW. Utilizing the UES "normal" load forecast implies UES can meet its load serving requirements without having to run the Valencia turbines through summer peak 2007. Therefore, a RMR condition is expected to exist in Santa Cruz County by the summer of 2008 per the new forecast.

The economic impact of such RMR operation of the Valencia units is significant because UES has a full requirements power purchase contract with Pinnacle West Capital Corporation ("PWEC"). Therefore, operating expenses of the Valencia units occur on top of and above the cost of the power otherwise purchased and contracted for via PWEC. Operating the Valencia units during summer storm season in preparation for restoring service following a transmission line outage has the same cost impacts even when the load is below the 65 MW pre-Gateway SIL.

TEP and UES have requested elimination of the Commission requirement that the Valencia units be operated in standby (spinning reserve) mode during any period storms poses a threat. They argue that there is little system benefit from such a practice given the service restoration improvements achieved in the revised procedures. Furthermore, they point out there are fuel consumption costs, higher emission implications, and loss of turbine life associated with such operation. Staff is convinced by their argument given that the TEP and UES updated procedures reflect significant reductions in the time to restore service following a 115 kV transmission line outage. Therefore, Staff agrees that the requirement to operate the Valencia units in standby during storm season should be rescinded once all of the 25 MVAR of capacitors, Table 1 improvements and the 46 kV emergency tie are constructed, installed and operational.

TEP and UES have also requested that they be allowed to discontinue the monthly black start testing of the Valencia generating units. Instead the companies propose the black start capability of the turbines be tested in accordance with Southwest Reserve Sharing Group ("SRSG") requirements. Staff concurs with this proposal as it aligns with the general provisions that have been imposed on merchant power plants in recent plant siting cases. Compliance with SRSG requirements assures application of a consistent standard of performance for all generation used in the reserve sharing pool.

It is Staff's opinion that TEP and UES have taken all reasonable steps in their Outage Response Plan to improve their ability to restore service following an existing transmission line outage. On this basis, Staff finds the TEP and UES Outage Response Plan to be sufficient. However, the Commission ordered UES' predecessor, Citizens, to build facilities that assure

⁶ ibid, page 4.

TEP and UES Docket No. E-01032A-99-0401 Page 7

electric customers in Santa Cruz County have reliable service founded on the principle of continuity of service for outage of a transmission line as opposed to restoration of service. None of the aforementioned operational improvements achieve that purpose. In fact, the UniSource Energy Services RMR Study filed on February 9, 2004, indicates that, even with the proposed new 115 kV transmission line from Gateway to Valencia, a system voltage violation would occur for the outage of the new line or the Valencia to Sonoita line.

The RMR study indicates that this service concern can be managed technically via the RMR operation of the Valencia generating units until the Santa Cruz County load reaches approximately 75 MW. According to the UES forecast (Exhibit 2) the 75 MW load level may be experienced by the summer of 2010. TEP and UES have committed to studying and analyzing in 2004 the merits of a second 115 kV line from Gateway to either Valencia or Sonoita. Staff would expect TEP and UES to file such study results with their ten year transmission plan in January 2005.

In addition, Staff needs the ability to monitor the quality of service being provided by TEP and UES on an on-going basis. Judging the level of service provided in the past has been difficult given that no specific reliability performance standards have been endorsed by the Commission. Many utilities use numerical indices as a measure of an average customer's distribution service reliability. Such reliability indices are typically computed on an annual basis. A utility may then set reliability targets based upon benchmarked data from its own system. The Institute of Electrical and Electronic Engineers ("IEEE") has adopted a standard definition of several reliability indices for electric distribution systems and established a national benchmark data base via a 1995 IEEE survey of the electric utility industry.

The most commonly used IEEE reliability indices are System Average Interruption Frequency Index ("SAIFI"), System Average Duration Index ("SAIDI"), and Customer Average Interruption Duration Index ("CAIDI"). Staff recommends that TEP and UES begin collecting system data to establish SAIDI, SAIFI, and CAIDI as defined per IEEE 1366 for their respective systems on an on-going basis. This will allow Staff to ascertain whether TEP and UES distribution service reliability is improving or deteriorating over time.

TEP and UES have also identified system voltage as quality of service concerns for Santa Cruz County. This is demonstrated by the need for the 25 MVAR of shunt capacitors in 2004, and the need for RMR operation of the Valencia units beginning in 2008 and a voltage criteria violation when Santa Cruz County load reaches approximately 75 MW In order to assure these voltage concerns are being properly managed by the respective utilities, Staff proposes that TEP and UES must provide documentation upon request of how they are enforcing their customer power factor requirements and what system improvements they are making to assure system voltage is within Western Electricity Coordinating Council ("WECC") and National Electric Safety Code ("NESC") requirements.

FEDERAL PERMITTING PROCESS UPDATE

Composing the final Environmental Impact Statement ("EIS") for the Gateway Project is a detailed and comprehensive process involving several federal agencies. As explained to Staff, the EIS is a disclosure document highlighting the environmental reviews conducted pursuant to the National Environmental Policy Act ("NEPA"). The requirements under NEPA for a certain project depend on the particulars of each case and what federal lands and/or agencies are implicated by the project. For the Gateway Project, while the Department of Energy ("DOE") is the lead agency for the EIS, the United States Forest Service ("USFS") and Bureau of Land Management ("BLM") have vital and key roles in the EIS' composition. The United State Fish and Wildlife Service ("USFW") and the U.S. Section of the International Boundary Water Commission ("USIBWC") also have significant roles in the process. These agencies are hereafter collectively referred to as the "Federal Agencies." Each agency must ensure that all of its requirements are incorporated in the NEPA process and the EIS.

Currently, the DOE, USFS and BLM are analyzing the abundance of comments submitted on the Draft EIS. The Draft EIS was noticed August 27, 2003. Commission Staff submitted comments on the Draft EIS on October 14, 2003. Staff's comments focused on the need for the Gateway Project to improve the reliability of electric service to UES customers in Santa Cruz County. Staff attached portions of the transcript in the proceedings before the Power Plant and Transmission Line Siting Committee ("Line Siting Committee") in Docket No. L-00000C-01-0111 detailing the need for the Gateway Project to reliably serve customers. Staff indicated in its comments that neither new local generation nor other means would preempt the need for a second transmission line.

On February 25, 2004, Staff met with representatives of UES and TEP, USFS, BLM and DOE to gain a better understanding of the federal process and to explore and encourage ways to expedite the process while still ensuring a thorough analysis. Staff understands that the Final EIS ("FEIS") is now expected to be issued in the July - August 2004 time frame. The Federal Agencies indicated that they each intend to issue a Record of Decision ("ROD") concurrent with the FEIS ROD. The USFS also indicated it intends to issue a Plan Amendment for the Coronado National Forest concurrent with its ROD. Staff also informed the USFS, BLM and DOE regarding the Arizona siting process for power plants and transmission lines.

The concurrent action offered by Federal Agencies is viewed as a positive response to Commission criticism concerning delays posed by the federal environmental and permitting processes. The Federal Agencies have not indicated which route(s) they will support so there remains a possibility that they may disagree among themselves as to the preferred route. Staff pledges to continue to be active in discussions with the Federal Agencies and believes that they have been receptive to Staff's comments and suggestions.

⁷ Ibid, page 14.

The Arizona State Land Department filed comments to the latest draft EIS with Dr. Mark Blauer of TetraTech, the DOE's EIS contractor, in March. The Arizona State Land Department provided a copy of their EIS comments to Staff at a meeting on April 29, 2004. Those comments are attached as Exhibit 4. It is unknown how the Federal Agencies will view the comments submitted by the State Land Department.

STAFF CONCLUSIONS AND RECOMMENDATIONS

The April 30, 2004 filed TEP and UES supplemental response satisfactorily responds to deficiencies noted by Staff in its March 11, 2004 Staff Report regarding the companies' prior response to questions raised by the Commission in Decision No. 66615. The TEP and UES supplemental response also satisfactorily:

- 1. Updates the power plant operations procedure and the transmission service restoration procedures previously approved as elements of Citizens' Outage Response Plan, and
- Modifies the UES Switching Procedures by refining the expected time required to restore service following a transmission line outage with the proposed 46 kV TEP emergency feeder tie to Kantor and all proposed remote controlled transmission and/or distribution feeder switching improvements.

It is Staff's opinion that TEP and UES have taken all reasonable steps in their Outage Response Plan to improve their ability to restore service following an existing transmission line outage. On this basis, Staff finds the TEP and UES Outage Response Plan to be sufficient. However, the Commission ordered UES' predecessor, Citizens, to build facilities that assure electric customers in Santa Cruz County have reliable service founded on the principle of continuity of service for outage of a transmission line as opposed to restoration of service. This requirement can only be achieved via a second transmission line to Nogales. Even with the new transmission line, a RMR condition is expected to exist in Santa Cruz County by the summer of 2008 per the new UES forecast. In fact, the RMR operation of the Valencia generating units becomes inadequate when the Santa Cruz County load reaches approximately 75 MW. According to the UES forecast (Exhibit 2) the 75 MW load level may be experienced by the summer of 2010.

Therefore, Staff recommends that this matter appear on an open meeting so the Commission may make a determination that the TEP and UES updated Outage Response Plan for Santa Cruz County is sufficient. Staff further recommends the Commission approve and order the following items:

1. Continued waiver of penalties, first authorized by Decision No. 66615, retroactive to July 1, 2004 conditioned upon achievement of the following improvements solely under the control of the applicants:

- a. UES documented construction completion and operation of 25 megavolt-amperes reactive ("MVAR") of new shunt capacitors dispersed among feeders originating from each UES distribution substation in Santa Cruz County by July 1, 2004.
- b. TEP demonstrated remote control startup of Valencia generating units and synchronization with the Western Interconnection transmission system by July 1, 2004.
- c. TEP demonstrated remote emergency restorative switching capability to serve Kantor and Cañez substations from Canoa and remote switching for service restoration to Sonoita and Valencia substations via Valencia generators by July 1, 2004.
- d. TEP documented construction completion of a 46 kV emergency tie line, of at least 20 megawatt ("MW") capacity, between the TEP Canoa Substation and the UES Kantor Substation. (\$1.9 million by August 31, 2004)
- e. TEP documented completion of GIS data conversion to Smallworld (July 2004), STORMS (October 2004), and Outage Management System (December 2004) software by January 1, 2005.
- 2. Waiver of penalties after August 1, 2004 be further conditioned upon completion of the following processes which are not solely under the control of the applicants:
 - a. The annual TEP and UES self-certification letter due to the Commission on August 1 per Certificate of Environmental Compatibility ("CEC") Condition 29 must include:
 - i. Documentation by TEP and UES of how they have expended every reasonable effort to expedite the timely resolution of the Federal EIS and permitting processes.
 - ii. Documentation by TEP and UES of how they have expended every reasonable effort to expedite and timely obtain from all state, county and local governmental agencies, especially the State Land Department, all required approvals and permits necessary to construct the project as defined in Condition 1 of their CEC.
 - b. Given that the second transmission line to Nogales will not be constructed by January 15, 2005, the Commission expects TEP and UES to seek an extension of time for their CEC before it expires. According to Condition 17 of the CEC granted by Decision No. 64356, TEP and UES authorization to construct the subject transmission facilities expires three years from the date (January 15, 2002) the CEC was approved by the Commission.

- c. Any TEP and UES request for extension of time of their CEC granted by Decision No. 64356 must be accompanied by:
 - i. Filing of a completed Federal Final EIS and associated Records of Decision from the various Federal Agencies with the Commission in accordance with Condition 15 of their CEC, and
 - ii. Revised project completion dates reflecting the outcome of the federal, state and local permitting processes.
- 3. Waiver of the storm season spinning reserve requirement of Valencia generating units approved by Decision No. 62011 shall become effective once the above conditions 1.a through 1.d are all met.
- 4. Waiver of monthly black start testing of turbines once they are tested in accordance with Southwest Reserve Sharing Group ("SRSG") requirements and are found to be in compliance as documented by correspondence from SRSG and continue to be so tested.
- 5. TEP and UES shall commence data collection and retention to document annual distribution system reliability indices (SAIFI, SAIDI, and CAIDI), as defined by IEEE 1366, on an on-going basis for each distribution feeder and distribution substation. Such data must also be aggregated to establish the distribution system reliability indices for each division or geographical sub-region of their respective service areas. This annual reliability data is to be made available upon request by Staff.
- 6. TEP and UES shall document, upon request of Commission Staff, enforcement of its customer power factor requirements and all system improvements made to assure appropriate system voltage control within Western Electricity Coordinating Council ("WECC") and National Electric Safety Code ("NESC") requirements.
- 7. RMR Studies are to be performed and solutions necessary to resolve system RMR deficiencies currently forecast for 2008 are to be determined and reported as part of the TEP and UES ten year transmission plan by January 31, 2005.

The above recommendations presume an on-going process for continued Commission oversight of TEP and UES compliance with its order to construct a second transmission line to serve electric customers in Santa Cruz County and the City of Nogales. The proposed process is founded on the principle that a waiver of penalty granted to TEP and UES in Decision No. 66615 will continue in effect as long as TEP and UES comply with the conditions recommended above. Compliance with conditions requiring demonstration of construction and operation of new facilities will be verified by the Utilities Division Engineering Staff. Compliance with conditions requiring documentation by TEP and UES will be determined by the Utilities Division Compliance Office. TEP or UES failure to satisfactorily comply with any of the above

TEP and UES Docket No. E-01032A-99-0401 Page 12

recommended conditions may warrant the Commission or Staff initiating new proceedings to rescind the waiver of penalties.

EXHIBIT 1

STAFF EXHIBIT 1

UniSource Service Restoration Procedures (UES April 30, 2004 Exhibits A, B and C)

EXHIBIT A

SANTA CRUZ DISTRICT

UniSourceEnergy	Power Plant Black Start Remote Process	Issue Date 04/26/99	Revision Date	Page 1 of 1
SERVICES		Approved:		
		M. Flores	;	

Process

- 1. Initiate remote start on one (1) turbine.
- 2. Call substation crew to Valencia Substation.
- 3. Ensure all feeder breakers are open, bus tie breaker is closed, and 115kV high side circuit switchers are open remotely via SCADA at Valencia Substation.
- 4. Initiate remote start on 2nd turbine approximately 5 minutes after 1st turbine starts.
- 5. Turbine bus breaker number 122 will automatically close to dead bus approximately 15 minutes from Step 1.
- 6. Increase bus frequency remotely to $60.5\ Hz$.
- 7. Close breaker 6241 remotely to pick up turbine auxiliaries.
- 8. 2nd turbine will synchronize to 1st turbine and to feeder 6241.
- 9. Balance load and adjust frequency to 60.5 Hz.
- 10. If additional load is picked up by the turbines, frequency needs to be adjusted accordingly before feeder breakers are closed see Note 1.
- 11. Remote start of the 3rd turbine will be initiated if it is required to pick up Sonoita Substation load.
- Note 1: When turbine loading is 5MW, switch fuel to diesel and gas (50/50).
- Note 2: The time from Step 1 to Step 9 is approximately 30 minutes.

Feeder Priority List

Valencia Substation	Sonoita Substation	Cañez Substation	Kantor Substation
6241	6207	8201	7201
6245	6204	8202	7202
6242	6203	8203	7203
6244	6206		
6243	6205		
6246			

Exhibit B
UNS Electric Inc.
Santa Cruz County System Overview

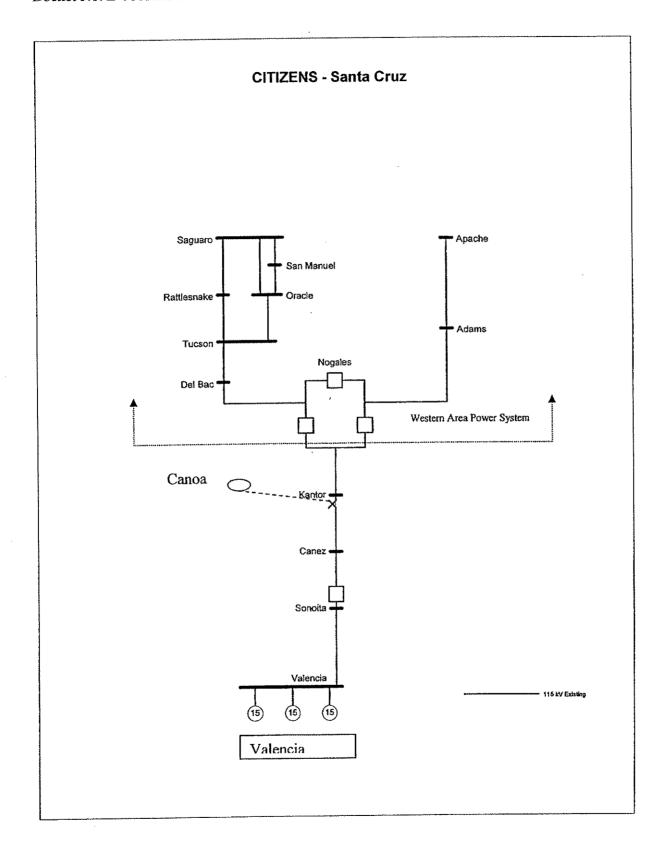


Exhibit C

UniSource Fnerny	ilwoo anu illottiautii ui iilk v iianomiootti	Issue Date 04/26/99	Revision Date	Page 1 of 1
SERVICES	<u>Line</u>	UTIZOTOO		1011
		Approved:		
		M. Flores	;	

Duties

Generation Systems Supervisor- Black start turbines per UES Power Plant Black Start Procedure (Remote).

Transmission Systems Supervisor - Restore 115kV, interconnect 46kV line to 115kV line, and coordinate with WALC.

Transmission Systems Supervisor will notify the Rocky Desert Reliability Coordinator (RDRC).

Distribution Systems Supervisor - Coordinate with Generation Systems Supervisor to pick-up distribution load and balance load with turbine generation.

<u>Assumption</u>

- Turbines are off and there is no ability to interrogate fault distance relay at the Nogales Tap Substation.
- When Valencia turbines are greater than 5MW per turbine each turbine will be switched to 50/50 fuel mix.

115kV Fault Location

Transmission - verify location of fault.

<u>Scenario A:</u> Fault north of Sonoita Substation - Nogales Tap Substation breakers will trip for the fault, de-energizing the 115kV line and the Sonoita Substation circuit switchers S115-CB2 and CB1 remain closed.

<u>Scenario B:</u> Fault south of Sonoita Substation - Nogales Tap Substation breakers remain closed and the Sonoita Substation circuit switcher S115-CB2 trips and deenergizes the 115kV line south of Sonoita Substation.

For either Scenario A or Scenario B, Generation Systems Supervisor will immediately refer to UES Power Plant Black Start Procedure (Remote) to begin restoring Valencia Substation load.

Scenario A

1. Send trouble/substation crew to Kantor Substation.

- 2. Transmissions Systems Supervisor coordinates with Distribution Systems Supervisor to remotely open distribution breakers and the 115kV breakers at Valencia Substation.
- 3. Transmissions System Supervisor will open Sonoita Substation circuit breaker S115-CB1 remotely.
- 4. Troubleman/Substation crew to verify whether fault is north or south of Kantor Substation by reading the fault indicators on K115-S2 at Kantor Substation.
 - If fault is north of Kantor Substation:
 - a. Trouble/substation crew will open switch K115-S1 at Kantor Substation.
 - b. Transmissions System Supervisor will close 46kV breaker K46-CB1 remotely. Kantor Substation and Cañez Substation load restored.
 - If fault is south of Kantor Substation:
 - a. Trouble/substation crew will open switch K115-S2 at Kantor Substation.
 - b. Transmission System Supervisor will close 46kV breaker K46-CB1 remotely. Kantor load restored.
 - c. Transmission System Supervisor will open C115-CS1 at Cañez Substation remotely.
 - d. Distribution System Supervisor will pick up Cañez Substation load through field switching (tie Kantor circuit 7201 to Cañez circuit 8203).
- 5. Transmission Systems Supervisor will open S115-CB2 at Sonoita Substation remotely.
- 6. Once the Valencia turbines are on line and feeding distribution circuits at Valencia Substation and the Generation Systems Supervisor is ready for additional load restoration, the Transmission System Supervisor will close V115-CS1 at Valencia Substation (this energizes the 115kV line between Sonoita and Valencia Substations).
- 7. Distribution Systems Supervisor will open all distribution feeder breakers, open S115-CS1 circuit switcher, and close the bus tie breaker at Sonoita Substation.
- 8. Transmission Systems Supervisor will close S115-CB2 at Sonoita Substation remotely (energizes T1 and distribution bus).
- 9. Distribution Systems Supervisor will coordinate with Generation Systems Supervisor while closing feeder breakers at Sonoita Substation to ensure generation and load balance.

Scenario B

Distribution Systems Supervisor will coordinate with Generation Systems Supervisor while closing feeder breakers at Valencia Substation to ensure generation and load balance.

Restoration of 115kV Line (fault cleared)

Scenario A

Assumption:

Valencia Substation and Sonoita Substation are on the Valencia turbines and TEP is carrying Kantor and Cañez Substation's load.

- 1. Transmission Systems Supervisor to ensure K115-S1 and K115-S2 are closed.
- 2. TEP and WALC will sync at the Nogales Tap.
- 3. Transmission Systems Supervisor will open 46kV breaker K46-CB1 remotely.
- 4. Transmission Systems Supervisor in coordination with WALC will sync at Sonoita Substation S115-CB1.

Scenario B

Assumption:

WALC is carrying Kantor, Cañez, and Sonoita Substation's and Valencia Substation is on the Valencia turbines.

- 1. Transmission Systems Supervisor will close V115-CS1 at Valencia Substation. (This energizes the 115kV line between Sonoita and Valencia Substations.)
- 2. Transmission Systems Supervisor in coordination with WALC will sync at Sonoita Substation S115-CB2

EXHIBIT 2

STAFF EXHIBIT 2

UES Load Forecast (UES February 10, 2004 Exhibit 4)

Exhibit 4
UES Load Forecast

		TEP	TEP High		D4001:-4
<u>Year</u>	<u>Actual</u>	<u>Forecast</u>	<u>Forecast</u>	RAC 2 Normal	RAC 2 hot
1999 Actual	50.4				
2000 Actual	52.6				
2001 Actual	51.5			w.	
2002 Actual	58.0				
2003 Actual	59.1	59.1			
2004 Fcst		61.4	64.4	62.0	67.0
2005 Fcst		63.6	66.8	64.0	69.0
2006 Fcst		65.8	69.0	166.0 B	72.0
2007 Fcst		67.9	71.3 · · · ·	68.0	74.0
2008 Fcst		70.1	73.5	70:5 ×	76.0
2009 Fcst		72:2	/= 75.8 · · · ·		78.0
2010 Fcst		74.5	78.2	74.0	80.0
2011 Fcst		76.8	80.6		
2012 Fcst	•.	79.2	83.1		
2013 Fcst		81.6	85.7		
•		84.1	88.3		
2014 Fcst		86.7	91.0		
2015 Fcst	¥			THE PARTY AND ADDRESS OF THE PARTY OF THE PA	A Service and the service of the ser

TEP Load forecast for Nogales

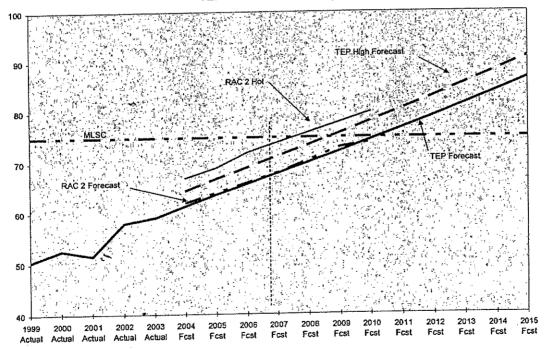


EXHIBIT 3

STAFF EXHIBIT 3

UniSource Energy Services
Santa Cruz County
Reliability Must Run Generation Study
(UES February 10, 2004 Exhibit 5)

Exhibit 5 RMR analysis

UniSource Energy SERVICES

RELIABILITY REQUIRED MUST-RUN GENERATION

UNS ELECTRIC (SANTA CRUZ) SYSTEM

FOR THE YEARS 2005, 2008, 2012

PREPARED FOR THE ARIZONA CORPORATION COMMISSION

TEP
Transmission System Planning

February 9, 2004

Introduction

The Santa Cruz County UNS Electric system is currently a radial system interconnected to the Western Area Power Administration 115 kV transmission system. From the interconnection point at Nogales Tap near Tucson, the UNS Electric 115 kV system proceeds down to Kantor substation – then Canez, Sonoita, and Valencia substations in that order (see exhibit 1).

Approximately 50% of UNS Electric load is located at Valencia substation and 25% at Sonoita substation. Hence, 75% of the total UNS Electric load is located on the last 8.5 miles of the system. Due to the long section of 115 kV from Nogales Tap and the lengthy 115 kV ties ultimately connecting the Saguaro and Apache generating stations to Nogales Tap, the bulk of the UNS Electric load is located at the weakest point on the system.

Because of the weak nature of the 115 kV transmission network, low voltage becomes an issue at higher loads. Presently, this problem has been mitigated by dispatching local gas turbine generators located at Valencia substation during peak load periods. These turbines not only supply some power locally which helps reduce loading on the 115 kV network, but they also enhance voltage support by contributing a modest amount of reactive power (VARs).

When the gas turbines are used to support the system in this manner, they are acting as Reliability Must-Run (RMR) generation. The purpose of this study is to quantify the necessity and effectiveness of the RMR aspect of this generation.

Study Power Flow Case Assumptions

The existing Santa Cruz UNS Electric system was explicitly modeled within the 2005 RMR case that was jointly prepared by TEP, APS, SRP, SWTC, and WAPA. Since the system changes made by outside entities during the entire 2005 – 2012 study period were located a considerable distance from the UNS Electric system, an assumption was made that such changes would have little impact to the UNS Electric system and therefore the 2005 case was used throughout. Additionally, 5.0 MVAR 13.2 kV substation capacitor banks were added on the distribution side of each load-serving transformer in each substation. This reflects planned improvements scheduled to be implemented by summer of 2004.

UNS Electric system load was assumed to be distributed in the following manner:

Substation loads with 0.95 p.f. lagging				
Substation	Percentage of total			
Kantor .	12.5%			
Canez	12.5%			
Sonoita	25%			
Valencia	50%			

The Valencia gas turbines were rated as follows in the case:

Turbine	Maximum Power Output ¹	Maximum Reactive Output ²
Valencia turbine #1	14 MW	8 MVAR
Valencia turbine #2	16 MW	8 MVAR
Valencia turbine #3	16 MW	8 MVAR

Based upon GE testing work performed in 1999

2 Estimate based upon total MVA rating and max. power output of each generator

The forecasted peak demand for the three study years is:

Santa Cruz UNS Electric Peak Demand 1			
Year	Demand		
2005	63.6 MW		
2008	70.1 MW		
2012	79.2 MW		

UNS Electric prepared by TEP forecasting dept. 2004

Results

The Santa Cruz county UNS Electric system was studied with two basic configurations. The first configuration was the existing system. The second configuration was the existing system with the addition of a 115 kV connection from Valencia substation to the future Gateway substation.

Pre-Gateway

For N-0 (no contingencies) the Simultaneous Import Limit (SIL) was calculated to be 65 MW. At this load, substation voltage regulators reach the top of their range and substation distribution voltage begins to go subnominal. It was assumed that a substation feeder voltage of 1.0 pu would translate into 0.95 pu at the remote end of feeders – the minimum permissible customer voltage.

With all three Valencia turbines dispatched at maximum, the Maximum Load-Serving Capability (MLSC) for an N-0 condition was determined to be 75 MW. The limiting factor in this case was the Valencia distribution transformers. The MLSC increases to approximately 100 MW for an N-0 condition assuming the transformer overloads can be mitigated. This could potentially be accomplished by replacing the transformers, or busing the two transformers together on the low side and installing a paralleling tap-synchronization device on the voltage regulators.

N-1 scenarios were not considered for this configuration since the system is radial prior to the Gateway interconnection. Any contingency will result in at least partial loss of load; however, load restoration plans are in place. The plans include dispatching the Valencia turbines and will be modified to include closing in an emergency 46 kV connection between the southern TEP system and Kantor substation once that connection is established.

Post-Gateway

With the Gateway station and Gateway - Valencia line in service, the Santa Cruz UNS Electric system becomes a looped system. Consequently, RMR analysis can be performed considering N-1 (single-contingency) scenarios.

Assuming all Valencia turbines off, the maximum load that can be served (SIL) was calculated to be 50 MW. The limiting factor is a delta voltage violation (5% or greater) on at least one bus due to loss of the Gateway – Valencia 115 kV line.

When all three Valencia turbines are fully dispatched, the maximum load that can be served (MLSC) was calculated to be 75 MW. The limiting factor was overloading on the Valencia distribution transformers. If this overloading is discounted as previously discussed, the limit becomes 90 MW. The limit for this latter scenario is a delta voltage violation for loss of the Gateway – Valencia line.

Once the Santa Cruz UNS Electric system becomes looped, the critical outage becomes loss of the Gateway – Valencia 115 kV line. To mitigate the effects of the outage, a completely redundant circuit from Gateway to Valencia was added for study purposes.

With that circuit in place, the SIL rose to 80 MW. Again, the Valencia distribution transformers were the limiting factor. Discounting the transformer overloads, the SIL rose to 95 MW. The limiting factor this time was a delta

voltage violation for loss of the Valencia – Sonoita 115 kV line. By 2012 the load has grown to the point that Sonoita, Canez, and Kantor experience a significant voltage drop because the relatively weak 115 kV WAPA system cannot maintain voltage for loss of Valencia – Sonoita. Additionally, RMR generation is ineffective because it is on the wrong side of the disturbance. Building a Gateway – Sonoita 115 kV line instead of a 2nd Gateway – Valencia 115 kV line might improve this situation and is something that TEP will study in 2004.

Based upon the limits and assumptions discussed above the following table summarizes the results:

Year	# of Gateway- Valencia ckts.	Forecast Peak	SIL	MLSC	RMR Generation at Peak
2005	1	63.6 MW	50 MW	75 MW	14 MW
2008	1	70.1 MW	50 MW	75 MW	20 MW
2012	1	79.2 MW	50 MW	75 MW	30 MW
2012	2	79.2 MW	80 MW	95 MW ¹	0 MW

¹ Assumes Valencia transformer overloads eliminated

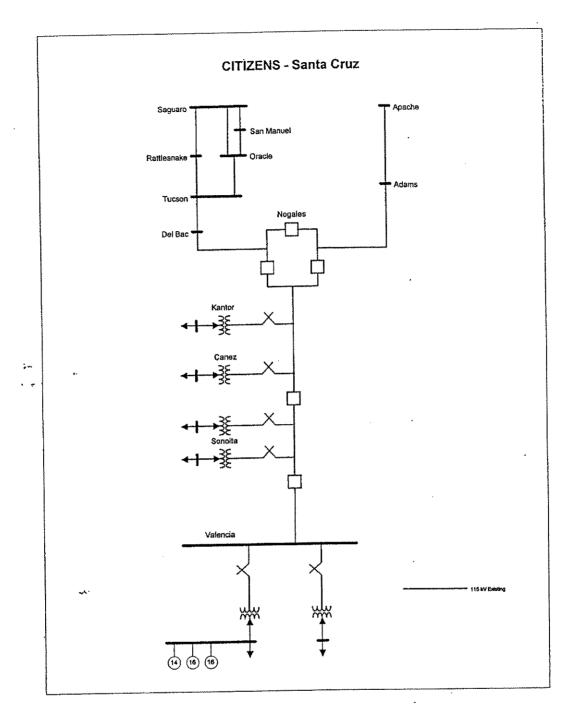


Exhibit 1

EXHIBIT 4

STAFF EXHIBIT 4

Federal EIS Comments Arizona State Land Department March 2004

From:

Linda Beals

To:

Mark -- Tt, Inc. Blauer

Subject:

TEP-DOE Siting

The Arizona State Land Department is still in the process of reviewing the Draft Environmental Impact Statement prepared by the DOE for the TEP Sahuarita-Nogales Transmission Line.

Our initial observations are as follows:

1.) There is a significant amount of Arizona State Trust Land impacted by all of the proposed alignments. (Approximately 30% of the alignment in each of the proposes routes.) We are concerned about the limited discussion of the State Trust and would propose the following language by incorporated into the EIS under (Section 1.2.2):

The Arizona State Land Department manages approximately 9.3 million acres of State owned "Trust" lands. These lands were granted to the State of Arizona under provisions in the federal Enabling Act that provided for Arizona's statehood in 1912. The lands are held in trust for fourteen public beneficiaries including Arizona's public schools and several state supported institutions.

The Department functions as the trustee of the State Land and it's natural resources. The Department's management of the trust is governed by extensive and detailed provisions in the Enabling Act (Sections 24-30), Act June 20, 1910, ©. 310,36 U.S. Stat. 557, 568-579). The Arizona Constitution (Article 10), and statutes in A.R.S. Titles 27 and 37. In addition there is extensive case law which governs the Department's procedures and management of the Trust.

The role, in this instance, of the State Land Department is to determine whether to approve an easement for the preferred right of way alignment for a power transmission line as well as a fiber optic communication line incorporated in the power line. In processing an application for a right of way, the Department will consider land status, current uses, existing lessees, affected resources, environmental issues, local and regional land use plans and comments from interested parties as well as other issues that may present themselves in the application process.

2.) Each of the alignments will have some degree of impact on trust land. The Department's mission is to manage State Trust Lands and resources to enhance value and optimize economic return for the Trust's beneficiaries consistent with sound stewardship, conservation and business management principles. The central alignment would have the greatest impact on the monetary value/income producing ability of the trust land. This is the land closer to the highway, portions of which are anticipated to be developed in the foreseeable future. However, the proposed Western and Crossover corridors cross approximately five miles of trust land and the proposed Central corridor crosses approximately 6.5 miles of trust land in the Tinaja Hills area (Pima County) identified as "conservation option lands" under the proposed State Trust Land Reform package to be presented to Arizona's voters in 2004. A goal of the State Trust Land Reform package is to improvement management and planning of trust lands and to conserve significant lands. The "Conservation Option" trust lands impacted are as follows:

WESTERN AND CROSSOVER CORRIDORS

Township 19 South, Range 12 East

- S2, Section 5; All Section 6
 - S2. Section 7:
 - N2. Section 8;
- * All, Section 16; All Section 17
- * E2, Section 19; All Section 20
 - All, Section 32

Township 20 South, Range 12 East

N2NE, Section

CENTRAL CORRIDOR

Township 18 South, Range 12 East S2S2, Section 23 All, Section 26 All, Section 35

Township 19 South, Range 12 East

- * All, Section 2; All, Section 3
- * All, Section 10; All, Section 11
- * All, Section 14; All, Section 15 N2N2 Section 22

*Proposed corridor alignment appears to follow section line boundaries between the parcels identified.

- 3.) Existing Leases- There are a number of existing leases within the proposed alignments. Most of them are grazing leases and proposed corridor should be able to co-exist these. There are minor accommodations for fencing, ranch roads, water facilities and similar grazing improvements that we need to consider. However, as we have previously discussed, the Arizona State Land Department currently leases approximately 4,500 acres of land to Caterpillar Corporation for their proving grounds and training center. With the majority of the buildings and other significant improvements are on their fee land. The leased land is utilized in conjunction with the fee land for testing and demonstration purposes. This lease could be jeopardized if the proposed power lines created a physical restriction/constraint on the use of the facility or if the aesthetic view corridor Caterpillar uses as a backdrop for its facility were to be severely impacted by the power lines. In either case, the income producing ability of the lease would be jeopardized, as well as the significant financial benefit to the local community. Caterpillar has outlined their economic benefit to the community in a previous correspondence to the DOE.
- 4.) Acquisition of State Trust Lands Under Chapter 9 (applicable Environmental Laws, Regulations, Permits and DOE Orders) it is indicated that TEP would acquire access across State Trust lands via condemnation. This is incorrect. Only the federal government may exercise it's power of eminent domain and condemn State Trust lands. TEP does not have condemnation power on trust lands. It should also be noted, that the Arizona State Corporation Commission has no authority to require the Arizona State Land Department to issue a right of way across trust lands.

As initially stated, we are still in the process of analyzing the impacts of the proposed routes and since TEP has not formally filed an application to purchase the required easement no final determination can or will be made at this time. Based upon our current mission and the laws governing the Trust we cannot endorse the central alignment. But as stated, there are concerns regarding both of the other proposed alignments, not the lease of which is the Caterpillar Lease. These concerns could become more acute if the proposed legislation for conservation of these land is passed.

Hopefully this information can and will be incorporated into the final EIS report and taken into consideration in any recommendations made by the DOE.

If you need any clarification on the matter herein for any additional information, please do not hesitate to call me at 602-542-2648.

Linda R. Beals, Manager
Right of Way Section
Arizona State Land Department
>>> "Blauer, Mark -- Tt, Inc." <Mark.Blauer@tetratech.com> 03/25 6:21 AM >>>
Linda

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It was very informative talking with you yesterday. Quite an eye opener on how AZ does [or doesn't] do business. Anyway, I just wanted to make sure that you had my contact info and if there is any thing I can do for you, please don't hesitate to call or email me. Also, please let me know if you get this email [sometimes my server doesn't like government servers and my emails get rejected]. Thanks.

Dr. H. Mark Blauer 5205 Leesburg Pike Suite 1400 Falls Church, VA 22041 703-931-9301 x590 703-931-9222 fax

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CC: Greg Keller; James Rees; Jerry Pell; Jim Adams;...

BEFORE THE ARIZONA CORPORATION COMMISSIO

COMMISSIONERS
MARC SPITZER - Chairman
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
MIKE GLEASON
KRISTIN K. MAYES



IN THE MATTER OF SERVICE QUALITY ISSUES, ANALYSIS OF TRANSMISSION ALTERNATIVES AND PROPOSED PLAN OF ACTION IN THE SANTA CRUZE ELECTRIC DIVISION OF CITIZENS UTILITIES COMPANY (NOW THE SANTA CRUZ DIVISION OF UNISOURCE ELECTRIC.

DOCKET NO. E-01032A-99-0401

NOTICE OF FILING STAFF REPORT

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Staff of the Utilities Division of the Arizona Corporation Commission hereby files its Staff Report, commenting on the sufficiency of the updated Outage Response Plan filed by Tucson Electric Power Company ("TEP") and UniSource Electric, Inc. ("UNS Electric"), as required by Commission Decision 66615. Staff apologizes for the lateness of the filing. Staff respectfully requests that the Commission consider the information provided in its Staff Report, attached to this filing.

RESPECTFULLY SUBMITTED this 11th day of March 2004.

Jason D. Gellman

(602) 542-3402

Attorney, Legal Division

Arizona Corporation Commission

1200 West Washington Street Phoenix, Arizona 85007

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27 28 The original and thirteen (13) copies of the foregoing were filed this http://day.of.with:

Docket Control Arizona Corporation Commission 1200 West Washington Street Phoenix, Arizona 85007

Copies of the foregoing were mailed/hand-delivered this 11th day of March, 2004 to:

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27	AngelaL. Bennett secretary to Jason D. Gellman

MEMORANDUM

TO:

Docket Control

FROM:

Ernest G. Shadon

Director

Utilities Division

DATE:

March 11, 2004

RE:

STAFF REPORT ANALYZING TEP AND UNISOURCE ENERGY SERVICES RESPONSE TO DECISION NO. 66615 REGARDING THE TEP AND CITZENS COMMUNICATION COMPANY JOINT APPLICATION FOR DELAY OF INSERVICE DATE OR WAIVER OF PENALTIES (DOCKET NO. E-01032A-99-

0401)

Attached is a Staff Report that supplements and augments an October 31, 2003 Staff Report for a Tucson Electric Power Company ("TEP") and UniSource Energy Services ("UES") joint application for delay of the in-service date or waiver of penalties for a second transmission line to serve Santa Cruz County.

Staff continues to recommend that prior to June 1, 2004, this matter appear on an open meeting so that the Commission can 1) determine sufficiency of the TEP and UES updated Outage Response Plan; 2) receive updates on the federal permitting processes; 3) address further waiving of the penalty for a prescribed period beyond June 1, 2004; and 4) establish a process for a) reviewing the TEP and UES Outage Response Plan such that it remains sufficient, b) providing further updates on the federal permitting processes, and c) addressing future waivers of the penalty beyond the prescribed period. Such a process might include waiver of penalties on a cyclical basis (i.e. 3 or 6 months) provided satisfactory progress is made in permitting and constructing the project.

Staff further recommends that TEP and UES file supplemental information by April 30, 2004 that:

- 1. Resolves deficiencies, noted by Staff in this report, in their response to questions raised by the Commission in Decision No. 66615.
- 2. Updates the power plant operations procedure and the transmission service restoration procedures previously approved as elements of Citizens' Outage Response Plan.
- 3. Proposes modifications to the UES Switching Procedures that refines the time required to restore service following a transmission line outage for each of the following potential system improvements:



- a. Proposed 46 kV TEP emergency feeder tie to Kantor,
- b. Potential automated or remotely controlled transmission and/or distribution feeder switching improvements.
- c. Potential emergency service via the Gateway interconnection to Mexico.

EGJ:JDS:rdp

Originator: Jerry D. Smith

Attachment: Original and thirteen copies

Service List for: TUCSON ELECTRIC POWER COMPANY and UNISOURCE ENERGY SERVICES

Docket No. E-01032A-99-0401

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STAFF REPORT UTILITIES DIVISION ARIZONA CORPORATION COMMISSION

TEP AND UNISOURCE ENERGY SERVICES RESPONSE TO DECISION NO. 66615 DOCKET NO. E-01032A-99-0401

APPLICATION FOR A DELAY OF IN-SERVICE DATE OR WAIVER OF PENALTIES

MARCH 11, 2004

STAFF ACKNOWLEDGMENT

This Staff Report for the TEP and Citizens Communication Company application for delay of in-service date or waiver of penalties, Docket No. E-01032A-99-0401 was prepared by Jerry Smith. It provides an analysis of TEP and UniSource Energy Services ("UES") response to Commission questions contained in Decision No. 66615. Subsequent to the original application, UES acquired the Citizens Communications Company gas and electric facilities in Arizona in August 2003. Mr. Smith was Staff's witness in all other proceedings regarding this matter and for the siting of the required second transmission line to Nogales. He was responsible for the review and analyses of the companies' application, review of the Commission's records of each company, determining their compliance with Commission policies/rules and reviewing customer complaints filed with the Commission regarding this matter. Mr. Smith also performed the engineering and technical analysis, and recommended action appropriate for pending delays in the construction of a second transmission line to serve Santa Cruz County in a prior Staff Report dated October 31, 2003.

Jerry D. Smith tric IIIII

Electric Utility Engineer

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PURPOSE OF STAFF REPORT

This Staff Report supplements and augments the October 31, 2003 Staff Report and has a three fold purpose. It critiques Tucson Electric Power Company ("TEP") and UniSource Energy Services, Inc. ("UES") responses to Commission questions posed in Decision No. 66615. Secondly, it contains Staff's comments on the sufficiency of TEP's and UES' updated Outage Response Plan for Santa Cruz County filed on February 9, 2003, in accordance with Decision No. 66615. Finally this report documents discussions among TEP, UES, Commission Staff, and Federal Agencies regarding steps remaining in the various federal processes to permit the proposed transmission line from TEP's South Substation to the new TEP Gateway Substation and from Gateway Substation to UES' Valencia Substation in Nogales, Arizona.

CRITIQUE OF RESPONSES TO COMMISSION QUESTIONS

On February 9, 2003, TEP and UES filed a response to Commission Decision No. 66615. That TEP and UES filing updates the Plan of Action for Santa Cruz County originally filed by the Citizens Communication Company. It includes an updated "Outage Response Plan" and their responses to the following questions:

- a. Can Citizens' operating procedures be improved to shorten the restoration time for transmission outage events utilizing TEP's operations center and field personnel?
- b. Are any of the following improvements cost effective as interim restoration of service solutions to the construction of a second transmission line?
 - i. A limited number of automated or remote controlled distribution feeder ties between substations
 - ii. Improved remote electronic dispatch control capability of the Valencia generator or improved generator controls.
- c. What refinements are appropriate in Citizens' RAC-2 peak load forecast? Please define the annual hours of exposure when load is forecast to exceed the capacity of the existing transmission line.
- d. Is the proposed interconnection with Mexico at the Gateway substation an interim service restoration solution for delay of the proposed South to Gateway transmission line through the Coronado National Forest?
- e. How much emergency service is available from TEP via a Kantor feeder tied to TEP's 46 kV line?

Staff has reviewed TEP and UES responses to the above questions and offers the following observations and comments.

a. Can Citizens' operating procedures be improved to shorten the restoration time for transmission outage events utilizing TEP's operations center and field personnel?

TEP and UES responded to this question by providing an Integration Task List (Exhibit 2) that depicts the status of activities being undertaken to integrate operational control of UES' facilities via TEP's operations center and utilizing both TEP and UES field personnel. Several of the items reported as "under investigation" or "not yet completed" directly affect TEP's and UES' ability to improve the operating procedures for Santa Cruz County. Completion of these pending operational improvements is critical if a reduction in time to restore service to customers following outage of the existing transmission line serving Santa Cruz County is to be achieved. The updated UES Switching Procedures (Exhibit 3) does not incorporate any of these incomplete operational improvements. Therefore, the updated switching procedure shows no reduction in the service restoration time for loss of the 115 kV line to Nogales.

b. Are any of the following improvements cost effective as interim restoration of service solutions to the construction of a second transmission line?

Cost effectiveness is not addressed in any form in the most recent filing by TEP and UES.

i. A limited number of automated or remote controlled distribution feeder ties between substations.

TEP reports that its engineering personnel are currently researching opportunities for such feeder ties. However, the updated UES Switching Procedure (Exhibit 3) does continue to reflect manual operation of circuit switchers, switches and circuit breakers at Valencia Substation, a 115 kV circuit switcher at Cañez Substation, a distribution feeder recloser at Four Winds Ranch on circuit 7201 and a distribution group operated switch at pole #7995 on circuit 8201. In addition, use of a 46 kV TEP feeder to restore service to Kantor is also contemplated.

Staff is simply asking what restoration time savings can be achieved by automating the operation of these devices or providing remote control capability for these devices instead of dispatching field personnel to the various locations for manual switching purposes. Do such time savings warrant the expenditure of capital funds to implement such proposed operational improvements? If so, when can such operational capability be achieved and reflected in the switching procedures?

ii. Improved remote electronic dispatch control capability of the Valencia generators or improved generator controls.

TEP reports it is reviewing the feasibility of consolidating and moving the remote dispatch control of the Valencia gas turbines to TEP's Irvington Control Center. Staff simply wants to know what restoration time savings could be achieved by remotely dispatching and controlling the units rather than dispatching field personnel to manually balance each unit's output to load

TEP and UES Docket No. E-01032A-99-0401 Page 3

following a switching procedure that picks up or drops load. Do such time savings warrant the expenditure of capital funds to implement such proposed operational improvements? If so, when can such operational capability be achieved and reflected in the switching procedures?

c. What refinements are appropriate in Citizens' RAC-2 peak load forecast? Please define the annual hours of exposure when load is forecast to exceed the capacity of the existing transmission line.

TEP has refined Citizens' RAC-2 peak load forecast (Exhibit 4). The "normal" forecast is similar to Citizens' RAC-2 forecast, but TEP's "high" forecast is somewhat lower. No rationale for the reduction in the "high" forecast was provided by TEP. The UES reliability must—run ("RMR") generation study report (Exhibit 5) indicates that the pre-Gateway Simultaneous Import Limit ("SIL") is 65 MW. Therefore, a RMR condition is expected to occur in Santa Cruz County by the summer of 2006 per the new forecast.

The annual hours of exposure when the load is forecast to exceed the capacity of the existing transmission line has not been provided. Without this analysis it is not possible to ascertain the RMR energy cost for running the Valencia units for the purpose of meeting the local load requirements. The economic impact of such operation of the Valencia units is significant because UES has a full requirements power purchase contract with Pinnacle West Capital Corporation ("PWEC"). Therefore, operating expenses of the Valencia units occur on top of and above the cost of the power otherwise purchased and contracted for via PWEC. Operating the Valencia units during summer storm season in preparation for restoring service following a transmission line outage has the same cost impacts even when the load is below the 65 MW pre-Gateway SIL.

d. Is the proposed interconnection with Mexico at the Gateway substation an interim service restoration solution for delay of the proposed South to Gateway transmission line through the Coronado National Forest?

TEP and UES report that construction of the Gateway Substation and interconnection with Mexico are dependent upon the completion of the Environmental Impact Statement ("EIS") for the project and the U.S. Department of Energy ("DOE") issuance of a Presidential Permit. They further claim that construction of such facilities can not occur prior to the resolution of the Coronado National Forest issues. Staff has concerns regarding both the technical aspects of such an interconnection and the role of the federal permitting process for this component of the project.

Staff does not know if construction of the proposed interconnection facilities to Mexico offers a technically satisfactory emergency restoration of service option for outage of the existing 115 kV line. Similarly, Staff does not know if there are contractual obstacles to such emergency service in the interim. Staff requests TEP and UES to consider and report on the technical and contractual merits of this alternative.

Since they are not on federal lands, it would appear construction of the Gateway Substation, the 345 kV interconnection to Mexico and the 115 kV line from Gateway to Valencia could precede independent of construction of other elements located on federal lands. However, it is unclear to Staff whether DOE can issue a Presidential Permit independent of the administrative processes of other federal agencies involved in the EIS process. If the Presidential Permit is for the entire project and is dependent on the finality of the administrative processes of both the Bureau of Land Management ("BLM") and the United States Forest Service ("USFS"), then this interim solution is not likely feasible. But, this solution, if technically sound, may be possible if DOE's issuance of a final EIS, Record of Decision ("ROD") and Presidential Permit are independent and only apply to the component of the project implicating the interconnection to Mexico. As stated above, this component is not on federal lands.

e. How much emergency service is available from TEP via a Kantor feeder tied to TEP's 46 kV line?

TEP reports that it could provide approximately 20 MW of emergency service to UES via a new 46 kV feeder tie with Kantor Substation. However, due to longstanding TEP two-county financing limitations, the 46 kV switch must remain normally open between the two systems. This means such service is strictly of a service restoration character and cannot assure continuity of customer service for outage of the existing 115 kV line to Nogales. Furthermore, Staff is still uninformed as to how much time is saved by using this emergency feeder tie to restore service following a transmission line outage.

SUFFICIENCY OF UPDATED OUTAGE RESPONSE PLAN

The updated UES Switching Procedures for loss of 115 kV line to Nogales (Exhibit 3) properly reflects current operating procedures for its Santa Cruz County electric facilities. It refines the personnel now responsible for the various actions given the current TEP and UES operational relationship. It further corrects the manual operational adjustments of Valencia turbines to a frequency of 60.5 Hz rather than 100.5 % of rated speed when balancing output of units to load following each feeder switching sequence. However, it reflects none of the operational improvements "under investigation" or "not yet completed" in the operational integration of UES facilities into TEP's operations center functions.

The Citizens Outage Response Plan approved and adopted by the Commission in Decision No. 62011 included power plant operations procedures and three procedures for restoring transmission service following a transmission line outage. The approved power plant operations procedures are attached to this report as Exhibit S-1 and the three transmission restoration procedures are attached to this report as Exhibit S-2. Neither of these two procedures has been updated. TEP's Integration Task List (Exhibit 2) indicates that procedures regarding operation of the Valencia turbines during storm season are "under investigation". Similarly, TEP reports in its Integration Task List that it is investigating the placement of Valencia turbine controls on TEP's supervisory control and data acquisition ("SCADA") system to enable remote start from TEP's control room. Given TEP's experience with black start of generating units and the scope of its

"investigations" Staff would expect to see updated power plant operating procedures and transmission service restoration procedures.

Staff also expects TEP and UES to update the UES Switching Procedures for loss of 115 kV line to Nogales to reflect possible utilization of 1) the proposed 46 kV emergency feeder tie to Kantor, 2) any automated or remote controlled switching devices that could be implemented to enable service restoration without depending on dispatching of field personnel, and 3) emergency switching if or when the Gateway interconnection to Mexico is implemented. Without knowing the reduction of time for service restoration via each of these potential operational improvements Staff can not judge their merits.

The Commission ordered UES' predecessor, Citizens, to build facilities that assure electric customers in Santa Cruz County have reliable service founded on the principle of continuity of service for outage of a transmission line. None of the aforementioned operational improvements achieve that purpose. In fact, the UniSource Energy Services RMR Study (Exhibit 5) filed on February 9, 2004, indicates that even with the proposed new 115 kV transmission line from Gateway to Valencia a system voltage violation would occur for the outage of the new line or the Valencia to Sonoita line. The RMR study indicates that this service concern can be managed technically via the RMR operation of the Valencia generating units until the Santa Cruz County load reaches approximately 75 MW. According to the TEP forecast (Exhibit 4) the 75 MW load level may be experienced by the summer of 2010. TEP has committed to studying and analyzing in 2004 the merits of a second 115 kV line from Gateway to either Valencia or Sonoita. Staff would expect TEP and UES to file such study results with their ten year transmission plan in January 2005.

FEDERAL PERMITTING PROCESS

Composing the final Environmental Impact Statement ("EIS") for the Gateway Project is a detailed and comprehensive process involving several federal agencies. As explained to Staff, the EIS is a disclosure document highlighting the environmental reviews conducted pursuant to the National Environmental Policy Act ("NEPA"). The requirements under NEPA for a certain project depend on the particulars of each case and what federal lands and/or agencies are implicated by the project. For the Gateway Project, while the Department of Energy ("DOE") is the lead agency for the EIS, the United States Forest Service ("USFS") and Bureau of Land Management ("BLM") have vital and key roles in the EIS' composition. The United State Fish and Wildlife Service ("USFW") and the U.S. Section of the International Boundary Water Commission ("USIBWC") also have significant roles in the process. Each agency must ensure that all of its requirements are incorporated in the NEPA process and the EIS.

Currently, the DOE, USFS and BLM are analyzing the abundance of comments submitted on the Draft EIS. The Draft EIS was noticed August 27, 2003. Commission Staff submitted comments on the Draft EIS on October 14, 2003. Staff's comments focused on the need for the Gateway Project to improve the reliability of electric service to UES customers in Santa Cruz County. Staff attached portions of the transcript in the proceedings before the Power Plant and

Transmission Line Siting Committee ("Line Siting Committee") in Docket No. L-00000C-01-0111 detailing the need for the Gateway Project to reliably serve customers. Staff indicated in its comments that neither new local generation nor other means would preempt the need for a second transmission line.

Staff understands that the final EIS is expected to be issued on June 1, 2004. This assumes that the USFW will issue its Biological Opinion ("BO") by April 1, 2004. Once the final EIS is issued, a Notice of Availability ("NOA") will be published in the Federal Register.

Staff continues to meet with representatives of UES and TEP, USFS, BLM and DOE to gain a better understanding of the federal process and to explore and encourage ways to expedite the process while still ensuring a thorough analysis. Staff has also educated USFW, BLM and DOE (hereinafter referred to as the "federal agencies") on the state siting process for power plants and transmission lines. Staff pledges to continue to be active in discussions with the federal agencies and believes that the federal agencies have been receptive to Staff's comments and suggestions. What follows is a summary of Staff's understanding of the processes for each of the federal agencies, after the final EIS has been composed.

Department of Agriculture - United States Forest Service ("USFS")

A. USFS - Record of Decision and Administrative Appeal

The decision process for the USFS is governed under 36 CFR parts 215 through 215.22. The USFS can issue its record of decision ("ROD") when the final EIS is completed, provided the USFW has issued its BO and met all the requirements under 36 CFR parts 215.5 and 215.6. However, it is more reasonable to expect a ROD from the USFS within thirty to sixty days from the date the final EIS is issued. The ROD is issued by an individual known as the Responsible Official ("RO"). The ROD is based on the findings after an extremely comprehensive EIS involvement by the USFS and a NEPA process that incorporates all factors required under 36 CFR parts 219 through 219.36.

Once a ROD has been issued, any party with standing can appeal the decision within forty-five days of publication of the legal notice of the ROD, pursuant to 36 CFR part 215.15. The Appeal Deciding Officer ("ADO"), the official who will issue a decision on the appeal, will decide on the appeal in accordance with all of the chain of evidence showing all of the activity contained within what is called the project record. Working with the ADO is the Appeal Reviewing Officer ("ARO"), who issues a recommendation to the ADO on the appeal of the ROD in accordance with 36 CFR 215.19. If an appeal is filed, an ADO should render a decision on the appeal within forty-five days following the end of the appeal-filing period, or else the RO's decision is deemed the final agency action. See 36 CFR 215.18.

The ADO may decide to affirm, or remand the ROD with instructions as detailed in 36 CFR 215.18(b)(1). The ADO may also not issue any decision, in which case the ROD becomes final in accordance with 36 CFR part 215.18(b)(2). The ADO's decision is the final administrative

determination of the U.S. Department of Agriculture. If the ADO has affirmed the ROD, there is a fifteen-day period prior to implementation. Presumably, it is at this time that an aggrieved party may file a notice of intent to sue in federal court with a temporary restraining order. If the ROD has been reversed/remanded, the process then reverts back to the RO.

The USFS administrative appeal process also contains an informal disposition component, governed by 36 CFR part 215.17. This regulation requires the RO, who originally issued the ROD, to offer to meet with the appellant. Such a meeting, if the offer is accepted by the appellant, shall take place within fifteen days after the closing date for filing an appeal under 36 CFR part 215.15. If any agreement is reached, in whole or in part, the appellant must withdraw its appeal, in whole or in part, within fifteen days of the agreement being reached.

It is anticipated that the ROD by USFS would be issued sixty days after the final EIS is issued. This means that if the final EIS was issued June 1, 2004, the ROD from USFS would be issued by August 1, 2004. Assuming that the USFS endorses the route approved by the Commission in Case No. 111, the USFS administrative process would not be final until after the administrative appeal process is finalized. The process for affirming a USFS ROD could last up to 105 days from the date of the ROD. This means the final administrative affirmation of an USFS ROD issued August 1, 2004, would occur around November 15, 2004. This timeframe is the best estimate based on the information provided to Staff and excludes any estimation if an aggrieved party were to sue in federal court.

B. USFS Special Use Permit - Pre-Application Screening

The nature of the project, two transmission lines, also implicates a requirements for a special use authorization under 36 CFR part 251.54. This part involves special use of land under the jurisdiction of USFS. Proposals under this section must be in writing and have information required under 36 CFR parts 251.54(d)(2) and (g)(3).

The process under this regulation is essentially a pre-application process broken into a two-step screening procedure. The initial screening determines if the proposal meets all nine criteria under 36 CFR part 251.54(e)(1). Only if all nine criteria are met does the project move into a second level of screening for any commercial project. The second level of screening is then implemented. Five criteria are used at this second level. If a project is determined to be incompatible with any of the five criteria, the project will be rejected at this point. 36 CFR part 251.54(e)(5). For instance, if a proposed project is inconsistent with the particular forest plan, such could be grounds for rejection in the second step of the screening. However, the forest plan could also be amended in accordance with the National Forest Management Act ("NFMA") simultaneously with the project continuing through the NEPA process, as is being done here. Once a project passes both levels of screening, then the project may become a formal application for a special use authorization. The process is then approved in accordance with 36 CFR parts 215(g)(4) and (g)(5). The special use authorization is formally approved after the completion of the NEPA process, including composition of the final EIS, and after the USFS ROD is issued by the RO.

United States Department of Interior - Bureau of Land Management

The Bureau of Land Management ("BLM") would not issue its ROD until at least thirty days after the final EIS is released. A BO from the USFW is also required before a BLM ROD can be issued. Also, UES and TEP would be required to submit a Plan of Development ("POD") before a BLM ROD could be issued. For this type of project, any appeal will come before the BLM's Interior Board of Land Appeals ("IBLA"), pursuant to 43 CFR part 4.1(b)(3). Appellants have thirty days to file for an administrative appeal with the IBLA, in accordance with 43 CFR part 4.411. The BLM's ROD can be stayed pending the administrative appellate process under 43 CFR part 4.21(b)¹. The appellant has an additional thirty days to file its statement of the reasons for the appeal with the BLA, in accordance with 43 CFR part 4.412(a). If a statement of the reasons is not filed, the appeal will be dismissed. See 43 CFR part 4.412(c). Any party served with a notice of appeal and statement of the reasons for the appeal has an additional thirty days from the date of service of the statement of the reasons to respond. 43 CFR part 4.414.

There appears to be no administrative regulation that mandates a time limit before a decision on an appeal shall be rendered. Certain appeals can go before an Administrative Law Judge ("ALJ") for an administrative hearing on questions of fact on the ROD. In fact, an appeal on a BLM ROD can undertake one out of several procedures, depending on the nature of the appeal. It is Staff's understanding, based on discussions with BLM officials, that it is not unusual for an administrative appeal on a BLM ROD to take three years before a decision is rendered. The ROD, or part of the ROD, could be effective pending the appeal, but any portion of the ROD may also be stayed. See 43 CFR 4.21(a). Also based on Staff's discussions with BLM officials, Staff believes that further litigation in the court system, after the administrative process is completed, is likely.

In summary, a ROD by BLM could be expected by July 1, 2004, if the final EIS is issued June 1, 2004. However, an administrative appeal could take years and the ROD decision stayed pending the outcome of the administrative appeal. This does not include litigation in federal court.

United States Department of Energy

As stated above, the Department of Energy ("DOE") is the lead agency authoring the final EIS. This is because the Gateway Project requires a Presidential Permit before interconnection with Mexico. DOE must also issue a ROD after the final EIS has been issued. DOE's regulations mandate a thirty-day "waiting period" from the date of issuance of the final EIS before it can issue a ROD. See 10 CFR part 1021.315. Once DOE has issued its ROD, the DOE is required to prepare a Mitigation Action Plan to plan and implement measures to minimize any environmental impacts. See 10 CFR part 1021.331. Unlike the USFS and BLM, there does not appear to be a formal administrative appellate process within DOE etched within the federal

¹ A decision approving or denying a stay, either in whole or in part, must be made within forty-five days of the expiration of the time for filing a notice of appeal.

regulations. However, DOE decisions involving NEPA have been further litigated in federal courts. As discussed above, whether a Presidential Permit can be issued while other administrative appellate processes are ongoing is an open question.

White House Task Force Discussions

Staff was also briefed on the discussions between the DOE, USFS and BLM with officials from the White House Task Force. The results of those discussions were encouraging. Some of the highlights are as follows: USFS and BLM will attempt to coordinate efforts such that a joint ROD can be issued, signed by the appropriate officials of the USFS and the BLM. Discussions to expedite the required documents to USFW so a BO can be issued expeditiously were also discussed. All representatives discussed a communication plan so that consistent information is relayed amongst all the working parts in each agency implicated in the NEPA/EIS process. Staff is hopeful that improved coordination will continue such that the final EIS can be issued as soon as possible.

STAFF RECOMMENDATION

Staff continues to recommend that prior to June 1, 2004, this matter appear on an open meeting so that the Commission can 1) determine sufficiency of the TEP and UES updated Outage Response Plan; 2) receive updates on the federal permitting processes; 3) address further waiving of the penalty for a prescribed period beyond June 1, 2004; and 4) establish a process for a) reviewing the TEP and UES Outage Response Plan such that it remains sufficient, b) providing further updates on the federal permitting processes, and c) addressing future waivers of the penalty beyond the prescribed period. Such a process might include waiver of penalties on a cyclical basis (i.e. 3 or 6 months), provided satisfactory progress is made in permitting and constructing the project.

Staff further recommends that TEP and UES file supplemental information by April 30, 2004 that:

- 1. Resolves deficiencies, noted by Staff in this report, in their response to questions raised by the Commission in Decision No. 66615.
- 2. Updates the power plant operations procedure and the transmission service restoration procedures previously approved as elements of Citizens' Outage Response Plan.
- 3. Proposes modifications to the UES Switching Procedures that refines the time required to restore service following a transmission line outage for each of the following potential system improvements:
 - a. Proposed 46 kV TEP emergency feeder tie to Kantor,
 - b. Potential automated or remotely controlled transmission and/or distribution feeder switching improvements.
 - c. Potential emergency service via the Gateway interconnection to Mexico.

CITIZENS UTILITIES COMPANY

POWER PLANT OPERATIONS PROCEDURES

7 29 x

SANTA CRUZ DISTRICT

CITIZENS	PROCEDURE Operation of Valencia Turbines	issue Dale 4/26/99	Revision Date	Page 1 of 1
UTILITIES Public Services Sector		Approved: E. Ojeda		

Purpose

The purpose of this procedure is to specify when the Valencia gas turbines will be operated.

Scope

12 3 x

This procedure covers power plant operations during inclement weather.

Procedure

Quring storm season (July through mid September) all three turbines will be started and operated at 100% speed with no load any time a storm rolls in. Plant personnel will man the plant during the evening shift 3:00 PM to Midnight.

Black Start Procedure

A Plant blackout is caused by the unexpected loss of the 115 kV line.

Loss of plant 440 AC does not affect the PLC's or the computers.

Start the auxiliary generator to provide electrical power to the compressors for the operating air pressure for the Air Blast Breaker & turbine control air.

Permissive to start -

If the turbines were in the "Ready to Start" condition before the black out they will remain in the "Ready to Start".

Go to the "Start Permissive Screen", if the turbines were not in the "Ready to Start" condition and clear all faults.

Make the following selections for the turbines and generators.

Item	Unit 1	Unit 2	Unit 3
Master Switch	Auto	Auto	Auto
Dead Bus	Yes	No	No
Mode	Droop	Droop	Droop
Sync	Auto	Auto	Off
MW Ctrl	Off	Off	Off
MVAR Ctrl	Off	Off	Off
Fuel	Gas-	Gas	Gas
Unit Status	Ready To Start	Ready To Start	Ready To Start
Select Start	Start	Start	Start

Open All Breakers.

Start 2 of the units at the same time.

The unit selected for Dead Bus will come up to 100% speed. The auto synchronizer, 25A and the check synchronizer, 25, will both recognize the dead bus and close the breaker. The second unit will synch to the live bus. There are now two generators on line in droop ready to load and one unit at FSNL.

CITIZENS UTILITIES COMPANY

RESTORATION OF SERVICE FOLLOWING TRANSMISSION LINE OUTAGES

Transmission Service Restoration Procedure
North of Nogales Tap

[[[]	Procedure	Time	Cum.	Who	Location
Step	110000010		Time		
	WAPA reports service restored to line north of the Nogales Tap	0:00	0:00	WAPA	WAPA
1	WAPA reports service restored to line north of the rogales 14p				Dispatch
	WAPA monitors Sync scope at the Nogales tap and sends reports to power plant	0:05	0:05	WAPA	Nogales
2	control room.		1		Тар
3	Valencia turbines synchronize with WAPA	0:02	0:07	Operator	Control
	Valencia dibines synomoriaze with With N				Room
4	WAPA closes breaker at Nogales Tap	0:01	0:08	Operator	WAPA
1 4	WAT A Gloses breaker at Hogaios Tup				Dispatch
5	Load is dropped sequentially by each unit	0:05	0:13	Operator	Control
	Load is dropped sequentially by each and				Room
6	System Normal				

Between Sonoita and Nogales Tap

Cton	Procedure	Time	Cum.	Who	Location
Step	1 locedule		Time		
1	CUC crews report completed construction on lines	0:00	0:00	Electric Superintendent	Work site
2	Inform WAPA that CUC will be restoring service to WAPA	0:01	0:01	Operator	Control Room
3	Open breakers at the Valencia turbines	0:05	0:06	Operator	Control Room
4	Manually open group operated switch (distribution) south of the Cañez substation on Pendelton Road on circuit 8201 – circuit 8201 disconnected from circuit 6204–	0:03	0:09	Lineman	Switch on Pendelton
	Cañez bus de-energized. Pole #7995 Manually close circuit switcher on high side of transformer at Cañez Substation	0:03	0:12	Lineman	Cañez
5	Manually close circuit switcher on high side of transformer at ourse outside in	0:03	0:15	Lineman	Kantor
6 7	Manually close switch KT115-3 at Kantor Substation Manually open recloser at four winds ranch on circuit 7201 – circuit 7201	0:03	0:18	Lineman	4 Winds Ranch
8	disconnected from circuit 8203 Close 115 kV switch on the north side of Sonoita	0:03	0:21	Lineman	Sonoita Substation
9	WAPA closes breaker at Nogales Tap	0:03	0:24	WAPA	WAPA Dispatch
10	System Normal				

Between Sonoita and Valencia Substations

	Downson Contact and	Time	Cum.	Who	Location
Step	Procedure	11110	Time		
	CUC crews report completed construction on lines	0:00	0:00	Electric	Work site
1 '	GGG GIGWS Topolt dompictors delicated			Superintendent	
2	Inform WAPA that CUC will be restoring service to WAPA	0:01	0:01	Operator	Control
1 4	I MIOMI WAF A that COC will be restoring service to This T				Room
-	Open breakers at the Valencia turbines	0:05	0:06	Operator	Control
3	Open breakers at the valencia turbines				Room
4	Manually close 115 kV switch facing Nogales	0:03	0:09	Lineman	Sonoita
1	Walidally Globe 1 15 KV SWILCH Idolling Hogolida				Substation
5	Manually close both circuit switchers at the Valencia substation	0:03	0:12	Lineman	Valencia
	WAPA closes breaker at Nogales Tap	0:03	0:15	WAPA	WAPA
6	WALA Closes pieaker at Hogales 1 ap				Dispatch
7	System Normal	0:03	0:18		

Instructions for Accessing TEP and Citizens Communications Company Certificate of Environmental Compatibility and Line Siting Committee, Docket No. L-00000C-01-0111 and L-00000F-01-0111

The Certificate of Environmental Compatibility (CEC) and the proceedings from the Line Siting Committee comprise some 1914 pages and are not reprinted here. However, these documents can be accessed via DOE's project website at www.ttclients.com/TEP.

Appendix K

Harris Environmental Group, Inc.
Supplemental Information for the
Final Biological Assessment
TEP Proposed Sahuarita-Nogales
Transmission Line Project
115-kV Gateway to Valencia Substations
Interconnection (HEG 2004d)

Supplement Information for the Final Biological Assessment of the Tucson Electric Power Sahuarita to Nogales Transmission Line, Western Corridor

PREPARED FOR:



Tucson Electric Power
One South Church
PO Box 711
Tucson, Arizona 85702

PREPARED BY:

HARRIST ENVIRONMENTAL®

Harris Environmental Group, Inc. 58 East 5th Street Tucson, Arizona 85705

15 March 2004



EXECUTIVE SUMMARY

This report is intended provide supplemental information for Tucson Electric Power's (TEP) ongoing consultation with the U.S. Fish & Wildlife Service (USFWS) on the Sahuarita to Nogales Transmission Line, Western Corridor. Specifically, this supplemental information is in response to (1) an expansion in the scope of the project and (2) a request from the USFWS for additional information.

The project scope expansion is the proposed 115kV transmission line connecting the proposed Gateway substation to the existing Valencia substation. We evaluated potential effects of the project on the three federally listed species that could potentially occur in the area and concluded that the effects determination and proposed mitigation, as discussed in the Final Biological Assessment (BA)(Harris Environmental Group, Inc.2003), remain unchanged.

The USFWS's request involves the amount of potential disturbance in proposed Mexican spotted owl (MSO) critical habitat along the Western Corridor of the Sahuarita to Nogales transmission line. Based on a review of engineering data provided by TEP and information in the Final Roads Analysis conducted for the Coronado National Forest (URS 2003), the proposed Western Corridor would permanently disturb 9.69 acres and temporarily disturb 46.85 acres of land within proposed MSO critical habitat.



1. EXPANSION OF PROJECT SCOPE

Project Description

In August 2003, UniSource Energy Services (TEP's parent company) acquired the Nogales-area electric system as part of a purchase of utility assets from Citizens Communications Company. In order to connect the proposed Gateway substation to Citizens' existing Valencia generating station, TEP proposes to construct a 115kV transmission line between the two substations. The Valencia generating station provides approximately 50 MW of standby resources and is directly interconnected with the distribution system serving the City of Nogales and surrounding areas. The proposed 115kV transmission line corridor is approximately 3 miles in length and is located in the north side of the City of Nogales (Figure 1). Specifically, it is located within Section 12 of Township 24 South, Range 13 East and Sections 5, 7, and 8 of Township 24 South, Range 14 East, Gila and Salt River Meridian. Additional technical information regarding the construction of the 115kV can be found in TEP/Citizens' Joint Application for Certificate of Environmental Compliance filed before the Arizona Corporation Commission (March 2001).

Project Area

The proposed 115kV transmission line corridor ranges in elevation from approximately 3,750 to 4,000 feet above mean sea level. Topography ranges from relatively flat to rolling hills and ridges. The proposed project area borders the western edge of an commercial/industrial area, and continues south to Mariposa Canyon, then turns east and crosses Highway 189, turns east-northeast to the western edge of Interstate 19 (I-19), parallels I-19 for approximately 0.5 miles, then crosses I-19 and turns east for approximately 0.5 miles. Disturbances in the proposed project area and vicinity include produce warehouses, other commercial development and I-19.

Vegetation in the proposed project area is representative of the ecotone between the semidesert grassland and oak woodland vegetation communities (Brown 1994) (Figure 2). Common conspicuous perennial plant species included: velvet mesquite (*Prosopis velutina*), Emory oak (*Quercus emoryi*), Mexican blue oak (*Quercus oblongifolia*), agave (*Agave* sp.), soaptree yucca (*Yucca elata*), and sotol (*Dasylirion wheeleri*). A complete list of plant species observed within the proposed project area (25 February 2004) is presented in Appendix A.



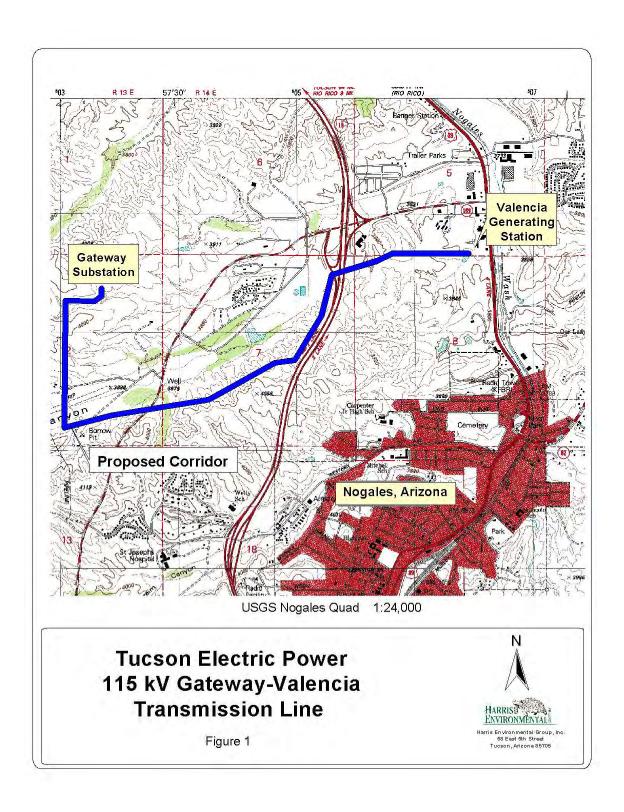






Figure 2. Vegetation within the proposed TEP Gateway-Valencia 115k Transmission Line, Nogales, Arizona (25 February 2004).

Species Identification

The USFWS list of threatened, endangered, proposed, and candidate species for Santa Cruz County, Arizona, was reviewed by a qualified biologist to determine species potentially occurring in the proposed project area. Additionally, a walking survey of the corridor was conducted by a team of biologists on 25 February 2004.

Based on the list review and site visit, three endangered species have the potential to occur in the proposed project area; the cactus ferruginous pygmy-owl, Pima pineapple cactus, and lesser long-nosed bat. Species included in the USFWS list, but excluded from evaluation are addressed in Appendix B.

Species Evaluation

Pima Pineapple Cactus (Coryphantha scheeri var. robustispina)-Endangered

Pima pineapple cacti (PPC) are known to occur within the semidesert grassland and Sonoran desertscrub biotic communities, generally at elevations between 2,300 and 5,000 feet (USFWS 1998, Phillips and Phillips 1981, Benson 1982). In southeastern Arizona, the known range lies within Santa Cruz and Pima counties and is generally bounded to



the east by the Santa Rita Mountains, to the west by the Baboquivari Mountains, and to the north by the south side of Tucson (Ecosphere Environmental Services 1992).

Because the proposed project site lies within the known range of this species, we conducted a survey of the proposed corridor for PPC on 25 February 2004. We followed USFWS survey protocol (Roller 1996) modified to a single survey pass of the entire proposed project area. This protocol requires that surveyors walk in parallel transects no more than 7 meters apart, such that there is an overlapping view of the ground.

Effects Determination

No PPC were located during our survey and no impacts to this species beyond those discussed in the Final BA are anticipated. Therefore, the effects determination and proposed mitigation as discussed in the Final BA remain unchanged.

Cactus ferruginous pygmy-owl (Glaucidium brasilianum cactorum)-Endangered

Cactus ferruginous pygmy-owls (CFPO) nest in cavities of larger trees (typically defined as a tree with a trunk at least 6 in [15 cm] diameter at breast height [DBH]) or large columnar cactus. CFPO have been documented in three vegetation communities in Arizona, including (1) Sonoran riparian woodland associations, such as cottonwoods, willows, mesquites, ash, or other trees growing along watercourses; (2) Sonoran desertscrub, particularly areas containing saguaro cactus; and (3) semidesert grassland with drainages containing mesquite, hackberry, cottonwood, willow, ash, etc. Throughout its range, CFPO occur at low elevations, generally below 4,000 ft (1,219 m).

The proposed project corridor crosses marginal habitat in Mariposa Canyon, where some scattered large diameter trees occur. The elevation of the canyon floor is 3,900 ft, just within the range of this species. The proposed project area occurs in Survey Zone 3, which includes areas within the historic range of CFPO and has a low potential of occupancy (USFWS 2000). Furthermore, the proposed project is not within proposed CFPO critical habitat or within in a Draft Recovery Zone (USFWS 2003). No surveys of this area have been conducted, but protocol surveys would be conducted prior to construction (U.S. Department of Energy 2003).

Effects Determination

Because there is a low likelihood of CFPO occupancy in this area and preconstruction surveys will be conducted, no impacts to this species beyond those discussed in the Final BA (HEG 2003) are anticipated. Therefore, the effects determination and proposed mitigation as discussed in the Final BA remain unchanged.

Lesser long-nosed bat (Leptonycteris curasoae yerbabuenae)-Endangered

The lesser long-nosed bat (LLNB) is typically associated with their primary food source, flower nectar and fruit of columnar cacti and certain agave species. In addition to food availability, there must be suitable roosting within commuting distance of the food source. Currently, the longest known commute distance is about 30 mi (48 km). The closest known LLNB roost site is a cave in the Patagonia Mountains, approximately 18 mi (56 km) to the northeast.



While no columnar cacti occur in the proposed project corridor, a few agaves are present. It is unknown if these individual plants would be impacted by the proposed project, but any potentially disturbed agaves will be transplanted.

Effects Determination

Because of the low number of agaves in the proposed project area, no impacts to this species beyond those discussed in the Final BA (HEG 2003) are anticipated. Therefore, the effects determination and proposed mitigation as discussed in the Final BA remain unchanged.

2. Disturbance in Proposed MSO Critical Habitat

In November 2003, the USFWS proposed critical habitat for the MSO, including unit BR-W-13 in the Atascosa/Pajarito Mountains. The proposed Western Corridor crosses this unit of proposed critical habitat. The USFWS requested a calculation of permanent and temporary disturbance in this unit of critical habitat.

The calculations were based on the assumptions listed in the Final Roads Analysis (Section 1.4) (URS 2003), including: (1) temporary disturbance at structure locations would occur in an area within a 100-foot radius; (2) laydown areas were calculated as temporary disturbance; (3) the permanent area of disturbance at each structure site as 25 ft²; (4) proposed new roads would be maintained for maintenance (and thus were permanent disturbance); and (5) the average width of proposed new roads would be 12 feet wide.

Engineering data provided by TEP indicate 65 structures and 35,026 linear feet of new roads are proposed within unit BR-W-13 of proposed critical habitat. Therefore, based on the above assumptions, the proposed Western Corridor would permanently disturb 9.69 acres and temporarily disturb 46.85 acres of land within proposed MSO critical habitat.



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APPENDIX A

Plant species observed within the proposed TEP Gateway-Valencia 115k Transmission Line, Nogales, Arizona (25 February 2004).

Scientific Name	Common Name				
TREES					
Prosopis velutina	velvet mesquite				
Quercus emoryi	Emory oak				
Quercus oblongifolia	Mexican blue oak				
SHRUBS AND	CACTUS				
Agave sp.	agave				
Baccharis sarothroides	desert broom				
Calliandra eriophylla	fairyduster				
Celtis pallida	desert hackberry				
Chilopsis linearis	desert willow				
Dalea greggii	smoke bush				
Dasylirion wheeleri	sotol				
Echinocereus fendleri	hedgehog cactus				
Echinocereus pectinatus	rainbow cactus				
Eysenhardtia polystachya	kidney wood				
Ferocactus wislizenii	barrel cactus				
Gutierrezia sarothrae	snakeweed				
Isocoma tenuisecta	burroweed				
Mammillaria spp.	pincushion cactus				
Mimosa biuncifera	wait-a-minute				
Nicotiana glauca	tree tobacco				
Nolina microcarpa	beargrass				
Opuntia sp.	prickly pear				
Opuntia acanthocarpa	buckthorn cholla				
Yucca elata	soaptree yucca				
Ziziphus obtusifolia	graythorn				
VINES					
Cucurbita digitata	coyote gourd				



APPENDIX A (continued)

Plant species observed within the proposed TEP Gateway-Valencia 115k Transmission Line, Nogales, Arizona (25 February 2004).

FORBS					
Amaranthus sp	amaranth				
Ambrosia sp.	ragweed				
Amsinckia sp.	fiddle neck				
Descurainia sp.	tansy mustard				
Eriogonum sp.	buckwheat				
Erodium cicutarium	storkbill, filaree				
Eschscholzia mexicana	Mexican poppy				
Helianthus sp.	sunflower				
Lepidium sp.	peppergrass				
Liliaceae	lily				
Lupinus sp.	lupine				
Oenothera sp.	evening primrose				
Phacelia sp.	phacelia				
Physalis sp.	ground cherry				
Proboscidea sp.	devils claw				
Sisymbrium irio	london rocket				
Solanum sp.	nightshade				
Verbena sp.	verbena				
GRASSE	S				
Andropogon	blue stem				
Aristida sp.	three awn				
Bothriochloa barbinodis	cane beard grass				
Bouteloua sp.	grama				
Bouteloua curtipendula	side oats grama				
Bouteloua hirsuta	hairy grama				
Eragrostis sp.	lovegrass				
Eragrostis lehmanniana	Lehmann lovegrass				
Eragrostis megastachya	stinkgrass				
Lycurus phleoides	wolftail				
Muhlenbergia emersleyi	bullgrass				
Panicum sp.					
Setaria sp.	foxtail				



APPENDIX B

Federally Listed and Proposed Species under jurisdiction of the U.S. Fish and Wildlife Service in Santa Cruz County, Arizona as of 25 February 2004, excluded from further consideration.

COMMON NAME	SCIENTIFIC NAME	STATUS	Навітат	JUSTIFICATION
PLANTS				
Canelo Hills ladies' tresses	Spiranthes delitescens	Endangered	Finely grained, highly organic, saturated soils of cienegas. Potential habitat occurs in Sonora, Mexico, but no populations have been found.	No habitat present.
Huachuca water umbel	Lilaeopsis schaffneriana ssp. recurva	Endangered	An emergent aquatic plant that requires marshy wetlands.	No habitat present.
FISH				
Desert pupfish	Cyprinodon macularius	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	No habitat present.
Gila chub	Gila intermedia	Proposed Endangered	Small streams and cienegas; prefer deeper pools with cover.	No habitat present.
Gila topminnow	Poeciliopsis occidentalis occidentalis	Endangered	Small streams, springs, and cienegas vegetated shallows.	No habitat present.
Sonora chub	Gila ditaenia	Threatened	Perennial and intermittent small to moderate streams with boulders and cliffs.	No habitat present.
AMPHIBIANS				
Chiricahua leopard frog	Rana chiricahuensis	Threatened	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs	No habitat present.
Sonoran tiger salamander	Ambystoma tigrinum stebbinsi	Endangered	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains at 4,000-6,300 ft.	No habitat present



APPENDIX B (continued)

Federally Listed and Proposed Species under jurisdiction of the U.S. Fish and Wildlife Service in Santa Cruz County, Arizona as of 25 February 2004, excluded from further consideration.

BIRDS				
Bald eagle	Haliaeetus leucocephalus	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	No habitat present.
California brown pelican	Pelecanus occidentalis californicus	Endangered	Coastal land and islands; species is found around many Arizona lakes and rivers.	No habitat present.
Masked bobwhite	Colinus virginianus ridgewayi	Endangered	Only known Arizona population has been reintroduced on Buenos Aires Natl. Wildl. Refuge	ROW is outside of known range.
Southwestern willow flycatcher	Empidonax traillii extimus	Endangered	Cottonwood/willow and tamarisk vegetation communities along rivers and streams	No habitat present.
Northern apolomado falcon	Falco femoralis septentrionalis	Endangered	Grassland and savannah habitats.	No recent confirmed reports for Arizona.
MAMMALS				
Ocelot	Felis pardalis	Endangered	Prefers humid tropical & subtropical habitats; typically found at higher elevations.	ROW is outside of known range.
Jaguar	Panthera onca	Endangered	Remote areas in Sonoran desertscrub up through subalpine conifer forest.	No habitat present.
Mexican gray wolf	Canis lupus baileyi	Endangered	Remote chapparal, woodland, and forested areas above 4,000 ft.	No habitat present.