DOE/EIS-0323

Western
AREA POWER
ADMINISTRATION

SIERRA NEVADA REGION

Sacramento Area Voltage Support

DRAFT ENVIRONMENTAL IMPACT STATEMENT

NOVEMBER 2002

COVER SHEET

Title: Sacramento Area Voltage Support
Draft Environmental Impact Statement (EIS)

Lead Agency: Western Area Power Administration (Western)

Location: Alameda, Contra Costa, Placer, Sacramento, San Joaquin, and Sutter Counties, State of California.

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Abstract

The Western Area Power Administration's Central Valley Project transmission system forms an integral part of the interconnected Sacramento area transmission grid. Western is contractually responsible to oversee that the system is operated in accordance with strict reliability standards. Growth in the greater Sacramento, California area and power imported from generation outside the region, have increased the demand on the interconnected electric transmission system, leading to transmission system overloads and reducing the reliability and security of the area power system. Western has prepared this Sacramento Area Voltage Support (SVS) Draft Environmental Impact Statement (EIS) in compliance with Federal laws, regulations and guidelines, principally the *National Environmental Policy Act* (NEPA).

This Draft EIS evaluates the potential environmental effects of physical improvements to the area's power system. Enhancements are needed to improve system reliability and provide voltage support for the Sacramento area. The results of public scoping meetings, workshops, meetings with agencies, and earlier studies by Western and area utilities helped to develop a range of alternatives for analysis. The Proposed Action involves:

- Constructing a new double-circuit, 230-kV transmission line paralleling the existing double-circuit, 230-kV line from the O'Banion Substation to the Elverta Substation;
- Realigning a portion of the existing Cottonwood–Roseville single-circuit, 230-kV transmission line north of Elverta Substation; and
- Reconductoring the existing double-circuit, 230-kV transmission line from the Elverta Substation to the Tracy Substation.

Public Hearings on the Draft EIS will be held between December 9-12, 2002. Comments on this Draft EIS are encouraged and should be sent to Ms. Loreen McMahon (above). Comments must be received by December 30, 2002.

EXECUTIVE SUMMARY

The Western Area Power Administration's (Western) Central Valley Project (CVP) transmission system forms an integral part of the interconnected Sacramento area transmission grid. Regional growth has led to increased demand for electric power in the Sacramento area. Power system studies conducted by Sacramento power agencies, organizations, and utilities have indicated that reliability of the power system could be at risk due to voltage instability. This Sacramento Area Voltage Support (SVS) Environmental Impact Statement (EIS), prepared pursuant to the *National Environmental Policy Act* of 1969 (NEPA) presents Western's analysis of the environmental effects from the voltage support system additions and improvements identified for the Proposed Action and alternatives.

ES.1 WESTERN'S BACKGROUND

The Sacramento area is within the Sierra Nevada Region (SNR) which maintains and operates numerous substations and more than 1,200 miles of transmission lines. These transmission lines are interconnected to other Sacramento area utility transmission lines, including those owned and operated by the Sacramento Municipal Utility District (SMUD). By law, Western first markets power that is in excess of the Federal project requirements to preference customers such as Federal and state agencies, Native American tribes, electric cooperatives, municipal utilities, public utility districts, irrigation and water districts.

Western sells wholesale electricity to more than 70 customers in central and northern California and Nevada as part of the Central Valley Project (CVP) and the Washoe Project. Much of that power is allocated and delivered to five major customers: SMUD, Silicon Valley Power, and the cities of Redding, Roseville, and Palo Alto.

ES.2 VOLTAGE SUPPORT

Voltage support consists of elements of the electrical power system that help sustain or keep the electrical system operating to meet the long-term load demand. These elements include additional generation (new power sources—especially those at or near the load), increased transmission capacity, and improved system equipment.

ES.3 NEED FOR A SOLUTION

Population growth and development in the Sacramento area have steadily increased load demand for electric power. The increased demand has reduced the security and reliability of the interconnected transmission system. Security refers to the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements such as a substation. Reliability is the assessment of the frequency, duration, and magnitude of interruptions for a given power system. The power system security and reliability problems became evident to California residents as rolling blackouts hit the state in 2001. Although a lack of generation was a major cause, increased demand on the interconnected electrical transmission system resulted in system overloads, and played a part in blackouts, including those in the Sacramento area. Increased transmission capacity, therefore, must be part of any long-term solution.

Power system studies conducted by the Sacramento Area Transmission Planning Group (SATPG) and the River City Transmission Group (RCTG) concluded that transmission additions in the Sacramento area are necessary to alleviate voltage sag and ensure power system reliability. Results of the first phase of the SATPG study indicated that construction of a new 230,000-volt (230 kilovolt [kV]) circuit could provide short-term (3 to 5 years) system support to the region (SATPG 2000). The study concluded that long-term solutions (greater than 5 years) for area transmission security also must be developed. These solutions must include construction of additional local generation or 500-kV transmission line options. Conclusions from the RCTG draft report also supported the need for additional transmission infrastructure to meet load growth and to provide for the transmission of future generation (RCTG 2002-Draft).

This Draft EIS analyzes environmental impacts of alternatives identified for improvement of electric system reliability and voltage support for the Sacramento area. Findings from this Draft EIS will provide a basis for decisions on whether to proceed and, if so, how to proceed. Western would implement appropriate solutions under Reclamation Law, which includes the *Central Valley Project Act*.

ES.4 PUBLIC INVOLVEMENT

Public involvement is a vital part of the decision-making process for this SVS EIS. Western developed a public involvement program to provide multiple opportunities for comment during the SVS EIS process of public

scoping, alternative formulation, alternative evaluation, and decision-making. The program is intended to guide Western through a collaborative, systematic, decision-making process with four primary purposes:

- Share information with the interested public.
- Gather information from the public.
- Identify public concerns and issues.
- Develop and maintain credibility.

During the period of September 12, 2000 through September 21, 2000, Western's SNR conducted a series of four scoping meetings in Lodi, Marysville, and Folsom, California. Public scoping comments were collected from August 8 through October 2, 2000. Western held two public workshops (March and September 2001) to address public comments on the selection of alternatives under consideration. Western plans to hold three public hearings after the United States Environmental Protection Agency (EPA) publishes the Notice of Availability (NOA) for the Draft SVS EIS. The public hearings will be held before the conclusion of the 45-day public comment period ends.

ES.5 ALTERNATIVE DEVELOPMENT

Western identified five broad alternative categories (new power generation, demand-side management (DSM), distributed generation, new transmission, and transmission upgrades) to consider in the Notice of Intent (65 FR 48496). During the subsequent four-phased alternative development process, the alternatives of new power generation, distributed generation, and DSM were eliminated from detailed review. New power generation and distributed generation alternatives would not solve short-term voltage support and reliability issues. DSM would be more applicable to the distribution of electricity, and the local utilities have implemented programs to decrease the electricity load during peak-use hours. Western believes that in the short term, imposing regulations of this type would not solve the reliability issues.

ES.6 ALTERNATIVES EVALUATED

The results of public scoping meetings, workshops, meetings with agencies, and earlier studies by Western and area utilities helped to develop a range of alternatives for analysis. Figures ES-1 and ES-2 present an illustration of the five alternatives analyzed and their locations within the study area. Each segment is divided into one-mile sections marked by numeric mileposts (MP), each segment beginning with MP 0.0. Mileposts are estimated distances. Each alternative is represented by route segments (Segments A through H) that represent specific activities. The alternatives involve three types of project activities:

- ***New construction*** of transmission lines would include designing and building new structures and installing new conductors. New construction would occur on existing right-of-ways (ROWs) where possible, or require the acquisition of new ROWs in parallel with existing ROWs.
- ***Realignment*** would include route deviations from Western's existing transmission lines at two locations. The first realignment would avoid encroachment of the Pleasant Grove Cemetery and the second realignment would avoid residential areas.
- ***Reconductoring*** would consist of replacing the existing transmission line conductors (wires) with higher capacity conductors. In general, the existing ROWs would be used and few new structures would be needed.

Project activities associated with each of the five alternatives are summarized in Table ES-1 and described below.

- ***The Proposed Action*** would consist of 1) reconductoring a double-circuit, 230-kV transmission line from Elverta Substation to Tracy Substation; 2) constructing a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation; and 3) realigning the transmission line near Pleasant Grove Cemetery between the O'Banion and Elverta substations and a portion of the Cottonwood–Roseville single-circuit, 230-kV transmission line.
- ***Alternative 1—Reconductoring O'Banion Substation to Tracy Substation*** would consist of reconductoring a double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation.
- ***Alternative 2—New Transmission O'Banion Substation to Elverta Substation*** would consist of constructing a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation and realigning the transmission line near Pleasant Grove Cemetery and a portion of the Cottonwood–Roseville single-circuit, 230-kV transmission line.
- ***Alternative 3—New Transmission Elk Grove Substation to Tracy Substation*** would consist of constructing a new double-circuit, 230-kV transmission line from Elk Grove Substation to Tracy Substation.
- ***No Action Alternative***—Under the No Action Alternative, operation of the existing transmission line system would continue unchanged. Western would not develop or build additional transmission lines or substation facilities in the study area relative to voltage support.

Table ES-1. Activities for the Proposed Action and Alternatives

Alternative	Specific Operations
Proposed Action: New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation Construct 26.6 miles of new 230-kV double-circuit transmission line from O'Banion Substation to Elverta Substation (Segments A_1 and B) Realign 230-kV single-circuit transmission line. (Construct transmission line around the Pleasant Grove Cemetery, construct 5 miles of Segment G; abandon 3.6 miles of Segments F and H) Reconductor 72.6 miles of 230-kV double -circuit transmission line from the Elverta Substation to Tracy Substation (Segments C, D, and E)	107.8 miles right of way length 167 new structures 163 existing structures replaced 17 structures abandoned 28 miles of new access roads 581 acres short-term disturbed 66 acres long-term disturbed
Alternative 1: Reconductoring O'Banion Substation to Tracy Substation Reconductor 99.2 miles of 230-kV double-circuit transmission line from the O'Banion Substation to Tracy Substation (Segments A, B, C, D, and E)	99.2 miles right of way length 199 existing structures replaced 85 acres short-term disturbed 0 acres long-term disturbed
Alternative 2: New Transmission O'Banion Substation to Elverta Substation and Realignments Construct 26.6 miles of new 230-kV double-circuit transmission line from O'Banion Substation to Elverta Substation (Segments A_1 and B) Realign 230-kV double-circuit transmission line (Construct transmission line around the Pleasant Grove Cemetery, construct 5 miles of Segment G; abandon 3.6 miles of Segments F and H)	35.2 miles right of way length 167 new structures 17 structures abandoned 28 miles of new access roads 515 acres short-term disturbed 66 acres long-term disturbed
Alternative 3: New Transmission Elk Grove Substation to Tracy Substation Construct 46.2 miles of new 230-kV double-circuit transmission line from Elk Grove Substation to Tracy Substation (Segment E_1)	46.2 miles right of way length 225 new structures 47 miles new access roads 855 acres short-term disturbed 108 acres long-term disturbed
No Action Operation and maintenance unchanged. Western would not build additional transmission lines or substations (existing Segments A, B, C, D, and E)	0 miles right of way length 0 new structures 0 structures abandoned 0 miles of new access roads 0 acres short-term disturbed 0 acres long-term disturbed

Source: Original 09-10-02

ES.7 IMPACTS

The Proposed Action would consist of 31.6 miles of new construction (including realignments) on new and existing ROWs (Segments A_1, B, and G) and 72.6 miles of reconductoring on existing ROWs (Segments C, D, and E). The Proposed Action would require 3.6 miles of existing line that would be abandoned in place (Segments F and H). A total of 330 new structures would be required, while 17 existing structures would be abandoned in place. A total of 28 miles of new access roads would be required. Approximately 49 pulling sites would be needed along the length of the transmission line, temporarily impacting 19.6 acres. In total, the Proposed Action would temporarily disturb 581 acres and impact 66 acres long term.

Construction of the Proposed Action would involve 330 new structures, the greatest number when compared with 199 for Alternative 1, 167 for Alternative 2, and 225 for Alternative 3. The Proposed Action has fewer miles of new construction on new ROW (31.6 miles) than does Alternative 3 (46.2 miles), the same as Alternative 2, and more than Alternative 1. The Proposed Action would disturb 66 acres long term, the same as Alternative 2, and fewer than Alternative 3 (108 acres). Alternative 1, a proposal to reconductor the transmission line from O'Banion Substation to Tracy Substation, would not impact any additional acreage. Table ES-2 provides a summary comparison of these disturbances.

SNR developed and uses environmental protection measures (EPMs) to reduce environmental consequences associated with construction activities. For the Proposed Action and action alternatives the environmental impacts are similar. Generally, new construction would result in more impacts than reconductoring because of the requirement for new structures and access roads. The Proposed Action affects more overall miles than the other action alternatives; however, only a portion is new construction. Alternative 3, which is all new construction, may have a greater potential for impacts.

Air quality is the only resource area that may have a significant impact for the action alternatives. However, more detailed air quality analysis would be necessary once a project is selected to move forward. Significant impacts would be mitigated to less than significant. The No Action Alternative appears to have the fewest day-to-day impacts for the operation and maintenance of the existing transmission line; however, it does not meet the need for power system security and reliability. A comparison of the impacts associated with each alternative is presented in Table ES-3.

ES.8 CUMULATIVE IMPACTS

Cumulative impacts result from the incremental effect of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions. Requirements for addressing cumulative impacts are to gather and analyze enough data to make a reasoned decision concerning these impacts. Western examined actions that have environmental impacts on the same resources affected by this proposal and similar projects. Western also reviewed other proposed projects including major linear projects that would potentially create impacts on the same resources. For past actions, Western included existing transmission lines in the study area. Impacts from these past projects were considered for each resource area.

ES.8.1 Reasonably Foreseeable Projects

A list of reasonably foreseeable projects is presented in Table ES-4. The proposed projects include power generation that would require construction of new transmission lines and interconnection to the Sacramento area power grid.

ES.8.2 Cumulative Effects

Cumulative effects for environmental justice (EJ), floodplains, geology, soils, health and safety, land use, noise, and wetlands are expected to be negligible. A description of cumulative effects is provided below for air quality, biological resources, cultural resources, electric and magnetic fields, paleontological resources, socioeconomics, visual resources, and water resources.

ES.8.2.1 Air Quality

Within the Sacramento area, particulate emissions,VOCs, and NO_x from construction activities, rice field and agricultural burning, industrial operations (aggregate mining), and vehicle equipment may all impact air quality. Constructing new transmission lines or reconductoring existing lines add to these emissions, but only for the short term. Western would use EPMs to reduce particulate emissions, VOCs, and NO_x. Therefore, cumulative impacts of the Proposed Action and alternatives, coupled with other area projects, would be considered unavoidable short-term impacts. Long-term operation under the Proposed Action or any alternative, along with other transmission projects in the general area, would not generate significant amounts of air pollution emissions.

Table ES-4. Projected Projects with Related Transmission Lines

Project	Proponent	County	Size (MW)	Interconnect	In Service Date	Comments or Date Approved
East Altamont Energy Center	Calpine	Alameda	1,100	Western	5/04	Online May, 2004
SMUD Cosumnes Power Plant Project Combined Cycle	SMUD	Sacramento	1,000	SMUD	10/04	Online October, 2004

Source: Original and California Energy Commission (CEC) web site http://www.energy.ca.gov/sitingcases/current.html August 2002
MW: megawatt
SMUD: Sacramento Municipal Utility District

ES.8.2.2 Biological Resources

For the short term, the Proposed Action, Alternative 2, and Alternative 3 would affect nonurban areas, or areas not developing rapidly, and containing sensitive biological habitat. Much of the study area remains rural, and it is expected to remain rural for the near term not affecting these habitats. Although the frequency of bird strikes with transmission lines would continue, the use of transmission line marking devices and locating new lines next to existing lines would result in lower additive cumulative impacts. Cumulative impacts resulting from the Proposed Action, Alternative 2, or Alternative 3, and other area projects would be considered insignificant.

The impacts to vegetation as a result of Alternative 1, reconductoring, would be temporary, as these areas would be replanted following the completion of work. As a result, cumulative impacts to biological resources would be minimal.

ES.8.2.3 Cultural Resources

Impacts from the alternatives would be limited to incremental physical impacts to cultural resources located within the existing ROW. Most new transmission lines would be located in areas with other transmission lines where the visual effects would also be incremental. Western should be able to satisfactorily avoid or mitigate impacts on prehistoric and historic archaeological sites. The potential to avoid or mitigate impacts on traditional cultural properties is less clear, although tribal groups would be involved in assessing impacts and identifying and implementing avoidance or mitigating measures.

With adherence to the EPMs, it is likely that the Proposed Action, Alternative 2, and Alternative 3, all of which include building new transmission lines, would only add slightly to the cumulative impacts on the cultural resources of the region. Alternative 1, which only includes reconductoring, would not add to the cumulative impacts on the cultural resources of the region.

ES.8.2.4. Electric and Magnetic Fields

In discussions with planning agencies, Western determined that no new permanent, occupied buildings are planned within 100 feet of Western's ROWs. Additionally, because EMFs diminish rapidly with distance from the transmission line, and there is no planned encroachment to the ROWs, there would be minimal electric and magnetic field (EMF) cumulative impacts to human health or the environment.

ES.8.2.5 Paleontological Resources

Impacts to paleontological resources could result if fossil materials are destroyed during excavation of 10 feet deep or more. Continued development, extending farther into the Central Valley, could disturb more fossil-bearing sedimentary deposits and threaten paleontological resources. The cumulative impacts depend on the increasing disturbance or removal of fossil-bearing rocks. Proper site monitoring would minimize the potential for loss of paleontological resources during construction and cumulative impacts would be negligible.

ES.8.2.6 Socioeconomics

Under the No Action Alternative, the current strain on electric power supply and distribution would continue, which could result in power supply shortfalls and disruptions as power demand increases to support future development. These supply and distribution difficulties could decrease the efficiency of business operations in the study area and have an adverse effect on the overall economy. Other related spending in local markets would continue as beneficial economic effects.

ES.8.2.7 Visual Resources

Past, existing, and future development have and would continue to visually alter the landscape. Negative effects to the visual quality of the area from development include existing utility lines and associated cleared ROWs, commercial development, major roads, abandoned

buildings, industrial land uses, aggregate mining, and sand and gravel pits. Where the alternative would be located near one of these existing negative visual features, the impacts would result in an additive adverse effect to the existing visual impacts. However, locating the proposed transmission line next to an existing utility corridor would typically be preferable to locating the line in a previously undisturbed landscape. The additive cumulative impacts for any of the alternatives would not be significant.

ES.8.2.8 Water Resources

Growth and development in the Sacramento area would increase water demand. Construction activities projected for the Proposed Action and alternatives would cause slight increases in surface-water sediment load and water use. These effects would be transitory. Incremental increases in surface-water sediment load from maintenance would not result in significant cumulative impacts.

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CHAPTER 1

Introduction

1.1 BACKGROUND

The Western Area Power Administration (Western) delivers reliable, cost-based hydroelectric power and related services within the central and Western United States (U.S.). Western is one of four power marketing administrations within the U.S. Department of Energy (DOE), whose role is to market and transmit electricity from multi-use water projects. Western's transmission system carries electricity from powerplants operated by the U.S. Bureau of Reclamation (Reclamation), U.S. Army Corps of Engineers (USACE), and the International Boundary and Water Commission (IBWC).

Western's service area covers 1.3 million square miles, and its wholesale power customers provide service to millions of consumers in 15 Western states. Western operates and maintains more than 16,800 miles of transmission lines from its four regional offices in Billings, Montana; Phoenix, Arizona; Loveland, Colorado; and Folsom, California. Western markets power from these regions and its Colorado River Storage Project Management Center in Salt Lake City, Utah. The Sacramento area is within Western's Sierra Nevada Region (SNR).

The SNR maintains and operates numerous substations and more than 1,200 miles of transmission lines. These transmission lines are interconnected to other Sacramento area utility transmission lines, including those owned and operated by the Sacramento Municipal Utility District (SMUD). By law Western first markets power that is in excess of the Federal project requirements to preference customers, such as Federal and state agencies, Native American tribes, electric cooperatives, municipal utilities, public utility districts, irrigation districts, and water districts.

The Electrical Power System

Electrical power systems consist of four primary elements: generation, transmission systems, distribution systems, and load. Generators convert fuel (for example, water, natural gas, nuclear, wind, sun, or coal) into electricity. The transmission system carries the electricity from the generators to the distribution systems, using high-voltage transmission lines. Transmission systems comprise a complex network across several neighboring states, which allow generators to serve loads hundreds of miles away. Distribution systems deliver electricity to retail customers. The system load is the sum of all power-consuming devices (such as household appliances, lights, air conditioners, industrial loads, etc.) plus system losses. Figure 1-1 illustrates a typical electrical power system.

Voltage

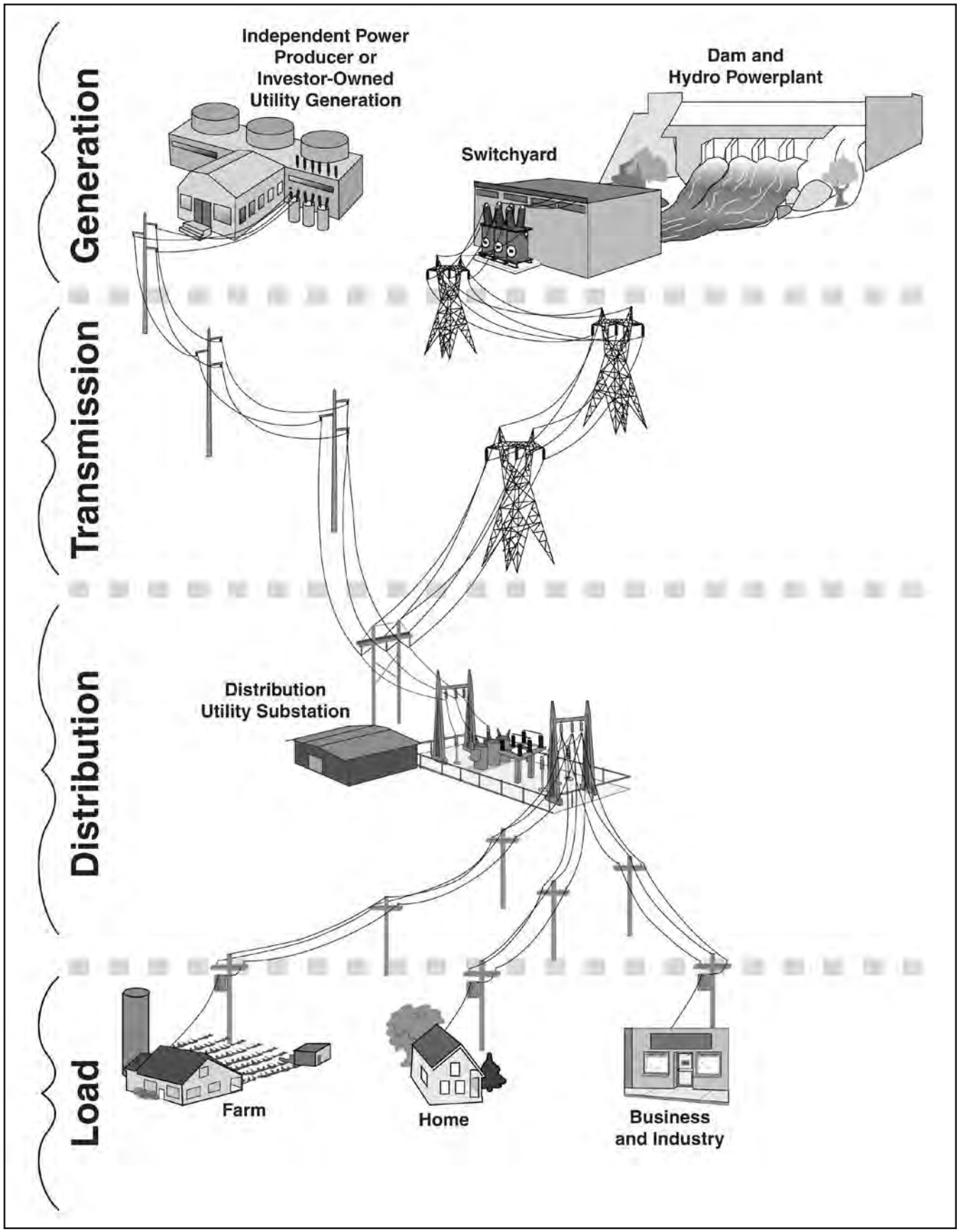
Voltage is the force that causes charged particles to move. The operation of a transmission line is similar to the flow of water through a hose. A generator develops voltage to put into the transmission line similar to the way a water pump develops water pressure to put into the hose. Voltage, like water pressure, is "a force." The transmission line or hose serves as the conduit for delivery of the resource to the user. The size of the transmission line conductor (wire) or the hose is the limiting factor in the delivery system regardless of the force applied. The length of the transmission line may also affect the amount of electricity that can flow through it. Electrical losses in a transmission line occur because some of the electricity's energy escapes in the form of heat. Longer transmission lines will generally have more losses. Likewise, the water pressure at the end of the garden-hose would be considerably less than the pressure directly at the faucet.

Load

Load is the amount of electric power delivered or required at any specified point or points on a system. Load primarily originates at the energy-consuming equipment of the customers (for example, lights, heating and cooling systems, and electrical devices).

Voltage Sag

Voltage is influenced by load. As load decreases, voltage tends to increase at the load. Conversely, as load increases, voltage tends to decrease at the load. When load exceeds generated power or transmission capacity, voltage "sag" occurs. As it sags, voltage can be compensated by adding generation (adjusting turbines and gates to increase production) using capacitors, adjusting transformer taps to "fine tune" voltage levels, or creative dispatching (rerouting electricity). Ideally, these measures quickly restore voltage to normal levels; however, load shedding or rotating blackouts may be necessary in some cases to avoid system wide collapse.



Source: Original May 2002
Note: Depiction of transmission is illustrated as single circuit

Figure 1-1. Diagram of a Typical Electrical Power System.

Western sells wholesale electricity to more than 70 customers in central and northern California and Nevada as part of the Central Valley Project (CVP) and the Washoe Project. Much of that power is allocated and delivered to five large customers: SMUD, Silicon Valley Power, and the cities of Redding, Roseville, and Palo Alto.

Western has prepared this Sacramento Area Voltage Support (SVS) Draft Environmental Impact Statement (EIS) in compliance with Federal laws, regulations and guidelines, principally the *National Environmental Policy Act* (NEPA), the Council on Environmental Quality (CEQ), *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR Parts1500-1508), the DOE NEPA Implementing Procedures (10 CFR Part 1021), and other applicable regulations.

1.2 VOLTAGE SUPPORT

Voltage support consists of elements of the electrical power system that help sustain or keep the electrical system operating to meet the long-term load demand. These elements include additional generation (new power sources—especially those at or near the load), increased transmission capacity, and improved system equipment.

Population growth and land development in the Sacramento area have steadily increased load demand for electric power. The increased demand has reduced the security and reliability of the interconnected transmission system. Security refers to the ability of the electric system to withstand sudden disturbances, such as electric short circuits or unanticipated loss of system elements such as a substation. Reliability is the assessment of the frequency, duration, and magnitude of interruptions for a given power system. The power system security and reliability problems became evident to California residents as rolling blackouts hit the state in 2001. Although a lack of generation was the major cause, increased demand on the interconnected electrical transmission system played a part in blackouts. Increased transmission capacity, therefore, must be part of any long-term solution.

Power system studies conducted by the Sacramento Area Transmission Planning Group (SATPG) and the River City Transmission Group (RCTG) concluded that transmission additions in the Sacramento area are necessary to alleviate voltage sag and ensure power system reliability. Results of the first phase of the SATPG study indicated that construction of a new 230,000-volt (230 kilovolt [kV]) circuit could provide short-term (3 to 5 years) system support to the region (SATPG 2000). The study concluded that long-term solutions (greater than 5 years) for area transmission security must also be developed. These solutions must include options to construct additional local generation or 500-kV transmission lines. Conclusions from the RCTG draft report also supported the need for additional transmission infrastructure to meet load growth and to provide for future generation (RCTG 2002-Draft). Appendix A presents the alternatives development for the SVS EIS.

This Draft EIS analyzes environmental impacts of the Proposal Action and alternatives identified for improvement of electric system reliability and voltage support for the Sacramento area. Findings from this Draft EIS will provide a basis for decisions on whether to proceed and, if so, how to proceed. Western would implement appropriate solutions under its *Reclamation Law* authority.

1.3 PUBLIC INVOLVEMENT

Public involvement is a vital part of the decision-making process for this SVS EIS. Western developed a public involvement program to provide multiple opportunities for comment during the SVS EIS process of public scoping, alternative formulation, alternative evaluation, and decision-making. The program is intended to guide Western through a collaborative, systematic, decision-making process with four primary purposes:

- Share information with the interested public.
- Gather information from the public.
- Identify public concerns and issues.
- Develop and maintain credibility.

The public participation process was designed to heighten public awareness and to encourage open communication throughout the development of the SVS EIS. The process was designed for flexibility and responsiveness to the issues and needs of the public, Western's customers, and public agencies. Appendix B provides a detailed description of the public involvement process.

1.3.1 SCOPING

During the period of September 12, 2000 through September 21, 2000, Western's SNR conducted a series of four scoping meetings in Lodi, Marysville, and Folsom, California. Public scoping comments were collected from August 8 through October 2, 2000. Appendix B includes a summary of the scoping comments.

1.3.2 Public Workshops and Hearings

Western held two public workshops (March and September 2001) to address public comments on the selection of alternatives under consideration. Western plans to hold three public hearings after the U.S. Environmental Protection Agency (EPA) publishes the Notice of Availability (NOA) for the Draft SVS EIS. The public hearings are scheduled to be held prior to the conclusion of the 45-day public comment period.

CHAPTER 2

Purpose and Need

2.1 WESTERN'S PURPOSE AND NEED FOR THE PROPOSED ACTION

2.1.1 Background

Western's CVP transmission lines form a critical part of the Sacramento area transmission grid. Western's transmission system is used to transmit power to Western's customers and import power from outside the region when hydropower generation is not adequate to meet Western's contractual delivery commitments. Western's transmission system is part of an interconnected transmission system, which enhances transmission system reliability and operation. Growth in the greater Sacramento, California area, and power imported from generation outside the region, have increased the demand on the interconnected electric transmission system, leading to transmission system overloads as described in Section 1.0. The transmission lines have reached their maximum transfer limits for serving existing needs. Area utilities have taken interim measures, such as load shedding, to manage peak power demands and avoid uncontrolled, system-wide outages. These situations have impacted the reliability and security of Western's power system, particularly during summer peak periods.

In response to the system overload, and as the operator of the CVP transmission system, Western has participated in transmission system studies with other area transmission system owners and power providers to address solutions to the transmission system overloading. In pursuing transmission system improvements, Western must ensure that the system is operated in accordance with strict reliability standards established by the North American Electric Reliability Council (NERC) and the Western Electricity Coordinating Council (WECC). Western must meet its contractual obligations.

The results of Western's short- and long-term transmission planning studies, as well as other transmission impact studies for transmission line interconnection requests, have shown the need for transmission system additions and upgrades to maintain power system security and reliability.

2.1.2 Need for the Proposed Action

Western transmission system studies have identified a need for short-term transmission line enhancements to maintain CVP transmission security and reliability. The enhancements include a transmission system addition between O'Banion Substation and Elverta Substation and an upgrade of existing 230-kV transmission in the Sacramento area.

These transmission enhancements and additions must be implemented within the next five years.

2.1.3 Purposes for the Proposed Action

To continue to meet Western's mission, purposes for the Proposed Action include:

1. Maintaining CVP transmission system security and reliability.
2. Meeting Western's legislative and contractual requirements.
3. Meeting NERC and WECC operating criteria.

CHAPTER 3

Proposed Action and Alternatives

This chapter describes the Proposed Action, three action alternatives and the No Action Alternative. It presents descriptions of the project activities associated with the Proposed Action and alternatives. It identifies the environmental protection measures (EPM) and provides an impact summary comparing the alternatives analyzed. The chapter also includes a discussion of alternatives initially evaluated, but later eliminated from detailed study.

Figure 3-1 graphically compares the general layout of the Proposed Action and alternatives that are broken into route segments (A through H). Some segments are common to several alternatives. Figure 3-2 details the 10 route segments. Each segment is divided into one-mile sections marked by numeric mileposts (MP), each segment beginning with MP 0.0. Mileposts are estimated distances.

Table 3-1 provides a summary of the Proposed Action and alternatives with associated specific operations including the number of new structures, replacement structures, and abandoned structures; miles of new access roads; and acres of land that would be disturbed. Table 3-2 provides a summary of new ground disturbance for the Proposed Action and alternatives. Figures 3-3 through 3-7 illustrate the location of the Proposed Action and associated route segments and MPs. Appendix E contains aerial photos of the line segments and mileposts.

3.1 PROPOSED ACTION

The Proposed Action would include: 1) reconductoring the existing single- and double-circuit, 230-kV transmission line from the Elverta Substation to the Tracy Substation; 2) constructing a new double-circuit, 230-kV transmission line paralleling the existing double-circuit, 230-kV line from the O'Banion Substation to the Elverta Substation; and 3) realigning portions of the existing Cottonwood–Roseville single-circuit, 230-kV transmission line north of Elverta Substation.

Below is a detailed description of elements of the three major activities (reconductoring, new construction, and realignment) associated with the Proposed Action. Some or all project activities also apply to the alternatives. Descriptions are provided later in this chapter. Figure 3-1 presents a schematic comparing the general layout of the existing system, the Proposed Action, and each alternative.

Reconductoring

Western would reconductor 72.6 miles of single- and double-circuit, 230-kV transmission lines (Segments C, D, and E) between Elverta Substation and Tracy Substation. Reconductoring would be completed in two phases to minimize service disruption. The first 11.2 miles (Segment C) would be a double-circuit, 230-kV transmission line between Elverta Substation and Hurley Substation. The second 61.4-miles (Segments D and E) between Hurley Substation and Tracy Substation would include a combination of either two single- or one double-circuit transmission line. From Hurley Substation (Segment D, MP 0.0) to Hedge Substation (Segment D, MP 6.8), there would be one double-circuit, 230-kV transmission line. Hedge Substation to Tracy Substation would include a combination of either two single-circuit, 230-kV transmission lines, or one double-circuit, 230-kV transmission line. Western would improve the fiber-optic communication system where necessary, replacing one of the two existing shield wires with a fiber-optic cable.

New Transmission Line

Western would construct a new, 26.6-mile, double-circuit, 230-kV transmission line (Segments A_1 and B) between O'Banion Substation and Elverta Substation. It would parallel the existing O'Banion–Elverta double-circuit transmission line. This action would require a new right-of-way (ROW) (125 feet wide) for the transmission line. Additional access roads (15 feet wide) may be required.

Realignments

Realignments are proposed for two locations. Realignment is defined as a route deviation of an existing transmission line. The route deviation would be sited outside of the existing ROW. The purpose for the realignments would be to reduce impacts to land use. One realignment for the Proposed Action would call for the construction of a new transmission line (2.8 miles) parallel to the existing O'Banion–Elverta transmission line, approximately 17 miles southeast of the O'Banion Substation (Segment A_1 MP 17.4 to 20.2). The realignment would avoid encroachment to the Pleasant Grove Cemetery. Conductors for the existing O'Banion–Elverta transmission line would be transferred to the west on 14 proposed new structures. The proposed new conductors would be strung along the existing structures to the east. This would avoid transmission line conductors crossing one another. Figure 3-8 illustrates this realignment.

The second realignment would occur on Segment G. Western currently operates two transmission lines (2.8 miles) in adjacent ROWs (O'Banion–Elverta double-circuit, 230-kV line and Cottonwood–Roseville single-

Table 3-1. Activities for the Proposed Action and Alternatives

Alternative	Specific Operations
Proposed Action: New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation Construct 26.6 miles of new 230-kV double-circuit transmission line from O'Banion Substation to Elverta Substation (Segments A_1 and B) Realign 230-kV single-circuit transmission line. (Construct transmission line around the Pleasant Grove Cemetery, construct 5 miles of Segment G; abandon 3.6 miles of Segments F and H) Reconductor 72.6 miles of 230-kV double -circuit transmission line from the Elverta Substation to Tracy Substation (Segments C, D, and E)	107.8 miles right of way length 167 new structures 163 existing structures replaced 17 structures abandoned 28 miles of new access roads 581 acres short-term disturbed 66 acres long-term disturbed
Alternative 1: Reconductoring O'Banion Substation to Tracy Substation Reconductor 99.2 miles of 230-kV double-circuit transmission line from the O'Banion Substation to Tracy Substation (Segments A, B, C, D, and E)	99.2 miles right of way length 199 existing structures replaced 85 acres short-term disturbed 0 acres long-term disturbed
Alternative 2: New Transmission O'Banion Substation to Elverta Substation and Realignments Construct 26.6 miles of new 230-kV double-circuit transmission line from O'Banion Substation to Elverta Substation (Segments A_1 and B) Realign 230-kV double-circuit transmission line (Construct transmission line around the Pleasant Grove Cemetery, construct 5 miles of Segment G; abandon 3.6 miles of Segments F and H)	35.2 miles right of way length 167 new structures 17 structures abandoned 28 miles of new access roads 515 acres short-term disturbed 66 acres long-term disturbed
Alternative 3: New Transmission Elk Grove Substation to Tracy Substation Construct 46.2 miles of new 230-kV double-circuit transmission line from Elk Grove Substation to Tracy Substation (Segment E_1)	46.2 miles right of way length 225 new structures 47 miles new access roads 855 acres short-term disturbed 108 acres long-term disturbed
No Action Operation and maintenance unchanged. Western would not build additional transmission lines or substations (existing Segments A, B, C, D, and E)	0 miles right of way length 0 new structures 0 structures abandoned 0 miles of new access roads 0 acres short-term disturbed 0 acres long-term disturbed

Source: Original 09-10-02

circuit, 230-kV line) between Keys Road and Elverta Substation along Segment B (MP 0.0 to 2.8). The total width of the two adjacent ROWs is 225 feet. There is no space to expand the ROW to add a third transmission line without impacting residences. Due to these ROW constraints, Western would realign five miles of the Cottonwood–Roseville single-circuit, 230-kV transmission line (Segment G). A new transmission line between Keys Road and Elverta Substation (Segment B) would be constructed in place of the realigned Cottonwood–Roseville line. The realignment (Segment G) would deviate from the existing Cottonwood–Roseville transmission line at Keys Road and traverse eastward approximately 1.7 miles using new 125-foot-wide ROW along the south side of Keys Road. There it would angle south, paralleling the west side of the existing Pacific Gas & Electric Company (PG&E) Rio Oso–Brighton double-circuit, 230-kV transmission line for 3.3 miles. At that point, it would rejoin the existing route of the single-circuit, 230-kV Cottonwood–Roseville transmission line. This would eliminate the need for approximately 1.4 miles of Segment F and 2.2 miles of Segment H of the existing Cottonwood–Roseville transmission line that would be abandoned in place. Figure 3-4 details the realignment.

3.1.1 Reconductoring for the Proposed Action

Reconductoring would involve replacing existing conductors with higher-capacity conductors. Reconductoring would increase the thermal rating of the

transmission line and the amount of current the line could carry. Modifying or replacing a portion of the existing transmission structures may be necessary to provide the structural support for new conductors. Structural modifications could include replacing insulators, increasing the height of structures, reinforcing structures, installing stronger cross-arms, or in some cases, replacing structures.

Elements for reconductoring would consist of:

- Design
- ROW requirements
- Detailed siting
- Circuit outage
- Access roads
- Structures
- Conductor stringing
- Material storage yards
- Cleanup and reclamation
- Operation and maintenance

Typical personnel and equipment needed for construction operations are listed in Table 3-3. The tasks would be conducted in stages; therefore, personnel and equipment would not be working on all tasks simultaneously at a given location.

3.1.1.1 Design

All conductors, structures, and equipment would meet the National Electric Safety Code (NESC), and any other

Table 3-3. Typical Assumptions for Personnel and Equipment Required

Tasks	Staffing[a,b]	Equipment
Access roads, gates, and clearing	2 to 4 equipment operators	1 motor grader 1 pickup truck 1 bulldozer 1 backhoe
Clearing structure sites, construction yard, wire handling site	8 to 12 laborers/equipment operators	1 dozer or motor grader 2 pickup trucks
Materials hauling	4 to 8 laborers/equipment operators	1 to 2 tractor trailers 1 to 2 hydrocranes 1 to 2 pickup trucks 1 to 2 flatbed trucks
Removal of existing structures	3 to 5 laborers/equipment operators	1 crane, 50- to 100-ton capacity 2 flatbed trucks 1 tractor trailer 2 pickup trucks
Modify existing structures	2 to 4 laborers/equipment operators	2 hydro lifts 2 flatbed trucks 1 pickup truck
Foundation excavation	4 to 8 laborers/equipment operators	2 tractors with augers 2 pickup trucks 1 backhoe 1 compressor
Tying and hauling rebar cages	3 to 4 ironworkers and laborers	1 flatbed w/lift 2 welding machines
Foundation setting	12 to 18 laborers/equipment operators	3 flatbed trucks 3 crew pickup trucks 3 air compressors 3 hydro lifts
Concrete placement	4 to 5 laborers	2 mixer trucks 1 pickup truck 1 manhaul
Structure erection	5 to 8 linesmen/groundsmen and crane operators	1 crane, 50 to 100-ton capacity 2 pickup trucks

Table 3-3. Continued Typical Assumptions for Personnel and Equipment Required

Tasks	Staffing[a,b]	Equipment
Structure assembly	6 to 12 linesmen/groundsmen and crane operators	1 to 3 hydrocranes 4 to 6 pickup trucks 1 to 3 flatbed trucks 1 compressor
Guard structures	3 linesmen/groundsmen	1 auger 1 tractor 1 pickup truck
Wire stringing	20 to 25 linesmen/groundsmen	2 pullers 2 tensioners 4 reel stringing trailers 1 materials truck 2 dozers 5 to 6 pickup trucks
Cleanup	2 to 4 laborers	1 bulldozer w/ripper 1 grader 1 front-end loader 1 tractor/harrow/disk 1 pickup truck

Source: Original September 2002
[a]Approximate total work force at one time: 50 to 70 individuals.
[b]Approximately 40 to 50 percent of work force is assumed localhire.

applicable criteria, including California Public Utilities Commission (CPUC) General Order 95. Self-supporting steel lattice structures exist for both single and double-circuit, 230-kV lines. These structures would be evaluated to determine if structural changes or replacement are required to support new conductors and shield wire.

3.1.1.2 Right-of-Way Requirements

The ROW requirements for reconductoring would be minimal and limited to the construction area. New ROW would not be required for replacement structures or for stringing new conductors. Any land temporarily required for construction (such as conductor pulling sites, material and equipment storage areas) outside the existing ROW would be by agreement between the construction contractor and affected landowners.

ROW vegetation would be selectively cleared to provide suitable access for construction equipment and adequate structure and conductor clearance. Shrubs and trees would be cleared or trimmed from access roads, structure sites, pulling sites, and material storage yards.

3.1.1.3 Detailed Siting

Facility siting and the location of related activities would be selected to reduce or eliminate impacts to existing and planned land uses and to avoid or minimize disturbances to landowners and sensitive environmental areas. Landowners would be consulted for siting material storage yards and access roads.

3.1.1.4 Circuit Outage

During construction, Western would need to de-energize portions of the transmission line and adjacent lines for public and construction crew safety. Western would plan and coordinate outages with its customers to minimize temporary impacts.

3.1.1.5 Access Roads

Wherever possible, access to each structure would be within and along the existing ROW. Temporary access roads (15 feet wide) may be required for construction. Existing access roads would be used where practical; some may need to be rebladed. New temporary access roads would be routed to minimize environmental impacts to water, soils, habitat, vegetation, landowner improvements, and other identified sensitive resources. Gates and fences disturbed or damaged from access road construction would be restored to their preconstruction condition. Temporary access roads would also be restored.

3.1.1.6 Structures

Most existing transmission line structures would not require replacement. However, some structures or hardware (such as insulator strings) may be replaced. Construction crews would detach the existing conductors from insulator strings and replace the old insulators. The new conductors would be attached to the insulators during the stringing process.

Existing structures that require replacement would be dismantled. Footings of the dismantled structures would be left in place. Footings for the new structures would be excavated, casings placed, and concrete poured in casings. Structures would be assembled, erected, and attached to foundations. Strings of insulators would support the conductor. Each structure would require a temporary land disturbance of about 0.23 acres (100 feet by 100 feet). Excess fill material would be spread evenly around the structure base to provide positive site drainage. An estimated 415 existing double-circuit, 230-kV structures would be involved in reconductoring the Proposed Action along Segments C, D, and E. Of these, approximately 163 structures would be replaced. Figures 3-9 and 3-10 depict typical double-circuit, 230-kV transmission structures.

3.1.1.7 Conductor Stringing

Flatbed trucks would carry reels of conductor to the various conductor-pulling sites along the ROW. Other equipment would include stringing trailers, tensioning machines, pullers, bulldozers, and several trucks, including a bucket truck.

Stringing rollers (pulleys) attached to the end of the insulator string would allow the conductor to be threaded from structure to structure. Existing conductors would be fastened to the new conductors to pull in the new conductors. Splicing would occur at pulling sites. Conductors would be adjusted to proper sag and tension, and the stringing rollers would be replaced with conductor shoes, to which conductors would be secured. Temporary guard structures would be installed at prescribed locations to ensure that the conductor does not sag into roads or other locations that could result in a safety hazard.

Typically, conductor-pulling sites would be spaced at 15,000- to 20,000-foot intervals. However, distances would vary depending on the geography, topography, and sensitivity of the specific area; the length of the line; and the accessibility by equipment. Stringing equipment at each pulling site would be set up approximately 300 feet from the initial structure. Pulling sites would require an area of 0.4 acres (125 feet by 125 feet). These sites would be located along the transmission line centerline. Angle-structure pulling sites would be located outside the ROW because of the need to pull the conductor on a straight line.

3.1.1.8 Material Storage Yards

Temporary material storage yards would be required near the transmission line and public access ways. These areas would serve as reporting locations for workers, parking spaces for vehicles, and storage spaces for equipment and materials. Material storage yards would cover approximately five acres (400 feet by 540 feet). Areas would be selected that require as little clearing and grading as possible. In most cases, existing substations would serve as material storage yards. Trucks would haul structural materials such as structure steel, hardware, foundation material, spools of conductor, and shield wire into the yard. A crane or forklift would unload and transport the materials.

3.1.1.9 Cleanup and Reclamation

Waste materials and debris from construction areas would be collected, hauled away, or disposed of at approved landfill sites. Typical equipment would include a grader, front-end loader, tractor, and a dozer with a ripper.

Procedures for vegetation clearing and restoring and ROW maintenance would be implemented as standard construction and reclamation measures for the double-circuit, 230-kV transmission line. In construction areas (for example, material storage areas and temporary access roads) restoration would consist of returning disturbed areas to their natural contour, reseeding if required, installing cross drains for erosion control, and filling ditches.

3.1.1.10 Operation and Maintenance

Typical activities associated with operating and maintaining transmission lines would continue as before construction. The proposed transmission line system would operate at 230 kV. The amount of power transferred along the conductors would vary depending on seasonal and time-of-day loads, as well as other system demands. Western's power system dispatchers would direct day-to-day and emergency transmission line operation in accordance with Western's *Power System Operations Manual* (PSOM) and in cooperation with adjacent control areas and systems.

Western would maintain the proposed transmission system by monitoring, testing, and repairing equipment. Typical maintenance activities include:

- Periodic routine aerial inspections with emergency aerial inspections after storms, severe wind, lightning, or other weather factors, or reported vandalism.
- Periodic and emergency ground inspections.
- Routine maintenance to inspect and repair damaged structures, conductors, and insulators.
- Emergency maintenance to immediately repair transmission lines damaged by storms, floods, vandalism, or accidents. Emergency maintenance would involve prompt movement of crews to repair damage.
- Access road maintenance to regrade and fill gullies, clear and repair culverts, and repair erosion-control features and gates.
- Vegetation management activities including cutting, trimming, lopping, and clearing trees, brush, noxious weeds, and undergrowth.

Some land-use impacts could occur during routine maintenance activities and increase during emergencies. Western would restore damage or compensate landowners when responsible for damage. Past emergency activities have been infrequent and restricted in most cases to a small area.

3.1.2 New Transmission Line for the Proposed Action

Western would construct a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation along Segments A_1 and B. Some previously discussed activities common to reconductoring also apply to building a new transmission line. These include design, existing ROW requirements, detailed siting, circuit outage, access roads, structures, conductor stringing, material storage yards, cleanup and reclamation, and operation and maintenance.

Additional requirements for building a new transmission line include:

- New ROW requirements
- Engineering surveys
- Access roads
- Excavation and foundation construction
- Structures
- Conductor stringing

Table 3-3 describes construction personnel and equipment typically required for constructing a new double-circuit, 230-kV transmission line.

3.1.2.1 New Right-of-Way Requirements

The Proposed Action would require new ROW 125 feet wide. Once the final route is determined, Western would acquire land rights in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act* of 1970 (P.L. 91-646), as amended. Western would purchase rights through negotiations with landowners at fair market value, based on independent appraisals. Landowners would retain title to the land and could continue to use the property in ways that would be compatible with the transmission line. If good faith negotiations fail, Western would acquire the additional right-of-way through condemnation, under its eminent domain authority.

3.1.2.2 Engineering Surveys

Surveys would locate the transmission line centerline, property lines and corners; provide accurate ground profiles along the centerline; locate structures; and determine the exact locations and rough ground profiles for new access roads. Initial centerline survey work, consisting of survey control, corridor centerline location, profile surveys, and structure staking, would occur before construction. This information would help complete legal descriptions of proposed properties. Soils would be tested to determine physical properties, including the ability to support the proposed structures. Western would consult with affected landowners during the initial route selection and structure-siting process to reduce or eliminate impacts to land uses and avoid or minimize disturbance to sensitive environmental areas.

3.1.2.3 Access Roads

Existing access roads would be used where possible; however, new access roads (15 feet wide) would likely be needed, requiring an estimated 50.9 acres (Segments A_1 and G). Western would work directly with landowners to route and construct these roads with minimal impact to soils, vegetation, visual resources, and other sensitive resources. Access roads would cross perennial and intermittent streams and washes at right angles wherever possible. Some perennial or intermittent streams or wetlands could require use of timber mats for construction. Culverts would be installed to minimize maintenance and reduce soil erosion. All activities affecting floodplains and wetlands would be conducted to meet applicable Federal, state, and local standards.

Gates would be installed wherever an access road crosses an existing fence and kept closed but not locked, unless the landowners request differently. Existing fences disturbed during construction would be repaired or replaced with temporary fencing sufficient to contain livestock or reasonably accommodate other landowner concerns. After construction, Western would restore fences to preconstruction conditions.

3.1.2.4 Excavation and Foundation Construction

Minor grading and vegetation removal may be required at structure sites and staging areas. Where grading is required, topsoil would be removed and stockpiled for reclamation. After construction, Western would regrade disturbed areas to establish original contours, and then redistribute topsoil. Temporary topsoil stockpiles would be protected from erosion during construction. Any excess soil would be disposed at an approved landfill site.

Excavation for foundations would require a backhoe, front-end loader, or pressure auger. Excavation to bedrock or other suitable base material would be required. A rock drill, air compressor, or explosives may be required if rock is encountered during excavation.

Most structures would require reinforced concrete foundations. After foundation concrete is placed, a mechanical

tamp would recompact soil around the foundation. Excess soil would be spread evenly around the structure base to promote site drainage away from structures. Waste cement management or washing of cement trucks would comply with EPMs. Disposal pits would be dug by backhoe at wash sites for cement trucks. Percolation of cement wastewater would be monitored for containment.

3.1.2.5 Structures

Western would use either single-pole steel or self-supporting lattice steel structures for the Proposed Action. Figures 3-9 and 3-10 illustrate the two structure types. New construction of Segments A_1 and B may require 142 double-circuit, 230-kV structures.

Structure sites would include assembly and crane-landing areas. Before construction, the areas would be cleared of vegetation and graded. Typical clearing would require 0.23 acre per structure. Long-term disturbance would be about 0.1 acre per structure. Single-pole steel structure disturbance would be slightly less per structure. Chapter 4 discussions assumed the use of lattice steel structures to establish worst-case scenario analysis for ground disturbance.

Trucks or helicopters would transport structural components to the sites. A crane would be used to erect structures. Equipment may include cranes (ground or helicopter), augers, bulldozers, bucket trucks, backhoes, air compressors, electric generators, pickup trucks and other vehicles, machinery, and equipment.

3.1.2.6 Conductor Stringing

Conductor stringing would be similar to the method described in reconductoring (Section 3.1.1.7); however, rope would be connected to the conductor and shield wire used to pull the line from structure to structure during new construction.

3.1.3 Realignments for the Proposed Action

Two locations for realignment are proposed. The first would be a 2.8-mile realignment that would occur along Segment A_1 (MP 17.4 to 20.2) near the Pleasant Grove Cemetery (Figure 3-8) requiring about 14 new double-circuit, 230-kV structures. The first 0.5 mile of Segment A_1 would be located approximately 0.6 mile east of Segment A at MP 17.9. Segment A_1 would then parallel Segment A from MP 17.9 to 20.2, and the existing double-circuit 230-kV line would be transferred to new structures. New 230-kV conductors would then be placed on existing structures. Similar activities and equipment described for new construction would be used to complete realignment.

A second realignment, Segment G would require an estimated 25 single-circuit, 230-kV structures. Using Segment G would eliminate the need for the existing Cottonwood–Roseville line (Segments F and H). An estimated 17 structures for Segments F and H would be abandoned as part of the Proposed Action (Figure 3-4).

Construction and operation and maintenance activities for the realignment would include activity elements previously discussed for new transmission line construction. The additional activity of abandonment is applicable for the second realignment described above.

3.1.3.1 Abandonment

Structures, foundations, conductors, shield wires, insulators, and hardware for abandoned transmission lines would be left in place or in some cases removed.

3.2 ALTERNATIVE 1 —RECONDUCTORING

Alternative 1 would reconductor 99.2 miles of single- and double-circuit, 230-kV transmission lines on 820 structures from O'Banion Substation to Tracy Substation along Segments A, B, C, D, and E (Figures 3-3 through 3-7). About 199 structures would be replaced. Work would occur in three phases: O'Banion Substation to Elverta Substation (Segments A and B); then Elverta Substation to Hurley Substation (Segment C); and finally, Hurley Substation to Tracy Substation (Segments D and E). Reconductoring activities for Alternative 1 would be the same as reconductoring activities described for the Proposed Action. Table 3-3 contains typical personnel and equipment requirements for reconductoring. While Alternative 1 would provide relatively less voltage support and capacity than the other action alternatives, it would relieve the system especially during periods of high load demand.

3.3 ALTERNATIVE 2 — NEW TRANSMISSION O'BANION SUBSTATION TO ELVERTA SUBSTATION

Alternative 2 is identical to the new transmission line construction and realignment activities of the Proposed Action, including new ROW (125 feet wide) and access roads (15 feet wide). Alternative 2 includes new construction of 26.6 miles of double-circuit, 230-kV transmission line between O'Banion Substation and Elverta Substation and realigning 2.8 miles near the Pleasant Grove Cemetery and five miles of the Cottonwood–Roseville transmission line (Segment G). New construction would occur along Segments A_1 and B (Figures 3-3, 3-4, and 3-8).

Alternative 2 would require an estimated 50.9 acres of new access roads. Both realignments are described in the

Proposed Action. Alternative 2 would meet the Purpose and Need by providing new transmission line between O'Banion Substation and Elverta Substation, and by providing additional voltage support for the Sacramento Area. The new line would eliminate limitations on the flow of power (generation) to Sacramento during n-1 and n-2 contingencies.[1]

3.4 ALTERNATIVE 3 —NEW TRANSMISSION ELK GROVE SUBSTATION TO TRACY SUBSTATION

Alternative 3 would require new construction of 46.2 miles of double-circuit, 230-kV transmission line from Elk Grove Substation to Tracy Substation along Segment E_1 (Figures 3-5 and 3-6). The route would parallel Western's two existing transmission lines (Hurley–Tracy No. 1 and No. 2) to the west. A new 125-foot-wide ROW adjacent to existing transmission line ROWs would contain about 225 new structures. Alternative 3 would require an estimated 85.5 acres of access roads. Alternative 3 would meet the Purpose and Need by supporting the load and thus increasing voltage support to the Sacramento area.

3.5 NO ACTION

The No Action Alternative would include operating and maintaining the existing transmission lines. Western would not build or reconductor any transmission lines in the study area relative to voltage support. Implementing this alternative would preclude most short-term environmental impacts associated with construction and reconductoring activities.

This alternative would not meet Western's Purpose and Need. Western may be unable to meet system reliability standards and its contractual obligations.

3.6 ALTERNATIVES DEVELOPMENT

Western's mission is to market and deliver reliable, cost-based hydroelectric power and related services to its customers. New power generation was eliminated as an alternative because it does not meet Western's Purpose and Need for short-term implementation. Demand-side management (DSM) and distributed generation were eliminated from detailed review because Western sells wholesale power and does not have distribution load to employ these solutions. DSM alternatives apply more to electrical distribution. Local utilities (such as SMUD) have implemented programs to decrease the electricity load during peak-use hours. Appendix A presents the details of alternatives development.

3.7 ENVIRONMENTAL PROTECTION MEASURES

EPMs have been developed by Western to reduce environmental consequences associated with construction activities. Environmental consequences for each resource area (Chapter 4) assume that the EPMs specified in Table 3-4 would be fully implemented. Western would use these practices on both public and private lands. These EPMs would be implemented consistent with regulatory and industry standards for any activity proposed.

3.8 COMPARISON OF ALTERNATIVES

Table 3-5 presents a summary comparison of effects, impacts, and environmental protection measures by resource topic for each alternative. Full discussion can be found in Chapter 4, Affected Environment and Environmental Consequences.

Table 3-4. Environmental Protection Measures

No.	Resource	Environmental Protection Measures
1	Air Quality	All requirements of those entities having jurisdiction over air quality matters would be adhered to and any permits needed for construction activities would be obtained. Open burning of construction trash would not be allowed.
2	Air Quality	Project participant would use reasonably practicable methods and devices to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants.
3	Air Quality	Visible emissions from diesel-powered equipment would be controlled.
4	Air Quality	Emissions from all off-road diesel powered equipment would not exceed 40 percent opacity for more than three minutes in any one hour.
5	Air Quality	Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments or other inefficient operating conditions would not be operated until corrective repairs or adjustments were made.

[1] n-1 contingencies occur when one element of the power system (for example, one transmission circuit or one transformer) is forced out and n-2 contingencies occur when two elements of the power system (for example, two transmission circuits that are on the same structure) are forced out.

Table 3-4. Environmental Protection Measures

No.	Resource	Environmental Protection Measures
6	Air Quality	Vehicles and equipment used in construction and maintenance of the Proposed Action or alternatives would maintain appropriate emissions control equipment, and be appropriately permitted.
7	Air Quality	Road construction would include dust-control measures such as watering and other approved suppressing agents for limiting dust generation during construction.
8	Air Quality	Fill material storage piles would include dust-control measures such as water or chemical suppressants.
9	Air Quality	Ground surfaces, which have been significantly disturbed, would be seeded appropriately to prevent wind dispersion of soil.
10	Air Quality	Removal of vegetation and ground disturbance would be limited to the minimum area necessary to complete project construction activities. Vegetative cover would be maintained on all other portions of the project area.
11	Air Quality	Regular watering of exposed soils and unpaved access roads would be conducted during construction periods.
12	Air Quality	Grading activities would cease during periods of high winds (greater than 25 mph averaged over one hour).
13	Air Quality	Trucks transporting loose material would be covered or maintain at least two feet of freeboard and not create any visible dust emissions.
14	Biological Resources	Mitigation measures developed during the consultation period under Section 7 of the ESA would be adhered to as specified in the subsequent Biological Opinion of the USFWS. In addition, mitigation developed in conjunction with state and tribal authorities would be followed.
15	Biological, Cultural, and Paleontological Resources	Before construction, all construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address Federal, state, and tribal laws regarding antiquities, fossils, plants, and wildlife, including collection and removal, and the importance of these resources and the purpose and necessity of protecting them. Western would instruct that cultural resources might be present in the study area. They would be trained to stop work near any discovery, and notify Western's regional environmental manager, who would confirm that the resource is evaluated and avoided. Known cultural resources would be fenced and a minimum distance maintained for work disturbances.
16	Biological Resources	Construction sites located in sensitive habitats would require a qualified biologist to conduct a site survey before clearing vegetation. The purpose of this survey would be to identify any biologically sensitive issues such as wetlands, vernal pools, or habitat of concern. Western would avoid or use best management practices to lessen disturbance.
17	Biological Resources	During construction, no equipment refueling or oil changing would be conducted within 300 feet of any waterbody or streams.
18	Biological Resources	Within riverine habitat, ROW clearing would be done by manual methods. Construction activities would not occur within 100 feet of the streambank.
19	Biological Resources	Vegetation would be controlled or removed in accordance with *Western's Integrated Vegetation Management Environmental Guidance Manual* (Western 1999).
20	Biological Resources	To the extent practical, freshwater emergent, lacustrine, and riverine wetlands would be spanned and vehicular traffic would not encroach within 100 feet of the boundary of these wetlands.

Table 3-4. Environmental Protection Measures

No.	Resource	Environmental Protection Measures
21	Biological Resources	To the extent practical, during the wet season, vernal pools would be driven around, spanned, or otherwise avoided.
22	Biological Resources	Reconductoring and/or replacing insulators on structures containing active raptor nests would be conducted after young birds have fledged. Inactive nests would not be removed from structures unless they pose a safety or reliability hazard.
23	Biological Resources	Human activity in the Cosumnes River Preserve during the winter months could disturb foraging behavior and adversely affect sandhill cranes. Western would coordinate construction timing in this area with the Preserve and the USFWS to the extent practical.
24	Biological Resources	Construction between the Cosumnes River and Laguna Creek could result in increased erosion and sedimentation, which may adversely affect fish species occurring in the area. Western would span these water bodies and no construction equipment would cross via the water bodies when water is present. In addition, sedimentation control structures would be used to prevent sediment from reaching riverine habitat.
25	Biological Resources, Floodplains, Water Resources, and Wetlands	Hazardous materials would not be drained onto the ground, into streams, or into drainage areas. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials.
26	Biological Resources	Special-status species habitats or other species of particular concern would be considered during post-EIS phases of project implementation in accordance with management policies set forth by the appropriate land-managing agency. This could entail conducting surveys for habitat, plant, and wildlife species of concern. Where such species are identified, appropriate action would be taken to avoid adverse impacts on the species or habitat.
27	Biological Resources, Soils, and Land Use	On completion of the work, all work areas except access trails would be scarified or left in a condition that would facilitate natural or appropriate vegetation, provide for proper drainage, and prevent erosion.
28	Cultural Resources	Cultural resources would be considered during post-EIS phases of project implementation in accordance with the programmatic agreement being developed in conjunction with the EIS. Surveys to inventory and evaluate cultural resources would be conducted.
29	Cultural Resources	Where ground-disturbing activities are identified, cultural resource evaluations would be done to determine the need for field inventory. Construction activities would avoid all historic properties, or a special use permit or mitigation plan would be developed in consultation with SHPO.
30	Cultural Resources, Floodplains, Water Resources, and Wetlands	Irrigation system features, which are eligible for the NRHP, would be avoided during the siting of new transmission line structures and access roads, and most other irrigation system features would be avoided to the extent practicable in the siting of new structures and access roads.
31	Electric and Magnetic Fields	Complaints of radio or television interference generated by the transmission line will be responded to and appropriate actions taken.
32	Floodplains, Soils, Water Resources, and Wetlands	In construction areas (for example, material storage yards, structure sites, and spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur.
33	Floodplains, Soils, Water Resources, and Wetlands	Access roads would be built at right angles to the streams and washes to the extent practicable. Culverts would be installed where needed. All construction activities would be conducted to minimize disturbance to vegetation and drainage channels.

Table 3-4. Environmental Protection Measures

No.	Resource	Environmental Protection Measures
34	Floodplains, Soils, Water Resources, and Wetlands	Excavated material or other construction materials would not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can encroach, in any way, upon the watercourse.
35	Floodplains, Soils, Water Resources, and Wetlands	Nonbiodegradable debris would not be deposited in the ROW. Slash and other biodegradable debris would be left in place or disposed.
36	Floodplains, Soils, Water Resources, and Wetlands	All soil excavated for structure foundations would be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations. Excavated soil excess to these needs would be removed from the site and disposed of appropriately.
37	Floodplains, Water Resources, and Wetlands	To the extent possible, new structures and access roads would be sited out of floodplains. Due to the abundance of floodplains and surface water resources in the study area, complete avoidance may not be possible, and Western will consult with USACE.
38	Floodplains, Water Resources, and Wetlands	Culverts would be installed where needed to avoid surface water impacts during construction of transmission line structures. All construction activities would be conducted in a manner to avoid impacts to water flow.
39	Geology	Geological hazards would be evaluated during final design specification for each structure location and road construction area. Options would include avoidance of a poor site by selection of a site with stable conditions, or correction of the unsuitable slope.
40	Health and Safety	Conform with safety requirements for maintaining the flow of public traffic and would conduct construction operations to offer the least possible obstruction and inconvenience to public transportation.
41	Health and Safety	Comply with all applicable health and safety standards.
42	Health and Safety and Land Use	Some land uses occurring within the ROW would require temporary closure or limited access. Proper signage would be posted in these areas.
43	Health and Safety	For identified locations, structures and/or shield wire would be marked with highly visible devices where required by governmental agencies (for example, the Federal Aviation Administration [FAA]).
44	Land Use	Construction operations would be conducted to prevent unnecessary destructing, scarring, or defacing of the natural surroundings to preserve the natural landscape to the extent practicable.
45	Land Use	No permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey.
46	Land Use	When weather and ground conditions permit, all construction-caused deep ruts that are hazardous to farming operations and to moving equipment would be restored to preconstruction condition, as practical.
47	Land Use	During construction, movement would be limited to the access roads and within a designated area in the ROW so as to minimize damage to agricultural land.
48	Land Use	Damaged fences and gates would be repaired or replaced to restore them to their preconstruction condition.
49	Noise	All vehicles and equipment would be equipped with required exhaust noise abatement suppression devices.

Table 3-4. Environmental Protection Measures

No.	Resource	Environmental Protection Measures
50	Paleontological Resources	Preconstruction surveys of sensitive paleontological areas may be conducted as agreed upon by the land-managing agency and lead Federal agency.
51	Soils and Geology	A California registered Professional Geotechnical Engineer would evaluate the potential for geotechnical hazards and unstable slopes on the centerline route and areas of new road construction or widening on slopes with over 15 percent gradient.
52	Soils	All construction must be in conformance with Western's Erosion Control and Revegetation Plan.
53	Soils	If wet areas cannot be avoided, wide-track or balloon tire vehicles and equipment and or timber mats would be used.
54	Soils, Water Resources, and Wetlands	All construction vehicle movement outside the ROW normally would be restricted to predesignated access, contractor-acquired access, or public roads.
55	Soils, Water Resources, and Wetlands	When feasible, all construction activities would be re-routed around wet areas while ensuring that the route does not cross sensitive resource areas.
56	Soils, Water Resources, and Wetlands	Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses would be conducted to prevent muddy water and eroded materials from entering the streams or watercourses with construction of interceptors.
57	Soils, Water Resources, and Wetlands	Runoff from the construction site would be controlled and meet the Regional Water Quality Control Board (RWQCB) storm water requirements.
58	Visual Resources	Transmission structures would be constructed of galvanized material.
59	Water Resources and Wetlands	Construction within jurisdictional waters or wetlands may require 401 and 404 permits. These activities would be coordinated with the U.S. Army Corps of Engineers (USACE) and RWQCB, as needed.

Source: SNR Memorandum: Environmental Protection Measures, 2002

CHAPTER 4

Affected Environment and Environmental Consequences

The Affected Environment section for each resource describes existing conditions in the study area and includes background on the resource, definition of the study area, issues of environmental concern, and a characterization of the study area. The Environmental Consequences section provides information on the standards of significance, Western's EPMs, a description of impacts for each alternative and mitigation measures, if appropriate. The chapter concludes with discussion on cumulative impacts, unavoidable/adverse impacts, short-term use versus long-term productivity, irreversible/irretrievable commitment of resources, and growth-inducing impacts.

Issues identified through public involvement, including scoping, are an integral part of the environmental analysis. These scoping issues determine the depth and breadth of environmental analysis required for the Proposed Action and alternatives. Not all resources are treated with the same level of detail in the Draft EIS. Resources susceptible to impacts from the construction or operation of a transmission line are given full evaluation, while resource impacts that do not exist or can be easily avoided by facility location or structure placement are addressed in less detail.

Environmental resource areas for the Draft EIS include:

- Air Quality
- Biological Resources
- Cultural Resources
- Electric and Magnetic Fields
- Environmental Justice
- Floodplains
- Geology
- Health and Safety
- Land Use
- Noise
- Paleontological Resources
- Socioeconomics
- Soils
- Visual Resources
- Water Resources
- Wetlands

The Environmental Consequences section for each resource analyzes and explains the changes that can be expected from implementing the Proposed Action and alternatives, including the No Action Alternative. This section forms the scientific and analytic basis for the Draft EIS (Chapter 40 of the *Code of Federal Regulations* [40 CFR] Part 1502.14). It consolidates the discussions on those elements described in the Purpose and Need, public participation, and alternative development and comparison sections of the Draft EIS (40 CFR Part 1502.16). SNR uses standard construction practices and has adopted EPMs to minimize impacts to the environment. Table 3-4 is a list of the EPMs appropriate to this EIS. They are an integral part of SNR's construction specifications.

Environmental impacts can be positive (beneficial) or negative (adverse) as a result of the action (direct) or as a secondary result (indirect), and can be permanent, long-lasting (long-term), or temporary (short-term). Impacts can vary in degree or magnitude from no change, or only slightly detectable change, to a total change in the environmental condition or system. This assessment identifies impacts, evaluates the standards of significance, evaluates applicable EPMs, and recommends mitigation measures if EPMs were insufficient.

To determine the levels or magnitude of potential impacts to the environment, standards of significance have been developed for each resource. They include the following guidelines:

- ***Resource Sensitivity***—the probable response of a particular resource to project-related activities.
- ***Resource Quantity***—the amount of the resource potentially affected. The impacted resources are quantified to determine the significance of the impact.
- ***Resource Quality***—the present condition of the potentially affected resource.
- ***Duration of Impact***—the period of time over which the resource would be affected, measured as short-term (up to five years or as defined by the resource section) or long-term (life of the project and beyond). The anticipated duration of some impacts define their significance.

Each alternative has been divided into segments and MPs. Various combinations of segments define the Proposed Action and alternatives, while MPs, and occasionally structure numbers, serve to locate precise points within the segments. See Figures 3-1 through 3-8 for segment locations and MP information.

4.1 AIR QUALITY

4.1.1 Affected Environment

Air quality is regulated by Federal (U. S. Environmental Protection Agency [EPA]), state (California Regional Air Resources Board [ARB]), and local air districts. The Federal *Clean Air Act* (CAA) of 1970 established National Ambient Air Quality Standards (NAAQS) in 40 CFR Part 50. The NAAQS include both primary (protective of human health) and secondary (protective of property and natural ecosystems) standards for "criteria" pollutants such as: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than 10 microns in diameter (PM_{10}). Based on the NAAQS, the CAA established criteria for designating the air quality in specific regions. Regions with air quality levels that exceed NAAQS are designated as "nonattainment" and regions with air quality levels that are less than or equal to NAAQS are designated as "attainment."

Air quality designations are determined through ambient air quality monitoring and are established for each pollutant. The 1990 *Clean Air Act* Amendments (CAAA) established attainment deadlines for all areas designated as nonattainment. The state of California has adopted standards known as the California Ambient Air Quality Standards (CAAQS) that are typically more stringent than NAAQS. A comparison of Federal and state standards is presented in Table 4.1-1.

The EPA has final responsibility for ensuring that all areas of the U.S. meet, or are making progress toward meeting, the NAAQS. All states must submit State Implementation Plans (SIP) for nonattainment areas to demonstrate to the EPA that regional air quality would meet NAAQS within the required time frame. Each District prepares a portion of the SIP and EPA either approves or disapproves the SIP. Each air quality district is also responsible for establishing rules and implementation measures to regulate air quality. This is done by developing permitting systems for existing, new, and modified

Table 4.1-1. Relevant Federal and California Ambient Air Quality Standards

Pollutant	Averaging Time	California AAQS[a,c]	Federal AAQS[b,c] Primary	Federal AAQS[b,c] Secondary
Ozone (O_3)	1-hour 8-hour[d]	0.09 ppm (180 µg/m³) ----	0.12 ppm (235 µg/m³) 0.08 ppm (157 µg/m³)	Same as primary standard
Carbon Monoxide (CO)	8-hour 1-hour	9 ppm (10 mg/m³) 20 ppm (23 mg/m³)	9 ppm (10 mg/m³) 35 ppm (40 mg/m³)	Same as primary standard
Nitrogen Dioxide (NO_2)[e]	Annual Average (1 hour)	---- 0.25 ppm (470 µg/m³)	0.053 ppm (100 mg/m³) ----	Same as primary standard
Sulfur Dioxide	Annual Average (24 hour)	---- 0.04 ppm[f] (105 µg/m³)	0.03 ppm (80 µg/m³) 0.14 ppm (365 µg/m³)	---- ----
Respirable Particulate Matter (PM_{10})	Annual 24-hour	30 µg/m³ 50 µg/m³	50 µg/m³ 150 µg/m³	Same as primary standard
Fine Particulate Matter ($PM_{2.5}$)[d]	24-hour Annual (Arithmetic Mean)	No separate State standard	65 µg/m³ 15 µg/m³	Same as primary standard
Visibility Reducing Particulates	1 observation	See footnote g	No Federal standard	No Federal standard

Source: Original 2002

[a]Title 17, California Code of Regulations, California Ambient Air Quality Standards (CAAQS) for ozone (O_3) (as volatile organic compounds [VOCs]), carbon monoxide (CO), sulfur dioxide (SO_2) (1-hour), nitrogen dioxide (NO_2), and particulate matter equal to or less than 10 microns in diameter (PM_{10}), are values that are not to be exceeded. The visibility standard is not to be equaled or exceeded.

[b]40 CFR Part 50. National Ambient Air Quality Standards (NAAQS), other than those for ozone and based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year (CY) with maximum hourly average concentrations above the standard is equal to or less than one.

[c]Concentrations are expressed first in units in which they were promulgated. Equivalent units are given in parentheses and based on a reference temperature of 25 degrees Celsius (C) and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25 degrees C and a reference pressure of 760 mm of mercury; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d]New Federal 8-hour ozone and fine particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$) standards were promulgated by U.S. Environmental Protection Agency (EPA) on July 18, 1997. The Federal 1-hour ozone standard continues to apply in areas that violate the standard.

[e]NO_2 is the compound regulated as a criteria pollutant; however, emissions are usually based on the sum of all oxides of nitrogen (NO_X).

[f]Applicable at locations where the state standards for ozone and/or PM_{10} are violated. National standards apply elsewhere.

[g]sufficient amount to reduce the prevailing visibility to less than ten miles (mi) when the relative humidity is less than 70 percent. "Prevailing visibility" is defined as the greatest visibility, which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

mg/m³: milligrams per cubic meter

mm: millimeter

µg/m³: micrograms per cubic meter

stationary sources, monitoring air quality, and enforcing the rules as necessary. Important nonstationary emission sources, such as automobiles, are also regulated by the EPA.

The CAA requires Federal agencies to assure that actions conform to the approved air quality implementation plans within regions designated federally as nonattainment. The actions of Federal regulatory authorities are not allowed to prevent a region from realizing the goals of the SIPs, namely achieving NAAQS deadlines. EPA has established "general conformity" rates. Impacts for applicable projects with emissions that exceed general conformity rates would be considered significant. The general conformity rates applicable to the Proposed Action and alternatives, measured in tons per year, are presented in Table 4.1-2. The EPA requires that projects having emissions that exceed the general conformity

Table 4.1-2. SVS Emission Thresholds of Significance

	AIR DISTRICT				
	FRAQMD	**PCAPCD**	**SMAQMD**	**SJVAPCD**	**BAAQMD**
SVS Project Air District Jurisdiction					
Proposed Action	X	X	X	X	X
Alternative 1	X	X	X	X	X
Alternative 2	X	X	X		
Alternative 3			X	X	X
No Action	X	X	X	X	X
PM_{10}					
Federal Attainment Status – PM_{10}	Nonattainment (Moderate)	Attainment	Nonattainment (Moderate)	Nonattainment (Serious)	Unclassified
EPA General Conformity Rate – PM_{10} (tons/year)	100 tons/year	N/A	100 tons/year	70 tons/year	N/A
Air District Construction Significant Threshold (lbs/day)	80 lbs/day	82 lbs/day	225 lbs/day	Note a	80 lbs/day
NO_X					
Federal Attainment Status – NO_X	Nonattainment (Severe)	Nonattainment (Severe)	Nonattainment (Severe)	Nonattainment (Serious)	Nonattainment (Unclassified)
EPA General Conformity Rate – NO_X (tons/year)	25 tons/year	25 tons/year	25 tons/year	50 tons/year	100 tons/year
Air District Construction Significant Threshold (lbs/day)	25 lbs/day	82 lbs/day	85 lbs/day	55 lbs/day	80 lbs/day
VOC (ROG)					
Federal Attainment Status – VOC (ROG)	Nonattainment (Severe)	Nonattainment (Severe)	Nonattainment (Severe)	Nonattainment (Serious)	Nonattainment (Unclassified)
EPA General Conformity Rate – VOC (ROG) (tons/year)	25 tons/year	25 tons/year	25 tons/year	50 tons/year	100 tons/year
Air District Construction Significant Threshold (lbs/day)	25 lbs/day	82 lbs/day	0 lbs/day	55 lbs/day	80 lbs/day

Source: Original 2002
[a]Emissions not quantified. Projects complying with recommended controls deemed not significant.
BAAQMD: Bay Area Air Quality Management District
FRAQMD: Feather River Air Quality Management District
lbs/day: pounds per day
NO_X: Nitrogen oxides
PCAPCD: Placer County Air Pollution Control District
PM_{10}: particulate matter less than or equal to 10 microns in diameter
ROG: Reactive organic gas
SJVAPCD: San Joaquin Valley Unified Air Pollution Control District
SMAQMD: Sacramento Metropolitan Air Quality Management District
VOC: Volatile organic compound

rates adopt enforceable emission control measures that reduce applicable pollutant emissions to the maximum extent possible. Estimated annual emissions from the Proposed Action and alternatives would not exceed EPA general conformity rates.

Air districts are responsible to develop guidance to regulate emission sources. Each district, therefore, publishes a significant emission threshold. The Proposed Action and alternatives would transect a combination of five air districts:

- Feather River Air Quality Management District (FRAQMD)
- Placer County Air Pollution Control District (PCAPCD)
- Sacramento Metropolitan Air Quality Management District (SMAQMD)
- San Joaquin Valley Air Pollution Control District (SJVAPCD)
- Bay Area Air Quality Management District (BAAQMD)

Projects with emissions of regulated pollutants that exceed district significance levels are required to control emissions to the lowest extent possible. Many air districts differentiate between construction and operational emissions, recognizing that construction emission impacts are short term and operational impacts are long term. Table 4.1-2 presents significant emission thresholds, based on maximum daily emissions, for each district that the project may be associated with.

4.1.1.1 Resource Study Area

Figure 4-1 shows the study area in relationship to the air districts and air basins. The study area includes five air districts: FRAQMD, SMAQMD, SJVAPCD, PCAPCD, and BAAQMD.

4.1.1.2 Issues of Environmental Concern

The primary source would be short-term pollutant emissions related to vehicle exhaust and particulates generated by soil-disturbing activities during construction and maintenance. Vehicles and internal combustion-powered equipment such as graders, excavators, dozers, scrapers, tractors, water trucks, and associated equipment would generate exhaust emissions of CO, NO_x (sums of all oxides of nitrogen), SO_2, VOCs/ROG, and PM_{10}. Earth clearing and grading and traffic on the site would also generate PM_{10}. NO_x and PM_{10} emissions are widely recognized as the pollutants of most concern.

4.1.1.3 Characterization

The study area experiences hot summers, mild winters, infrequent rainfalls, moderate breezes, and low humidity. Prevailing winds are southerly for all months except November, when the winds typically blow from the north. Topographical features, light winds, and minimal vertical mixing hinder the dispersal of air pollutants in the study area. Temperature inversions trap pollutants near the ground and commonly elevate air pollutant levels.

The entire study area is designated Federally and by the state as nonattainment for O_3 and PM_{10}. Activities in these areas would be required to meet higher emission standards for these pollutants. The study area is designated as attainment for all other regulated pollutants.

4.1.2 Environmental Consequences

4.1.2.1 Standards of Significance

The Proposed Action and alternatives would have significant, adverse effects on air quality if they:

- Violate ambient air quality or emissions standards applicable to the study area,
- Expose sensitive receptors to detrimental pollution concentrations,[1]
- Contribute to a collective or combined air quality effect of the Proposed Action and alternatives and foreseeable other projects that lead to violation of air quality standards, even if the individual effect of the project/activity is relatively minor compared with other sources,
- Produce air contaminants above the level of significant cancer risk, if any. The State of California defines the level of significant cancer risk as more than 10 confirmed cases per one million individuals exposed, or
- Conflict with adopted environmental plans and goals as provided in the SIP or regional air quality plan.

4.1.2.2 Environmental Protection Measures

EPMs for air resources from Table 3-4 include the following:

- All requirements of those entities having jurisdiction over air quality matters would be adhered to and any

[1] The California ARB defines sensitive receptors as "identifiable subsets of the general population that are at greater risk than the general population to the toxic effects of a specific air pollutant." One school and one senior residence are located within 1,000 feet of a transmission line that is part of the Proposed Action and Alternative 1 —reconductoring existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation.

permits needed for construction activities would be obtained. Open burning of construction trash would not be allowed.

- Project participant would use reasonably practicable methods and devices to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants.
- Visible emissions from diesel-powered equipment would be controlled.
- Emissions from all off-road diesel-powered equipment would not exceed 40 percent opacity for more than three minutes in any one hour.
- Equipment and vehicles that show excessive emissions of exhaust gases due to poor engine adjustments or other inefficient operating conditions would not be operated until corrective repairs or adjustments were made.
- Vehicles and equipment used in construction and maintenance of the Proposed Action or alternatives would maintain appropriate emissions control equipment and be appropriately permitted.
- Road construction would include dust-control measures such as watering and other approved suppressing agents for limiting dust generation during construction.
- Fill material storage piles would include dust-control measures such as water or chemical suppressants.
- Ground surfaces, which have been significantly disturbed, would be seeded appropriately to prevent wind dispersion of soil.
- Removal of vegetation and ground disturbance would be limited to the minimum area necessary to complete project construction activities. Vegetative cover would be maintained on all other portions of the project area.
- Regular watering of exposed soils and unpaved access roads would be conducted during the construction period.
- Grading activities would cease during periods of high winds (greater than 25 mph averaged over one hour).
- Trucks transporting loose material would be covered or maintain at least two feet of freeboard and not create any visible dust emissions.

4.1.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Tracy Substation to Elverta Substation

Impacts to air quality from the selection of either the Proposed Action or alternatives would primarily be short-term impacts during construction and, consequently, the following impact analysis is focused on these short-term emissions.

The Proposed Action involves new transmission, realignments, and reconductoring. Potential air impacts from new transmission, realignment, and reconductoring activities come from vehicle/equipment emissions for construction (poles, structure, and stringing), grading, site clearing, dust from traffic, digging and filling, and concrete operations. Impacts from reconductoring would be less than new transmission and realignment because fewer new structures would be built.

Western used established emission factors approved by Federal, state, and local agencies. Typical equipment use, and construction schedules were used to estimate construction emissions for the Proposed Action and alternatives. Average daily emissions, determined from the construction month having the highest emissions, were compared against each District's applicable emission significance threshold.

As shown in Table 4.1-3, maximum daily emissions for NO_x and PM_{10} would exceed significance thresholds in all air districts. Project emissions for VOCs would exceed SMAQMD and FRAQMD significant thresholds. EPA conformity rates are based on annual emissions and would not be exceeded by the Proposed Action.

While implementation of EPMs would reduce NO_x, $PM_{10,}$ and VOC emissions, to the maximum extent practical, emissions could still exceed the threshold values. Western has adopted a proactive stance by implementing EPMs that mirror measures recommended by the air districts.

Additionally, after the completion of engineering and design plans for an approved project, Western would complete an air analysis. This analysis would be more precise because Western's assumptions would be defined. Western expects that the NO_x, PM_{10}, and VOC emissions would actually be less than the estimated emissions presented in this EIS. Emission calculations are found in Western's "Estimated Emissions for the Sacramento Area Voltage Support Environmental Impact Statement Proposed Action and Alternatives" (Western 2002a).

4.1.2.4 Impacts from Alternative 1 —Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 involves only reconductoring. Potential air impacts from reconductoring are vehicle and equipment emissions and dust from traffic. As shown in Table 4.1-4, emissions for NO_x would exceed significance thresholds in FRAQMD and SJVAPCD. Emissions for PM_{10} would exceed FRAQMD and BAAQMD significant thresholds. VOC emissions would exceed FRAQMD and SMAQMD

significant thresholds. EPA conformity rates are based on annual emissions and would not be exceeded for Alternative 1.

While implementation of EPMs would reduce NO_x, VOC, and PM_{10} emissions to the maximum extent practical, emissions could still exceed the threshold values. Western has adopted a proactive stance by implementing EPMs that mirror measures recommended by the air districts.

4.1.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would involve new transmission and realignments. As shown in Table 4.1-5, project emissions for NO_x would exceed significance thresholds in associated air districts. Project emissions for PM_{10} would exceed FRAQMD, SMAQMD, and PCAPCD significance thresholds. VOC emissions would exceed FRAQMD and SMAQMD significance thresholds. EPA conformity rates are based on annual emissions and would not be exceeded by Alternative 2.

While implementation of EPMs would reduce emissions to the maximum extent practical, emissions could still exceed the threshold values. Western has adopted a proactive stance by implementing EPMs that mirror measures recommended by the air districts.

Table 4.1-3. Proposed Action Emission Significance Determination

Regulated Pollutant	Estimated Maximum Daily Construction Emission (lbs/day)	FRAQMD Significant Threshold (lbs/day)	PCAPCD Significant Threshold (lbs/day)	SMAQMD Significant Threshold (lbs/day)	SJVAPCD Significant Threshold (lbs/day)	BAAQMD Significant Threshold (lbs/day)
NO_X	106	25	82	85	55	80
PM_{10}	230	80	82	225	None[a]	80
VOC (ROG)	46	25	82	0	55	80

Source: Original 2002
[a]Emissions not quantified. Projects complying with recommended controls deemed not significant.
BAAQMD: Bay Area Air Quality Management District
FRAQMD: Feather River Air Quality Management District
lbs/day: pounds per day
NO_X: Nitrogen oxides
PCAPCD: Placer County Air Pollution Control District
PM_{10}: particulate matter less than or equal to 10 microns in diameter
ROG: Reactive organic gas
SJVAPCD: San Joaquin Valley Unified Air Pollution Control District
SMAQMD: Sacramento Metropolitan Air Quality Management District
VOC: Volatile organic compound

Table 4.1-4. Alternative 1 Emission Significance Determination

Regulated Pollutant	Estimated Maximum Daily Construction Emission (lbs/day)	FRAQMD Significant Threshold (lb/day)	SMAQMD Significant Threshold (lb/day)	SJVAPCD Significant Threshold (lb/day)	BAAQMD Significant Threshold (lb/day)
NO_X	76	25	85	55	80
PM_{10}	99	80	225	None[a]	80
VOC (ROG)	32	25	0	55	80

Source: Original 2002
[a]Emissions not quantified. Projects complying with recommended controls deemed not significant.
BAAQMD: Bay Area Air Quality Management District
FRAQMD: Feather River Air Quality Management District
lbs/day: pounds per day
NO_X: Nitrogen oxides
PM_{10}: particulate matter less than or equal to 10 microns in diameter
ROG: Reactive organic gas
SJVAPCD: San Joaquin Valley Unified Air Pollution Control District
SMAQMD: Sacramento Metropolitan Air Quality Management District
VOC: Volatile organic compound

4.1.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 involves only new transmission construction. As shown in Table 4.1-6, emissions for NO_x would slightly exceed significance thresholds in all air districts. PM_{10} emissions would exceed significant thresholds in BAAQMD. VOC emissions would exceed significant thresholds in SMAQMD. EPA conformity rates are based on annual emissions, and would not be exceeded by Alternative 3.

While implementation of EPMs would reduce emissions to the maximum extent practical, emissions could still exceed the threshold values. Western has adopted a proactive stance by implementing EPMs that mirror measures recommended by the air districts.

4.1.2.7 Impacts from the No Action Alternative

Transmission lines would not be constructed, reconductored, or realigned under the No Action Alternative. Therefore, air emissions would not increase and there would be no significant impacts.

Table 4.1-5. Alternative 2 Emission Significance Determination

Regulated Pollutant	Estimated Maximum Daily Construction Emission (lbs/day)	FRAQMD Significant Threshold (lb/day)	PCAPCD Significant Threshold (lb/day)	SMAQMD Significant Threshold (lb/day)
NO_X	106	25	82	85
PM_{10}	230	80	82	225
VOC (ROG)	46	25	82	0

Source: Original 2002
[a]Emissions not quantified. Projects complying with recommended controls deemed not significant.
FRAQMD: Feather River Air Quality Management District
lbs/day: pounds per day
NO_X: Nitrogen oxides
PCAPCD: Placer County Air Pollution Control District
PM_{10}: particulate matter less than or equal to 10 microns in diameter
ROG: Reactive organic gas
SMAQMD: Sacramento Metropolitan Air Quality Management District
VOC: Volatile organic compound

Table 4.1-6. Alternative 3 Emission Significance Determination

Regulated Pollutant	Estimated Maximum Daily Construction Emission (lbs/day)	SMAQMD Significant Threshold (lb/day)	SJVAPCD Significant Threshold (lb/day)	BAAQMD Significant Threshold (lb/day)
NO_X	86	85	55	80
PM_{10}	186	225	None[a]	80
VOC (ROG)	37	0	55	80

Source: Original 2002
[a]Emissions not quantified. Projects complying with recommended controls deemed not significant.
BAAQMD: Bay Area Air Quality Management District
lbs/day: pounds per day
NO_X: Nitrogen oxides
PM_{10}: particulate matter less than or equal to 10 microns in diameter
ROG: Reactive organic gas
SJVAPCD: San Joaquin Valley Unified Air Pollution Control District
SMAQMD: Sacramento Metropolitan Air Quality Management District
VOC: Volatile organic compound

4.2 BIOLOGICAL RESOURCES

4.2.1 Affected Environment

The biological resources section focuses on plant and animal species habitats within the proposed study area. Screening studies were completed to assist in determining the presence of the plants, animals, and habitats that Federal and state resource management agencies consider deserving of special consideration in resource planning and development activities.

Biological resources were evaluated by reviewing existing literature, discussing species-specific information with agencies, and observations made during site visits to the study area. Pedestrian surveys were restricted to nonagricultural and nonurban habitats. Surveys of habitats within the ROW were conducted on June 25 through June 28, 2001; November 28, 2001; February 21 through February 22, 2002; and August 23, 2002. Wildlife observations and habitat characterizations were recorded during these surveys. Indications of wildlife presence that were noted included direct sightings, scat, tracks, burrows, and other signs. Vegetation communities were characterized in the field and mapped on aerial photos. Table C-1 in Appendix C summarizes observed habitat within the study area. Additional surveys would be conducted for the selected action as determined by the ROD. This information would be used to prepare the biological assessment.

4.2.1.1 Resource Study Area

The study for biological resources defined as the transmission line corridor from the O'Banion Substation south to the Tracy Substation, a total of approximately 100 miles, with an approximate width of 125 feet. In some cases, the survey width extends beyond the proposed right-of-way (ROW) when biological resources of concern could be directly or indirectly impacted.

4.2.1.2 Issues of Environmental Concern

Issues of environmental concern include areas of designated critical habit, special-status wildlife and plants, and sensitive habitat types. These issues are described in detail below.

Designated Critical Habitat

Critical habitat was identified as an issue of concern to both the EPA and the U.S. Fish and Wildlife Service (USFWS). Critical habitat is defined in 50 CFR 424.02 as "the specific areas within the geographic area currently occupied by a species, at the time it is listed in accordance with the Act (*Federal Endangered Species Act* of 1973), on which are found those physical or biological features essential to the conservation of the species and that may require special management considerations or protection, and . . ." Either the USFWS or the National Marine Fisheries Service (NMFS) may list critical habitat.

Special-status Wildlife and Plant Species

Special-status species are those plants and animals that are of concern to Federal, tribal and state resource management agencies. These may include endangered or threatened species, organisms with declining populations, or vanishing habitats. Table C-2 in Appendix C summarizes special-status species that have been identified as occurring or potentially occurring in the study area.

Special-status species that may occur in the study area were identified by searching the California Department of Fish and Game (CDFG) California Natural Diversity Data Base (CNDDB), and from correspondence with the USFWS and NMFS (refer to Appendix C for the CNDDB results and agency letters). The CNDDB was searched on June 20, 2001, for each U.S. Geological Survey (USGS) 7.5-minute quadrangle within which the Proposed Action ROW occurs. The species list provided by the USFWS on October 29, 2001, contains the special-status species known to occur in the study area. The list provided by the NMFS on April 27, 2001, contains species known to occur within the aquatic systems crossed by the Proposed Action ROW. Both lists are summarized in Appendix C.

Sensitive Habitat Types

Wetlands, primarily vernal pools, are an issue of concern within the study area. Vernal pools provide habitat for a number of endangered, threatened, proposed, and Candidate species. These include several species of vernal pool fairy and tadpole shrimp, as well as a number of plants.

Riparian corridors, another sensitive habitat type found within the study area, are defined as those habitats bordering rivers and streams. They contain plant species that are considered mesophytic (a plant that tolerates both dry and wet conditions). These include cottonwood (*Populus* sp.), willow (*Salix* sp.), sycamore (*Platanus* sp.), and other herbaceous and woody vegetation. Riparian corridors are sensitive because of their proximity to aquatic systems. Ground disturbance in riparian corridors can lead to erosion and the subsequent increase in sedimentation that would decrease water quality in these areas and downstream. Vegetation removal within riparian corridors can also increase the adverse effects of flooding.

4.2.1.3 Characterization

The following section presents a characterization of habitat types and associated plant species found in the study area. Each segment within the study area is then described based on these habitat types.

Habitat Types and Associated Plant Species

Fifteen different habitat types occur within the study area. In general, habitat types were categorized based on *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Riverine, lacustrine, pasture, cropland, orchard/vineyard, and urban habitat types, which could not be categorized using Holland (1986), were categorized based on *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Brief descriptions of these habitat types and associated plant species are provided below.

- ***Cropland*—**Cropland habitat is typically a monoculture; that is, a single species growing in a given space. Most croplands support annuals planted in spring and harvested during summer or fall. In many areas, second crops are commonly planted after the first are harvested (Zeiner 1988a). A major portion of the cropland in the study area is used for rice fields, which provide habitat for a different set of species, such as waterfowl, because they are flooded.
- ***Freshwater emergent wetland*—**These wetlands are characterized by erect, rooted, herbaceous hydrophytic (water-loving) vegetation. Dominant plants are generally perennials up to seven feet high (Cowardin *et al.* 1979). Freshwater emergent wetlands are flooded frequently and the plants found there must be able to tolerate an absence of oxygen (anaerobic) environment around their roots. Additional detail regarding this habitat type is provided in Sections 4.6 and 4.16, which address floodplains and wetlands, respectively.
- ***Great Valley Cottonwood Riparian Forest*—**This habitat type is a dense, broad-leaved, winter-deciduous riparian forest dominated by Fremont cottonwood (*Populus fremontii*) and Gooddings willow (*Salix gooddingii variabilis*). The understory is dense, with abundant vegetative reproduction of canopy-dominant species. California wild grape (*Vitis californica*) is the most conspicuous vine. Scattered seedlings of shade-tolerant species such as box-elder (*Acer negundo californica*) or Oregon ash (*Fraxinus latifolia*) may be found within this riparian forest, but frequent flooding prevents their reaching into the canopy (Holland 1986).
- ***Great Valley Mixed Riparian Forest*—**This habitat is a tall, dense, winter-deciduous, broad-leaved riparian forest. The tree canopy usually is fairly well closed and moderately to densely stocked with several species including box-elder, California black walnut (*Juglans californica hindsii*), western sycamore (*Platanus racemosa*), Fremont's cottonwood, Goodding's willow, red willow (*Salix laevigata*), and *Salix lasiandra*. The understory consists of these taxa plus shade-tolerant shrubs like buttonbush (*Cephalanthus occidentalis*) and Oregon ash. Several vine species are conspicuous in both tree and shrub canopies (Holland 1986).
- ***Great Valley, Valley Oak Riparian Forest*—**This habitat contains medium to tall trees that are rarely more than 100 feet tall. The habitat generally consists of broad-leaved, winter-deciduous, closed-canopy, riparian forest dominated by valley oak. Understory species include scattered Oregon ash, California black walnut and western sycamore, as well as young valley oaks. Vines are often conspicuous and quickly moving into sunny areas created by openings in the canopy. They are also scattered throughout the shady understory (Holland 1986).
- ***Lacustrine*—**Lacustrine habitats, including ponds or lakes, are inland depressions or dammed riverine channels containing standing water. They may vary from small ponds of less than two acres to large areas covering several square miles. Depth can vary from a few inches to hundreds of feet. Lacustrine habitats include permanently flooded lakes and reservoirs, intermittent lakes, and ponds (Grenfell 1988a). Ponds are the main lacustrine habitat type in the study area.
- ***Nonnative Grassland*—**A dense to sparse cover of annual grasses (plants that germinate, mature, set, seed, and die in one year) typifies this habitat type, often associated with numerous species of showy-flowered, native annual forbs ("wildflowers"), especially in years of favorable rainfall. Germination occurs with the onset of the late fall rains, growth, flowering, and seed-set occur from winter through spring. With a few exceptions, the plants are dead through the summer-fall dry season, persisting as seeds (Holland 1986).
- ***Orchard/Vineyard*—**Orchards are typically single-species, tree-dominated habitats. Depending on the tree type and pruning methods, they may be low bushy trees or taller species with a closed canopy. Both have an open understory to facilitate harvest. Vineyards are composed of single species planted in rows, usually supported on wood and wire trellises. Vines are normally intertwined in the rows but are open between rows. The ground under the vines is usually sprayed with herbicide to prevent growth of unwanted plants (Schultze 1988).

- ***Pasture*—**Pasture vegetation is a mix of annual and perennial grasses and legumes that normally provide 100-percent ground cover. The mix of grasses and legumes varies according to management practices, such as seed mixture, fertilization, soil type, irrigation practices, weed control, and livestock type on the pasture (Zeiner 1988b).
- ***Riverine*—**Riverine habitats are intermittent or continually running water, such as rivers and streams (Grenfell 1988b). Within the study area, riverine habitats vary from large rivers, such as the San Joaquin and Cosumnes rivers, to intermittent streams, such as Coon Creek.
- ***Urban*—**The structure of urban vegetation varies with the five types of vegetative structure: tree grove, street strip, shade tree/lawn, lawn, and shrub cover. Tree groves are common in city parks, greenbelts, and cemeteries. Strips of trees along streets show variation in spacing of trees, depending on the species, design and landowner preferences. Lawns are structurally the most uniform vegetation of the California urban habitat. Shrub cover is more limited in distribution than the other structural types; hedges represent a variation of the urban shrub cover type. Species composition varies with planting design and climate (McBride and Reid 1988).
- ***Valley Needlegrass Grassland*—**This habitat is a mid-height (up to two feet) grassland dominated by perennial tussock-forming needlegrass (*Stipa pulchra*). Native and introduced annuals occur between the perennials, often actually exceeding the bunchgrasses in ground cover (Holland 1986).
- ***Valley Oak Woodland*—**This habitat type is similar to Northern Oak Woodland and Blue Oak Woodland, but typically, more open, forming a grassy understory savanna rather than a closed-canopy woodland. Valley Oak (*Quercus lobata*) is usually the only tree present within this type of woodland. This winter-deciduous species is California's largest broad-leaved tree, with mature individuals reaching 50 feet to 115 feet tall. Most stands consist of trees with an open-canopy growth form. The stands seldom exceed 30 to 40 percent ground cover (Holland 1986).
- ***Valley Wildrye Grassland*—**This is a dense, sod-prairie habitat dominated by rye grass *Elymus triticoides* (Holland 1986).
- ***Vernal Pool*—**Holland (1986) categorized two types of vernal pool habitat that may occur in the study area: Northern Hardpan Vernal Pool and Northern Claypan Vernal Pool. The surveys conducted did not distinguish between these two categories and, as a result, only the category vernal pool is used in this document. Vernal pools consist of grass- or mud-bottomed swales, earth sumps, or basalt flow depression pools in unplowed grasslands (USFWS 1992) with an impermeable layer. The impermeable layer allows the pools to retain water much longer than the surrounding uplands; nonetheless, the pools are shallow enough to dry up each season. Vernal pools may fill and empty several times during the rainy season (California Wetlands Information System 2002). This habitat type is important in the Central Valley of California because only plants and animals that are adapted to this cycle of wet and dry can survive in vernal pools. A number of protected plant and animal species rely on vernal pool habitats resulting in special management consideration.

Segment Characterization

Figures 3-1 through 3-8 map the line segments and MPs. Segments A and A_1 have nine stream crossings (extending from the O'Banion Substation to north of the Elverta Substation), totaling approximately 0.9 miles of riverine and riparian habitat. Additionally, Segments A and A_1 parallel the Sutter Causeway for approximately nine miles. A total of 13.4 acres of wetland are crossed by this segment (wetlands are further described in Section 4.16). The first 1.8 miles of Segments A and A_1 crosses cropland—mostly rice fields and their associated irrigation ditches along with some scattered wetlands. The segment also crosses Gilsizer Slough from MP 1.8 to 2.0. Gilsizer Slough is an important freshwater emergent wetland, which provides suitable habitat for the giant garter snake. From MP 2.0 to 11.0, Segments A and A_1 cross cropland. At MP 11.0, the ROW encounters the north levee of the Feather River floodplain. This floodplain is approximately one-half mile wide. At least one structure (146/3) is in the Feather River State Wildlife Area that lies between the two levees. South of MP 11.5 (the south levee of the Feather River), the segments cross mostly cropland except at Coon Creek, between MPs 13.3 and 13.5, which contains some riparian habitat. Coon Creek is about 13.5 miles south of the O'Banion Substation. The next four miles cross cropland. About 17.5 miles south of the O'Banion Substation, Segments A and A_1 cross East Side Canal. From there to about MP 20.0, both of the segments cross croplands, some small freshwater emergent wetlands, and the riparian and floodplain habitats associated with Pleasant Grove Slough and Pleasant Grove Creek. Segment A continues to MP 22.4, crossing some urban and grassland habitat types.

Segments A and A_1 contain giant garter snake and California red-legged frog habitats near the O'Banion Substation and along the Sutter Bypass, (Segments A and A_1, MP 0.0 to 10.0) where wetlands and canal ditches are dispersed. There are numerous freshwater emergent wetlands, both natural and manmade. The latter includes

rice fields as well as irrigation ditches and canals. Birds were noted nesting and/or perching on the existing transmission line structures along the entire length of the segment.

Segment B is mostly residential, with some areas less developed than others. There may be vernal pool habitat along this segment. Most of the habitat types in Segment B include grasslands, urban and some valley oak woodlands. There are two stream crossings in Segment B totaling approximately 0.1 mile of riverine and riparian habitat. The segment also crosses 1.5 acres of wetlands (a more detailed description of wetlands is provided in Section 4.16 Wetlands).

The north end of Segment C (Elverta Substation to Hurley Substation) is rural residential from MP 0.0 to 5.5. There are wetlands, including vernal pools, intermixed with grassland habitat in this segment. Just south of the crossing of Interstate 80, urban habitat types become common. At approximately MP 7.5, the segment enters into the American River floodplain and continues through the floodplain for approximately 3.8 miles. Where Segment C crosses or parallels the American River floodplain, its associated vegetation includes elderberry shrubs. There is evidence of habitation by the threatened valley elderberry longhorn beetle (VELB). The floodplain of the American River, between MP 7.3 and 11.1 also contains several small freshwater emergent wetlands (see Section 4.16). There are 4.2 total miles (62.7 acres) of riparian habitat and vernal pools crossed by Segment C. There are also two drainage canal crossings in Segment C.

There are five stream crossings in Segment D (extending from the Hurley Substation to the Elk Grove Substation) totaling approximately 2.4 miles of riverine and riparian habitat. The segment also crosses 36.3 acres of wetlands (see Section 4.16 for further detail of wetlands occurring within this segment). Segment D parallels the American River for about one mile and crosses it once. The first one-quarter mile of Segment D crosses the floodplain of the American River which contains elderberry bushes in its riparian zone. The next one-half mile crosses urban habitat before recrossing the American River at the American River Parkway. The American River Parkway also contains elderberry bushes that support the Federally threatened VELB. After leaving the riparian habitat of the American River, as the segment goes further south, the land becomes more industrialized, leaving most natural communities and small highly fragmented parcels. The existing transmission line crosses urban habitat with industrial parks, landfills, and nonnative grasslands. Segment D then turns almost due south at MP 7.0, at the Hedge Substation. Once the segment passes Gerber Road at MP 8.8, the habitat becomes less urban and more rural residential, with grasslands, croplands, and widely scattered residences. For most of the remaining length of Segment D, habitat types encountered include riparian, riverine, and grassland. Segment D crosses Laguna Creek and its associated riparian area at MP 12.8, which may provide habitat for the California red-legged frog. There may also be vernal pools and more riparian habitat along Elk Grove Creek at MP 14.7.

Segments E and E_1 (extending from the Elk Grove Substation south to the Tracy Substation) begin at the Elk Grove Substation and go almost due south to MP 8.0. The transmission line route crosses several lacustrine and emergent wetlands and at least one riverine wetland. The latter is associated with the Cosumnes River. The Cosumnes River corridor, which starts at MP 2.6 (Eschinger Road) and runs to MP 6.8 (Twin Cities Road), is part of the Cosumnes River Preserve and managed jointly by the Nature Conservancy, Bureau of Land Management (BLM), the CDFG, and other agencies. This area is managed for the benefit of wildlife and native communities. The Cosumnes River floodplain contains dense riparian habitat consisting of willows and poplar trees with scattered oak trees approximately 120 yards apart on each side of the river. The existing ROW contains a 25-foot wide vegetation buffer where vegetation is limited to 12 feet high along the north and south banks of the Cosumnes River. There is the likelihood of a large giant garter snake population around Badger Creek, Segments E and E_1, MP 4.4. From about MP 10.0 to 13.0 Segments E and E_1 cross several draws and sloughs as well as the Mokelumne River and Dry Creek. These riverine systems contain important riparian habitat. Segment E_1 crosses 23 streams totaling approximately 3.1 miles of riverine and riparian habitat. This segment also crosses 47.3 acres of wetlands.

Other important wetland habitat is found from MP 24.3 to 31.0. There is a large wetland/riparian area between Pixley Slough and Bear Creek. Access was limited during surveys, but observations from the levee showed an extensive dense wetland area. The area appeared to contain several large poplar trees and valley oaks. Fourteen Mile Slough, San Joaquin River, and Stockton Deep Water Channel along with Mokelumne Slough provide riverine and riparian habitat.

At MP 31.1, Segments E and E_1 turn southwest to the Tracy Substation. Most of this portion of Segments E and E_1 traverse croplands including orchards, vineyards, row crops, and grasslands. As the transmission line approaches the Tracy Substation, the habitat includes more grassland types such as pasture and annual grasslands, as well as freshwater emergent wetlands. The agricultural areas are interspersed with ditches, drains, and watercourses. Elderberry shrubs were identified within some of these

agricultural areas beneath existing towers (MP 36.75, 40.3, and 41.5).

Segments E and E_1 cross several watercourses that provide riparian habitat. The habitat includes areas suitable for giant garter snake, red-legged frog, and vernal pool species of concern. Important riparian habitat was noted at the Cosumnes and San Joaquin river crossings, Badger, Laguna, and Dry creeks and Pixley Slough. Freshwater emergent wetlands were observed in association with the watercourses. A number of vernal pools were found in the area of the Cosumnes River Nature Preserve.

Segment F is approximately 1.5 miles long. The study area for Segment F crosses Curry Creek at approximately MP 0.3. Curry Creek contains some riparian habitat. There is one stream crossing in Segment F totaling approximately 0.1 miles of riverine and riparian habitat. One half acre of wetland is also crossed by the segment (see Section 4.16, Wetlands).

Between MP 2.0 and 4.2 of Segment G where it crosses Curry Creek, several unnamed tributaries to Curry Creek and several wetland areas associated with Curry Creek exist. These wet areas, including the streams, appear to be suitable habitat for giant garter snake and red-legged frog. Rice fields at the north end of Segment G could also provide suitable habitat for both species. Vernal pools may also be present within and adjacent to the ROW. There are two stream crossings in Segment G totaling approximately 0.2 miles of riverine and riparian habitat. Three acres of wetland are also crossed by the segment (see Section 4.16, Wetlands).

The habitat for Segment H includes areas suitable for giant garter snake, red-legged frog, and vernal pool species of concern. Segment H would also cross several unnamed drainages that flow west to the Natomas East Main Drainage Canal, and the potential exists for the introduction of fish species into these waterbodies.

4.2.2 Environmental Consequences

4.2.2.1 Standards of Significance

The Proposed Action and alternatives would have significant and adverse effect on biological resources if they:

- Adversely affect a listed endangered, threatened, or proposed plant or animal species or designated critical habitat,
- Substantially interfere with the movement of any native resident or migratory fish or wildlife species for more than one reproductive season,
- Reduce the value of habitat for fish, wildlife, or plants to an unusable level,
- Cause a native fish or wildlife population to drop below self-sustaining levels,
- Introduce or increase the spread of noxious weeds, or
- Adversely and substantially affect important riparian areas, wetlands, or other wildlife habitats.

Short-term impacts are those that last through the construction phase of a project, or one or two reproductive cycles, whichever is longer.

Long-term impacts are those that last more than two reproductive periods, or as long as the life of the transmission line depending on the organism or habitat involved.

Direct impacts are those that occur as a result of construction or operation of the transmission line.

Indirect impacts are those that occur as a result of the transmission line presence. These are usually associated with increased human accessibility to a previously inaccessible area. Because of the existing development in the Sacramento Valley, indirect impacts to biological resources would be negligible.

4.2.2.2 Environmental Protection Measures

EPMs for biological resources from Table 3-4 include the following:

- Mitigation measures developed during the consultation period under Section 7 of the ESA would be adhered to as specified in the subsequent Biological Opinion of the USFWS. In addition, mitigation developed in conjunction with state and tribal authorities would be followed.
- Before construction, all construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address Federal, state, and tribal laws regarding antiquities, fossils, plants, and wildlife, including collection and removal, and the importance of these resources and the purpose and necessity of protecting them.
- Construction sites located in sensitive habitats would require a qualified biologist to conduct a site survey before clearing vegetation. The survey would identify any biologically sensitive issues such as wetlands, vernal pools, or habitat of concern. Western would use Best Management Practices to lessen disturbance.
- During construction, no equipment refueling or oil changing would be conducted within 300 feet of any waterbody or streams.
- Within riverine habitat, ROW clearing would be done by mechanical and manual methods. Construction

activities would not occur within 100 feet of the streambank.

- Vegetation would be controlled or removed in accordance with Western's *Integrated Vegetation Management Environmental Guidance Manual* (Western 1999).
- Elderberry shrubs would be avoided to the extent practical to minimize impacts to the threatened valley elderberry longhorn beetle.
- To the extent practical, freshwater emergent, lacustrine, and riverine wetlands would be spanned and vehicular traffic would not encroach within 100 feet of the boundary of these wetlands.
- To the extent practical, during the wet season, vernal pools would be driven around, spanned, or otherwise avoided.
- Reconductoring and/or replacing insulators on structures containing active raptor nests would be conducted after young birds have fledged. Inactive nests would not be removed from structures unless they pose a safety or reliability hazard.
- Human activity in the Cosumnes River Preserve during the winter months could disturb foraging behavior and adversely affect sandhill cranes. Western would coordinate construction timing in this area with the Preserve and the USFWS to the extent practical.
- Construction between the Cosumnes River and Laguna Creek could result in increased erosion and sedimentation, which may adversely affect fish species occurring in the area. Western would span these water bodies, and no construction equipment would cross via the water bodies, when water is present. In addition, sedimentation control structures would be used to prevent sediment from reaching riverine habitat.
- Hazardous materials would not be drained onto the ground, into streams, or into drainage areas. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials.
- Special-status species or other species of particular concern would be considered during post-EIS phases of project implementation in accordance with management policies set forth by the appropriate land-managing agency. This could entail conducting surveys for plant and wildlife species of concern. Where such species are identified, appropriate action would be taken to avoid adverse impacts on the species or habitat.
- At completion of work, all work areas except access trails would be scarified or left in a condition that would facilitate natural or appropriate vegetation, provide for proper drainage, and prevent erosion.

4.2.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

The following section discusses those impacts anticipated to occur to critical habitat, special status species, and sensitive habitat types as a result of implementation of the Proposed Action. The Proposed Action includes work in all segments (Segments A through H).

Construction, reconductoring, and realignments may result in adverse impacts to biological resources. These impacts may include the discovery of an endangered, threatened, or critical habitat during construction or impacts to wetlands if Western was unable to span the area.

To avoid significant impacts, Western's construction and operation activities would comply with the EPMs presented in Table 3-4. Additionally, after the selection of a project, Western would prepare a Biological Assessment and survey the area as part of Section 7 consultation with the USFWS. The USFWS Section 7 consultation would evaluate the potential impacts to the Federally listed species presented in Appendix C, Table C-2. The CDFG would be consulted for state species of concern also listed in Table C-2.

If the project selected is located in San Joaquin County, Western would coordinate with Joint Powers Authority of San Joaquin County. San Joaquin County is within the area covered by the San Joaquin Multi-species Habitat Conservation Plan (MSHCP or Plan). The San Joaquin MSHCP conservation strategy relies on minimizing, avoiding, and mitigating impacts for species covered under the MSHCP, including Swainson's hawk, valley elderberry longhorn beetle, giant garter snake, burrowing owl, vernal pools, and vernal pool species.

Designated Critical Habitat

Critical habitat for the VELB is found near the transmission line between the Elverta Substation and Hurley Substation. No other critical habitat for VELB is designated within the study area.

The need to remove elderberry shrubs from the ROW and at structure locations would result in direct, adverse impacts to the threatened VELB. Replacing insulators and

rehanging the conductors would involve going to a specific structure by truck and cutting back vegetation within a 20-foot radius of the structure to allow a safe work area. Where these structures are co-located with elderberry shrubs, for instance along the American River Parkway, the VELB could be directly impacted.

Elderberry shrubs would be avoided to the extent practical to minimize impacts to the threatened VELB. If impacted, mitigation measures would be implemented in accordance with the Biological Opinion. Construction staging areas would be planned to avoid impacting elderberry shrubs. In areas where elderberry shrubs occur adjacent to construction, environmentally sensitive area fencing would be put in place under the supervision of a biological monitor.

Critical habitat for winter-run and spring-run Chinook salmon also exists in the study area within the Sacramento-San Joaquin Rivers Delta. Critical habitat for salmon is considered all tidal waters of the Delta, including the San Joaquin River and its tributaries.

Special-status Wildlife and Plant Species

Endangered or threatened wildlife and plant species associated with vernal pools may be adversely impacted by the movement of vehicles through vernal pools. Where possible, vernal pools would be avoided by requiring vehicles to drive around them, or span them during construction. Consultation with the USFWS will determine mitigation that may be required for temporary impacts to vernal pool species.

Raptor nests may be impacted during reconductoring or replacing insulators on transmission line structures. Sandhill cranes that may be present at Cosumnes River Preserve during winter migration could be affected by disturbance caused during construction.

To the extent practical, reconductoring and insulator replacement would occur outside the nesting season to avoid impacts to nesting birds, including raptors (approximately mid-February through mid-July). On towers with active raptor nests, construction would be conducted after young birds have fledged as determined by the qualified biologist. Inactive nests would not be removed from structures unless they pose a safety or reliability hazard. This work would also be scheduled to avoid winter migration of sandhill cranes at Cosumnes River Preserve, Segments E and E_1, MP 4.0 to 7.0. Construction timing in this area would be coordinated with the Preserve and the USFWS to the extent practical.

Sensitive Habitat Types

Constructing a new transmission line between the O'Banion Substation and the Elverta Substation (Segment A_1) would require the temporary disturbance of more than 419 acres and the permanent disturbance of over 54 acres of habitat. This would result in impacts to all of the habitat types discussed for Segment A_1 (Section 4.2.1.3).

Impacts to riverine and freshwater emergent wetlands may also occur with construction of a new transmission line. Temporary water crossings (timber mats, etc.) may be built to access areas between the Cosumnes River and Laguna Creek, which may unavoidably cause increased sedimentation of riverine habitat. Further discussion of wetland impacts is presented in Section 4.16.

Removal of large woody vegetation from the water's edge in riparian habitats would result in some additional solar heating of the water. Removing vegetation in the riparian zone would also result in erosion and the subsequent increase in sedimentation of the watercourse. This would reduce the value of the habitat to aquatic and semi-aquatic wildlife.

The addition of a new double-circuit transmission line in this area, parallel to the existing line, would increase the possibility of bird collisions. If collisions occur, Western would provide marking devices to minimize collisions.

Reconductoring the existing transmission line between the Elverta Substation and the Hurley Substation (Segment C) would result in the temporary disturbance of 6.6 acres. It would involve two major actions that could result in direct impacts to biological resources. These actions would be development of pulling or tensioning sites necessary for installing new conductors and replacement of insulators on each structure. Typically, a pulling site would be required in the existing ROW, approximately every two to five miles. Constructing the pulling sites would result in minor additional loss of vegetation.

Where previously cleared areas are not available, it would be necessary to clear an area of vegetation for the pulling site. These uncleared areas would include places where the pulling sites occur at turning structures. Because the conductors and overhead ground wires are pulled in a straight line, when the transmission line turns a corner, the pulling sites may occur outside the ROW. Removing vegetation in these areas would typically be a short-term impact since vegetation would grow back.

Modification or replacement of some of the existing structures would provide additional support for the new conductor. These modifications may include increasing the height of, or reinforcing the structures, or installing larger cross-arms. Any of these activities would occur in the existing ROW. The impacts would be similar to those described above for replacing insulators.

Reconductoring the existing transmission line in Segment D (from the Hurley Substation to the Elk Grove Substation) would require temporary disturbance of approximately 16 acres. The same biological impacts described for Segment C would pertain to Segment D.

Reconductoring the existing transmission line in Segment E (from the Elk Grove Substation to the Tracy Substation) would require temporary disturbance of about 43 acres. The same biological impacts described for Segments C and D would pertain to Segment E.

There are two stream crossings in Segment G (located east of the starting point of Segment F to the Cottonwood–Roseville transmission line) totaling approximately 0.2 mile of riverine and riparian habitat. Realigning approximately five miles of the Cottonwood–Roseville transmission line would require new construction resulting in nearly 90 acres of temporarily disturbed habitat and almost 12 acres of long-term habitat disturbance. Some of this habitat is considered suitable for giant garter snake, fairy shrimp, and red-legged frog.

Abandonment of a transmission line may require the movement of personnel and equipment to remove conductor and shield wire, along with the steel structures. The actions and equipment required for abandonment would be similar to construction and would cause similar impacts. Biological resources that could be affected by these actions include wetlands, including vernal pools where they occur, as well as riparian and agricultural habitats. Impacts to the agricultural habitats would be temporary and short term.

4.2.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

The following section discusses potential impacts to critical habitat, special-status species and other sensitive habitat types resulting from implementation of Alternative 1. EPMs presented in Table 3-4 and consultation and coordination described for the Proposed Action would apply to Alternative 1. Alternative 1 consists of Segments A, B, C, D, and E (see Section 4.2.1.3). Reconductoring existing lines from the O'Banion Substation to the Tracy Substation would result in fewer impacts to biological resources than the Proposed Action. There are fewer acres of temporary disturbance and no areas of long-term disturbance. There would be no additional ROW requirements, although pulling sites may be required outside the ROW at turning structures.

Designated Critical Habitat

Critical habitat for the VELB is found near the transmission line between the Elverta Substation and Hurley Substation. Reconductoring of the transmission line would not result in any impacts to the VELB critical habitat. Critical habitat for the winter-run and spring-run Chinook salmon occurs within all tidal waters of the Delta, including the San Joaquin River and its tributaries. Reconductoring would not impact this critical habitat.

Special-status Wildlife and Plant Species

In some cases, recurrent removal of elderberry shrubs may be necessary. Implementation of the EPMs and the anticipated Section 7 consultation with USFWS would minimize the magnitude of biological resource impacts.

Reconductoring the existing transmission line would not increase the potential for bird collisions. Spacing of conductors and other equipment would minimize the likelihood of large bird electrocutions.

Sandhill cranes that may be present at Cosumnes River Preserve during winter migration could be affected by disturbance caused during construction.

Sensitive Habitat Types

The impacts would include the movement of equipment down the ROW and removal of vegetation within 20 feet of existing structures for safe workspace. Pulling and tensioning sites would also be cleared.

Depending on the type of wetland and timing of construction, movement of equipment through the wetland could result in contamination of the water or adversely affect the impermeable layer that keeps water from percolating down through the substrate. In those areas where the existing ROW contains wetlands, impacts would occur as described in Section 4.16.

Under Alternative 1, it would be necessary to modify or replace approximately 199 existing structures to provide additional support for the new conductor. These modifications may include increasing the height of, or reinforcing the structures, or installing larger crossarms. Any of these activities needed would occur in the existing ROW. This work may result in impacts to elderberry shrubs if they exist beneath any of the 199 existing structures to be modified or replaced. The impacts would be similar to those described above for the Proposed Action.

4.2.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

The following section discusses impacts to critical habitat, special-status species, and other sensitive habitat

types resulting from implementation of Alternative 2. EPMs presented in Table 3-4 and consultation and coordination described for the Proposed Action would apply to Alternative 2. Alternative 2 includes Segments A_1, B, F, G, and H.

Designated Critical Habitat

Critical habitat for the VELB is found near the Elverta Substation. No impacts to designated critical habitat would occur under Alternative 2.

Special-status Wildlife and Plant Species

The need to remove elderberry shrubs where they occur in the ROW and at structure locations, particularly along riparian habitats, would result in an adverse impact to the VELB. The EPMs and the anticipated Section 7 consultation with USFWS would minimize the magnitude of impacts.

Building a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation would require the temporary disturbance of 486 acres and the permanent disturbance of nearly 66 acres of habitat. It could result in impacts to all of the habitat types discussed in Section 4.2.1.3. Primary concern would be impacts to vernal pools. Movement of vehicles through vernal pools would result in adverse impacts to the habitat by contamination and possibly the loss of integrity of the impermeable substrate. Further discussion of potential impacts to vernal pools is provided in Section 4.16.

The addition of a new double-circuit transmission line in this area, parallel to the existing transmission line, would increase the possibility of bird collisions. The design requirements of the transmission line would minimize the potential for electrocutions of large birds.

Sensitive Habitat Types

Additional impacts to riverine and freshwater emergent wetlands are also a possibility. Removal of large woody vegetation from the water's edge in riparian habitats would result in additional solar heating of the water. Removal of vegetation in the riparian zone would result in erosion and the subsequent increase in sedimentation of the watercourse, which would adversely affect aquatic and semi-aquatic wildlife.

Although some habitat alteration would occur, there are no large tracts of forested habitat in these segments that would suffer from fragmentation if a 125-foot ROW were cleared through them.

4.2.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation To Tracy Substation

The following section discusses impacts to critical habitat, special-status species, and other sensitive habitat types resulting from implementation of Alternative 3. EPMs presented in Table 3-4 and consultation and coordination described for the Proposed Action would apply to Alternative 3. Alternative 3 consists of Segment E_1.

Designated Critical Habitat

Critical habitat for the VELB is found near the Elverta-Hurley transmission line. There is no VELB critical habitat designated within the alignment from the Elk Grove Substation to the Tracy Substation. Critical habitat for the winter-run and spring-run Chinook salmon occurs within all tidal waters of the Delta, including the San Joaquin River and its tributaries.

Where the transmission line crosses the San Joaquin River or its tributaries, measures would be taken to avoid impacts to the waterways so as to avoid impacts to the listed winter-run and spring-run Chinook salmon.

Special-status Wildlife and Plant Species

In some cases, recurrent removal of elderberry shrubs may be necessary. The EPMs and the planned Section 7 consultation are expected to minimize the magnitude of biological resource impacts.

Segment E_1 contains suitable habitat for the giant garter snake and the red-legged frog, which, if present, would be impacted (directly and indirectly) by constructing and maintaining this transmission line.

The construction of a double-circuit transmission line in this area would increase the potential for bird collisions. The stacked configuration of conductors and shield wires on the double-circuit structure would increase the number of wires to be avoided. This would be problematic at communication corridors such as at watercourses and valley crossings. The design requirements of a 230-kV transmission line would minimize the likelihood of electrocution of large birds.

Sandhill cranes that may be present at Cosumnes River Preserve during winter migration could be affected by disturbance caused during construction.

Sensitive Habitat Types

This alternative would temporarily disturb more than 850 acres and permanently disturb more than 100 acres of habitat. It could result in impacts to all habitat types discussed in the characterization of Segment E_1 (Section

4.2.1.3). Primary concern would be of impacts to the Cosumnes River Preserve. Movement of vehicles through this area could result in adverse effects to riverine and freshwater emergent wetlands by contamination. Removing large woody vegetation from the water's edge in riparian habitats would result in some additional solar heating of the water. Clearing vegetation in the riparian zone would result in erosion and the subsequent increase in sedimentation of the watercourse, which would adversely affect aquatic and semi-aquatic wildlife. Vernal pools have also been identified within the Cosumnes River Preserve in the vicinity of the transmission line (May Consulting Services October 2000).

There is a possibility for indirect long-term impacts from creating new access into the Cosumnes River Preserve through the development of access roads. While the land managers minimize entrance to the Preserve, the presence of new access roads and the movement of heavy equipment increase the likelihood that others may find an entrance to explore the area.

4.2.2.7 Impacts from the No Action Alternative

If the facilities were not developed, routine and emergency maintenance would continue to repair or replace equipment or remove vegetation, which threatens worker and public safety and transmission line reliability. As the existing facilities age, emergency maintenance of the system would probably increase.

Under the No Action Alternative, additional indirect impacts to biological resources would not occur. However, direct impacts associated with routine and emergency maintenance would continue. Activities in the ROW, including the methods used for access and maintenance, would remain.

No additional impacts to special-status species would occur beyond those described in the Programmatic Biological Opinion issued for Western's routine maintenance activities by the USFWS on May 27, 1998.

4.3 CULTURAL RESOURCES

4.3.1 Affected Environment

Cultural resources are aspects of the physical environment that relate to human culture and society and cultural institutions that hold communities together and link them to their surroundings. Cultural resources include expressions of human culture and history in the physical environment (such as prehistoric and historic sites, buildings, structures, objects, districts, and other places, including natural features) considered important to a culture, subculture, or community. Cultural resources also include traditional lifeways and practices, community values, and institutions.

Cultural resources have an important role in connecting all contemporary societies to their heritage and traditions, thereby providing structure and perspective for contemporary life. Once damaged or destroyed, these resources are essentially nonrenewable, though the tangible evidence of the past sometimes may be restored or reconstructed to some degree.

Western has prepared and distributed a Programmatic Agreement (PA) for this project to meet compliance with Section 106 of the *National Historic Preservation Act* (NHPA). The PA describes procedures to identify cultural resources within the area of potential effects. All identified cultural resources would be evaluated and treated in consultation with the parties participating in the PA.

4.3.1.1 Resource Study Area

The resource study area for assessing impacts on cultural resources was considered the "area of potential effects," as defined by regulations. The area of potential effects is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties" (36 CFR Part 800.16[d]).

The area of potential effects was considered the ROW where ground-disturbing activities could occur. This also includes the ROW for existing or new access roads.

Potential indirect effects include visual and noise intrusions that could diminish the historic values of certain cultural resources. The area of potential indirect effects is defined as extending up to 0.25 mile from any project component.

Methods used to identify the presence of cultural resources and to determine National Register of Historic Places (NRHP) eligibility vary among the cultural resource types. Pedestrian surveys are used to locate prehistoric and historic resources, and sometimes excavations or in-depth architectural recordings are required to evaluate NRHP eligibility. Archival research of written records helps identify historic resources or possible traditional cultural properties (TCPs). Consultations with interested Native American tribes or other culture groups identify TCPs and religious resources. Consultation sometimes includes meetings with traditional religious practitioners, interviews with knowledgeable individuals, and site visits to particular areas of concern.

Western completed archival research to determine if any cultural resources have been identified within the ROW or within one-quarter mile of the ROW of any of the alternatives. The research was conducted at the Califor-

nia Historical Resource Information Centers at Sonoma State University in Rohnert Park and at appropriate California state universities. In addition, Western consulted with the California Native American Heritage Commission (NAHC) on appropriate Native American contacts for the study area. In consultation with the NAHC, Western consulted with three Federally recognized tribes: the Shingle Springs Band of Miwok Indians, the Ione Band of the Miwok Indians, and the United Auburn Indian Community of the Auburn Rancheria. Contacts also included groups that have petitioned for Federal recognition status. These include the Muwekma Indian Tribe, the Miwok Indian Community of the Wilton Rancheria, and the Indian Canyon Mutsun Band of Costanoan. Consultations would determine their interest in becoming signatories to the PA and providing traditional use information. Additional information on tribal consultation for the SVS EIS is located in Appendix D.

4.3.1.2 Issues of Environmental Concern

The following laws, regulations, and Executive Orders (EOs) mandate specific cultural resource requirements or restraints that could affect the alternatives that are analyzed in the Draft EIS:

- NHPA of 1966, as amended (16 United States Code (U.S.C.) §470) and implementing regulations (36 CFR Part 800)
- *National American Graves Protection and Repatriation Act* (NAGPRA) of 1990 (25 U.S.C. §3001) and implementing regulations (43 CFR Part 10)
- *American Indian Religious Freedom Act* (AIRFA) of 1978 (42 U.S.C. §1996)
- *Archaeological Resources Protection Act* (ARPA) of 1979 (16 U.S.C. §470aa *et seq.* as amended P.L. 100-555; P.L. 100-588 and implementing regulations at 43 CFR Part 7)
- EO 13007, Indian Sacred Sites, May 24, 1996

For this Draft EIS, cultural resource information has been organized into the categories of prehistoric cultural resources, historic cultural resources, and TCPs. A cultural resource can fall into more than one category due to use through a long period or for multiple functions.

Prehistoric Cultural Resources

Prehistoric resources refer to any material remains, structures, and items used or modified by people before the establishment of a European presence in the Sacramento Valley in the early 19th century. Examples of prehistoric resources in the study area include village sites, rock shelters, rock art, water-control features, game drives or traps, aboriginal trails, campsites, and scatters of prehistoric artifacts.

Historic Cultural Resources

Historic resources include material remains and landscape alterations since the arrival of Europeans in the area. Examples in the study area include homestead, ranching, and agricultural features; water control features; mining features; historic trails, roads, and railroad features; buildings and structures in cities; Native American resources; and scatters of historic artifacts.

Traditional Cultural Properties

TCPs are places associated with the cultural practices or beliefs of a living community. These sites are rooted in the community's history or are important in maintaining cultural identity. The study area has been occupied or used for at least 4,500 years by Native American, Spanish, Mexican, and American cultures. The relationships between these cultures and their surroundings are as varied as the cultures themselves. These relationships may have resulted in the attachment of traditional, spiritual, or religious aspects to various natural and cultural features. Religious resources, such as sacred areas or places, are needed for the practice of a religion. These resources have attained a position in the religious or spiritual history and activities of the community and are a part of that particular culture's spiritual survival. Very often religious resources are also considered TCPs.

4.3.1.3 Characterization

A Class I records search was conducted at the California Historical Resources Information System at the California State University at Stanislaus, Chico, Sacramento, and Rohnert Park. Much of the study area was surveyed by Far Western Anthropological Group, Inc. (Far Western 2002) for a Western project unrelated to the Draft EIS but overlapping a large portion of this study area. Some portions of the Draft EIS segments were not surveyed due to the presence of rice fields. The following descriptions use existing data from this records search and the Far Western (2002) survey. Western contacted the California NAHC, and there are no known TCPs or sacred sites in the study area. Tribal consultations are ongoing, but no TCPs have been identified. Due to the sensitive nature of cultural resources, maps showing site-specific locations are not provided in this document. Figures 3-1 through 3-8 detail the line segments and MPs.

No prehistoric cultural resources were recorded for Segment A. Historic resources included three levees, one road, and three railroads. No TCPs were identified. The O'Banion to Elverta double-circuit transmission line

was constructed in 1962 and was not recorded as a site due to its recent date of construction. While Segment A_1 was not surveyed near the Pleasant Grove Cemetery, the proximity to Segment A would suggest similar results.

No prehistoric or historic cultural resources or TCPs were recorded for Segment B. The O'Banion to Elverta double-circuit transmission line was constructed in 1962 and was not recorded as a site due to its recent date of construction. The Cottonwood to Roseville single-circuit transmission line was constructed in 1947 as part of the CVP by the Bureau. It was recorded for the Far Western project previously described.

The inventory at Segment C identified prehistoric and historic sites. One prehistoric site is a low mound with an apparent midden (prehistoric village site). No transmission structures are within the site boundary. The second prehistoric site was previously identified as a mound, but was not found during the Far Western (2002) inventory. The five historic sites include a city dump, two roads, three levees, and four railroads. No TCPs were identified. The Elverta to Tracy transmission line was built in 1961 and was not recorded as a site due to its recent date of construction.

No prehistoric cultural resources were recorded for Segment D. Four historic cultural resources were recorded, including one levee and three railroads. No TCPs were identified. The Elverta Substation to Tracy Substation transmission line was constructed in 1961 and was not recorded as a site due to its recent date of construction.

One previously recorded prehistoric mound village site of Segment E was recorded in the area in 1937, but was not relocated during the Far Western (2002) inventory. No other cultural resources or TCPs were located. South to the Sacramento/San Joaquin county line, the records search indicated that the transmission line crosses three railroads. A prehistoric midden site is also located along the ROW, which may have transmission line structures within the site boundary. The records search also indicated numerous historic buildings in the area, but these are not close to the existing transmission line, and are outside the area of potential effects. The Elverta Substation to Tracy Substation transmission line was constructed in 1961 and was not recorded as a site due to its recent date of construction.

Segment E_1 has not been surveyed. The records search indicated, however, that south of the Sacramento/San Joaquin county line the transmission line crosses three railroads. The records search also indicated numerous historic buildings in the area, but these structures are not close to the transmission line, and are outside the area of potential effects.

No prehistoric or historic cultural resources or TCPs were identified at Segment F. The Cottonwood–Roseville transmission line was constructed in 1947 as part of the CVP for the Bureau. It was recorded for this EIS.

Segment G has not had an archaeological survey. The records search indicated a cemetery in the study area. No other cultural resources or TCPs were identified.

No prehistoric or historic cultural resources or TCPs were identified at Segment H. The Cottonwood–Roseville transmission line was constructed in 1947 as part of the CVP for the Bureau. It was recorded for this EIS.

4.3.2 Environmental Consequences

Under the Proposed Action and alternatives, significant adverse impacts to cultural resources could occur. Potential impacts as a result of constructing, reconductoring and maintaining the Proposed Action and alternatives would be similar in nature. Alternatives that include constructing new transmission lines would be more likely to have an impact than those involving reconductoring. Alternatives requiring the construction of new access roads would have the highest potential for impacts to archaeological resources. Augering new holes for transmission line structures would have the next largest impact. Where at all possible, transmission line structures and access roads would be sited to avoid known cultural resources. Pulling locations, splice points, and staging areas can be selected to avoid cultural resources. Reconductoring a transmission line that is NRHP-eligible could be an adverse effect, depending on the values making the transmission line eligible to the NRHP. Removing an existing transmission line would have potential impacts to archaeological resources from pulling or digging out transmission line structures. Therefore, structures identified for removal will be cut off at ground level rather than below ground surface. Erosion control methods can include recontouring, reseeding, and other minor surface disturbance.

Avoiding cultural resources is Western's standard practice. Other EPMs, discussed below, address many of these impacts. Other project-related impacts would be addressed through the PA.

4.3.2.1 Standards of Significance

The laws, ordinances, and regulations discussed above deal with impacts to cultural resources. In nearly every case, cultural resources must meet some set of criteria for significance before agencies direct efforts to preserve the values these resources represent. Under the NHPA and the regulations at 36 CFR Part 800, only historical or prehistoric sites, objects, or features, or architectural

resources determined "significant" by a Federal agency, need to be considered for potential impacts. Significance of any cultural resources is determined following the criteria for eligibility for nomination to the NRHP, as defined in 36 CFR Part 60.4. The NRHP criteria states:

> *"The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, building(s), structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and*
>
> *(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(b) That are associated with the lives of persons significant in our past; or*
>
> *(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(d) That have yielded, or may be likely to yield, information important to history or prehistory."*

If resources are determined to be eligible for listing on the NRHP, and the State Historic Preservation Officer (SHPO) agrees with the agency's determination, these resources are then considered significant, and the agency must avoid or lessen the impacts to them by the Proposed Action or alternatives. Indian tribes, state and local agencies, the public, and the Advisory Council on Historic Preservation are given opportunities to influence how those resources are treated. Sites within California eligible for the NRHP are eligible for the California Register of Historical Resources. Project-related impacts to an eligible cultural resource site that would adversely affect the values of the resource making it eligible for inclusion in the NRHP would be considered significant.

4.3.2.2 Environmental Protection Measures

Programmatic Agreement

Cultural resources would be considered during post-EIS phases of project implementation in accordance with the PA being developed in conjunction with the Draft EIS. Detailed inventories would occur once the Final EIS has been distributed and a ROD issued. Cultural resource identification would only be conducted for the selected alternative. Specific measures would be developed and implemented to avoid and minimize identified adverse impacts. These measures, or stipulations of the PA, could include project modifications to avoid adverse impacts, monitoring of construction activities, procedures for handling the discovery of cultural resources during construction, and data recovery studies. Under the PA, any unknown cultural resources or human remains discovered during the course of construction would be protected, evaluated, and treated in accordance with the PA. Western would instruct construction crews that cultural resources might be present in the study area. They would be trained to stop work near any discovery, and notify Western's regional environmental manager, who would confirm that the resource is evaluated and recorded by a professional archaeologist, as per the PA. This PA would be signed by Western, other project proponents, involved land-managing and utility oversight agencies, the California SHPO, and appropriate and interested tribes.

EPMs for cultural resources from Table 3-4 include the following:

- Before construction, all supervisory construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address Federal, state, and tribal laws regarding antiquities, fossils, plants, and wildlife, including collection and removal, and the importance of these resources and the purpose and necessity of protecting them. Western would instruct that cultural resources might be present in the study area. Contractors would be trained to stop work near any discovery and notify Western's regional environmental manager, who would confirm that the resource is evaluated and avoided. Known cultural resources would be fenced and a minimum distance maintained for work disturbances.
- Cultural resources would be considered during post-EIS phases of project implementation in accordance with the programmatic agreement being developed in conjunction with the EIS. Surveys to inventory and evaluate cultural resources would be conducted.
- Where ground-disturbing activities are identified, cultural resource evaluations would be done to determine the need for field inventory. Construction activities would avoid all historic properties, or a special use permit or mitigation plan would be developed in consultation with SHPO.
- Irrigation system features, which are eligible for the NRHP, would be avoided during the siting of new transmission line structures and access roads, and most other irrigation system features would be avoided to the extent practicable in the siting of new structures and access roads.

4.3.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

For the Proposed Action, the O'Banion Substation to Elverta Substation (Segment A_1 near Pleasant Grove Cemetery) has not been inventoried for cultural resources. The parallel nearby ROW for the existing transmission line was surveyed for cultural resources during the completion of a vegetation management project (Far Western 2002). Cultural resources in the study area are expected to be similar. Historic resources on the parallel ROW include: the Feather River Bypass Levee, the Feather River Levee, the Cross Canal Levee, the Sacramento Northern Railroad, the Western Pacific Railroad, Sacramento Northern Railroad, and Sorrento Road. Part of the realignment segment of the Cottonwood–Roseville line was surveyed during the Far Western (2002) inventory, and no prehistoric cultural resources were located. Historic resources include the Southern Pacific Railroad, the Union Pacific Railroad Mainline and the Cottonwood–Roseville transmission line. A cultural resources field inventory would be necessary for the O'Banion Substation to Elverta Substation ROW (Segment A_1) and Segment H. The Elverta Substation to Tracy Substation transmission line was surveyed to 34 miles north of Tracy Substation (Far Western 2002). This inventory recorded one prehistoric site, a midden village mound. One prehistoric mound village and one prehistoric mound site were not relocated during the field inventory of 2002. Historic sites included five levees identified during previous surveys, the Western Pacific Railroad, the Sacramento North Railroad, the Union Pacific Railroad, the Sacramento Valley Railroad, the California Central Traction Company Railroad, the Southern Pacific Railroad, Northgate Boulevard, and Del Paso Boulevard. In the unsurveyed southern segment, one prehistoric midden site is in the ROW. The disturbance of an eligible cultural resource would be significant; however, such disturbance is not expected once the standard practices and associated PA commitments are implemented.

Once a cultural resource inventory of this Proposed Action, including associated access roads, has been completed for the unsurveyed segment, Western would conduct a detailed evaluation of any effects to cultural resources, in accordance with the PA, which was developed for the Proposed Action and alternatives in compliance with Section 106 of the NHPA. The two recorded prehistoric sites would need to be evaluated for NRHP eligibility, and if eligible, an assessment of possible adverse project-related impacts and effects would be conducted. Through the PA, Western would negotiate a method to ensure avoidance or mitigate adverse effects.

The Proposed Action would not impact historic resources. All historic resources are in use and would be avoided by any ground-disturbing activities. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of related commitments, are expected to avoid or minimize the magnitude of cultural resource impacts. Therefore, significant impacts are not expected, and mitigation is not appropriate.

4.3.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Except for the southernmost 34 miles in Alternative 1, the entire transmission line corridor has been inventoried for cultural resources. One recorded prehistoric site can be avoided through design. Another prehistoric midden site in the southern, unsurveyed segment would need to be evaluated for impacts and effects. At least six historic sites are in the area. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of related commitments, are expected to avoid or reduce cultural resource impacts. Therefore, significant impacts are not expected.

4.3.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would be the same as the Proposed Action from O'Banion Substation to Elverta Substation, but would not entail any work south of Elverta Substation.

The segment from O'Banion Substation to Elverta Substation (Segment A_1 near Pleasant Grove Cemetery) has not been inventoried for cultural resources. The parallel nearby ROW for the existing transmission line was surveyed, and cultural resources are expected to be similar. Historic resources on the parallel ROW include the Feather River Bypass Levee, the Feather River Levee, the Cross Canal Levee, the Sacramento Northern Railroad, the Western Pacific Railroad, Sacramento Northern Railroad, and Sorrento Road. The existing Cottonwood–Roseville transmission line was surveyed, and there are no cultural resources. The realignment of the Cottonwood–Roseville transmission line (Segment H) has not been surveyed. The Class I survey indicates the Pleasant Grove Cemetery nearby, which would be avoided through design. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of related commitments, are expected to avoid or reduce cultural resource impacts. Therefore, significant impacts are not expected.

4.3.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

The ROW for Alternative 3 has not been surveyed for cultural resources. The EPMs summarized in Section 4.3.2.2, including the development of a PA and the implementation of associated commitments, are expected to avoid or minimize the magnitude of cultural resource impacts. Therefore, significant impacts are not expected.

4.3.2.7 Impacts from the No Action Alternative

There would be no new impacts under this alternative. Impacts would be restricted to transmission line and access road maintenance. This includes periodic air and ground patrols. Repair to the transmission lines or structures could involve localized ground disturbance from heavy equipment. Vegetation removal by hand or mechanical equipment may be necessary to improve access roads or access to individual transmission line structures. The EPMs summarized in Section 4.3.2.2 are expected to avoid or minimize the magnitude of cultural resource impacts. Therefore, significant impacts are not expected.

4.4 ELECTRIC AND MAGNETIC FIELDS

4.4.1 Affected Environment

Both voltage and current are required to transmit electrical energy over a transmission line. The current, a flow of electrical charge measured in amperes, is the source of a magnetic field. The voltage represents the potential for an electrical charge to do work and is measured in volts (V) or kilovolts (kV). The voltage is the source of an electric field.

The possibility of adverse health effects from electric and magnetic fields (EMFs) exposure has increased public concern in recent years about living near high-voltage transmission lines. Both fields occur together whenever electricity flows, hence the general practice of considering both as EMF exposure. The available evidence has not established that such fields pose a significant health hazard to exposed humans. However, the same evidence does not prove there is no hazard. Therefore, in light of present uncertainty, the issues are discussed below, and Western's policy is to reduce such fields to some degree, where feasible, until the issue is better understood.

4.4.1.1 Resource Study Area

Approximately 108 miles of linear features make up the Proposed Action and alternatives study area. The study area is the transmission line ROW and any structures (buildings, other transmission lines, etc.) within 200 feet of this ROW. All transmission lines for all alternatives would be operated at 230 kV.

4.4.1.2 Issues of Environmental Concern

All transmission lines generate electric and magnetic fields. The present lines, the Proposed Action, and the alternatives would generate similar electric and magnetic fields. The effects of concern relating to EMFs follow:

The electrical effects of a transmission line can be characterized as "corona effects" and "field effects." Corona is the electrical breakdown of air into charged particles. It is caused by the electrical field at the surface of conductors. Field effects are induced currents and voltages, as well as related effects that might occur as a result of EMFs at ground level.

Corona Effects

Corona can occur on the conductors, insulators, and hardware of an energized high-voltage transmission line. Corona on conductors occurs at locations where the field has been enhanced by protrusions, such as nicks, insects, dust, or drops of water. During fair weather, the number of these sources is small, and the corona effect is insignificant. However, during wet weather, the number of these sources increases, and corona effects are much greater. Effects of corona are audible noise, radio and television interference, visible light, and photochemical reactions.

- ***Audible Noise***—Corona-generated audible noise from transmission lines is generally characterized as a crackling/hissing noise. The noise is most noticeable during wet-weather conditions. Audible noise from transmission lines is often lost in the background noise at locations beyond the edge of the ROW.
- ***Radio and Television Interference***—Corona-generated radio interference is most likely to affect the amplitude modulation (AM) broadcast band (535 to 1,705 kilohertz); frequency modulation (FM) radio is rarely affected. Only AM receivers located very near to transmission lines have the potential to be affected by radio interference. Television interference from corona effects occurs during bad weather, and is generally of concern for transmission lines with a voltage of 345 kV or more and only for receivers within about 600 feet of the line.
- ***Visible Light***—Corona is visible as a bluish glow or as bluish plumes. On the transmission lines in the area, the corona levels are so low that the corona on the conductors would be observable only under the darkest conditions with the aid of binoculars.

- ***Photochemical Reactions***—When corona is present, the air surrounding the conductors is ionized and many chemical reactions take place producing small amounts of O_3 and other oxidants. Approximately 90 percent of the oxidant is O_3, while the remaining ten percent is composed principally of NO_x. The maximum incremental ozone levels at ground level produced by corona activity on the transmission lines during bad weather would be less than 1 ppb. This level is insignificant when compared to natural levels and their fluctuations.

Field Effects

The electric field created by a high-voltage transmission line extends from the energized conductors to other conducting objects such as the ground, transmission structures, vegetation, buildings, vehicles, and persons. The electric field is measured in units of kV/meter (m), at a height of 1 m above ground level. Field effects can include induced currents, steady-state current shocks, spark discharge shocks, and in some cases field perception.

- ***Induced Currents***—When a conducting object, such as an ungrounded fence, vehicle, or person, is placed in an electric field, current and voltages are induced. The magnitude of the induced current depends on the electric-field strength and size and shape of the object. The induced currents and voltages represent a potential source of nuisance shocks near a high-voltage transmission line. Under Western's transmission line requirements, high-voltage transmission lines are placed high above objects to reduce the potential for nuisance shocks. In addition, permanent structures in the ROW, such as fences, gates, and metal buildings are grounded.
- ***Spark-Discharge Shocks***—If the induced voltage is sufficiently high on an ungrounded object, a spark-discharge shock would occur as contact is made with the ground. Under Western's transmission line requirements, the magnitude of the electric field would be low enough that this type of shock would occur rarely, if at all. Carrying or handling conducting objects such as irrigation pipe, under transmission lines can result in spark discharges that are a nuisance. The primary hazard with irrigation pipes or any other long objects, however, is electrical flashover from the conductors if the section of pipe is inadvertently tipped up near the conductors.
- ***Steady-State Current Shocks***—Steady-state currents are those that flow continuously after a person contacts an object, such as an ungrounded fence, and provides a path to ground for the induced current. The effects of these shocks may include involuntary movement in a person.
- ***Field Perception and Neurobehavioral Responses***—When the electric field under a transmission line is sufficiently strong, it can be perceived by hair erection on an upraised hand. At locations directly under the conductors, it is possible for some individuals to perceive the field while standing on the ground. Perception of the field does not occur at or beyond the edge of ROW.

Magnetic Field

A 60-hertz magnetic field is created in the space around transmission line conductor s by the electric current flowing in the conductors. The magnetic field is expressed in units of microteslas (μT) and in gauss or milligauss (mG) where one mG is one thousandth of a gauss (1 μT = 10 mG). The maximum magnetic fields of transmission lines are similar to the maximum magnetic fields measured near some common household appliances. The actual level of magnetic field would vary as the current on the transmission line and the distance to the line varies. There are no established limits for peak magnetic fields. A possible short-term effect associated with magnetic fields from alternating current transmission lines is induced voltages and currents in long-conducting objects such as fences and aboveground pipelines.

Health Effects

While there is considerable uncertainty about the EMF/health effects issue, the following facts have been established from the available information and have been used to establish Western's existing policies:

- Any exposure-related health risk to the exposed individual would likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

No Federal regulations have established environmental limits on the strengths of fields from power lines. However, the Federal government continues to conduct and encourage research on the EMF issue.

Due to the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new transmission lines are similar to those from existing

lines. Some states (Florida, Minnesota, New Jersey, New York, and Montana) have set specific environmental limits on one or both fields. These limits, however, are not based on any specific health effects. Most regulatory agencies believe that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

The State of California Department of Education enacted regulations that require minimum distances between a new school and the edge of a transmission line ROW. The setback distances are 100 feet from the edge of the transmission line ROW for 50-kV to 133-kV lines, 150 feet from the edge of the transmission line ROW for 220-kV to 230-kV lines, and 350 feet from the edge of the transmission line ROW for 500-kV to 550-kV lines. These distances were not based on specific biological evidence, but on the known fact that fields from power lines drop to near background levels at those distances. In 1993, the California Public Utilities Commission (CPUC) authorized the state's investor-owned utilities to carry out no- and low-cost EMF avoidance measures in the construction of new and upgraded utility projects. Although not investor-owned, Western does have field-reducing guidelines for designing new and upgraded transmission lines. California has no other rules governing EMF.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component, which can cause radio noise, audible noise, and nuisance shocks. The present focus is on the magnetic field because only it can penetrate building materials to potentially produce the types of health impacts at the root of the present concern. It is important for perspective to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (NIEHS 1995, DOE 1995). Scientists have not established which types of exposures would be more biologically meaningful. High-level magnetic field exposures regularly occur in areas other than the power line environment. Examples of magnetic fields at particular distances from household appliance surface are listed in Table 4.4-1.

4.4.1.3 Characterization

The Proposed Action and alternatives would all involve 230-kV transmission lines, in various configurations: single-circuit, double-circuit, and parallel single-circuit lines. Electric and magnetic fields measured under the lines and at the edge of the ROW would vary depending upon the configuration of the circuits. Circuits placed parallel to each other tend to cancel electric and magnetic fields, thus reducing the measured fields under the lines and at the edge of the ROW. Fields and currents can be induced on nearby fences, irrigation pipes, and other metallic objects.

4.4.2 Environmental Consequences

4.4.2.1 Standards of Significance

Electric and magnetic fields would be considered significant if:

- The distance between the edge of ROW and a newly constructed school is within 150 feet, or

Table 4.4-1. Magnetic Fields from Household Appliance Surfaces

Appliance	Milligauss at 1 foot	Milligauss at 3 feet
Can Opener	7.19 to 163.02	1.3 to 6.44
Clock	0.34 to 13.18	0.03 to 0.68
Clothes Iron	1.66 to 2.93	0.25 to 0.37
Coffee Machine	0.09 to 7.30	0 to 0.61
Computer Monitor	0.20 to 134.7	0.01 to 9.37
Dishwasher	4.98 to 8.91	0.84 to 1.63
Fax Machine	0.16	0.03
Portable Fan	0.04 to 85.64	0.03 to 3.12
Range	0.60 to 35.39	0.05 to 2.83
Television	1.80 to 12.99	0.07 to 1.11

Source: L. Zaffanella, School Exposure Assessment Survey, California EMF Program, interim results, (November 1997).

National Environmental Health Science Reports

In June 1999, the National Institute of Environmental Health Sciences (NIEHS) released its report, *Health Effects From Exposure to Power-line Frequency Electric and Magnetic Fields* (NIEHS 1999). The report's Executive Summary concludes that "extremely-low-frequency electric and magnetic field (ELF-EMF) exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion (NIEHS), this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the U.S. uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or noncancer health outcomes provide sufficient evidence of a risk to currently warrant concern." Nevertheless, the report goes on to recommend some actions: "In summary, the NIEHS believes that there is weak evidence for possible health effects from ELF-EMF exposures, and until stronger evidence changes this opinion, inexpensive and safe reductions in exposure should be encouraged (Electric Power Research Institute [EPRI] 1999)."

The NIEHS report, submitted to Congress, is the culmination of a long-term commitment under the Research and Public Information Dissemination (RAPID) Project, which began with the *Energy Policy Act* of 1992. RAPID's objective was to accelerate applied EMF research with a focused program supported by matching funds from the Federal government and the private sector. The electric utility industry provided most of the private sector funds.

The most significant source for the NIEHS report was the NIEHS Working Group (The Working Group) Report, which resulted from a nine-day meeting in June 1998. The Working Group considered all literature relevant to the potential effects of power-frequency electric and magnetic fields on health, including cancers of several types, adverse pregnancy outcomes, chronic illnesses (for example, Alzheimer's disease and amyotrophic lateral sclerosis), 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 lymphocyte leukemia and employment on jobs with potentially high magnetic field exposure. Based on this assessment and charged with ranking EMF according to 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.

Although regulatory actions are not in the purview of the NIEHS, they suggest "the power industry 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. We also encourage technologies that lower exposures from neighborhood distribution lines provided that they do not increase other risks, such as those from accidental electrocution or fire."

Paper by Dr. Sander Greenland, "A Pooled Analysis of Magnetic Files, Wire Codes, and Childhood Leukemia:"

A 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 2000) has been accepted for publication in the journal *Epidemiology*. The work was funded by NIEHS (EPRI 2000).

The authors concluded:

- An effect of magnetic fields below 0.3 μT (3 mG) is unlikely or too small to detect in epidemiological studies.
- There is suggestive evidence that an association between magnetic fields greater than 0.3 μT (3 mG) and childhood leukemia exists.
- Magnetic fields show a more constant association with childhood leukemia than wire code do.
- Future studies of EMF and childhood leukemia should focus on highly exposed populations.

Paper by Dr. Anders Ahlbom, Karolinska Institute, Sweden

A 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 unlike meta-analysis, which is based on published results-combined from previous epidemiological studies to examine whether there is an association between magnetic fields and leukemia (EPRI 2000).

The authors concluded:

- "We did not find any evidence of an increased risk of childhood leukemia at residential magnetic field levels less than 0.4 μT (4 mG). However, we did find a statistically significant relative risk estimate of two for childhood leukemia in children with residential exposure to EMF greater than 0.4 μT (4 mG) during the year before diagnosis. Less than one percent of subjects were in this highest exposure category. The results did not change following adjustment for the potential confounders. In addition, the existence of the so-called wire code paradox could not be confirmed."
- "The explanation for the elevated risk is unknown but selection bias may have accounted for some of the increase."

Report by the Department of Health Services, State of California, "A*n Evaluation of the Possible Risks from Electric and Magnetic Fields from Power Lines, Internal Wiring, Electrical Occupations, and Appliances*"

In response to a requirement of the California Public Utilities Commission (CPUC), the California Department of Health Services (DHS) initiated research on the possible health effects of electric and magnetic fields created by the use of electricity. While the report does not include recommendations on how to protect against the identified health risks, it does recommend further research.

The final report, dated June, 2002 asked three DHS scientists to review studies to examine the potential biological and health effects resulting from EMF exposure. The following conclusions were made:

- To one degree or another, all three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's Disease, and miscarriage.
- They strongly believe that EMFs do not increase the risk of birth defects, or low birth weight.
- They strongly believe that EMFs are not universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.
- To one degree or another they are inclined to believe that EMFs do not cause an increased risk of breast cancer, heart disease, Alzheimer's Disease, depression, or symptoms attributed by some to sensitivity to EMFs.
- All three scientists had judgments that were "close to the dividing line between believing and not believing" that EMFs cause some degree of increased risk of suicide.
- For adult leukemia, two of the scientists are "close to the dividing line between believing or not believing" and one was "prone to believe" that EMFs cause some degree of increased risk.

magnetic fields are in excess of 22 MG (the average value of the magnetic field of a 230-kV single-circuit line at 150 feet is 15 mG.)

- EMF avoidance practices are not conducted in the design and operation of the transmission line.

4.4.2.2 Environmental Protection Measures

One EPM for electric and magnetic fields was listed in Table 3-4. It states that Western will respond to complaints of radio or television interference generated by the transmission line and take appropriate actions.

4.4.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

Western follows Federal and state regulations for designing, constructing, maintaining, and operating its transmission lines. Impacts associated with the Proposed Action and alternatives would be relatively the same. Table 4.4-2 presents the maximum design values for electrical and magnetic fields for the Proposed Action and alternatives. A discussion of the impacts from electric and magnetic field effects is presented below:

- ***Audible Noise***—There are no design-specific Federal regulations to limit the audible noise from transmission lines. There are no noise codes applicable to transmission lines in California. Audible

Table 4.4-2. Electric and Magnetic Fields from the Proposed Action and Alternatives

Configuration	Electric, Magnetic Field at Centerline	Electric, Magnetic Field, Edge of ROW	Electric, Magnetic Field, 200 Feet from Centerline
Proposed Action. Double circuit, Elverta Substation to Tracy Substation	1.0 kV/m, 160 mG	0.53 kV/m 50 mG	0.03 kV/m, 2 mG
Proposed Action. Double circuit parallel to the existing double circuit line, O'Banion Substation to Elverta Substation	1.7 kV/m, 202 mG	0.56 kV/m 50 mG	0.03 kV/m, 2.5 mG
Proposed Action. Single circuit between Cottonwood Roseville	1.9 kV/m, 180 mG	0.96 kV/m 80 mG	0.07 kV/m, 9 mG
Alternative 1. Double circuit parallel to the existing double circuit line, O'Banion Substation to Elverta Substation	1.7 kV/m, 202 mG	0.56 kV/m 50 mG	0.03 kV/m, 2.5 mG
Alternative 1. Double circuit line Elverta Substation to Hurley Substation	1.0 kV/m, 160 mG	0.53 kV/m 50 mG	0.03 kV/m, 2 mG
Alternative 2. Double circuit parallel to the existing double circuit line, O'Banion Substation to Elverta Substation	1.7 kV/m, 202 mG	0.56 kV/m 50 mG	0.03 kV/m, 2.5 mG
Alternative 2. Single circuit between Cottonwood and Roseville	1.9 kV/m, 180 mG	0.96 kV/m 80 mG	0.07 kV/m, 9 mG
Alternative 3. Double circuit Elk Grove Substation to Tracy Substation parallel to existing *double and single* circuit	1.7 kV/m, 202 mG	0.56 kV/m 50 mG	0.03 kV/m, 2.5 mG
No Action	1.9 kV/m, 180 mG	0.96 kV/m 80 mG	0.07 kV/m, 9 mG

Source: Original 2002
kV/m: kilovolt per meter
mG: milligauss

noise from transmission lines associated with the Proposed Action is limited instead through design and maintenance standards established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability.

The noise level depends on the strength of the line electric field. The potential for occurrence can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during wet weather and from lines 345 kV or higher. Research by EPRI (1982) has validated this by showing the fair weather audible noise from modern transmission lines of less than 500 kV to be indistinguishable from background noise at the edge of a 100-foot ROW.

For the Proposed Action, low-corona design would minimize the potential for corona-related audible noise. This means upgraded, modified, and new transmission lines would add a small incremental noise level to existing background noise levels.

- ***Radio and Television Interference***—Transmission line-related radio frequency interference is an indirect effect of line operation produced by the physical interactions of line electric fields. The level of interference usually depends on the magnitude of the electric fields involved. The potential for such interference is usually only of concern for lines of 345 kV and above and not the 230-kV lines associated with this Proposed Action and alternatives. The lines would be constructed according to Western's standards, which minimize the potential for surface irregularities (nicks and scratches on the conduc-

tor), sharp edges on suspension hardware, and other irregularities.

However, if such interference occurred, Western would implement practices to eliminate it such as by appropriate line maintenance and antenna modification.

- ***Visible Light***—On the transmission lines for the Proposed Action, the corona would be similar to those on existing lines. The visible corona on the conductors would be seen only under the darkest conditions with the aid of binoculars, and would not be significant.
- ***Photochemical Reactions***—The maximum incremental O_3 levels at ground level produced by corona activity on the new and upgraded transmission lines for the Proposed Action and alternatives would be similar to that produced by existing lines in the area. During rain or fog, O_3 produced would be less than 1 ppb. This level is insignificant when compared to natural levels and their fluctuations.
- ***Induced Currents***—The magnitude of the induced currents depends on the electric field strength and size, and shape of the object. Under Western's transmission line requirements, high-voltage transmission lines are placed high above objects to reduce the potential for these shocks. In addition, permanent structures in the ROW, such as fences, gates, and metal buildings, would be grounded. Induced currents are insignificant for the Proposed Action.
- ***Steady-State Current Shocks***—Features reducing the level of potential for induced current in objects near the transmission line also reduce the level of possible induced current shock. The Proposed Action would be constructed according to Western's requirements to prevent hazardous shocks from direct or indirect human contact with overhead, energized line. Therefore, these lines are not expected to pose any such hazards to humans.
- ***Spark-Discharge Shocks***—Under Western's transmission line requirements, the magnitude of the electric field would be low enough that this type of shock would occur rarely, if at all. Under current Western practice, the potential for nuisance shocks would be minimized through standard grounding procedures. Ensuring adequate ground clearance would minimize the potential for the electrical charging.
- ***Field Perception and Neurobehavioral Responses***—Perception of the field associated with the new and upgraded lines for the Proposed Action would not be detected beyond the edge of the ROW. Persons working under the ROW (for example, farmers) might feel the field. Studies of short-term exposure to electric fields have shown that some people may perceive fields (such as felt movement of arm hair) at levels of about 2-to10-kV/m, but studies of controlled, short-term exposures to even higher levels in laboratory studies have shown no adverse effects on normal physiology, mood, or ability to perform tasks. The International Commission on Non Ionizing Radiation Protection (ICNIRP 1990) guidelines propose that short-term exposures be limited to 10-kV/m for the general public. This level could occur directly below the proposed transmission line but would decrease with distance from the centerline.
- ***Magnetic Fields***—The maximum magnetic fields of the transmission lines for the Proposed Action would be comparable with the maximum magnetic fields measured near some common household appliances (NIEHS 1995, DOE 1995). The actual level of magnetic field would vary as the current on the transmission line varies and as the height of the line above ground varies. There are no established limits for peak magnetic fields.

Transmission lines in Segment D pass within 150 feet of an existing school. Land use criteria require new schools to be located at least 150 feet from transmission lines. Magnetic fields at the school would be less than those upon which the State of California bases the 150 feet distance requirement for 230-kV lines, which is approximately 22 mG. At this location, the magnetic field would be 15 mG.

4.4.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

The impacts of Alternative 1 on emissions of EMF effects would be similar to those described for the Proposed Action. Impacts from Alternative 1 are not expected to be adverse and significant.

4.4.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

The impacts of Alternative 2 on emissions of EMF effects would be similar to those described for the Proposed Action. Impacts from Alternative 2 are not expected to be adverse and significant.

4.4.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

The impacts of Alternative 3 on emissions of EMF effects would be similar to those described for the Proposed Action. Impacts from Alternative 3 are not expected to be adverse and significant.

4.4.2.7 Impacts from the No Action Alternative

Under the No Action Alternative, power shortages would be more frequent than shortages under the Proposed Action and action alternatives. No change to existing conditions would be expected.

4.5 ENVIRONMENTAL JUSTICE

4.5.1 Affected Environment

This section assesses the potential for environmental justice impacts that would result from the implementation of the Proposed Action and alternatives.

Executive Order 12898, "Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations," provides that "each Federal agency shall make achieving EJ part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental effects of its programs, policies, and activities on minority and low-income populations and Indian tribes." The EO requires the EPA and all other Federal agencies, as well as state agencies receiving Federal funds, to develop standards to address this issue. The CEQ has oversight of the Federal government's compliance with EO 12898 and NEPA. The CEQ has developed implementation guidance for EJ under NEPA, dated December 10, 1997.

4.5.1.1 Resource Study Area

The EJ study area consists of Sutter, Placer, Sacramento, San Joaquin, Contra Costa, and Alameda counties (Segments A through H). The area of consideration includes both urban and rural areas, including the Sacramento metropolitan area. The Proposed Action, Alternative 1, and No Action ROWs would pass through the City of Sacramento.

4.5.1.2 Issues of Environmental Concern

Environmental justice considerations focus on the potential for disproportionate impacts resulting from Federal activities on minority populations, low-income communities, and tribes. Specifically, EJ issues include such things as the potential physical displacement of populations and employment and income impacts. Other issues may include the potential for adverse impacts on community institutions and organizations, reductions in access to public services, traditional and religious practices, and forms of land use, and community cultural character. Impacts related to these issues could occur temporarily during construction and for the long term after construction.

Participation in the project by Indian tribes and other potentially affected minorities and the effects of potential rate increases were issues identified during the public scoping process. Rate increases might affect low-income populations more than others. While rate increases are not included in the Proposed Action and alternatives, they could occur as a result of the added cost of improving Western's transmission system.

4.5.1.3 Characterization

The majority of the transmission line ROWs included in the Proposed Action and alternatives is in rural areas, except for portions of the Proposed Action and Alternative 1 and the No Action Alternative that would pass through Sacramento in an existing transmission ROW. Segment B from MP 4.0 to the Elverta Substation and Segment C from the Elverta Substation to MP 3.5 are adjacent to Rio Linda. Segment C from MP 3.5 to the Hurley Substation passes through the City of Sacramento. Segment D from the Hurley Substation to the Hedge Substation is within Sacramento. Segment D between MP 13.0 to 15.0 is adjacent to Elk Grove. Otherwise, residences and farms are scattered along the length of the line.

Minority and low-income populations are found in each county in the study area. Among these counties, San Joaquin and Sacramento counties have the highest percentages of residents below the poverty line (18.8 and 17.2 percent, respectively) and have Hispanic populations that are 30.5 and 16.0 percent of their respective total populations.

4.5.2 Environmental Consequences

4.5.2.1 Standards of Significance

As noted in Section 4.5.1.1 above, EO 12898 guides EJ analyses. The CEQ has also issued guidance on compliance with EO 12898 (*Environmental Justice: Guidance Under the National Environmental Policy Act,* 1997). Based on this guidance, Western has coordinated the assessment of potential EJ impacts with air quality, cultural resources, electromagnetic fields, health and safety, noise impact assessments, and socioeconomics (see Sections, 4.1, 4.3, 4.4, 4.8, 4.10, and 4.12 respectively). The EJ analysis has determined how the types of impacts addressed in these other sections could disproportionately affect low-income and minority populations. Minority and low-income populations would incur significant and adverse impacts if they experience a disproportionate share of the adverse effects caused by the Proposed Action or alternatives.

4.5.2.2 Environmental Protection Measures

EPMs described in the air quality, cultural resources, electromagnetic fields, health and safety, noise impact assessments, and socioeconomic sections would also help minimize and avoid adverse impacts to minority and low-income populations (see Sections, 4.1, 4.3, 4.4, 4.8, 4.10, and 4.12

respectively). These EPMs include consultation with potentially affected Native Americans. On this project, and as further described in Section 4.3, Western consulted with the California NAHC and three Federally recognized tribes: the Shingle Springs Band of Miwok Indians, the Ione Band of the Miwok Indians, and the United Auburn Indian Community of the Auburn Rancheria. Contact was also made with groups who have petitioned for Federal recognition status. These include the Muwekma Indian Tribe, the Miwok Indian Community of the Wilton Rancheria and the Indian Canyon Mutsun Band of Costanoan. Consultation helps avoid and minimize adverse impacts to Native Americans by better defining their concerns, locations of TCPs, and cultural practices that could be affected by the Proposed Action and alternatives.

4.5.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

Most of the Proposed Action would be constructed in existing ROW, and the portion that would require new ROW (Segments A_1 and G) would mostly be next to existing ROW. It would be carefully sited to avoid any displacement of nearby rural residences or businesses. Therefore, no minority or low-income populations would be displaced and the Proposed Action would not divide the communities they live in. Construction could cause minor adverse impacts, such as traffic diversions at detours, or adverse air quality and noise impacts near the routes construction trucks would travel, or where construction equipment is used. Minority or low-income landowners could experience negative impacts if their land is needed for part of the new ROW included in the Proposed Action; however, most affected land is undeveloped or agricultural. No businesses or residences would be displaced. The acquisition of land for new ROW is not expected to cause significant or disproportionate impacts to minority and low-income populations.

Other low-income or minority individuals could experience positive employment and income impacts if hired as part of a construction crew needed to work on the Proposed Action. The Proposed Action would improve the reliability of power supplies in the areas served by the related transmission lines, which could help avoid adverse employment and income impacts during power shortages.

Western's EPMs include siting facilities to avoid TCPs and other cultural sites important to Native Americans. These practices and compliance with the cultural resources PA during post-EIS phases of Proposed Action implementation would help avoid and minimize adverse impacts to Native Americans.

Cultural resources, EMFs, health and safety, and socioeconomics analyses (Sections 4.3, 4.4, 4.8 and 4.12, respectively) all defined potential impacts on minority and low-income populations. However, given Western's EPMs, and the nature and location of the Proposed Action, none of these impacts is expected to be significant. Minority and low-income populations are not expected to be disproportionately impacted.

4.5.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

The impacts of Alternative 1 on minority and low-income populations would be similar to those described for the Proposed Action. No new ROW would be required. Minority and low-income populations are not expected to be disproportionately impacted.

4.5.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

The impacts of Alternative 2 on minority and low-income populations would be similar to those described for the Proposed Action. Minority and low-income populations are not expected to be disproportionately impacted.

4.5.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

The impacts of Alternative 3 on minority and low-income populations would be similar to those described for the Proposed Action. Minority and low-income populations are not expected to be disproportionately impacted.

4.5.2.7 Impacts from the No Action Alternative

Under the No Action Alternative, power shortages may be more frequent than shortages under the Proposed Action and action alternatives. Power shortages can have a disproportionate impact on low-income and minority workers with hourly wages, as opposed to salaries, who work for manufacturing and other businesses especially affected by disruptions in power service.

4.6 FLOODPLAINS

4.6.1 Affected Environment

This section describes existing floodplain conditions within the study area and how the Proposed Action and alternatives would affect floodplains. Floodplains perform the natural, vital function of conveying and dissipating the volume and energy of peak, surface runoff flows downstream. Periodic flood flows form and sustain specific habitat types (such as wetland and riparian areas) within the floodplains (see

Sections 4.2 and 4.16 for discussion of habitat types). Environmental regulations have been developed to preserve unimpaired flood flows through established floodplains, prevent flood-related damage to downstream resources, and protect unique habitat types and species.

Activities affecting floodplains, and Waters of the United States typically found in floodplains, are regulated under Section 404 of the *Clean Water Act* (CWA) (33 U.S.C. §1251, *et seq.*) and EO 11988, Floodplain Management (42 *Federal Register* [FR] 26951, May 24, 1977). DOE has established policy and procedures in 10 CFR Part 1022 to ensure that DOE activities in floodplains comply with the EO requirements. This section incorporates the required information to comply with 10 CFR Part 1022. The Final EIS would provide a statement of findings explaining why specific activities would be located in the floodplain, what alternatives were considered, and the steps to be taken to minimize unavoidable impacts to the floodplain.

4.6.1.1 Resource Study Area

The study area includes floodplain portions of the Sutter Bypass, the Feather, American, Cosumnes, Mokelumne, and San Joaquin rivers, and associated smaller tributary floodplains crossed by or along the existing, Proposed Action, and alternative transmission ROW alignments.

Floodplains within the study area were determined by reviewing the Federal Emergency Management Agency (FEMA) maps of delineated floodplains. Floodplains for the larger tributaries are constrained by levees to prevent extensive overbank flooding and convey peak flows downstream. In some locations the levees have been set back, expanding the area available to flooding to reinstate a more natural local flood regime. The levee setback areas increase the likelihood of interaction with floodplain resources.

4.6.1.2 Issues of Environmental Concern

Issues of concern are the potential for the structure footings and access roads to alter or impair the ability of floodplains to convey flood flows. Facilities and construction activities could obstruct flows or decrease bank stability, increasing erosion. Reduced floodplain capacity may adversely impact lives and property downstream, as well as a wide variety of natural resources. There are two types of floodplains in the study area: 1) the 100-year floodplain has a 1-percent chance of flooding in any given year, and 2) the 500-year floodplain has a 0.2 percent chance of flooding in any given year. This likelihood of occurrence is based on historic hydrology; future flood flows may be more or less frequent.

4.6.1.3 Characterization

A large portion of the study area is located within the broad, combined floodplain of the major waterways listed above. Line Segments A through H, including A_1 and E_1, cross through the 100- and 500-year floodplains of the various surface watercourses between O'Banion Substation and Tracy Substation.

Figure 4-2 shows where segment alignments intersect various floodplains. Table 4.6-1 summarizes study area ROW/floodplain intersections by line segment.

Table 4.6-1. Summary of Floodplains by Line Segment

Line Segment	Total Segment Length (in miles)	Miles/Acres Within 100-yr Floodplain	Miles/Acres Within 500-yr Floodplain	Miles/Acres Outside 500-yr Floodplain
A / A_1	22.4	17.0/258.0	3.4/53.0	2.0/3.0
B	4.2	0.3/4.5	-	3.9/59.1
C	11.2	3.7/56.0	-	7.5/113.6
D	15.2	6.0/91.0	-	9.2/139.4
E / E_1	46.2	19.8/300.0	25.0/379.0	1.4/21.2
F	1.4	0.3/3.8	-	1.1/16.7
G	5.0	0.4/6.1	-	4.6/69.7
H	2.2	-	-	2.2/33.3
Proposed Action	107.8	47.5	28.4	31.9
Alternative 1	99.2	46.8	28.4	24.0
Alternative 2	35.2	18	3.4	13.8
Alternative 3	46.2	19.8	25.0	1.4

Source: Original September 2002

Figures 3-1 through 3-8 show additional detail of the segment and milepost locations.

Segments A and A_1 cross approximately 17 miles (258 acres) of the 100-year floodplain. These 17 miles include 9.3 miles along the east side of Sutter Bypass (MP 0.0 to 9.3), 1.3 miles crossing the Feather River floodplain (MP 10.5 to 11.8), and 6.4 miles in the lesser floodplains of Burkham Slough (MP 15.0 to 16.3), Cross Canal, the east side of Pleasant Grove Creek Canal, Pleasant Grove Creek, and Curry Creek at MP 17.3 to 22.4. The segment crosses the 500-year floodplain of Sutter Bypass and the Feather River for 3.4 miles (53 acres) at MP 9.3 to 10.5 and MP 11.8 to 14.0. Two miles of this alignment (MP 14.0 to 15.0 and MP 16.3 to 17.3) are outside the 500-year floodplain.

Segment B is outside the 500-year floodplain, except for three minor tributary crossings of 0.1 miles each within the 100-year floodplain at MP 0.7, 3.5, and 3.9, respectively (4.5 acres total).

Segment C is outside the 500-year floodplain from MP 0.0 to 7.5. The segment alignment falls within the 100-year floodplain for approximately 3.7 miles (56 acres) along the north bank of the American River from MP 7.5 to 11.2.

Segment D crosses about six miles (91 acres) of the 100-year floodplain, including 4.4 miles along the north bank of the American River. The ROW parallels, then crosses the American River floodplain from MP 0.0 to 4.4. The other 1.6 miles are minor tributary crossings at MP 5.6 to 6.6, 7.8, 13.8, and 15.7. The remaining portions of this segment from MP 4.4 to15.2 fall outside the 500-year floodplain.

Segments E and E_1 cross about 19.8 miles (300 acres) of 100-year floodplain, mostly (12.2 miles) in the eastern floodplain of the Cosumnes River and northern and southern floodplains of the Mokelumne River at MP 1.0 to 6.8, MP 7.3 to 12.7, MP 12.8 to 13.0, and MP 13.3 to 14.0. The ROW crosses a small 100-year floodplain drainage at MP 17.4 to 17.8 and reenters the 100-year floodplain at Pixley Slough, MP 24.0 to 24.7, then crosses a minor drainage at MP 25.1 to 25.3. The ROW continues through the floodplains of Five Mile Slough and the San Joaquin River from MP 26.1 to 30.5, the Middle River (MP 37.0 to 38.0), the Old River (MP 43.3 to 43.8), and the Delta-Mendota Canal (MP 44.4 to 44.8). The segment crosses approximately 25 miles (379 acres) of the 500-year floodplain of the various watercourses at MP 12.8, MP 13.0 to 13.3, and MP 14.0 to 17.4, MP 17.8 to 24.0, MP 24.6 to 25.1, MP 25.3 to 26.1, MP 30.5 to 37.0, MP 38.0 to 43.3, MP 43.8 to 44.5, and MP 44.8 to 46.2. The only areas outside the 500-year floodplain are at MP 0.0 to 1.0 and MP 6.8 to 7.2.

Segment F crosses approximately 0.3 miles (3.8 acres) of the Curry Creek 100-year floodplain at MP 0.3 to 0.5. The remaining 1.1 miles are outside the 500-year floodplain.

Segment G crosses approximately 0.4 miles (6.1 acres) of the 100-year floodplain, including two Curry Creek tributaries and one minor drainage at MP 2.0, MP 2.8, and MP 4.4, respectively. The remaining 4.6 miles are outside the 500-year floodplain.

Segment H (2.2 miles) is entirely outside the 500-year floodplain.

4.6.2 Environmental Consequences

The Proposed Action and alternatives would impact floodplains during and following construction of new access roads, structures, and temporary work sites within existing and new ROWs. Activities that result in additional fill within the floodplain or block water movement through the floodplain could reduce its capacity to dissipate the energy and volume of peak flows.

4.6.2.1 Standards of Significance

The effects of the Proposed Action and alternatives would be considered significant if floodplains were substantially altered. The capacity of the watercourse to convey peak seasonal flows would be reduced, thereby increasing the stage and extent of a flood. Such a situation could cause an increase in risks to life, property, and downstream resources.

4.6.2.2 Environmental Protection Measures

EPMs for floodplains from Table 3-4 include the following:

- Hazardous materials would not be drained onto the ground, into streams, or into drainage areas. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials.
- Irrigation system features, which are eligible for the NRHP, would be avoided during the siting of new transmission line structures and access roads, and most other irrigation system features would be avoided to the extent practicable in the siting of new structures and access roads.
- In construction areas (for example, material storage yards, structure sites, and spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur.
- Access roads would be built at right angles to the streams and washes to the extent practicable. Culverts would be

installed where needed. All construction activities would be conducted to minimize disturbance to vegetation and drainage channels.

- Excavated material or other construction materials would not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm water runoff or can encroach, in any way, upon the watercourse.
- Nonbiodegradable debris would not be deposited in the ROW. Slash and other biodegradable debris would be left in place or disposed.
- All soil excavated for structure foundations would be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations. Excavated soil excess to these needs would be removed from the site and disposed of appropriately.
- To the extent possible, new structures and access roads would be sited out of floodplains. Due to the abundance of floodplains and surface water resources in the study area, complete avoidance may not be possible, and Western will consult with the USACE.
- Culverts would be installed where needed to avoid surface water impacts during construction of transmission line structures. All construction activities would be conducted in a manner to avoid impacts to water flow.

4.6.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

Forty-seven miles of the Proposed Action occur within the 100-year floodplain. Within these 47 miles, approximately 163 new transmission line structures (99 for new construction, 64 for reconductoring) would be constructed along the new and existing ROW. These activities would disturb approximately 38 acres of the 100-year floodplain temporarily and 16 acres long term.

Another 29 miles of the Proposed Action occur within the 500-year floodplain. Within these 29 miles, 20 new structures would be constructed and 61 structures would be replaced during reconductoring. This would cause 19 acres of temporary disturbance and 8 acres of long-term disturbance to the 500-year floodplain.

Most impacts would be temporary and all would be less than significant when the EPMs are implemented (Table 3-4). The only long-term impacts would result from installing concrete footers and contouring for positive drainage at new transmission line structures. The expanse of available floodplain within and surrounding the area would completely absorb any change resulting from such modifications. These negligible changes to the 100- and 500-year floodplain would not individually or cumulatively alter the capacity of the floodplain to convey and dissipate the volume and energy of peak flows. Therefore, the stage and extent of a flood would not be increased.

4.6.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Forty-seven miles of Alternative 1 occur within the 100-year floodplain. Within these 46 miles, approximately 89 new transmission line structures would be constructed during reconductoring along the existing ROW. These activities would disturb approximately 20 acres of the 100-year floodplain temporarily and nine acres long term.

An additional 28 miles of the Alternative 1 alignment occur within the 500-year floodplain. Within these 28 miles, approximately 66 structures would be replaced during reconductoring. Resulting impacts to the 500-year floodplain would total approximately 15 acres of temporary disturbance and seven acres of long-term disturbance.

Floodplain impacts would be similar to those discussed for the Proposed Action. These negligible changes to the 100- and 500-year floodplain would not individually or cumulatively alter the capacity of the floodplain to convey and dissipate the volume and energy of peak flows. Therefore, the stage and extent of a flood would not be increased.

4.6.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Eighteen miles of Alternative 2 lie within the 100-year floodplain. Within these 18 miles, approximately 99 new transmission line structures would be constructed along the new and existing ROW. These activities would disturb approximately 23 acres of the 100-year floodplain temporarily and 10 acres long term.

An additional 3.4 miles of Alternative 2 alignment occur within the 500-year floodplain. Within these 3.4 miles, 20 new structures would be constructed. Resulting impacts to the 500-year floodplain would total approximately 4.5 acres of temporary disturbance and two acres of long-term disturbance.

Floodplain impacts would be similar to those discussed for the Proposed Action. These negligible changes to the 100- and 500-year floodplain would not individually or cumulatively alter the capacity of the floodplain to

convey and dissipate the volume and energy of peak flows. Therefore, the stage and extent of a flood would not be increased.

4.6.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Twenty miles of Alternative 3 alignment occur within the 100-year floodplain. Within these 20 miles, approximately 96 new transmission line structures would be constructed along the new and existing ROW. These activities would disturb approximately 22 acres of the 100-year floodplain temporarily and 10 acres long term.

An additional 25 miles of the Alternative 3 alignment occur within the 500-year floodplain. Within these 25 miles, approximately 225 new structures would be constructed along the new ROW. Resulting impacts to the 500-year floodplain would total approximately 52 acres of temporary disturbance and 24 acres of long-term disturbance.

Floodplain impacts would be similar to those discussed for the Proposed Action. These negligible changes to the 100- and 500-year floodplain would not individually or cumulatively alter the capacity of the floodplain to convey and dissipate the volume and energy of peak flows. Therefore, the stage and extent of a flood would not be increased.

4.6.2.7 Impacts from the No Action Alternative

Without the Proposed Action or action alternatives, no changes to existing facilities or alignment would occur and no new impacts to the active floodplain would be expected. Normal operation and maintenance, repairs, and emergency management of the system would continue as in the past. There are recognized temporary and insignificant impacts from maintaining access and transmission service (for example, vegetation management within the ROW). These impacts would continue as before and be avoided, minimized, or mitigated to the extent possible using Western's established EPMs (Table 3-4).

4.7 GEOLOGY

4.7.1 Affected Environment

This section describes the existing geologic and hydrogeologic conditions and impacts from the implementation of the Proposed Action and alternatives. Geology includes discussions on grading, erosion, mining, and seismicity.

4.7.1.1 Resource Study Area

The focus of the study for geologic constraints and hazards is the transmission line ROW and nearby geologic faults including the Willows, Midland, Stockton, and Midway faults that could potentially affect the transmission lines.

4.7.1.2 Issues of Environmental Concern

Issues of environmental concern for geological resources include erosion, subsidence, landslides, and seismic and related hazards (liquefaction). They are discussed in the following section.

4.7.1.3 Characterization

Regional Setting

The study area lies within the Central Valley of California, a broad depositional basin between the Sierra Nevada Mountains on the east and the Coast Mountain Range on the west. The Central Valley is about 400 miles long by 50 miles wide and covers approximately 20,000 square miles. It contains the Sacramento Valley and the San Joaquin Valley. The surface elevation of the Central Valley lowland rises from slightly below sea level to about 400 feet above sea level at its north and south ends. The valley is unusual for a lowland area because it is a relatively undeformed basin surrounded by highly deformed rocks units. The Central Valley trough has been filled with as much as six vertical miles of sedimentary deposits in the San Joaquin Valley and ten vertical miles of deposits in the Sacramento Valley; these sediments range in age from Jurassic to Holocene. The Sacramento River drains the northern part of the Sacramento Valley, and the San Joaquin River drains the southern part of the San Joaquin Valley.

The geology in the Sacramento Valley relates to three different subbasins within the Sacramento Groundwater Basin: 1) the North American Subbasin; 2) the South American Subbasin; and 3) parts of the Cosumnes Subbasin.

The North American Subbasin lies in the eastern central portion of the Sacramento Groundwater Basin. The Bear River is its northern boundary, the Feather River is its western boundary, and the Sacramento River is its southern boundary. The eastern boundary is a north-south line extending from the Bear River south to Folsom Lake. The eastern boundary represents the approximate edge of the alluvial basin, where little or no groundwater flows into or out of the groundwater basin from the rock of the Sierra Nevada. The eastern portion of the study area is characterized by low, rolling dissected uplands. The western portion is nearly a flat flood basin for the Bear, Feather, Sacramento, and American rivers, and several small east side tributaries. The general direction of drainage is west to southwest at an average grade of about 5 percent (California Department of Water Resources [DWR] 2002, draft Bulletin 118).

The South American Subbasin is bounded on the east by the Sierra Nevada, on the west by the Sacramento River, on the north by the American River, and on the south by the Cosumnes and Mokelumne rivers. These perennial rivers generally create a groundwater divide in the shallow subsurface. There is interaction between groundwater of adjacent subbasins at greater depths (DWR 2002, draft Bulletin 118).

The Cosumnes Subbasin is the area of unconsolidated to semi-consolidated sedimentary deposits bounded on the north and west by the Cosumnes River, on the south by the Mokelumne River, and on the east by consolidated bedrock of the Sierra Nevada Mountains. The Cosumnes Subbasin is bounded on the south and southwest by the Eastern San Joaquin Subbasin and on the north to northwest by the South American Subbasin of the Sacramento Valley Groundwater Basin. The subbasin drains westward through three major rivers, namely the Cosumnes on the north, Dry Creek in the middle, and the Mokelumne River on the south. A large surface water body, the Camanche Reservoir, is located along a portion of the Mokelumne River in the southeast part of the subbasin (DWR 2002, draft Bulletin 118).

The San Joaquin Valley portion of the study area relates to three different subbasins within the San Joaquin Groundwater Basin: 1) the Eastern San Joaquin Subbasin; 2) the Tracy Subbasin; and 3) parts of the Cosumnes Subbasin.

The Eastern San Joaquin Subbasin is the area of unconsolidated to semi-consolidated sedimentary deposits bounded by the Mokelumne River on the north and northwest; San Joaquin River on the west; Stanislaus River on the south; and consolidated bedrock on the east. The Eastern San Joaquin Subbasin is bounded on the south, southwest, and west by the Modesto, Delta-Mendota, and Tracy Subbasins, respectively, and on the northwest and north by the Solano, South American, and Cosumnes Subbasins. The Eastern San Joaquin Subbasin is drained by the San Joaquin River and several of its major tributaries, namely the Stanislaus, and Calaveras, and Mokelumne rivers. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay (DWR 2002, draft Bulletin 118).

The Tracy Subbasin is the area of unconsolidated to semi-consolidated sedimentary deposits bounded by the Diablo Range on the west; the Mokelumne and San Joaquin rivers on the north; the San Joaquin River to the east; and the San Joaquin-Stanislaus County line on the south. The Tracy Subbasin is located adjacent to the Eastern San Joaquin Subbasin on the east and the Delta-Mendota Subbasin on the south. All of the above mentioned subbasins are within the larger San Joaquin Valley Groundwater Basin. The Tracy Subbasin also lies to the south of the Sacramento Valley Groundwater Basin, Solano Subbasin. The Tracy Subbasin is drained by the San Joaquin River and one of its major western tributaries, Corral Hollow Creek. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into the San Francisco Bay (DWR 2002, draft Bulletin 118).

Geologic Formations in the Study Area

The Proposed Action and alternatives cross three geologic formations (at land surface) between the O'Banion Substation and Tracy Substation. Figure 4-3 shows the geology units that surround the study area. These Quaternary and Tertiary deposits include:

- ***Quaternary Floodbasin (Qb)***—Floodbasin deposits, associated with flood stage on major streams
- ***Quaternary River Deposit (Qr)***—River deposits, associated with river channels, floodplains, and natural levees
- ***Quaternary Continental Deposit (QTc)***—Continental deposits (older alluvium, fanglomerate, and sedimentary formations)

Floodbasin deposits (Qb) crop out in low-lying areas throughout the Central Valley. They result from flood waters entering low-lying basins and depositing mostly fine silt and clay and some fine sand. Floodbasin deposits grade into river deposits, rocks, deposits of Tertiary and Quaternary age, and lacustrine and marsh deposits. As with most deposits of Quaternary age in the valley, contact with underlying deposits is difficult to determine. The DWR stated that the floodbasin deposits in the Sacramento Valley consist of as much as 160 feet of fine-grained sediments in the area west and south of Sacramento. In the San Joaquin Valley, the deposits were estimated to be as much as 100 feet thick (USGS, Prof Paper 1401-C, 1986).

River deposits (Qr) crop out along the major rivers and streams of the Central Valley and include channel and floodplain deposits. River deposits are still accumulating, except where human activity intervenes. Channel deposits, which consist chiefly of sand and gravel, range in width from a few feet to nearly 1,000 feet. Floodplain deposits generally are finer-grained than channel deposits and consist chiefly of sand and silt. They range in width from a few hundred feet to more than three miles. Because soil development and topography are the criteria for mapping river deposits, subsurface contact with underlying deposits is poorly defined. River deposits in the Sacramento area have been described as predominantly coarse-grained at relatively shallow depths that appear

to be hydraulically continuous with the present stream channels, floodplains, and natural levees. The DWR believes that the river deposits are a maximum of about 115 feet thick and that they are the most permeable deposits in the Sacramento Valley (USGS, Prof Paper 1401-C, 1986).

Continental deposits (QTc) are largely of Holocene age; along their outer margins, however, some may be Pleistocene age. The deposits crop out chiefly along the major rivers and streams of the valley, as well as in other low-lying areas, and include river deposits, floodbasin deposits, and sand dunes, all of Holocene age. In places, they may include such deposits as the Modesto Formation of Pleistocene age (USGS, Prof Paper 1401-C, 1986).

Figure 4-3 presents geological deposits in the vicinity of the study area. Segments of transmission lines in relation to local geology are described below.

River deposits pose the greatest concern for building or accessing transmission lines. The deposits consist of sand and gravel, usually unconsolidated, are typically water bearing, and are poor for compaction and drilling. River deposits along the ROW are approximately perpendicular to the route because they follow the rivers west from the Sierra Nevada Mountains. Segments A and A_1 cross about four miles of river deposits along the Feather River from MP 10.0 to 14.0. Segment C crosses river deposits from MP 4.0 to 10.0, and Segment D crosses river deposits from MP 0.0 to 3.0. Segments E and E_1 cross river deposits at the Cosumnes River from MP 2.0 to 4.0 and MP 5.0 to 6.0 at Dry Creek from MP 10.0 to 11.0, and the Mokelumne River from MP 12.0 to 13.0.

The continental deposits are the most geologically stable and are most prevalent along the study area in Sacramento County. Continental deposits are present in Segments A and A_1 from MP 0.0 to 10.0 and MP 14.0 to 22.0 and all of Segments B, F, G, and H.

Continental deposits are again present in Segment D from MP 3.0 to 14.0 and Segment E from MP 0.0 to 2.0, MP 4.0 to 5.0, MP 6.0 to 10.0, MP 11.0 to 12.0, MP 13.0 to 18.0 and MP 44.0 to 46.0. Floodbasin deposits are more suitable for construction than river deposits, but less suitable than continental deposits. In San Joaquin County, floodbasin deposits are the primary material along the proposed routes. Floodbasin deposits are present in Segment E from MP 18.0 to 44.0.

Mining

Several sand and gravel mines are located in the vicinity of the study area including one along Segment D between MP 4.2 and 5.5. Transmission lines can be placed in locations not interfering with these mining operations.

Faults

Earthquakes occur along fault zones. A fault zone is a break in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust. Figure 4-3 shows faults near the study area. The nearest historically active fault is the Concord Fault, approximately 50 miles west of the study area. Displacement on the Dunnigan Fault, about 20 miles west of Segments A, A_1, and C, has occurred within Holocene time (within the last 10,000 years), and the Vernalis Fault, near Tracy, has had activity in the Quaternary Period (within 1.6 million years). The nearest faults to the ROW have not been active within Quaternary times. These include the Willows Fault, the Stockton Fault, and the Midland Fault. The Willows Fault roughly parallels the ROW from the beginning of Segment A and A_1 south to about Segment D MP 7.0 at the Hedge Substation. The fault lies within 1 to 5 miles of the study area and crosses the study area at the O'Banion Substation, Segment A MP 4.0, the Elverta Substation, and coincides with the study area between Segment D MP 2.0 to the Hedge Substation. The Stockton Fault is as close as four miles southeast of the study area between Segment E MP 30.0 and the Tracy Substation. The Midland Fault is as close as 4 miles west of the study area between Segment D MP 12.0 and the Tracy Substation.

Seismicity

A Seismic Zone classification is used by the Uniform Building Code (UBC) to define the magnitude of protection required for building design to withstand earthquake risk in the area or from adjacent areas. UBC Seismic Zones range from 1 to 4 (with Zone 4 having the highest risk) and are based on a 10-percent probability of specific peak ground acceleration (PGA) values being exceeded within 50 years. The entire study area is within UBC Zone 3. All of California is seismically active, with numerous historic earthquakes and seismic activity recorded by instruments daily. Seismic Zone 3 could have earthquakes with a Modified Mercalli Intensity (MMI) rating of VIII or higher. The MMI scale rates earthquakes by their effect on people, structures, and objects. Major structural damage would typically occur from an earthquake with an intensity of VIII or higher. Intensity VIII is generally equated with an average peak acceleration of 20 to 30 centimeters per second (cm/sec). This intensity typically results in slight damage to specially designed structures; considerable damage to ordinary, substantial buildings, with partial collapse; and great damage to poorly built structures. This intensity could also result in falling columns, monuments, and walls (Bolt 1988). Secondary hazards of earthquakes include rapid ground settlement (subsidence), landslides and rockfalls, and liquefaction. These hazards are discussed below.

Subsidence

Land subsidence occurs when the ground surface decreases in elevation. It can be caused by various natural phenomena such as tectonic movement, consolidation, hydrocompaction, or rapid sedimentation. Subsidence can also result from a variety of human activities, including withdrawing water or petroleum from the subsurface. The numerous fine-grained (clayey) lenses in Central Valley deposits are conducive to subsidence. The southern San Joaquin Valley (south of Tracy Substation) has the largest volume of land subsidence in the world (from groundwater withdrawal), and many areas of the Central Valley are vulnerable to this phenomenon. The other important cause of subsidence in the Central Valley is oxidation and compaction of peat soils caused by draining soils nears the confluence of the San Joaquin and Sacramento Rivers. The southern portion of Segment E, from approximately Stockton to Tracy, runs along the edge of an area of subsidence caused by compaction of peat according to a 1952 Field survey (Williamson 1989). Subsidence is typically a slow process, unless induced by seismic activity. Its potential effects on structures might not be evident for years or decades.

Landslides and Rockfalls

Landslides, rockfalls, mudslides, and debris avalanches refer to rock or debris descending a slope due to gravity. Slopes within the study area are typically shallow or nonexistent, making landslides unlikely. Construction in areas with steep slopes should be avoided whenever possible. These limited areas may include the banks of some rivers, levees, or canals.

Liquefaction

Liquefaction occurs when saturated soils lose strength and cohesion when subjected to dynamic forces, such as shaking during an earthquake. Liquefaction can also occur in unsaturated soils with low cohesion, such as sand. Liquefaction and related phenomena have caused tremendous amount of damage during historical earthquakes when water pressure between soil particles can increase until the soil cohesion is lost, along with the support that it normally supplies to building foundations. Liquefaction occurs more frequently in areas where groundwater is very shallow, such as in river deposits near water bodies. Quaternary River Deposits (Segments A, A_1, C, D, E, and E_1) may be prone to liquefaction.

4.7.2 Environmental Consequences

4.7.2.1 Standards of Significance

Significant geologic impacts would result if structures were to fail or create hazards to adjacent property due to slope instability, effects of earthquake, or adverse soil conditions (such as compressible, expansive, or corrosive soils).

4.7.2.2 Environmental Protection Measures

EPMs for geologic resources from Table 3-4 include the following:

- A California registered Professional Geotechnical Engineer would evaluate the potential for geotechnical hazards and unstable slopes on the centerline route and areas of new road construction or widening on slopes with over 15 percent gradient.
- Geological hazards would be evaluated during final design specification for each structure location and road construction area. Options would include avoidance of a poor site by selection of a site with stable conditions, or correction of the unstable slope conditions.

4.7.2.3 Impacts from the Proposed Action, Alternative 1, Alternative 2, Alternative 3, and No Action

No noteworthy geological features were identified to distinguish among the Proposed Action and alternatives. Therefore, the discussion on geology applies to all alternatives. Potential impacts to the Proposed Action and alternatives would be similar, although the specific locations might vary. The route for the Proposed Action and Alternatives 1 and 2 would cross a fault zone that has not been active within the past 1.6 million years; therefore, this is not considered to have more seismic impact than Alternative 3.

Any steep or unstable slopes near the Proposed Action or alternatives ROW would be avoided or minimized with standard construction practices described above. Alternative 3 would cross fewer miles of river deposits than the Proposed Action or other alternatives; however, it would cross 26 miles of floodbasin deposits that could also succumb to earthquake forces, such as liquefaction, more readily than the continental deposits that predominate in the Proposed Action, Alternative 1, and Alternative 2. Geological hazards would be evaluated during final design specification for each structure location and road construction area and standard design practices would be used.

Sand and gravel mining operations (Segment D) would be avoided, and would not be impacted by the Proposed Action or alternatives. No significant geologic impacts are noted for the Proposed Action or alternatives.

4.8 HEALTH AND SAFETY

4.8.1 Affected Environment

This section describes the health and safety issues associated with the Proposed Action and alternatives.

4.8.1.1 Resource Study Area

The resource study area for health and safety depends on the specific health and safety issue. For example, the study area for hazardous materials and herbicides is the area where they are stored, transported, or applied. Fires, electrocutions, and falls could occur anywhere along the transmission line, making the proposed ROW the study area.

4.8.1.2 Issues of Environmental Concern

Issues of environmental concern for health and safety are spills or mishandling of hazardous materials, hazardous waste, herbicides, electrical contact (fires, burns, and electrocutions), and worker falls.

4.8.1.3 Characterization

Hazards can occur under existing conditions as discussed below:

Hazardous Materials and Hazardous waste

Hazardous materials concerns could arise from spills (gasoline, diesel fuel, oil, or solvents) from containers or vehicles. Spills could contaminate soils or leach into ground or surface water. Known storage locations include existing substations (O'Banion, Elverta, Hedge, Hurley, Elk Grove, and Tracy). California-designated hazardous waste has been stored at Tracy and Elverta substations. The waste is managed in accordance with regulations, and is removed for final disposal within allowable time limits. The other substations may store hazardous waste (for example, bushings and oil) for short periods as allowed by regulation.

Western applies herbicides along the existing ROWs (Segments A, B, C, D, E, F, and H) where vegetation threatens the safe operation of the transmission line and related facilities. Herbicide misuse, over-spray, or drift could adversely affect humans, wildlife, vegetation, or water.

Electrical Hazards

Electrical hazards could include vegetation or equipment fires, electrical burns, or electrocutions to humans or animals. Electrical hazards could occur anywhere near energized conductors or facilities (Segments A, B, C, D, E, F, and H). These hazards are primarily a concern for construction and maintenance workers.

Fall Hazards

Fall hazards could affect individuals working at heights. Elevated work is essential for assembly and repair of transmission structures and equipment (Segments A, B, C, D, E, F, and H). Workers typically perform this work from bucket trucks or by climbing structures. In both instances, Western requires workers to use fall-protection devices.

4.8.2 Environmental Consequences

The Proposed Action and alternatives could affect the environment if hazardous materials were released from spills as discussed above.

4.8.2.1 Standards of Significance

The Proposed Action and alternatives would have significant and adverse effect on health and safety if they would:

- Create a public or worker health hazard beyond limits set by health and safety regulatory organizations, or
- Interfere with adopted emergency response plans.

4.8.2.2 Environmental Protection Measures

EPMs for Health and Safety from Table 3-4 include the following:

- Conform with safety requirements for maintaining the flow of public traffic and conduct construction operations to offer the least possible obstruction and inconvenience to public transportation.
- Comply with all applicable health and safety standards.
- Some land uses occurring within the ROW would require temporary closure or limited access. Proper signage would be posted in these areas.
- For identified locations, structures and/or shield wire would be marked with highly visible devices where required by governmental agencies (for example, the Federal Aviation Administration [FAA]).

Each health and safety issue described above is highly regulated by one or more of the following: U.S. Department of Transportation (DOT), EPA, Occupational Safety and Health Administration (OSHA), and DOE, as well as state, county, and local governments. Additionally, Western and its contractors are required to comply with safety and environmental protection policies and guidance developed by Western, including Western's Occupational Safety Program (WAPA Order 3790.1B), the Power System Maintenance Manual (PSMM), the Power System Safety Manual (PSSM), and PSOM.

4.8.2.3 Impacts from the Proposed Action, Alternative 1, Alternative 2, Alternative 3, and No Action

Construction and maintenance activities increase exposure to safety and health hazards. The risk varies among the Proposed Action and alternatives, increasing where substances are stored or transferred, live electrical components are likely to contact vegetation, animals, or

humans, or where workers conduct their tasks at heights. Generally, new construction would be most intensive in worker time and exposure to these hazards, followed by reconductoring, then maintenance. Therefore, the Proposed Action and Alternative 3 would be expected to present more health and safety risk than Alternative 2, followed by Alternative 1. The No Action Alternative would present the least risk. Performed in compliance with all applicable regulations and guidance, activities for the Proposed Action and alternatives would pose no significant threat to the health and safety of workers or the public.

4.9 LAND USE

4.9.1 Affected Environment

The purpose of the land use study was to identify and describe all major land uses, which could be affected by the construction and operation of the Proposed Action and alternatives. Western compiled land use information from maps and existing literature from public agencies and private organizations. Data sources for the baseline inventory included interpretations from USGS 7.5-minute topographic quadrangle sheets and natural color aerial photographs. Baseline data were supplemented by meetings with Federal, state, and county planning, and land management agencies. Several agencies also supplied pertinent documents and maps.

4.9.1.1 Resource Study Area

The land use study area includes the transmission-line corridor and adjacent land uses along the corridor. The study area extended up to 0.5 mile from the ROW for the Proposed Action and alternatives. Appendix E presents aerial photographs of the area around the Proposed Action and alternatives and provides visual examples of the surrounding land.

4.9.1.2 Issues of Environmental Concern

Issues of concern identified during scoping included proximity of transmission lines to residential areas, loss of prime farmland, effects on recreation and open space areas, and potential interference with traffic patterns during construction. Table 4.9-1 presents types of land use compatible within and adjacent to the ROW.

Table 4.9-1. Compatibility of Land Use Types Within and Adjacent to the Transmission Line ROW

Land Use Type	Compatibility with Transmission Line	
	Within ROW	Adjacent to ROW
Residential/Developed Urban	Not allowed, removal of structures	Allowable, potential electrical annoyance and visual effects
Commercial/Industrial	Not allowed, removal of structures	Allowed visual effects and potential interference with access
Airport	Not allowed	Not allowed immediately adjacent to the ROW due to conflicts with aircraft flight paths
Surface Mining/Quarry	Not allowed, cessation of use	Generally allowable
Landfill	Active landfill areas not allowed/cessation of use	Generally allowable
Agricultural Land	Possible land/easement acquisition, but use would be allowed to continue. Some potential interruptions to irrigation, tilling and harvesting techniques. Removal of use at structure footings. Height restrictions for orchard crops and equipment.	Generally allowable
Cemetery	Use would be allowed to continue, possible displacement at structure footings and change in access	Allowable, visual effects
School/Church	Not allowed, removal of structures/cessation of use	Generally allowable. Potential electrical annoyance (radio/TV interference) and visual effects.

Sources: American Electric Power Co., 1995, and adapted from California Public Utilities Commission (CPUC), 1987
ROW: right-of-way

4.9.1.3 CHARACTERIZATION

Figures 3-1 through 3-8 map the locations of line segments and MPs. Appendex E presents aerial photographs of the study area. The O'Banion Substation is south of the Sutter National Wildlife Refuge and next to the east side of the Sutter Bypass Wildlife Area. Lands crossed by Segments A, A_1, and B, are mostly prime farmland. These segments parallel other existing transmission lines. Segments A and A_1 run along the eastern levee of the Sutter Bypass drainage to MP 9.0. Segments A and A_1 cross the Feather River Wildlife Area (between MP 11.0 and 11.8). A portion of Segment A_1 (MP 17.4 to 20.2) would be realigned to avoid sensitive land uses, including two residential areas (MP 17.6) and the Pleasant Grove Cemetery (MP 18.2).

A portion of Segment B would be located along scattered residential areas containing ranchettes. The residential areas along Segment B are more built up south of Baseline Road (MP 1.5). Segment B parallels other transmission lines, especially from MP 2.8 to the Elverta Substation. Although Segments F and H and a portion of Segment G parallel transmission lines, each segment is located in a more rural area than Segment B. Land uses along Segment G include agriculture and grazing lands. A few scattered residences are located along Segment G (MP 3.0 to 4.0). Segment G (MP 0.0 to 1.7) is the only segment that does not parallel existing transmission lines or ROWs.

Segment C and the northern portion of Segment D parallel other transmission lines within existing ROWs and through the metropolitan Sacramento area. Land uses include a mix of urban residential, commercial, industrial, parks, and recreation areas. Segment C (MP 3.5 to 3.8) would run through several commercial and industrial parking lots. A community park is located at MP 7.3. There are urban residential neighborhoods from MP 4.0 to the American River Parkway (MP 8.7). Segment C passes along the American River Parkway, to the Hurley Substation. Segment D crosses the Parkway (MP 2.5). There is a bicycle path between MP 10.0 and 11.0.

Along Segment D, there is a private school adjacent to the north side of the ROW (MP 1.9). A portion of the school's soccer field and playground are located in the ROW. Mixed land use occurs near MP 1.0, including a senior residence care center and a private recreation facility along with the recreation facility's tennis courts, located in the ROW. Industrial uses include a gravel quarry and an adjacent landfill (MP 4.2 to 5.5). Approaching Hedge Substation, a network of other transmission lines feed into or pass near the substation. Between Hedge and Elk Grove substations Segment D would continue to parallel other transmission lines.

New residential areas are located along the ROW from Calvine Road to the Elk Grove Substation. A park and tennis courts are located within the ROW between Vintage Park Drive and Calvine Road (Segment D, MP10.0). An old cemetery is located west of the ROW at Segment D, MP 13.0. South of Elk Grove Boulevard Segment D, MP 12 to 14, there is a groundwater treatment plant, an asphalt plant, a concrete mix plant, and other industrial facilities. The area around Elk Grove Substation is designated for industrial development by the General Land Use Plan for the City of Elk Grove (Elk Grove, 2002). Grazing occurs in the ROW both north and south of the Elk Grove Substation.

Segments E and E_1 would run through an industrial zone, a golf course, and an area designated for future urban development (MP 0.0 to 0.8). There is a private airstrip about one mile east of the substation. Segments E and E_1 would cross the Cosumnes River and Cosumnes River Preserve near MP 3.4. The Cosumnes River Preserve is public land managed jointly by a consortium of public agencies and private entities. There is a small gas-fired power plant operated by Northern California Power Agency (NCPA) along Segments E and E_1 (MP 21.2). PG&E operates a substation at MP 23.4.

Moving south, Segments E and E_1 cross large areas of prime farmland between MP 10 and 19 with crops including alfalfa, asparagus, tomatoes, and corn. Vineyards (MP 12.5 to 16) are also dispersed along the transmission line ROW. The route would traverse three to five miles west of the communities of Galt (MP 10.1), Lodi (MP 19.0), and Stockton (MP 30.0) and then continue southwest through undeveloped portions of San Joaquin, Contra Costa, and Alameda counties.

Segments E and E_1 would cross the San Joaquin River (MP 29.1). West of Stockton, Segments E and E_1 would cross a series of sloughs (MP 30.0 to 32.0) designated by San Joaquin County as resource conservation areas. The segment would cross over the Mokelumne Aqueduct (MP 30.2) and pass approximately 0.25 mile west of the Rough and Ready Island U.S. Naval Reservation (MP 30.5). Continuing south the line would cross the Middle River (MP 37.5), also designated by San Joaquin County as a resource conservation area.

Segments E and E_1 would pass approximately 0.25 mile southeast of the Clifton Court Forebay (MP 43.7), which is owned by the State of California. The Livermore Yacht Club is located west of MP 45.0, south of the Mendota Canal. The community of Tracy is nine miles southeast of the Tracy Substation. The new planned community of Mountain House is 1.5 miles southeast of Tracy Substation.

4.9.2 Environmental Consequences

4.9.2.1 Standards of Significance

Within the study area, the following types of potential land use impacts are considered significant if the Proposed Action and alternatives would:

- Be inconsistent with adopted land use plans and goals of the community or area in which they are located, including open space designations or other types of areas designated for preservation,
- Cause major conflicts in established recreational areas,
- Convert prime, unique or other farmland of statewide importance to nonagricultural uses,
- Permanently preclude planned land uses over a large area,
- Conflict with existing utility ROWs,
- Cause major traffic delays for a substantial number of motorists, or
- Cause physical damage to roads that is not repaired to a level equal to or better than what existed prior to construction.

The socioeconomics section (4.12) includes significance standards related to some of the potential land use conflicts identified in this section, including standards for potential impacts to residential areas and businesses, public services and the economic-related impacts of converting prime farmland to other uses.

4.9.2.2 Environmental Protection Measures

EPMs for land use issues from Table 3-4 include the following:

- When weather and ground conditions permit, all construction-caused deep ruts that are hazardous to farming operations and to moving equipment would be restored to preconstruction condition, as practical.
- On completion of the work, all work areas except access trails would be scarified or left in a condition that would facilitate natural revegetation, provide for proper drainage, and prevent erosion.
- During construction, movement would be limited to the access roads and within a designated area in the ROW to minimize damage to agricultural land.
- Construction operations would be conducted to prevent unnecessary destructing, scarring, or defacing of the natural surroundings to preserve the natural landscape to the extent practicable.
- No permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey.
- Damaged fences and gates would be repaired or replaced to restore them to their preconstruction condition.
- Some land uses occurring within the ROW would require temporary closure or limited access. Proper signage would be posted in these areas.

For land uses occurring within the ROW (such as the private school's playground and soccer field and the private recreation facility's tennis courts Segment D, MP 1.0 to 2.0), temporary closure and limited access to these areas would be required. Signage would be posted for the length of the temporary closure. The EPMs included in the socioeconomics section (Section 4.12.2.2) are also designed to minimize and avoid potential impacts to other land uses, including nearby residences, businesses, landowners, and motorists during construction.

4.9.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

No significant impacts would result from the Proposed Action. The proposed alignment of the new O'Banion–Elverta transmission line and the realignments are planned and sited to avoid the existing Pleasant Grove Cemetery and residential areas. The new line and ROW along Segment G would be within 0.25 mile of two rural residences, resulting in potential impacts that are addressed in the socioeconomics (Section 4.12) and visual resource sections (Section 4.14). This is the only segment of new line that would not be adjacent to an existing transmission line ROW. This approximate 1.5 mile portion of the Proposed Action route would not conflict with any existing or planned land uses or designations, other than prime farmland. The private school along Segment D (MP 1.9) and private recreation facility/tennis courts would experience indirect short-term construction impacts, and some recreation areas would not be usable during construction.

For Segment A_1, 6.7 acres of prime farmland would be removed from agricultural production where new structures would be placed in the ROW. Removing prime farmland permanently from agricultural use would be a long-term impact. However, farming practices would continue in the new ROW, and the socioeconomics section concluded that the potential economic impacts of removing this land from production would not be significant.

Potential additive impacts to parks, resource conservation, and recreation areas including the American River Parkway would not be significant. All of the Proposed

Action, except about 1.5 miles in Segment G, would be constructed in existing transmission ROW or parallel and adjacent to existing transmission lines. This, along with the fact the Proposed Action would be sited to minimize conflicts with existing land uses, would help avoid new impacts to incompatible and existing land uses. Incremental impacts to recreation and conservation areas would not be significant. As with agricultural uses, most existing recreation uses could continue within the new and existing ROW where the Proposed Action would be constructed. Recreation and conservation areas are not found within the portion of Segment G that would not be parallel to an existing ROW.

Construction could temporarily interfere with the use of local roadways or driveways. Heavy construction equipment may damage study area roadways or driveways. Western's EPMs would avoid and reduce the magnitude of such impacts. These practices include using detours, limiting the area and duration of traffic impacts by carefully siting staging areas and construction traffic routes, making arrangements with local business owners and residences, and repairing any damage that may occur to roadways or driveways during construction.

Reconductoring would cause minimal impacts to existing land uses during short-term maintenance, including the private school (and associated playground and soccer field) and the private recreation facility (and associated tennis courts) along Segment D (MP 1.0 to 2.0).

4.9.2.4 Impacts from Alternative 1— Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 would not result in long-term impacts to prime farmland. This alternative has the potential to cause land use impacts as described for the Proposed Action. For the same reasons as described for the Proposed Action, none of these impacts are expected to be significant.

4.9.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would remove approximately 6.7 acres of prime farmland from agricultural use (the same as the Proposed Action). All this land would be in Segment A_1. This alternative has the potential to cause the same land use impacts described for the Proposed Action. However, for the same reasons as described for the Proposed Action north of Elverta Substation, none of these impacts are expected to be significant.

4.9.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 would remove approximately 15.2 acres of prime farmland from agricultural use (the most of any of the action alternatives). This alternative may cause the same impacts described for the Proposed Action. However, for the same reasons as described for the Proposed Action, none of these impacts are expected to be significant.

4.9.2.7 Impacts from the No Action Alternative

No new land use impacts would occur under the No Action Alternative. The No Action Alternative could continue to have periodic impacts on existing land uses during routine maintenance and operations activities on agricultural lands where crops are located in the ROW. These short-term impacts would not be significant. Under the No Action Alternative, and to minimize crop damage in the ROW, Western would continue to work with landowners regarding scheduling of routine maintenance and operation activities.

4.10 NOISE

4.10.1 Affected Environment

This section describes existing conditions and noise impacts that would result from the Proposed Action and alternatives. Noise is sound that is often considered undesirable because it can interfere with speech, communication, or hearing, or is otherwise annoying. It can be intense enough to damage hearing. Noise decreases with distance from the source. The distance at which sound can be heard depends on the intensity of the sound, meteorological conditions, terrain, and background noise levels.

4.10.1.1 Resource Study Area

Approximately 108 miles of linear features make up the Proposed Action and alternatives study area. The study area is within the counties of Sutter, Sacramento, Placer, San Joaquin, Contra Costa, and Alameda. The study area for noise impacts covers the ROW and areas that could be impacted by noise from the ROW.

4.10.1.2 Issues of Environmental Concern

Potential noise impacts of the Proposed Action and alternatives would be from construction and operation of the line.

Table 4.10-1. Sound Levels for Some Typical Outdoor Noise Sources

Noise Level Decibels (dBA)	Outdoor Noise
110	Jet flyover at 1,000 feet
100	Gas lawn mower at 3 feet
90	Diesel truck at 50 feet
80	Urban daytime noise
70	Gas lawn mower at 100 feet
60	Heavy traffic at 300 feet
50	Quiet urban daytime
40	Quiet urban night time
30	Quiet rural night time
20	Rustling leaves
10	Mosquito at 3 feet

Source: Original 2002

4.10.1.3 Characterization

Sound levels are stated in decibels (dB), a measure of sound pressure compared to a reference sound pressure. Sound levels calculated as decibel, A-weighted sound levels (dBA), approximate the frequency response of the human ear. Table 4.10-1 provides noise levels for typical noise sources.

The study area passes through or near urban areas, mixed agricultural, commercial, industrial, and residential developments, and major freeways and highways. OSHA and the *California Noise Control Act* (California Health and Safety Code Sections 46000-46080) apply to the generation of and exposure to noise. Counties and local governments set noise regulations to protect communities against nuisance noises.

The average day-to-night noise level (L_{dn}), is used as a standard of regulation, and is calculated by adding a 10 dB penalty to sound levels in the night (10 p.m. to 7 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. The counties along the study area have established a day-to-night standard from the source to residence of 65 dBA L_{dn} that they consider compatible with residential land uses. The EPA has published an outdoor noise level guideline of 55 dBA averaged over 24 hours.

The study area would traverse areas ranging from sparsely inhabited rural and agricultural to metropolitan. Activities near the study area that generate noise above background levels of 30 to 50 dBA would include motor vehicle traffic along the interstates and state routes. Freeway traffic levels can be up to 90 dBA and local traffic noise can be up to 80 dBA. Industrial activities and construction in the Sacramento metropolitan vicinity, trains traveling along the Southern Pacific, Western Pacific, and Central California tracks, agricultural activities, and aircraft flying in and out of Sacramento International Airport and local airstrips also contribute to noise levels near the study area. Interstates 5, 80, and Business 80, and Highways 99, 113, 70, 50, 12, and 4 are other major sources of noise.

4.10.2 Environmental Consequences

4.10.2.1 Standards of Significance

A significant effect from noise would result in

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local noise ordinance, or applicable standards of regulatory agencies,
- Exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels where they live, work, or recreate,
- A substantial permanent increase in ambient noise levels in the study area vicinity above levels existing without the study area, or
- Exceeding the regulatory levels of 65 dBA L_{dn} or 55 dBA averaged over 24 hours.

4.10.2.2 Environmental Protection Measures

The EPM for noise resources from Table 3-4 states that all vehicles and equipment would be equipped with required exhaust noise abatement suppression devices.

4.10.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

The Proposed Action and alternatives would require the use of several kinds of construction equipment. Sound levels from typical construction equipment are shown in Table 4.10-2.

Construction activities require various types of work. Reconductoring can be divided into the phases of site preparation and excavation, wire pulling, installation, and cleanup. Construction of new transmission lines is divided into the phases of site preparation and excavation, foundation and concrete pouring, pole erection, wire pulling and installation, and cleanup. Realignment follows the same phases of new construction with the addition of pole and foundation removal and cleanup. Table 4.10-3 shows sound levels from various kinds of construction activities.

Table 4.10-2. Sound Levels from Typical Construction Equipment

Equipment	Average Sound (dBA)	Comments
Dump trucks	91	At 50 feet
Heavy trucks	91	At 50 feet
Welding Machine	73	At 50 feet
Backhoe (0.75 yd^3)	85	At 50 feet
Loader	78	At 50 feet
Grader	87	At 50 feet
Concrete mixer	85	At 50 feet
Movable crane	88	At 50 feet
Generator	78	At 50 feet
Pneumatic tools	85	At 30 feet
Compressor	86	At 50 feet
Trencher	72	At 25 feet
Side boom	80	At 25 feet
Cat tractor	93	At 25 feet
Jackhammer	88	At 50 feet
Hand grinder	82	At 5 feet

Source: US EPA 1971, Noise from Construction Equipment and Operations, US Building Equipment and Home Appliances, Prepared BY Bolt, Beranek, and Newman for US EPA Office of Noise Abatem ent and Control, Washington D.C.
dBA: decibel, A-weighted sound levels
yd^3: cubic yard

Table 4.10-3. Sound Levels from Typical Construction Activities

Activity	Loudest Construction Equipment	Equipment Noise Level (dBA)	Composite Site Noise Level at 50 feet from Source (dBA)
Site preparation and excavation	Dump truck Backhoe	91 85	92
Foundation and concrete pouring	Heavy truck Concrete mixer	91 85	92
Pole erection	Moveable crane Jackhammer	88 88	91
Wire pulling and installation	Moveable crane Heavy truck	88 86	90
Cleanup	Heavy truck Grader	91 87	92

Source: Original 2002
dBA: decibel, A-weighted sound levels

New transmission system construction, removal of transmission structures, access road construction, reconductoring, and pulling operations all generate noise. Estimated maximum noise levels during peak construction at the edge of ROW for the Proposed Action would not exceed 92 dBA. Noise generated at the pulling sites would be about 90 dBA. Commercial businesses and residences would be close enough to the Proposed Action that noise from construction would be noticeable.

Because the work would be of short duration, with intermittent noise only during daylight hours, the limits for day-to-night average noise (65 dBA L_{dn}) and 24-hour average noise (55 dBA $Leq_{(24)}$) would not likely be exceeded beyond the edge of the ROW. At most locations, work would not exceed two to three days at any one location. In addition, feasible noise abatement measures would be implemented. Therefore, noise impacts would be considered insignificant.

Corona discharges at the conductor surface resulting from the electrical breakdown of air into charged particles cause operational noises of transmission lines. Noise would mainly occur during wet weather, with noise levels low enough to blend into the background and not be noticeable beyond the edge of the ROW.

Maintenance of the transmission line would result in the noise of routine inspection vehicles or aircraft periodically during the year. If repairs need to be made, noise would result from vehicles, equipment, and tools.

4.10.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 would generate overall less noise than the Proposed Action because only reconductoring would occur. Under Alternative 1, forty percent fewer structures would be constructed and 85 percent less short-term disturbed acreage would result than under the Proposed Action. Therefore, noise impacts would be considered insignificant.

4.10.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would generate the same level of noise as the Proposed Action between the O'Banion Substation and Elverta Substation. Reconductoring between Elverta Substation and Tracy Substation would not be conducted, thereby decreasing the relative duration of overall noise impacts. Therefore, noise impacts would be considered insignificant.

4.10.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 would generate less overall noise than the Proposed Action because construction would be confined between Elk Grove Substation and Tracy Substation. Therefore, noise impacts would be considered insignificant.

4.10.2.7 Impacts from the No Action Alternative

Under the No Action Alternative, maintenance and line inspection activities would continue on the existing lines. There would be periodic noise from inspection aircraft and vehicles, with the associated noise of equipment and tools and the noise would be short term and insignificant.

4.11 PALEONTOLOGICAL RESOURCES

4.11.1 Affected Environment

Paleontological resources are fossilized remains or imprints of multicellular animals and plants (36 CFR Part 261.2). A fossil is the remnant or trace of an organism of a past geologic age, such as a skeleton or leaf imprint, embedded and preserved in the earth's crust. The significance of paleontological resources is subjectively ranked based on the presumed scientific value of proven fossil content. Vertebrate fossils are typically less abundant than invertebrate fossils, and are usually rated more significant. However, well-preserved soft-bodied organisms, including worms, insects, spiders, or rare invertebrate fossils, may be considered highly significant.

Activities affecting paleontological resources on Federal lands would fall under the Federal *Land Policy and Management Act* of 1976 (43 USC 1701 et seq.), which requires public lands to be managed in a manner that protects "scientific qualities" and other values of resources. The *Antiquities Act of 1906* (16 USC 431-433) requires Federal protection for significant paleontological resources on Federally owned lands.

4.11.1.1 Resource Study Area

The study area for paleontological resources is the width of one mile from the ROW centerline. The excavation depth for footings would depend on soil characteristics at each structure location; however, a depth of 10 feet has been assumed for similar projects.

4.11.1.2 Issues of Environmental Concern

The issue of environmental concern for paleontological resources is the potential destruction of significant fossils in the study area. Potential impacts to paleontological resources would be confined to construction activities. The likelihood of impacts from reconductoring would be low because ground disturbance would take place in areas that have already been disturbed when replacing structures. Construction of a new transmission line would necessitate excavation of potentially undisturbed ground and require extensive use of heavy equipment for new structures. Excavation for structures covers largely disturbed agricultural regions north and south of the Sacramento metropolitan area.

4.11.1.3 Characterization

Paleontological resources are defined by the geologic units in which they are found. Fossils are found in sedimentary rocks, which are typically classified into lithostratigraphic units, units of stratified, mainly sedimentary, rocks grouped based on lithology, rather than biologic characteristics or age.

As discussed in Section 4.7 (Geology), three types of geologic formations exist along the transmission corridor between the O'Banion Substation and Tracy Substation (see Figure 4-3), including:

- ***Quaternary Floodbasin (Qb)***—Floodbasin deposits, associated with flood stage on major streams,
- ***Quaternary River Deposit (Qr)***—River deposits, associated with river channels, floodplains, and natural levees, and
- ***Quaternary Continental deposit (QTc)***—Continental deposits (older alluvium, fanglomerates, and sedimentary formations).

The river and floodbasin deposits are Holocene (since the last ice age within the last 11,000 years), and the continental deposits are Pliocene to Holocene. The Pliocene (5.4 - 2.4 million years ago) represents the final stages of a global cooling trend that led up to the ice ages.

In general, the fossil potential for the river deposits is low because this is primarily an erosional environment, whereas the fossil potential for the floodbasin and continental deposits is high, since they are depositional environments. An example of the fossil potential of these units is excavation of bones from a giant ground sloth, bison, and camel, and mammoth tusks at the Arco Arena in 1989 (Butler 2001, Hilton 2002). Arco Arena is about 2 miles west of Segment C MP 6.0, outside the study area. These fossils were found at a depth of 12 to 15 feet and date between 600,000 and 15,000 years old in continental deposits. This was a massive excavation with a much greater likelihood of encountering fossils, when compared to excavations necessary for structure footings.

The Proposed Action and alternatives are in the central portion of California's Central Valley. Literature review

and fossil databases did not reveal any recorded fossil locations within the study area. Lithostratigraphic units within the study area range in age from Holocene to Pliocene. The continental and floodbasin deposits have the potential to contain significant fossils. Much of the existing and proposed routes and alternatives cover large areas of row crops and rice fields. Because of intense cultivation, these areas would generally have a low paleontologic expectation for near-surface soils.

4.11.2 Environmental Consequences

4.11.2.1 Standards of Significance

The Proposed Action and alternatives could have a significant effect on paleontological resources if they would substantially compromise the scientific and educational value of a significant paleontological site.

4.11.2.2 Environmental Protection Measures

EPMs for paleontological resources issues from Table 3-4 include the following:

- Before construction, all supervisory construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources. To assist in this effort, the construction contract would address Federal, state, and tribal laws regarding antiquities, fossils, plants, and wildlife, including collection and removal, and the importance of these resources and the purpose and necessity of protecting them. Western would instruct that cultural resources might be present in the study area. Contract employees would be trained to stop work near any discovery, and notify Western's regional environmental manager, who would confirm that the resource is evaluated and avoided. Known cultural resources would be fenced and a minimum distance maintained for work disturbances.
- Preconstruction surveys of sensitive paleontological areas may be conducted as agreed upon by the land-managing agency and lead Federal agency.

4.11.2.3 Impacts from the Proposed Action, Alternative 1, Alternative 2, and Alternatiave 3

Potential paleontological impacts are essentially proportional to the number of new structures required by a given alternative and the types of deposits on which they would be built. As discussed in Section 4.11.1.3, paleontological resources are unlikely to be present in river deposits (Q_r) and likely to be present in floodbasin (Q_b) or continental deposits (QT_c). Access roads should have negligible impact on paleontological resources because they are not generally associated with excavation. Table 4.11-1 presents the estimated miles and proposed number of new structures that would be constructed on floodbasin, continental, and river deposits.

The Proposed Action would have the greatest number of new structures built on deposits likely to contain paleontological resources. Possible impacts from the Proposed Action and alternatives to paleontological resources would be confined to extremely localized areas (primarily excavations for new structure footings). Excavation for structures covers largely disturbed agricultural regions, so shallow excavations are unlikely to uncover fossils. Monitoring excavations and halting excavation if fossils are encountered would eliminate any significant effect on paleontological resources for the scientific and educational value of a significant paleontological site.

4.11.2.4 Impacts From The No Action Alternative

Under the No Action Alternative, the existing double-circuit 230-kV transmission system between O'Banion Substation and Tracy Substation would continue to operate and be maintained as it is presently. The line would be periodically accessed for routine maintenance or emergency repairs along the existing ROW and access roads. These activities are also consistent with the Proposed Action and action alternatives. This action would have no impact to paleontological resources.

Table 4.11-1. Paleontological Deposits of Concern

DESCRIPTION	Proposed Action	Alternative 1	Alternative 2	Alternative 3	No Action
Miles of study area traversing continental and floodbasin deposits (where paleontological resources would likely be found)	92.6 miles	84 miles	32.2 miles	42 miles	0 miles
Miles of study area traversing river deposits (where paleontological resources would not likely be found)	15.2 miles	15.2 miles	3 miles	4.2 miles	0 miles
Number of new structures likely to be built in continental and floodbasin deposits	282	167	153	204	0

Source: Original 2002

4.12 SOCIOECONOMICS

4.12.1 Affected Environment

This section describes the existing conditions and socioeconomic impacts resulting from the Proposed Action and alternatives. The socioeconomic setting for this section includes data on population, employment, income, housing, and schools.

4.12.1.1 Resource Study Area

The study area consists primarily of the six counties (Sutter, Placer, Sacramento, San Joaquin, Contra Costa, and Alameda) most directly affected by the Proposed Action and alternatives, both temporarily during construction and in the long term by receiving economic benefits from the proposed facilities. In addition, the study area encompasses 11 additional counties where more minor and indirect socioeconomic impacts could occur: Butte, Calaveras, Colusa, Glenn, El Dorado, Lake, Nevada, Tehama, Sierra, Yolo, and Yuba Counties. The study area includes both rural and urban areas, including the Sacramento metropolitan area.

4.12.1.2 Issues of Environmental Concern

Issues of environmental concern within the study area include displacing existing residents, disrupting existing businesses, reducing property values, effects on income and employment, and if the project induces new growth, long-term population increases and the resultant demand for housing and schools. The environmental impacts of these issues could occur temporarily during construction and long-term during operation. The types of potential impacts listed above could have a positive or negative effect on the budgets of local agencies if tax revenues change. Potential socioeconomic benefits include those associated with a long-term increase in the reliability of the power supplies transmitted over transmission lines, and a temporary increase in employment and income during construction.

4.12.1.3 Characterization

The socioeconomic setting is characterized by population, employment, income, housing, and school data for the 17 counties in the study area, with an emphasis on the six primary counties.

Population includes the number of residents in the study area. The population in the primary counties totaled 4,506,983 in 2000. Sacramento County (Segments B, C, D, and E through MP 11.0) and Alameda County (Segment E from MP 44.8 to Tracy Substation) have the largest populations of the study area counties (U.S. Census 2002).

Employment data include labor force size, labor sectors, and statistics on unemployment. Labor sectors are divided into farm or nonfarm types. The wholesale trade, services, and state/local government sectors contain the largest numbers of jobs in both the study area counties and the primary counties. Within the primary counties, the mining and construction sector provides 119,800 jobs (CEDD 2001).

The unemployment rate for the counties in the study area in 2000 was 5.8 percent. In 2000, the unemployment rate was about 5 percent for the primary counties. In 2000, Colusa County had the highest unemployment rate (17.6 percent), followed by Sutter County (Segments A, B, and F) with 11.7 percent. Alameda County had the lowest unemployment rate (3 percent) (U.S. Census 2002).

Income information is provided as an annual total by county and as per capita income. Per capita personal income for the counties in the study area was $25,283 in 1999. The average per capita income for the primary counties was $30,059. In 1999, Contra Costa County (Segment E, MP 43.3 to 44.8) had the highest per capita personal income ($37,994) and Yuba County had the lowest ($17,485) (BEA 2000).

Housing data include numbers of housing units and the vacancy rate. In 2000, the study area counties had a housing stock of approximately 2.2 million units, and the average vacancy rate was six percent (125,055 vacant units). The primary counties had approximately 1.7 million housing units in 2000, with an average vacancy rate of 4 percent (71,214 vacant units). Alameda County (Segment E, MP 44.8 to Tracy Substation) had the largest housing stock in the study area (540,183 units), followed by Sacramento County (Segments B, C, D, and E to MP 11.0) (474,814 units) and Contra Costa County (Segment E, MP 43.5 to 44.8) (354,577 units) (U.S. Census 2002).

School enrollment and capacity are important considerations in assessing the effects of growth. In 1999, 1,709,967 students attended school in the 221 districts within the study area. Within the primary counties, 1,322,767 students attended schools in 109 districts (U.S. Census 2002).

4.12.2 Environmental Consequences

4.12.2.1 Standards of Significance

The Proposed Action and alternatives would have a significant and adverse effect on socioeconomic resources if they

- Cause a major and regionally-significant reduction in employment or income,
- Induce growth or population concentrations,
- Displace residences or physically divide the community they live in,
- Create a demand for additional housing that could not be sustained within the study area,
- Cause a substantial decrease in property values,
- Displace businesses or cause a major disruption in their business,
- Generate student enrollment that exceeds the capability of responsible authorities to accommodate,
- Lead to a major reduction in the revenues or expenditures of government agencies, or substantially adversely affect facilities providing public services, or
- Convert prime, unique, or farmland of statewide importance to nonagricultural use.

4.12.2.2 Environmental Protection Measures

EPMs for socioeconomic issues are not listed in Table 3-4; however, the following standard practices are applicable to temporary and long-term use of lands not owned by Western.

- Any land temporarily required for construction of the proposed facilities (such as conductor pulling sites, material and equipment storage areas) would be arranged through temporary-use permits or by specific arrangements between the construction contractor and affected landowners. Similar arrangements would be made with business owners to avoid or minimize disruptions in their business (posting detours and limiting the area and time of disruption, by obtaining temporary-use permits, or by specific arrangements between the construction contractor and affected landowners, or through purchase at fair market value).
- If a new ROW were needed, Western would acquire land rights (easements) in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act* of 1970 (P.L. 91-646), as amended. Easements would be purchased through negotiations with landowners at fair market value, based on independent appraisals. The landowner would normally retain title to the land and could continue to use the property in ways that would be compatible with the transmission line.

4.12.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

Short-Term Impacts

Transmission line construction would create new temporary jobs for construction workers and temporarily cause a positive increase in income and related economic activity, especially in the primary counties. These impacts, along with the significant amount of material to be purchased to construct the transmission line, would increase revenue for some businesses and create a minor increase in the tax revenue received by local and state agencies. Some material would be purchased from businesses within the study area.

As noted in the footnotes to Table 3-3, the total work force needed to construct the Proposed Action at any one time has been estimated to be 50 to 70 workers. Western assumes that approximately 40 to 50 percent of these workers would be hired locally. Workers with specialized skills may be brought in from outside the primary counties for specific aspects of the construction process. As noted previously, 119,800 persons were employed in the mining and construction sector in 1999 within the primary counties. This existing labor pool would likely be sufficient to meet the job opportunities generated by the Proposed Action. This beneficial impact on worker employment and income would indirectly benefit local businesses when workers buy gas and food, or as some workers stay in local motels.

The proposed construction areas are within commuting distance from residential communities in the study area, particularly the primary counties. Construction workers not hired locally would likely be accommodated by the 125,055 vacant housing units in the study area counties, including 71,215 vacant units in the primary counties. Because of the temporary nature of the construction, relocating construction workers would also be temporary and would likely not require the relocation of their families. Thus, an increase in the demand for schooling would not occur. The Proposed Action would not create a demand for additional housing or exceed the capacity of schools, and these potential impacts would not be significant.

Most of the Proposed Action would be constructed within rural areas, and most of the business operations in and near the ROW are agricultural. However, a portion of the transmission line would traverse urbanized areas, including the city of Sacramento. The Proposed Action may require the use of nearby areas for construction, including staging areas and access roads.

In areas where the Proposed Action would require new ROW, careful siting would occur to avoid any displacement of existing residences or businesses. Therefore, this type of potentially significant impact would not occur.

Long-Term Impacts

Potential long-term impacts on prime farmland and related farming activities would likely not be significant and would occur in areas where land would be needed to construct the new transmission structures included in the Proposed Action. A portion of the land of Segment A_1 is prime farmland (about 6.7 acres) and would likely be taken out of agricultural production. This land would be a minor amount from the standpoint of individual farming operations and businesses. The amount of farmland involved is also insignificant from a regional standpoint, and any lost tax revenue would be minor compared to the total tax revenues of affected local and state agencies. Although farming would continue between the structures and within the ROW, some farming operations could experience some minor but negative impacts on their farming practices.

Customers of utilities served by Western and the transmission lines would experience an increase in the reliability of their power supply. This long-term, positive impact would lead to indirect economic benefits, including less frequent production losses at businesses during power outages and related reductions in income for business owners and their employees.

The Proposed Action could cause minor negative impacts on property values. Incremental impacts would occur where new ROW would be required parallel to an existing ROW. Significant impacts may occur when the new ROW is not within or next to an existing transmission ROW, along Segment G (approximately 1.4 miles) where the new ROW would be on farmland. A few rural residences found in this area would experience a change in the views from their property (see the related Visual Resources analysis in Section 4.14). These residences already have transmission lines in the same viewshed where the new ROW would be located. The rest of the Proposed Action would either be constructed within existing ROW or in new ROW parallel and adjacent to existing transmission lines; thus, existing property values already account for the presence of transmission lines in the viewsheds of nearby residences and businesses in these areas.

Studies of the potential effects of transmission lines on property values have been conducted, but very little statistical information exists on the relationship between property values and the construction of new transmission lines. The Edison Electric Institute published an inventory of the major research to date on how the public perceives transmission lines (EEI March 1992). The study concluded that overhead transmission lines have the potential to reduce the sale price of residential and agricultural property. This effect is generally small (0 to 10 percent) for single-family homes, could be slightly greater for some types of rural properties (up to a 15-percent decrease), and diminish over time after construction.

A study in Connecticut (Real Estate Counseling Group of Connecticut, 1984), found that 90 percent of all real estate professionals surveyed thought the presence of transmission lines generally had a negative effect, on sales price, but a statistical analysis showed only 7 percent of the property owners reported paying lower prices because of the presence of transmission lines.

Operations of the proposed facilities would not induce a long-term population increase, or a related increase in the demand for housing and schools. While the Proposed Action would help accommodate future growth in the study area, the magnitude, location, and nature of future growth is determined by local planning agencies and the boards and commissions that direct them.

4.12.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

The socioeconomic impacts of Alternative 1 would be similar to those summarized for the Proposed Action. This section focuses on potential impacts that would differ from the Proposed Action. None of the socioeconomic impacts associated with Alternative 1 would be significant.

Fewer construction workers and materials would be required to construct Alternative 1 as compared to the Proposed Action. This would lead to fewer economic benefits associated with the construction phase of the transmission line, and less demand for housing from workers not hired locally. There would also be less potential for minor disruptions at nearby businesses and residences with Alternative 1.

Alternative 1 would cause no permanent disturbance to farmland. Unlike the other action alternatives, Alternative 1 would not require any new ROW. The potential for adverse property value impacts is the lowest with this alternative.

4.12.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

The socioeconomic impacts of Alternative 2 would be similar to those summarized for the Proposed Action, although unlike the Proposed Action and Alternative 1, none of these impacts would occur south of Elverta Substation. None of the socioeconomic impacts associated with Alternative 2 would be significant. The amount of prime farmland permanently affected by new transmission structures under this alternative is the same as with the Proposed Action (approximately 6.7 acres). Like the Proposed Action, this alternative includes the 1.7 miles of new ROW in Segment G that is not adjacent and parallel to existing ROW. The potential for adverse impacts on property values is greater in this segment than in others, but the magnitude of the impact still is not expected to be significant for the reasons described in Section 4.12.2.3.

4.12.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 differs from the Proposed Action and the other action alternatives in that no activities would occur north of Elk Grove Substation. Otherwise, the types of impacts described for the Proposed Action also apply to this alternative. Unlike the Proposed Action and Alternative 2, this alternative does not include any new ROW that would not be adjacent and parallel to existing transmission ROWs. Therefore, the potential for adverse impacts on property values is lower with this alternative.

This alternative includes the most amount of acreage that could be removed from agricultural production on a long-term basis. About 22.5 acres of land would be needed for transmission structures (see Table 3-2) and most of this land would likely be prime farmland; however, for the reasons described in Section 4.12.2.3, related impacts to farming operations and practices are not expected to be significant.

4.12.2.7 Impacts from the No Action Alternative

Under the No Action Alternative, the existing single- and double-circuit 230-kV transmission system between O'Banion Substation and Tracy Substation would be operated and maintained as it is presently. The line would periodically undergo routine maintenance or emergency repairs along the existing ROW and access roads. The No Action Alternative would therefore not cause any of the new construction- and operation-related impacts discussed in the sections above. As periodic maintenance and operations activities increase, local spending on food, lodging, and minor field equipment would also increase, resulting in short-term beneficial impacts.

The risk of power outages due to the existing problem in the study area could increase under the No Action Alternative, and outages could become more frequent and severe. Any outages would result in increasing widespread, negative socioeconomic impacts to local businesses, their employees, and perhaps the fiscal resources and related public services of affected agencies.

4.13 SOILS

4.13.1 Affected Environment

This section addresses soils within the study area and discusses constraints posed during construction, operation, and maintenance of the transmission line. The lower Sacramento Valley has many landforms. Nearly level floodplains exist along the Sacramento, American, and Cosumnes rivers and along the smaller creeks. Basin and terrace remnant landforms are in the American Basin, north of the American River and east of the Sacramento River. The most extensive area is the main valley floor, which extends from the northern Sacramento county line to the southern county line and is the primary area of the Draft EIS investigation. The main valley floor consists of nearly level, low terraces, basin rims, and local basins with slopes of less than one percent. The basin rims and local basins extend along the western edge of the main valley floor from south of Sacramento to the Cosumnes River (Soil Survey of Sacramento County–Soil Conservation Service).

Activities affecting soils would fall under the Federal EPA regulations (40 CFR Part 122) requiring the permitting of storm water pollution under the National Pollutant Discharge Elimination System (NPDES). The California Regional Water Quality Control Board has jurisdiction over the enforcement of the *Storm Water Program* in California. This agency regulates construction activities to control surface water runoff, transport of contaminants, and increased sedimentation in waterways.

4.13.1.1 Resource Study Area

The study area for the Proposed Action and alternatives extends from Sutter County to Sacramento County, Placer County, San Joaquin County, Contra Costa County and

Alameda County. Tables 4.13-1 and 4.13-2 describe the soils that exist along the Proposed Action and alternatives which cross Sacramento and San Joaquin counties. Soil reports for Sutter and Contra Costa counties are being revised, and new reports would be available soon. Soils data from Sacramento and San Joaquin counties were used for this analysis.

4.13.1.2 Issues of Environmental Concern

Issues of environmental concern for soils include erosion, drainage, high water erodibility, steep slopes, and compaction from construction disturbance, and potential impacts to existing access roads and new roads. These issues are somewhat heightened due to the large number of ditches, canals, rivers, and creeks, and the proximity of the water table to the land surface. Construction and maintenance could cause sedimentation, loss of farmland, and revegetation. Construction of structures, footings, and access roads in areas with steep or unstable slopes could create hazardous conditions that may pose a threat of disruption to structures. Increased soil compaction and rutting in the transmission line corridor could occur during construction, operation, and maintenance of the transmission lines.

4.13.1.3 Characterization

The study area is in the central portion of California's Central Valley. To the north is the Sacramento Valley, and to the south, the San Joaquin Valley. The primary land use types are irrigated cropland, livestock grazing, and urban development.

Table 4.13-1. Soils in Sacramento County

Soil	Description	Permeability (In/hr)	Erosion Factor K[1] Scale (good .02 - .69 poor)
Gazwell-Rindge	Very poorly drained, highly organic mineral soils and organic soils that have a high water table throughout the year and are protected by levees.	2.0 - 20.0	0.02 - 0.28
Sailboat-Scribner-Cosumnes	Somewhat poorly drained and poorly drained soils that have a seasonal high water table and are protected by levees.	0.06 - 2.0	0.24 - 0.43
Egbert-Valpac	Somewhat poorly drained and poorly drained soils that have a high water table throughout the year or during part of the year and are protected by levees.	0.06 - 2.0	0.24 - 0.37
Columbia-Cosumnes	Somewhat poorly drained soils that are subject to flooding or are protected by levees.	0.06 - 6.0	0.28 - 0.43
Rossmor-Vina	Well drained soils that are protected by levees or are subject to flooding.	0.6 - 6.0	0.20 - 0.32
Urban Land-Americanos-Natomas	Urban land and well drained soils.	0.6 - 2.0	0.10 - 0.43
Clear Lake	Somewhat poorly drained soils that have a seasonal high water table, are protected by levees, and are very deep or deep over a cemented hardpan.	0.06 - 0.20	0.24 - 0.32
Dierssen	Somewhat poorly drained soils that have a perched water table, are protected from levees, and are moderately deep or deep over a cemented hardpan.	0.06 - 0.60	0.24 - 0.32
San Joaquin	Moderately well drained soils that are moderately deep over a cemented hardpan.	0.06 - 2.0	0.24 - 0.37

Source: Original 2002

1. Erosion Factor K -- The erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. The estimates are based on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Table 4.13-2. Soils in San Joaquin County

Soil	Description	Permeability (In/hr)	Erosion Factor K[1] Scale (good .02 - 0.69 poor)
Rindge-Kingile-Ryde	Very poorly drained, organic soils and very poorly drained, highly organic, moderately fine textured, mineral soils, all of which are very deep and have been partially drained; on deltas and flood plains.	0.06 - 20.0	0.02 - 0.28
Peltier-Egbert	Poorly drained, highly organic, moderately fine textured soils that are very deep and have been partially drained; on deltas and flood plains.	0.06 - 20.0	0.20 - 0.28
Merritt-Grangeville-Columbia	Poorly drained and somewhat poorly drained, moderately coarse textured and moderately fine textured soils that are very deep and have been partially drained or drained; on flood plains.	0.06 - 6.00	0.28 - 0.43
Willows-Pescadero	Poorly drained, moderately fine textured and fine textured, saline-sodic soils that are very deep and have been partially drained; in basins.	<0.06 - 0.20	0.28 - 0.32
Jacktone-Hollenbeck-Stockton	Somewhat poorly drained and moderately well drained, fine textured soils that are moderately deep and deep to a cemented hardpan and that have been drained in some areas; on basin rims and in basins.	0.06 - 6.00	0.24 - 0.37
Guard-Devries-Rioblancho	Poorly drained and somewhat poorly drained, moderately coarse textured and moderately fine textured soils that are moderately deep to a cemented hardpan or are very deep and that have been drained in most areas; on basin rims.	0.06 - 6.00	0.24 - 0.37
Capay	Moderately well drained, fine textured soils that are very deep and have been subject to artificial wetness; mainly in interfan basins.	0.06 - 0.20	0.24 - 0.37
Capay-Stomar-Zacharias	Moderately well drained and well drained, moderately fine textured, gravelly moderately fine textured, and fine textured soils that are very deep; in interfan basins and on alluvial fans and stream terraces.	0.06 - 2.00	0.20 - 0.37
Tokay-Acampo	Moderately well drained and well drained, moderately coarse textured soils that are deep to a cemented hardpan or are very deep; on low fan terraces.	2.00 - 6.00	0.32 - 0.37
San Joaquin-Bruella	Moderately well drained and well drained, moderately coarse textured and medium textured soils that are moderately deep to a cemented hardpan or are very deep; on low terraces	<0.06 - 6.00	0.24 - 0.37

Source: Original 2002

1. Erosion Factor K -- The erosion factor K indicates the susceptibility of a soil to sheet and rill erosion.
The estimates are based on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion

Soil information was obtained from the Sacramento and San Joaquin Soil Surveys prepared by the Soil Conservation Service, U. S. Department of Agriculture (USDA 1992 and 1993). Reference numbers in the tables correlate soil types with the general soil map of each county. Soil information generally includes data describing the engineering and physical/chemical properties of each individual soil type. Soil permeability and the erosion factors are most pertinent to this investigation.

The soil types and soil assemblages in the study area fall into three distinct sections: 1) O'Banion Substation to Hurley Substation; 2) Hurley Substation to the San Joaquin County line at Segment E at MP 11.0; and 3) San Joaquin County line to the Tracy Substation.

Soils in the O'Banion Substation to Hurley Substation section include the "Sailboat-Scribner-Cosumnes" and "Clear Lake" series. These soil types have low permeability and a moderate erosion factor. For the Hurley Substation to San Joaquin County line section, the soil is mostly the San Joaquin type, which also has a low permeability and moderate erosion factor. For the San Joaquin County line to Tracy Substation section, the major soil types include the "Peltier-Egbert," "Merritt-Grangeville-Columbia," "Jacktone-Hollenbeck- Stockton," "Tokay-Acampo," and the "San Joaquin-Bruella" soils. These soils have relatively high permeability values and moderate erosion factors.

Additional soil data is available from the soil surveys (USDA 1992 and 1993). This includes information pertaining to the soil depth, texture, plasticity, clay

content, bulk density, water capacity, salinity, shrink-swell potential, and wind erodibility. This information is used to classify the type of soil.

4.13.2 Environmental Consequences

Soils could be impacted by construction and maintenance of the transmission line and associated access roads. Potential impacts would be limited to the ROW for the transmission line, pulling and tensioning sites, any construction office or laydown areas, and access roads. The impacts of the Proposed Action and alternatives would be similar in nature, although the specific locations and total acreage impacted would vary depending on the alternative selected. Alternatives incorporating construction of new transmission lines would have a higher potential for impact than those involving reconductoring. Impacts from access road construction and/or use would be similar for all alternatives, but alternatives requiring more access roads that are new would have a higher potential for impact. Use of existing access roads would be maximized to the extent possible to minimize disturbance and soil compaction.

4.13.2.1 Standards of Significance

The Proposed Action and alternatives could have a significant effect on soils if they would

- Increase erosion along the transmission line ROW,
- Affect downstream resources by erosion and sedimentation, or
- Increase soil compaction so current use or revegetative growth would be significantly altered.

4.13.2.2 Environmental Protection Measures

EPMs for soil resources from Table 3-4 include the following:

- On completing the work, all work areas except access trails would be scarified or left in a condition that would facilitate natural or appropriate vegetation, provide for proper drainage, and prevent erosion.
- In construction areas (for example, material storage yards, structure sites, and spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur.
- Access roads would be built at right angles to the streams and washes to the extent practicable. Culverts would be installed where needed. All construction activities would be conducted to minimize disturbance to vegetation and drainage channels.
- Excavated material or other construction materials would not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can encroach, in any way, upon the watercourse.
- Nonbiodegradable debris would not be deposited in the ROW. Slash and other biodegradable debris would be left in place or disposed.
- All soil excavated for structure foundations would be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations. Excavated soil excess to these needs would be removed from the site and disposed of appropriately.
- A California registered Professional Geotechnical Engineer would evaluate the potential for geotechnical hazards and unstable slopes on the centerline route and areas of new road construction or widening on slopes with over 15 percent gradient.
- All construction must be in conformance with Western's *Erosion Control and Revegetation Plan*.
- If wet areas cannot be avoided, Western would use wide-track and/or balloon tire vehicles and equipment and or timber mats.
- All construction vehicle movement outside the ROW normally would be restricted to predesignated access, contractor-acquired access, or public roads.
- When feasible, all construction activities would be rerouted around wet areas while ensuring that the route does not cross sensitive resource areas.
- Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses would be conducted to prevent muddy water and eroded materials from entering the streams or watercourses with construction of interceptors.

4.13.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

Soil impacts are proportional to the area of surface disturbance (from construction of structures and access roads) for each alternative. The Proposed Action would involve approximately 330 new structures, more than for the alternatives. The Proposed Action would result in 66 acres of long-term disturbance.

New structure construction would require local grading that would alter the topography, particularly on steep

slopes. Grading could create unstable cut-and-fill slopes, especially on steep slopes and areas with weak rock materials. Most grading would be required for construction of suitable footings for the transmission structures. Some grading would be needed for the temporary spur roads, widening existing access roads, and construction pads for structure sites on steep slopes to provide safe, level surfaces for excavation equipment, cranes, bucket trucks, and structure assembly. Hazards from unstable slopes and seismic hazards could affect roads. Debris clearing and road repair would be required as a normal response to such an event.

The Proposed Action would not result in significant impacts because EPMs described above would be enforced during construction and maintenance of the transmission line. Western would follow its erosion control and revegetation procedures to minimize potential erosion. EPMs that control erosion would also minimize erosion and sedimentation impacts to downstream resources. EPMs would also minimize impacts on soil compaction that could potentially affect the time required for successful revegetative growth or current use such as agricultural.

Even with the application of EPMs, soil erosion on construction sites cannot be eliminated, but it can be reduced to rates similar to pasture lands (or about 1.5 tons per acre per year). Therefore, soil impacts are considered insignificant.

4.13.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 would reconductor 99.2 miles on existing ROW from O'Banion Substation to Tracy Substation (Segments A, B, C, D and E). This reconductor alternative would require 199 new structures. Alternative 1 would involve fewer new structures than the Proposed Action and would have less environmental impact. Alternative 1 would also not impact any additional acreage. It would be constructed entirely on existing ROW using existing access roads.

4.13.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would be identical to the Proposed Action from O'Banion Substation to Elverta Substation, but would not entail any work south of Elverta. This alternative would consist of 27.4 miles of new construction on new ROW (Segments A_1 and G) and 4.2 miles of new construction on existing ROW (Segment B). 3.6 miles of existing line with encroachments would be abandoned (Segments F and H). Alternative 2 would require 167 new structures, while 17 existing structures would be abandoned in place. Alternative 2 would temporarily disturb 515 acres, and permanently impact 66 acres.

Alternative 2 would have the same impact on soil as the Proposed Action north of Elverta Substation.

4.13.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 consists of 46.2 miles of new construction on new ROW between Elk Grove Substation and Tracy Substation (Segment E_1). This alternative would require 225 new structures and 47 miles of new access roads. Alternative 3 would disturb 855 acres, with 108 acres disturbed for the long term.

Although the impacts of Alternative 3 would be confined to between Elk Grove Substation and Tracy Substation, it would be new construction on new ROW. Therefore, Alternative 3 impacts more acreage and requires more miles of access roads than any other alternative. The potential impacts to soil would be the highest for this alternative. Even so, no significant impacts have been identified and impacts to soil are considered insignificant.

4.13.2.7 Impacts from the No Action Alternative

Under the No Action Alternative, the existing 230-kV transmission system between O'Banion Substation and Tracy Substation would continue to be operated and maintained. The line would be periodically accessed for routine maintenance or emergency repairs along the existing ROW and access roads. Vehicles could cause rutting on dirt access roads in wet conditions. Otherwise, this action would have negligible impact to soil.

4.14 VISUAL RESOURCES

4.14.1 Affected Environment

The objectives of the visual resource analysis were to identify and describe visual resources, including visual quality and sensitivity, that could be affected by construction, operation, and maintenance of the Proposed Action or alternatives. Visual quality is the degree of contrast and variety within a landscape. Pleasant landscapes generally have high visual quality. Landscapes of high visual quality may contain distinctive landforms, vegetation patterns, and/or water forms. Visual sensitivity is the concern by viewers toward change to visual quality. Visual sensitivity is higher in natural or unmodified landscapes. The purpose of the analysis was to identify potential obstructions or modifications of present views in the landscape.

4.14.1.1 Resource Study Area

The visual resources study area consists of viewsheds where any of the Proposed Action or alternatives would be seen from sensitive viewing locations such as travel routes, residences, and recreation areas.

4.14.1.2 Issues of Environmental Concern

Issues raised by the public and agencies include effects on landscapes of high visual quality, altering the existing landscape, and consistency with the goals and objectives of the local and county general plans.

4.14.1.3 Characterization

The Proposed Action and alternatives would be located in the Central Valley of California. This area consists of a central alluvial plain drained by the Sacramento and San Joaquin rivers. This portion of the Central Valley contains two basins, the Sutter Basin and the American Basin. These basins are flat agricultural land of average visual quality. No distinctive landforms, waterforms, or vegetative patterns are present. The landscape has been modified by agricultural practices. Transmission lines criss-cross many portions of the study area.

Around the O'Banion Substation, visual quality is average with no distinctive landscape features. The agricultural landscape has been modified by rural residential uses. For this area, as well as many other portions of the study area, there are transmission lines along the landscape horizon. In some locations, particularly in close visual proximity, these lines dominate views and attract viewer attention.

Agricultural uses along most of Segments A and A_1 have created a patchwork landscape. Segments A and A_1 cross the Feather River (MP 11.5). The river is a distinctive water form feature resulting in an area of high visual quality. The visual sensitivity along Segment A and A_1 is moderate resulting from landscape modifications including other transmission lines.

The visual setting for Segments B, F, G, and H is agriculture and rural residences. Most of the visual sensitivity along these segments is moderate from landscape modifications. The visual quality of the area ranges from moderate to low because of the flat landscape, common vegetation patterns, and landscape modifications. No distinctive landscape features are present. Several other transmission lines reduce the visual quality, particularly near the Elverta Substation, where the visual quality is low.

Segment C and the northern portion of Segment D cross through urban landscapes of Sacramento. Visual quality is average to low from extensively modified landscapes. These segments cross a network of roads and highways. The freeways are heavily traveled commuter routes and, for the most part, are not scenic or used for pleasure driving. However, the freeways are protected by scenic corridors. The visual sensitivity from the freeways in the Sacramento metropolitan area is generally low to moderate.

Along Segment C (MP 7.6 to 11.1) and Segment D (MP 0.0 to 1.0), the route is within view of the American River Parkway. Although other transmission lines are visible within the Parkway, its water feature, vegetation patterns, and topographic formations provide average to high visual quality. The American River is protected in Sacramento County by a scenic corridor (Sacramento County 1997). The visual sensitivity is moderate to high. Moving south, Segment D crosses a disturbed landscape of low visual quality with gravel quarries, landfill (MP 4.2 through 5.5), and Hedge Substation (MP 6.9). As Segment D approaches the Elk Grove Substation, the landscape is a mix of rural and pockets of industrial sites that have a moderate to low visual sensitivity. New residential growth in the Elk Grove area Segment D (MP 6.0 to 12.0) has a low visual sensitivity.

The visual setting for Segments E and E_1 at Elk Grove Substation is semi-industrial. There are several existing transmission lines and communication towers in the area. The visual quality is low to average with no distinctive landforms or vegetative patterns. At MP 3.3, the segments would cross the Cosumnes River and Cosumnes River Preserve (MP 3.0 through 3.5) where water features provide average to high visual quality.

Most of Segments E and E_1 are in predominately flat agricultural land with average visual quality. The segments would cross Interstate 5 at MP 18.9. The line would parallel Interstate 5 to the west for about 6 miles, where visual sensitivity would be moderate. The proposed segments would cross the San Joaquin River and the Stockton Deep Water Channel (MP 29.1). Visual quality of this industrial area is low to average. The water feature has been greatly modified by channelizing the waterway. For about 10 miles, Segments E and E_1 would cross several waterways, including the Mokelumne Aqueduct (MP 30.3) and Middle River (MP 31.4), where visual quality is average with no distinctive landscape features to the mostly modified waterways. The segments would traverse southwest through the Union Island area (MP 37.5 through 43.4). The agricultural area is dissected with a series of sloughs and drawings typical of the delta region. The visual quality is average with no distinctive landscape features. Visual sensitivity along these portions of Segments E and E_1 is moderate to low.

Segments E and E_1 would pass by the eastern side of the Clifton Court Forebay (MP 43.7). The viewshed contains a network of transmission lines and telephone lines and

communication towers, with transmission lines dominating the visual setting. Around Tracy Substation, the visual setting is an expansive flat valley floor contained by rolling hills rising to ridgelines. A number of transmission lines feed in and out of the substation, which draws visual attention. Although the landscape contains varied topography, modifications from structures have resulted in an average visual quality. Visual sensitivity would be moderate.

Results of the visual analysis identified several river locations of high visual quality. These areas include the Feather River, American River, and Cosumnes River. Most segments parallel existing transmission lines, which in certain visual settings, dominate the landscape.

4.14.2 Environmental Consequences

The Proposed Action and alternatives can create visual impacts as a result of construction of new transmission lines. Impacts to visual resources would be direct and long term, lasting for the life of the Proposed Action and alternatives.

4.14.2.1 Standards of Significance

The Proposed Action and alternatives would cause significant and adverse impacts if they substantially change

- The quality of any scenic resource,
- Any scenic resource in the study area known to have rare or unique value,
- The view from, or the visual setting of, any designated or planned park, recreation, wilderness, natural areas, or other visually sensitive land use,
- The view from, or the visual setting of, any designated scenic travel route,
- The view from, or the visual recreation, education, preservation, or scientific facility, use area, activity, and view point or vista, or
- A view by introducing a negative visual element (such as creating light or reflecting glare).

Western addressed two issues in determining impact significance: 1) the type and extent of actual physical contrast, and 2) the visibility of a given corridor segment or transmission structures. The adverse affects to visual quality depend upon the amount of visual contrast between the proposed facilities and the existing landscape. The assessment of visual resource impacts has focused on incremental impacts where the Proposed Action and alternatives is adjacent to existing transmission line corridors.

4.14.2.2 Environmental Protection Measures

One EPM was identified for visual resources from Table 3-4 that transmission structures would be constructed of galvanized material.

4.14.2.3 Impacts From Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

New construction along Segments A_1, B, and a portion of G would result in low incremental visual impacts. The segments would be adjacent to existing transmission lines that dominate the landscape, particularly along Segment B and a portion of Segment G. Except for the crossing of the Feather River the visual quality is average. Although the visual quality of the river is high, other transmission lines cross the river at the same location as proposed for Segment A_1. This would result in a moderate incremental impact.

For the realignment of the Cottonwood–Roseville line, new transmission line would be constructed along Segment G. No transmission lines currently exist along Segment G from Keys Road east to the intersection of the PG&E Rio Oso–Brighton transmission line (MP 1.7). Residents near Keys Road who now have distant views of transmission lines would view the proposed line from a closer proximity. The new line would result in 1.7 miles of moderate visual impacts to Segment G (MP 0.0 to 1.7). Segments of F and H would be abandoned in place, resulting in no visual change. The reconductoring portion (Segments C, D, and E) of the Proposed Action would cause no apparent visual change and would not be noticeable to the typical viewer.

4.14.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 would have nearly the same type of reconductoring issues from O'Banion Substation to Tracy Substation as the Proposed Action reconductoring from Elverta Substation to Tracy Substation. The difference between Alternative 1 and the Proposed Action would be that line Segments A and B between O'Banion Substation and Elverta Substation would be reconductored. Reconductoring of this line would cause no apparent visual changes.

4.14.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would have the same impacts described for the new construction, realignment, and abandonment portions from O'Banion Substation to Elverta Substation of the Proposed Action.

4.14.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 would be adjacent to existing transmission lines for its entire length from Elverta Substation to Tracy Substation. These and other existing lines in the area dominate the landscape. This alternative would traverse mostly agricultural fields, where visual quality is average and visual sensitivity is low to moderate. However, at one point, Segment E_1 crosses the Cosumnes River Preserve (MP 3.0 to 3.5) where at the river, the incremental visual impact would be moderate. The overall incremental visual impacts of Alternative 3 line would be low.

4.14.2.7 Impacts from the No Action Alternative

No action would result in no new impacts to visual resources. During periodic maintenance and operation of Western facilities and ROWs, workers and their equipment could draw some visual attention for a short time. However, these impacts would not be significant. Mitigating measures would not be required because there would be no new impact on visual resources. Residual impacts would be negligible.

4.15 WATER RESOURCES

4.15.1 Affected Environment

Water resources and hydrology include surface and groundwater resources in the study area. These resources provide drinking water and agricultural irrigation water, as well as habitat for fish and wildlife species. This section characterizes the water and hydrological resources in the study area and assesses the potential impacts of the Proposed Action and alternatives.

Activities affecting water resources would fall under the CWA (33 U.S.C. § 1251-1387), Section 404 (31 U.S.C. § 1344) permitting requirements, Section 10 *Rivers and Harbors Act* (33 U.S.C. § 403) permitting requirements, and 401 Certification (33 U.S.C. § 1341). Jurisdictional entities include the Central Region of the DWR and the Sacramento District of the USACE.

4.15.1.1 Resource Study Area

Constructing and maintaining the transmission line and associated access roads could impact water resources. Potential impacts would be limited to the ROWs for the transmission line, pulling and tensioning sites, any construction office or laydown areas, and access roads. Potential impacts could occur on existing access roads as well as new roads. While there could be some limited potential impacts beyond the ROWs boundaries (for example, in the case of a spill into a creek or ditch), it is impossible to define the boundaries for such potentialities. Therefore, this analysis considers the area within the ROWs to be the affected environment, as physical impacts to water resources should be limited to those areas.

4.15.1.2 Issues of Environmental Concern

Issues of environmental concern for water resources include erosion, compaction, sedimentation from construction disturbance, blocked drainage, introducing construction debris or other fill into surface waters, spills of petrochemicals or other contaminants that could reach surface water or groundwater, impacts from excavating structure foundations, damage to irrigation improvements, and depleted water resources. These issues are somewhat heightened for the Proposed Action and alternatives due to the large number of ditches, canals, rivers, and creeks, and the proximity of the water table to the land surface.

4.15.1.3 Characterization

The Proposed Action and alternatives are in the central portion of California's Central Valley. To the north is the Sacramento Valley, and to the south the San Joaquin Valley. Surface water drains toward the study area, from which the region drains generally south-southwest, converging into the San Francisco Bay Delta and ultimately the Pacific Ocean by way of San Francisco Bay. The DWR has established subbasins within the Central Valley; the Proposed Action and alternatives are in portions of the Southern Sacramento Drainage Basin, the eastern portion of the Delta Drainage Basin, and the northern portion of the San Joaquin Drainage Basin.

The northern portion of the study area is primarily drained by the Sacramento River and its larger tributaries, including the American and Feather rivers. The southern portion is drained by the San Joaquin River and its tributaries, including the Cosumnes, Middle, and Old rivers. The San Joaquin River in this area is also the eastern part of the Stockton Deep Water Channel.

Irrigated agriculture on the flat valley floor in the study area has led surface water resources to be heavily devel-

oped. To the north of Sacramento, irrigation water floods rice paddies. South of Sacramento, there are extensive networks of irrigation ditches and canals, improved natural creeks, ponds, lakes, and other irrigation system. Some irrigation ditches and canals are managed by the Bureau and USACE. Many systems are managed by irrigation districts that the transmission lines traverse. These irrigation districts are listed below.

- Sutter Butte Mutual Water Company
- South Sutter Water District
- Natomas Central Municipal Water District
- Rio Linda Water District
- City of Sacramento Water Service Area
- Sacramento County Water District
- Citizens Utility Company
- Omochumne-Hartnell Water District
- Woodbridge Irrigation District
- Woodbridge Water Utility and Conservation District
- Central Delta Water Agency
- Stockton East Water District
- South Delta Water Agency
- Byron Bethany Irrigation District

In general, the study area falls into three main categories: urban; mixed agriculture and newer residential development; and agriculture. Much of the agricultural area is irrigated. A given field may be irrigated or not in any particular year depending on the crop. The area has abundant surface water in lakes, ponds, wetlands, sloughs, creeks, irrigation canals and drainages, and flooded fields. The water table is near the ground surface throughout the study area, which is essentially one large floodplain.

Table 4.15-1 lists all water bodies crossed by the segments of the Proposed Action and alternatives, and the following paragraphs describe the water resources by segment from the northern end of the study area to the southern end. See Figures 3-2 to 3-7 for segment locations and milepost information.

Segments A and A_1, which are the same route except for a minor deviation at Pleasant Grove Cemetery, leave O'Banion Substation and trend generally southeastward along the northeast dike of the Sutter Bypass, a 0.75 to 1 mile-wide drainage channel. Segments A and A_1 are 22.4 miles long and pass through very flat, flood irrigated cropland including rice paddies. The segments span or are near irrigation canals, drainage ditches, creeks, wetlands, and marshes. At MP 9 of Segments A and A_1, the route diverges from the Sutter Bypass and crosses the Feather River perpendicularly at MP 11.5 and the East Side Canal at MP 17.5. This area is predominantly cropland, becoming mostly grassland at MP 10.5.

Segments A and A_1 intersect Segments B and F about 4.2 miles north of Elverta Substation. Segments B, F, G, and H form a quadrilateral approximately two miles wide and four miles long north of Elverta Substation. This area, like that to the north, is very flat and drained by various creeks, sloughs, and ditches. The area is mainly pastureland with some cropland.

Segment C is 11.2 miles long and extends from Elverta Substation into the Sacramento metropolitan area, ending at Hurley Substation east of downtown Sacramento, just north of the American River. The area south of Elverta Substation is flat, mixed irrigated agricultural land and pastureland that is rapidly being converted to suburban housing developments. Surface water remains abundant, with the route crossing several creeks, canals, and ditches—many of which drain into the Natomas East Drainage Canal.

Table 4.15-1. Water Crossings

Segment	Milepost	Water Body[1]	CA Quad	County	Width[2] (feet)	Directions	Structure Number
A	2	Gilsizer Slough	Gilsizer Slough	Sutter	150	N to S	137/1-138/1
A	11	Nelson Slough	Nicolaus	Sutter	<100	NW to SE	146/1-147/1
A	11.5	Feather River	Nicolaus	Sutter	500	NW to SE	146/1-147/1
A	13.5	Coon Creek	Verona	Sutter	<100	NW to SE	148/1-149/1
A	15.25	Bunkham Slough	Verona	Sutter	<100	NW to SE	150/1-151/1
A	16.8	Bunkham Slough	Verona	Sutter	<100	NW to SE	150/1-151/1
A	17.3	East Side Canal	Verona	Sutter	150	NW to SE	152/1-153/1
A	19.75	Pleasant Grove Creek	Pleasant Grove	Sutter	<100	NW to SE	155/1-156/1
A	21	Curry Creek	Pleasant Grove	Sutter	<100	NW to SE	156/1-157/1

Table 4.15-1. Water Crossings

Segment	Mile-post	Water Body[1]	CA Quad	County	Width[2] (feet)	Direc-tions	Structure Number
C	0.7	Natomas East Main Drainage Canal	Rio Linda	Sacramento	<100	W to E	0/6-0/3
C	7.7	Natomas East Main Drainage Canal	Sacramento East	Sacramento	150	N to S	7/1-7/5
D	2.5	American River	Sacramento East	Sacramento	250	NW to SE	13/2-13/4
D	6.2	Morrison Creek	Carmichael	Sacramento	<100	N to S	17/1-18/2
D	7.8	Elder Creek	Elk Grove	Sacramento	<100	N to S	18/2-19/1
D	12.8	Laguna Creek	Elk Grove	Sacramento	<100	N to S	23/1-24/1
D	14.6	Elk Grove Creek	Elk Grove	Sacramento	<100	N to S	25/1-26/1
E	1.7	Small Lake	Galt	Sacramento	200	N to S	28/1
E	2.25	Lake	Galt	Sacramento	350	N to S	28/1-29/1
E	3.5	Cosumnes River	Galt	Sacramento	250	N to S	29/1-30/1
E	4.4	Badger Creek	Galt	Sacramento	<100	N to S	30/1-31/1
E	5.25	Intermittent Stream	Galt	Sacramento	<100	N to S	31/1-32/1
E	6	Laguna Creek	Galt	Sacramento	<100	N to S	32/1
E	6.8	Intermittent Stream	Galt	Sacramento	<100	N to S	32/1-33/1
E	7.6	Deadman Gulch	Galt	Sacramento	200	N to S	33/1-34/1
E	8.25	Potential Wetland Area	Galt	Sacramento	300	N to S	34/1-35/1
E	10.75	Bear Slough	Lodi North	Sacramento & San Joaquin	<100	N to S	37/1
E	11.2	Dry Creek	Lodi North	Sacramento & San Joaquin	<100	N to S	37/1-38/1
E	12.6	Mokelumne River	Thornton	San Joaquin	150	N to S	38/1-39/1
E	22.5	Telephone Cut	Terminous	San Joaquin	100	N to S	48/1-49/1
E	24.3	Pixley Slough	Terminous	San Joaquin	100	N to S	50/1-51/1
E	24.5	Bear Creek	Terminous	San Joaquin	150	N to S	50/1-51/1
E	25.25	Mosher Slough	Terminous	San Joaquin	200	N to S	51/1-52/1
E	26.6	Fourteen Mile Slough	Terminous	San Joaquin	200	N to S	52/1-53/1
E	26.7	Sewage Disposal Ponds	Terminous	San Joaquin	900	N to S	52/1-53/1
E	29	San Joaquin River (Stockton DWSC)	Holt	San Joaquin	600	N to S	55/1-56/1
E	30.2	Mokelumne Aqueduct	Holt	San Joaquin	100	NE to SW	56/1-57/3
E	37.4	Middle River	Holt	San Joaquin	300	NE to SW	63/1-64/1
E	43.4	West Canal	Clifton Court Forebay	Contra Costa & San Joaquin	400	E to W	69/1-70/1
E	44.7	Mendota Canal	Clifton Court Forebay	Contra Costa	250	NE to SW	70/1-71/1

Table 4.15-1. Water Crossings

Segment	Mile-post	Water Body[1]	CA Quad	County	Width[2] (feet)	Direc-tions	Structure Number
F	0.3	Curry Creek	Pleasant Grove	Sutter	<100	N to S	
G	2	Curry Creek	Pleasant Grove	Sutter	<100	N to S	
G	2.9	Curry Creek	Pleasant Grove	Sutter	<100	N to S	

Source: Original 2002
[1] USGS California topographical quadrangle sheet title
[2] Approximate width along transect as measured off topographic maps

Segment C crosses this canal less than one mile south of Elverta Substation, then roughly parallels the canal on the west side until crossing it again at about MP 7.5. Surface water becomes much less common after the route crosses Interstate 80 at about MP 5.3 and enters more intensive urban development, but there are still canals and drainage ditches, as well as smaller ponds and wetlands.

Segment D is 15.2 miles long and starts at Hurley Substation. It trends southeast before crossing the American River at MP 2.5, then heads south-southeast through progressively less industrial and urbanized areas before it reaches Hedge Substation at about MP 7. Segment D then trends due south, passing the City of Elk Grove on the east at MP 14 and reaching Elk Grove Substation at MP 15. The portion north of Hedge Substation has relatively little surface water compared with the segments further north, crossing only one creek of note, Morrison Creek. South of Hedge Substation, the segment passes through agricultural land with scattered newer housing subdivisions and crosses several creeks. The creeks in this area are, for the most part, natural drainages, not highly developed or rerouted like the creeks and sloughs north of Sacramento. There is much less irrigation in this area, and grassland pasture mixed with some cropland predominates.

Segments E and E_1 are the longest segments at 46.2 miles (Figures 3-6 and 3-7). They proceed south from Elk Grove Substation to about MP 31, then turn southwest into Tracy Substation. At MP 3.5, the segment starts to cross the Cosumnes River and its associated creeks, ditches, ponds, and wetlands. This surface water complex extends about 8.5 miles, and is characterized by pastureland with some cropland. Beyond MP 9, the route crosses several more creeks, ditches, and sloughs before crossing the Mokelumne River at MP 12.5. South of the Mokelumne River, the route crosses many developed canals, drainage ditches, and vineyards with some mixed cropland.

Between MP 19.5 and 29, the route skirts the east side of a large number of intensively developed irrigated fields surrounded by sloughs and wetlands. The segment passes west of Stockton at MP 27 and crosses the San Joaquin River and Stockton Deep Water Channel at MP 29. At MP 31, still crossing numerous irrigation canals and ditches, the route turns southwest, paralleling Trapper Slough, and continues to cross irrigated cropland. At MP 37.5, the segment crosses the Middle River, and at MP 43.5, the segment crosses the inflow to the Clifton Court Forebay, a manmade water body with almost 3.5 square miles of surface area. The inflow is fed immediately upstream by the Grant Line Canal, Farman and Bell Canal, Old River, and the Delta-Mendota Canal. After crossing the Delta-Mendota Canal at MP 44.8, the segment terminates at Tracy Substation at MP 46.2.

In terms of water resource sensitivity, the entire study area has abundant surface water that could be impacted. However, the entire area is flat, and stream gradients are extremely small. Vegetation reestablishes itself rapidly given the amount of water and growing conditions. Erosion potential is very small as a result. Span lengths at rivers are well within the maximum spans between structures, allowing structures to be located well back from the rivers. The Cosumnes River is the most sensitive area crossed, as there are a number of streams feeding into the river in a wide floodplain at this point. The area is also included in the Cosumnes River Preserve. However, two existing transmission lines on maintained ROW presently traverse this area, and only Alternative 3 would require a new transmission line on new ROW through this area.

4.15.2 Environmental Consequences

Construction and maintenance potential impacts on water resources by the Proposed Action or alternatives would be very similar, although the specific locations might vary depending on the alternative selected. Alternatives that include new transmission lines would have a higher potential for impact than those involving reconductoring. Impacts from access road construction use would be similar for all alternatives, but alternatives requiring more new access roads would have a higher potential for impact. Potential impacts from fuel and chemical spills would be similar for all alternatives. Because of the vast amount of surface water in the study area, some impact to water

resources is unavoidable, but erosion potential is small given the lack of terrain relief, low stream and river gradients, and rapid revegetation conditions.

4.15.2.1 Standards of Significance

The Proposed Action and alternatives would have significant and adverse effect on water resources if they

- Substantially degrade water quality,
- Contaminate a public water supply,
- Substantially degrade or deplete groundwater resources,
- Interfere with groundwater recharge, or
- Cause substantial flooding, erosion, or siltation.

4.15.2.2 Environmental Protection Measures

EPMs for water resources from Table 3-4 include the following:

- Hazardous materials would not be drained onto the ground, into streams, or into drainage areas. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials.
- Irrigation system features, which are eligible for the NRHP, would be avoided during the siting of new transmission line structures and access roads, and most other irrigation system features would be avoided to the extent practicable in the siting of new structures and access roads.
- In construction areas (for example, material storage yards, structure sites, and spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur.
- Access roads would be built at right angles to the streams and washes to the extent practicable. Culverts would be installed where needed. All construction activities would be conducted to minimize disturbance to vegetation and drainage channels.
- Excavated material or other construction materials would not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can encroach, in any way, upon the watercourse.
- Nonbiodegradable debris would not be deposited in the ROW. Slash and other biodegradable debris would be left in place or disposed.
- All soil excavated for structure foundations would be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations. Excavated soil excess to these needs would be removed from the site and disposed of appropriately.
- Wherever possible, new structures and access roads would be sited out of floodplains. Due to the abundance of floodplains and surface water resources in the study area, complete avoidance may not be possible, and Western will consult with USACE.
- Culverts would be installed where needed to avoid surface water impacts during construction of transmission line structures. All construction activities would be conducted in a manner to avoid impacts to water flow.
- All construction vehicle movement outside the ROW normally would be restricted to predesignated access, contractor-acquired access, or public roads.
- When feasible, all construction activities would be rerouted around wet areas while ensuring that the route does not cross sensitive resource areas.
- Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses would be conducted to prevent muddy water and eroded materials from entering the streams or watercourses with construction of interceptors.
- Runoff from the construction site would be controlled and meet the RWQCB storm water requirements.
- Construction within jurisdictional waters or wetlands may require 401 and 404 permits. These activities would be coordinated with the USACE and RWQCB, as needed. Thus, there would be no significant impacts.

4.15.2.3 Impacts from Proposed Action–New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

The Proposed Action would involve the greatest number of new structures compared to the other alternatives, resulting in 66 acres of long-term disturbance. Using the EPMs, the Proposed Action would not substantially degrade water quality, contaminate a public water supply, degrade or deplete groundwater resources, interfere with groundwater recharge, or cause any substantial flooding, erosion, or silting. Therefore, no significant impacts would be expected.

4.15.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 would involve fewer new structures than either the Proposed Action or Alternative 3. It would have more new structures than Alternative 2. Alternative 1 is entirely reconductoring, which would have less environmental impact than new construction on new ROW. Alternative 1 would also not impact any additional acreage, as it would be constructed entirely on existing ROW using existing access roads.

Using EPMs, Alternative 1 would not substantially degrade water quality, contaminate a public water supply, degrade or deplete groundwater resources, interfere with groundwater recharge, or cause any substantial flooding, erosion, or silting. Because it is entirely a reconductor project, with minimal surface disturbance, Alternative 1 would have the least impact to water resources. However, no alternative would cause significant impacts to water resources. The comparison of alternatives assesses various levels of minor impacts.

4.15.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 would have exactly the same impact on water resources as the Proposed Action north of Elverta Substation. It would temporarily disturb 515 acres and disturb 66 acres for the long term. Alternative 2 would require fewer new structures than any alternatives and the same number of new access roads as the Proposed Action. Using EPMs, Alternative 2 would not substantially degrade water quality, contaminate a public water supply, degrade or deplete groundwater resources, interfere with groundwater recharge or cause any substantial flooding, erosion, or siltation.

4.15.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Although the impacts of Alternative 3 would be confined between Elk Grove Substation and Tracy Substation, it would be all new construction on new ROW. Therefore, this alternative affects more acreage and requires more miles of access roads than any other alternative. This alternative also has the highest potential impacts to water resources. Even so, no significant impacts have been identified. Using EPMs, Alternative 3 would not substantially degrade water quality, contaminate a public water supply, degrade or deplete groundwater resources, interfere with groundwater recharge, or cause any substantial flooding, erosion, or siltation.

4.15.2.7 Impacts from the No Action Alternative

Under the No Action Alternative, the existing 230-kV transmission system between O'Banion Substation and Tracy Substation would be operated and maintained as it is presently. Western would periodically access the line for routine maintenance or emergency repairs along the existing ROW and access roads. Depending upon the location and the season, temporary and insignificant impacts to water resources could occur because of vehicle access for maintenance purposes. Routine vegetation management activities could also cause temporary insignificant impacts by increasing the potential for erosion and sedimentation by removing ground cover and soil compaction. There would be very low risks of physical damage to irrigation improvements or fuel spills during fieldwork, but the damage would promptly be repaired or spills cleaned up under Western's policies and applicable environmental law and regulations.

4.16 WETLANDS

4.16.1 Affected Environment

This section describes existing wetland conditions within the study area and how the Proposed Action and alternatives would affect wetlands. Wetlands provide natural flood protection and erosion control, recharge surface and ground waters, and maintain and improve local water quality. They are among the most productive and biologically diverse ecosystems in the world, providing dynamic, specialized habitat for a wide variety of common and rare plant and animal species. Environmental regulations have been developed to preserve and protect the unique habitat types and species they support. Table 4.16-1 and Figures 4-4, 4-5, and 4-6 present the wetlands within the study area.

Activities affecting wetlands are regulated under Section 404 of the CWA (33 U.S.C. §1344 *et seq.*) and EO 11990, Protection of Wetlands (42 FR 26961). Areas that meet wetland criteria, established by the USACE, are subject to the regulatory jurisdiction of USACE, pursuant to Section 404 of the CWA. DOE policy and procedures in 10 CFR 1022 ensure that DOE activities in wetlands comply with the EO requirements. This section contains information on avoiding activities impacting wetlands to comply with 10 CFR 1022.

4.16.1.1 Resource Study Area

The study area for wetland resources is the transmission line corridor along the existing ROW alignments. This includes ROW intersections with portions of the Sutter Bypass, the Feather, American, Cosumnes, Mokelumne, San Joaquin rivers, and smaller tributaries and flood-

plains. Wetland resources may be impacted by new construction (directly or indirectly), structure replacement, new and existing access roads, and temporary work sites (pulling, tensioning, or staging areas).

4.16.1.2 Issues of Environmental Concern

Activities may destroy or degrade the biological (species diversity and habitat) values of wetlands and interfere with or eliminate their beneficial functions in the ecosystem. These impacts may occur in study area wetlands because of excavation or filling, disturbance of hydrologic patterns, increased sedimentation from disturbed area runoff, and increased access and exploitation by humans and invasive plant species. Section 404 of the CWA requires a permit before any discharge of dredged or fill material into "Waters of the United States." Waters of the United States include navigable waters, interstate waters, and all other waters where the use, degradation, or destruction could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Pursuant to Section 404 of the CWA, USACE regulates and issues permits for such activities. Nearly all surface waters and wetlands in California meet the criteria for Waters of the United States, including intermittent streams and seasonal lakes and wetlands. Activities that require a permit under Section 404 include placing fill or riprap, grading, mechanized land clearing, and dredging. Any activity that deposits dredge or fill material within the "Ordinary High Water Mark" of Waters of the United States usually requires a permit, even if the area is dry when the activity takes place. The level of permitting required is determined by the scope of the action and level of disturbance to Waters of the United States.

4.16.1.3 Characterization

Wetland resources within the study area were determined from a review of the USFWS National Wetlands Inventory (USFWS 1990), the USDA Soil Conservation Service Local Identification Maps, USGS Topographic Maps of the study area, and various State of California wetland inventories. Western conducted field surveys of wetland resources June 25 through June 28, 2001, November 28, 2001, and February 21 through February 22, 2002. Table 4.16-1 lists field determinations based on vegetative and hydrologic features and classified according to Cowardin (Cowardin, *et al*., 1979).

The field survey recorded all wetland and floodplain habitats observed along the existing, proposed, and alternative ROWs. The results are presented in this section. Figures 4-4 through 4-6 show where various segments intersect and could impact wetland habitats. Specific descriptions of those intersections follow.

Western did not determine Section 404 jurisdictional status of wetland resources encountered. When the final Proposed Action or alternative is selected, any impacted wetlands would be evaluated for jurisdictional status during consultation with the USACE. Additionally, the existence and extent of vernal pool habitat was not

Table 4.16-1. Wetland Types

Wetland Type	Description
Fresh Water Emergent	Characterized by erect, rooted, herbaceous, hydrophytic vegetation (for example, sedges, rushes, curly dock, cattail, bulrush, arrowhead); frequently flooded or saturated soils.
Riverine	Freshwater emergent wetland located within a watercourse channel that lacks trees and shrubs, persistent emergents, mosses, and lichens.
Lacustrine	Freshwater emergent wetlands associated with deepwater habitats (depressions or dammed river channels) that lack trees and shrubs, persistent emergents, mosses, and lichens.
Palustrine	Freshwater emergent wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, separate from or associated with riverine or lacustrine wetlands.
Valley-Foothill Riparian	Mature riparian forest with canopy, subcanopy, shrub, and herbaceous layers, including plant species like cottonwood, ash, oak, alder, box elder, willow, blackberry, sedges, and rushes.
Vernal Pool	Seasonal, perched fresh water wetlands and swales of varying size found in a larger mosaic of grassland, oak woodland or riparian woodland, including plant species like wild oats, ripgut brome, annual ryegrass, and foxtail

Source: modified from Cowardin *et al*., 1979

always definitive due to seasonal water conditions and access limitations.

Segments A and A_1 intersect lacustrine and palustrine freshwater emergent wetlands associated with Gilsizer Slough at MP 1.8 to 2.0. The wetland is approximately 0.2 mile long totaling 3.4 acres within the existing ROW. Wetland vegetation consists of willow, bullrush, cattail, sedge, arrowhead, and water hyacinth. Structure 137-1 is sited within the wetland, occupying 0.1 acre of the wetland area.

The study area crosses the Feather River levee setback zones and the Feather River at MP 11.0 to 11.6. The existing ROW intersects 0.4 mile (six acres) of intermittent valley-foothill riparian wetlands in the north and south levee setback zones and 0.2 mile (three acres) of Waters of the United States. The wetland vegetation is generally comprised of cottonwood, box-elder, willow, and blackberry. The setback zones show evidence of prior agricultural disturbance. Existing Structure 146-4 is within this area, but well away from the valley-foothill riparian vegetation. Between MP 13.3 and 13.5, the segment crosses 0.2 miles (three acres) of valley-foothill riparian wetland (cottonwood and willow), including a small riverine wetland associated with Coon Creek. The existing transmission structures span the wetland and riparian area.

Segment A intersects 0.1 mile (1.5 acres) of valley-foothill riparian wetland and 0.1 mile (1.5 acres) of Waters of the United States associated with the East Side Canal between MP 17.4 and 17.6. Wetland vegetation consists of cottonwood, willows, blackberry, and some cattails surrounding small areas of annual grassland. Two existing structures, 152-4 and 152-5 are within the grassland areas. Segment A_1 diverges from Segment A at MP 17.4 because of a 2.8-mile proposed realignment from MP 17.4 to 20.2. The realignment would move structures 152-4 and 152-5 away (east) from the wetland area resolving access issues for structure and line repair and maintenance. Segments A and A_1 rejoin in parallel at MP 18.2. A small, freshwater emergent wetland (0.1 mile, 1.5 acres) associated with Pleasant Grove Creek occurs between MP 19.7 and 19.8 near existing Structure 154-5. The area is a rice field with cattails intermixed.

Segment B crosses two unnamed drainages at MP 0.6 and 0.8 with 0.1 mile (1.5 acres) of freshwater emergent wetland within the ROW. No structures are noted within the wetland areas. There may be small amounts of vernal pool habitat within the ROW between MP 1.6 and 2.8 (Structures 159-3 through 160-3).

Segment C, running south from Elverta Substation, intersects a 0.5-mile length (7.6 acres) of potential vernal pool habitat with some palustrine wetlands (cattails and bulrush) within the existing ROW between MP 0.3 and 0.8. Existing Structure 0-3 stands on a channel margin in this area. Another 0.5-mile (7.6 acre) length of potential vernal pool habitat is intersected between MP 4.3 and 4.8. Existing Structures 3-3 through 3-6 are in this area. Valley-foothill riparian habitat and small riverine, lacustrine, and palustrine wetlands possibly with vernal pools, run the length of the existing ROW in the American River floodplain from MP 8.0 to 11.2 (3.2 miles, 48.5 acres). Existing Structures 8-0 through 11-0 are within this area.

Segment D intersects approximately 0.6 mile (9.1 acres) of the valley-foothill riparian habitat within the existing ROW along the north side of the American River (MP 0.0 through 0.6). This habitat includes small areas of palustrine and lacustrine wetland. Structure 11-4 is just west, but outside of permanent wetland habitat associated with a small, nearby drainage. The ROW spans the American River between MP 2.3 and 2.5. The span crosses 0.1 mile (1.5 acres) of valley-foothill riparian area on the north and south banks and 0.2 mile (3 acres) of Waters of the United States. Small areas of vernal pool habitat may exist near MP 4.1 and 4.5 (structures 15-3 and 16-2). In addition, vernal pool habitat may exist between MP 10.0 and 11.9 (structures 21-2 through 22-5). Small areas (approximately 0.2 miles and 3 acres total) of freshwater emergent wetland (palustrine and lacustrine) and valley-foothill riparian areas occur where the ROW spans Morrison, Elder, Laguna, and Elk Grove creeks at MP 6.0, 7.8, 12.8, and 14.7, respectively. Potential vernal pool habitat (1.5 miles, 22.7 acres) occurs between MP 11.9 and 12.8 (structures 22-6 through 23-4) and around MP 14.7 in association with annual grasslands near Laguna Creek tributaries, and Elk Grove Creek.

Segments E and E_1 intersect Waters of the United States (ponds) at MP 1.7 and 2.2. About 0.3 mile (4.5 acres) of this habitat occurs within this portion of the ROW. Structures 27-9 through 28-3 are in this area. The ROW enters the Cosumnes River corridor at MP 2.9. The existing line from MP 3.0 to 4.7 crosses 0.6 mile (9.1 acres) of valley-foothill riparian habitat and palustrine wetlands and 0.1 mile (1.5 acres) of Waters of the United States where the Cosumnes River and its overflow are spanned. The structures in this reach are 29-3 through 30-2. Structures 30-4 and 3-04 span Badger Creek and its floodplain between MP 4.2 to 4.4, crossing approximately 0.1 mile (1.5 acres) of Waters of the United States and palustrine wetland. Waters of the United States and significant vernal pool habitat exist within the ROW from MP 5.0 through 6.3. The vernal pool complex (1.1 miles, 16.7 acres) is associated with the floodplain of Laguna Creek. Structures 32-1 and 32-2 span Laguna

Creek at MP 6.0. The ROW (existing Structures 33-4 and 34-1) crosses 0.2 mile (3 acres) total of valley-foothill riparian habitat and Waters of the United States at MP 7.6, 8.6, and 8.9. Vernal pool habitat is possible south of MP 7.6 and near MP 10.0. Valley-foothill riparian habitat (0.1 mile, 1.5 acres) associated with Waters of the United States (0.2 mile, 3 acres) in Dry Creek and the Mokelumne River are intersected where the ROW spans them at MP 11.2 (Structures 37-2 and 37-3) and MP 12.5 (Structures 38-4 and 39-1). Small lacustrine and palustrine wetlands (less than 0.1 miles, 1.5 acres) lay between Structures 44-2 and 44-3 at MP 18.2. The ROW crosses a 0.1 mile (2 acres) seasonal freshwater emergent wetland near Structure 45-1 at MP 18.9.

Segments E and E_1 intersect a large, significant complex of riverine, lacustrine, palustrine, and valley-foothill riparian wetlands called Pixley Slough associated with Bear Creek at MP 24.3 through 24.5. The 0.2-mile (3 acres) length beneath the ROW contains extensive cattail, bulrush, and deepwater wetland habitat. Structure 50-4 is sited within this area. The ROW intersects similar habitats at MP 26.6 to 26.7 (0.2 mile, 3 acres) where the existing line crosses Five Mile Slough. Structures 52-5 and 52-6 span this area. The ROW crosses the San Joaquin River at MP 28.9 to 29.2. The north and south banks support some marginal valley-foothill riparian habitat (0.2 mile, 3 acres) with 0.1 mile (1.5 acres) of Waters of the United States in the river channel. The ROW does not intersect any wetland habitat between the San Joaquin River crossing and Tracy Substation. However, it intersects Waters of the United States (approximately 0.2 mile and 3 acres for each crossing) at MP 37.3 (Middle River), MP 43.4 (Old River), and MP 44.7 (Delta Mendota Canal).

Segment F spans Curry Creek at MP 0.3. Some valley-foothill riparian habitat is present, but less than 0.1 mile (approximately 0.5 acre).

Segment G intersects and spans Curry Creek and several minor tributaries at MP 2.0, 2.9, 3.7, and 4.7. These areas total 0.2 mile and 3 acres.

Segment H ROW intersects two minor tributaries at MP 1.0, and 2.1. Some valley-foothill riparian habitat is associated with each. Total combined length and area of these habitats within the ROW is approximately 0.1 mile and 1 acre.

4.16.2 Environmental Consequences

The Proposed Action and alternatives can create impacts to wetlands during and as a result of construction of new access roads, structures, and temporary work sites within existing and new ROWs. Existing access roads and structures not replaced would continue to be maintained and used as under the No Action Alternative. These existing features were originally sited to avoid, to the extent practicable, wetlands and Waters of the United States. Structures to be replaced during reconductoring would be constructed on or near the site of the previously existing structure. Construction for new ROW, access roads, structures, realigned ROW, and temporary work sites avoid, to the extent practicable, impacts to wetlands and Waters of the United States. Summaries of impacts to wetlands by line segment and by alternative are provided in Table 4.16-2 and Table 4.16-3.

4.16.2.1 Standards of Significance

Significance can vary with the duration and source of specific impacts. Impacts may be temporary or long term and direct or indirect:

- Temporary impacts would last only through the construction period,
- Long-term impacts would last as long as the life of the facility,
- Direct impacts occur as a result of construction or operation of the Proposed Action or alternatives, or
- Indirect impacts occur as a result of the presence of the Proposed Action or alternatives usually associated with increased human accessibility to a previously inaccessible area.

The effects of the Proposed Action and alternatives would be considered significant if activities would result in

- Unmitigated temporary or long-term loss of wetland habitat (direct impact),
- Substantially increased access to wetland sites by humans (indirect impact),
- Increased erosion and sedimentation of soils or changes in topography that would significantly impact wetland habitat (direct impact), or
- Introduction of nonnative wetland plant species (indirect impact).

4.16.2.2 Environmental Protection Measures

EPMs for wetland resources from Table 3-4 include the following:

- Hazardous materials would not be drained onto the ground, into streams, or into drainage areas. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials. Irrigation system features, which are eligible for the NRHP, would be avoided during the siting of new transmission line structures and access roads, and most other irrigation system features would be

Table 4.16-2. Summary of Impacts by Segment on Wetlands and Waters of the United States

Segment	Wetland Miles	Wetland Acres	New Structures	Replaced Structures	Temp Acres Impact	Long-Term Acres Impact	Waters of the United States Miles	Waters of the United States Acres
A	0.9	13.4	0	1	0.23	0.1	0.3	4.5
A_1	0.9	13.4	5	0	1.15	0.5	0.3	4.5
B	0.1	1.5	1	0	0.23	0.1	0	0
C	4.2	62.7	0	6	1.38	0.6	0	0
D	2.4	36.3	0	3	0.69	0.3	0.2	3
E	3.1	47.3	0	4	0.92	0.4	0.7	10.5
E_1	3.1	47.3	16	0	3.68	1.6	0.7	10.5
F	0.1	0.5	0	0	0	0	0	0
G	0.2	3	1	0	0.23	0.1	0	0
H	0.1	0.1	0	0	0	0	0	0

Source: Original 2002

Table 4.16-3. Summary of Impacts by Alternative on Wetlands and Waters of the United States

Alternative	Wetland Miles Crossed	Wetland Acres Crossed	New Structures	Replaced Structures	Temporary Acres Impacted	Long-Term Acres Impacted	Waters of the United States Miles	Waters of the United States Acres
Proposed Action-New	1.4	18.5	7	0	1.61	0.7	0.3	4.5
Proposed Action-Reconductor	9.7	146.3	0	13	2.99	-	0.9	13.5
1	10.7	161.2	0	14	3.45	-	1.2	18
2	1.4	18.5	7	0	1.61	0.7	0.3	4.5
3	3.1	47.3	16	0	3.68	1.6	0.7	10.5

Source: Original 2002

avoided to the extent practicable in the siting of new structures and access roads.

- In construction areas (for example, material storage yards, structure sites, and spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur.
- Access roads would be built at right angles to the streams and washes to the extent practicable. Culverts would be installed where needed. All construction activities would be conducted to minimize disturbance to vegetation and drainage channels.
- Excavated material or other construction materials would not be stockpiled or deposited near or on stream banks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff or can encroach, in any way, upon the watercourse.
- Nonbiodegradable debris would not be deposited in the ROW. Slash and other biodegradable debris would be left in place or disposed.
- All soil excavated for structure foundations would be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations. Excavated soil excess to these needs would be removed from the site and disposed of appropriately.
- To the extent possible, new structures and access roads would be sited out of floodplains. Due to the abundance of floodplains and surface water resources in the study area, complete avoidance may not be possible, and Western will consult with USACE.

- Culverts would be installed where needed to avoid surface water impacts during construction of transmission line structures. All construction activities would be conducted in a manner to avoid impacts to water flow.
- All construction vehicle movement outside the ROW normally would be restricted to predesignated access, contractor-acquired access, or public roads.
- When feasible, all construction activities would be rerouted around wet areas while ensuring that the route does not cross sensitive resource areas.
- Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or watercourses would be conducted to prevent muddy water and eroded materials from entering the streams or watercourses with construction of interceptors.
- Runoff from the construction site would be controlled and meet the RWQCB storm water requirements.
- Construction within jurisdictional waters or wetlands may require 401 and 404 permits. These activities would be coordinated with the USACE and RWQCB, as needed.

4.16.2.3 Impacts from Proposed Action—New Transmission O'Banion Substation to Elverta Substation; Realignments; Reconductoring Elverta Substation to Tracy Substation

The Proposed Action intersects 11.1 miles (164.8 acres) of wetland habitat within the existing and new ROW. Of the 163 transmission line structures to be replaced within the existing ROW during reconductoring, approximately 13 are near wetland habitat. These structures would be constructed on the site of the previously existing structures, resulting in temporary, direct impacts up to 3 acres of associated wetlands. Long-term, direct impacts would be the same as the No Action Alternative. No new access roads would be constructed.

Of the 167 new transmission line structures to be constructed because of new or realigned ROW, approximately seven structures would be constructed near wetland habitats. New construction could temporarily impact up to 1.6 acres of wetlands resulting in long-term, direct impacts of 0.7 acre of wetlands.

On average, 0.2 mile of new access road would be required to access each new transmission line structure. If access to seven new structures requires crossing wetland habitat, the result could be up to 1.4 miles or 2.6 acres of long-term, direct impact. Limited, indirect impacts could occur over time due to increased access to previously inaccessible areas. The potential for additional access is small and controlled by EPMs. The resulting indirect impacts would be insignificant.

1.2 miles (18 acres) of Waters of the United States is presently or would be spanned by the existing or new transmission line components.

Temporary work sites (pulling and material storage) create temporary, direct impacts where constructed. The sites would be located in convenient, stable areas outside sensitive habitats to decrease costs, and increase ease of construction and operation. The Proposed Action includes 49 work sites temporarily impacting 19.6 acres. In accordance with EPMs and given the flexibility in siting these temporary work sites, direct impacts to wetland habitat would be unlikely. No long-term or indirect impacts are anticipated.

Transmission lines and temporary work sites normally span water bodies because of the increased difficulty of access and expense of construction in these areas, and because structures are typically sited on higher ground to increase span lengths and improve conductor ground clearance. Typical span widths without special structures are on the order of several hundred feet. Adjusting span width allows avoidance of most water bodies, including wetlands. The EPMs outlined above would be enforced during the construction and maintenance of the transmission line, and in addition to alternative siting, would further reduce direct and indirect impacts to wetlands. Revegetation of disturbed areas would occur rapidly given favorable regeneration conditions. Rapid revegetation would quickly reduce potential erosion, sedimentation, and invasion by nonnative plant species.

However, if preconstruction surveys identify unanticipated, unavoidable impacts to wetlands, Western would complete a survey and delineate the wetland areas. Western would consult with the USACE to determine the jurisdictional status of impacted habitats. In addition, a Section 401 Regional Water Quality Control Board Certification would be required before construction.

4.16.2.4 Impacts from Alternative 1—Reconductoring O'Banion Substation to Tracy Substation

Alternative 1 intersects 10.7 miles (161.2 acres) of wetland habitat within the existing ROW. Of the 163 structures to be replaced during reconductoring, about 14 transmission line structures are near wetland habitat. The new structures would be constructed on the site of the previously existing structures, resulting in temporary, direct impacts to up to 3.5 acres of associated wetlands.

Long-term, direct impacts would be the same as the No Action Alternative. No new access roads would be constructed. The existing transmission line components span 1.2 miles (18 acres) of Waters of the United States.

Alternative 1 includes 47 work sites temporarily impacting 18.8 acres. Using the EPMs and given the flexibility in siting these temporary work sites, direct impacts to wetland habitat would be unlikely. No long-term or indirect significant impacts are anticipated.

4.16.2.5 Impacts from Alternative 2—New Transmission O'Banion Substation to Elverta Substation and Realignments

Alternative 2 is the same as the Proposed Action from O'Banion Substation to Elverta Substation, but does not include the reconductoring work south of Elverta. This alternative intersects 1.4 miles (18.5 acres) of wetland habitat within the existing and new ROW. Approximately seven new or realigned structures are near wetland habitats. New construction could temporarily impact up to 1.4 acres of wetlands resulting in long-term, direct impacts to 0.7 acre of wetlands. If access to seven new structures requires crossing wetland habitat, the resulting impact could be up to 1.4 miles or 2.6 acres of long-term impact. Limited, indirect impacts could occur over time due to increased access to previously inaccessible areas. The amount of access being added is small and additional access is controlled by EPMs. The resulting indirect impacts would be insignificant. New transmission line components would span 0.3 mile (4.5 acres) of Waters of the United States. Alternative 2 includes 14 work sites temporarily impacting 5.6 acres. Using the EPMs and given the flexibility in siting these temporary work sites, direct impacts to wetland habitat would be unlikely. No long-term or indirect significant impacts are anticipated.

4.16.2.6 Impacts from Alternative 3—New Transmission Elk Grove Substation to Tracy Substation

Alternative 3 intersects 3.1 miles (47.3 acres) of wetland habitat within the new ROW. Approximately 16 new structures would be constructed near wetland habitats. New construction could temporarily impact up to 3.7 acres of wetlands, resulting in long-term, direct impacts of 1.6 acres of wetlands. If access to 16 new structures requires crossing wetland habitat, the resulting impact could be up to 3.2 miles or 5.9 acres of long-term impact. Limited, indirect impacts could occur over time due to increased access to previously inaccessible areas. Access would be controlled by EPMs. The resulting indirect impacts would be insignificant. The new transmission line components would span 0.7 mile (10.5 acres) of Waters of the United States. Alternative 3 includes 19 work sites that would temporarily impact 7.6 acres. Using EPMs and given the flexibility in siting these temporary work sites, direct impacts to wetland habitat would be unlikely. No long-term or indirect significant impacts are anticipated.

4.16.2.7 Impacts from the No Action Alternative

Without the Proposed Action or alternatives, significant changes to existing facilities or alignment would not occur. No new impacts to wetlands would be expected. Normal operation, maintenance, repairs, and emergency management of the system would continue as in the past. There are recognized temporary and insignificant impacts associated with maintaining access and transmission service.

4.17 CUMULATIVE IMPACTS

Cumulative impacts result from the incremental effect of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions. Requirements for addressing cumulative impacts are to gather and analyze enough data to make a reasoned decision concerning these impacts. Western examined actions that have environmental impacts on the same resources affected by this proposal and similar projects. Western also reviewed other proposed projects including major linear projects that would potentially create impacts on the same resources.

For past actions, Western included existing transmission lines in the study area. Impacts from these past projects were considered for each resource area.

4.17.1 Reasonably Foreseeable Projects

Table 4.17-1 contains a list of reasonably foreseeable projects. The proposed projects include power generation that would require construction of new transmission lines and interconnection to the Sacramento area power grid.

Cumulative effects for floodplains, geology, soils, health and safety, land use, noise, and wetlands are expected to be negligible. A description of cumulative effects is provided below for air quality, biological resources, cultural resources, electric and magnetic fields, paleontological resources, socioeconomics and EJ, visual resources, and water resources.

4.17.2 Air Quality

Within the Sacramento area, particulate emissions, VOCs, and NO_x from construction activities, rice field and agricultural burning, industrial operations (aggregate mining), and vehicle equipment may all impact air quality. Constructing new transmission lines or reconduc-

toring existing lines add to these emissions, but only for the short term. Western would use EPMs to reduce particulate emissions, VOCs, and NO_x. Therefore, cumulative impacts of the Proposed Action and alternatives, coupled with other area projects, would be considered unavoidable short term impacts. Long-term operation under the Proposed Action or any alternative, along with transmission and other projects in the general area, would not generate long-term significant amounts of air pollution emissions.

4.17.3 Biological Resources

For the short term, the Proposed Action, Alternative 2, and Alternative 3 would affect nonurban areas or areas not developing rapidly that may contain sensitive biological habitat. Much of the study area remains rural, and is expected to remain rural for the near term not affecting these habitats. Although bird strikes would continue, transmission line marking devices and locating new lines next to existing lines would result in lower additive cumulative impacts. Western should be able to satisfactorily avoid or mitigate impacts to biological resources. Cumulative impacts resulting from the Proposed Action, Alternative 2, or Alternative 3, and other area projects would not be significant.

The impacts to vegetation as a result of Alternative 1, reconductoring, would be temporary, as these areas would be replanted following the work. As a result, cumulative impacts to biological resources would be minimal.

4.17.4 Cultural Resources

Impacts from the alternatives would be limited to incremental physical impacts to cultural resources located within the existing ROW. Most new transmission lines would be located in areas with other transmission lines where the visual effects would also be incremental. Western should be able to satisfactorily avoid or mitigate impacts on prehistoric and historic archaeological sites. The potential to avoid or mitigate impacts on TCPs is less clear, although tribal groups would be involved in assessing impacts and identifying and implementing avoidance or mitigating measures.

With adherence to the EPMs, it is likely that the Proposed Action, Alternative 2, and Alternative 3, all of which include building new transmission lines, would only add slightly to the cumulative impacts on the cultural resources of the region. Alternative 1, which only includes reconductoring, would not add to the cumulative impacts on the cultural resources of the region.

4.17.5 Electric and Magnetic Fields

In discussions with planning agencies, Western determined that no new permanent, occupied buildings are planned within 100 feet of Western's ROWs. Because EMFs diminish rapidly with distance from the transmission line, and there is no planned encroachment to the ROWs, there would be minimal EMF cumulative impacts to human health or the environment.

4.17.6 Paleontological Resources

Impacts to paleontological resources could result if fossil materials are destroyed during excavation in depths of 10 feet or greater. Continued development extending farther into the Central Valley could disturb fossil-bearing sedimentary deposits and potentially damage paleontological resources. The cumulative impact is related to the increasing disturbance or removal of fossil-bearing rock. With proper site monitoring, the potential for loss of paleontological resources would be minimal, and cumulative impacts would be negligible.

Table 4.17-1. Projected Projects with Related Transmission Lines

Project	Proponent	County	Size (MW)	Interconnect	In Service Date	Comments or Date Approved
East Altamont Energy Center	Calpine	Alameda	1,100	Western	5/04	Online May, 2004
SMUD Cosumnes Power Plant Project Combined Cycle	SMUD	Sacramento	1,000	SMUD	10/04	Online October, 2004

Source: Original and California Energy Commission (CEC) web site http://www.energy.ca.gov/sitingcases/current.html August 2002
MW: megawatt
SMUD: Sacramento Municipal Utility District

4.17.7 Socioeconomics and Environmental Justice

Under the No Action Alternative, the current strain on electric power supply and distribution would continue, which could result in power supply shortfalls and disruptions as additional demands for power are made to support future development. These supply and distribution difficulties could decrease the efficiency of business operations in the study area and have an adverse effect on the overall economy. Other related spending in local markets would continue as beneficial economic effects.

4.17.8 Visual Resources

Past, existing, and future development have and would continue to visually alter the landscape. Negative effects to the visual quality of the area from development include existing utility lines and associated cleared ROWs, commercial development, major roads, abandoned buildings, industrial land uses, aggregate mining, and sand and gravel pits. Where the alternative would be located near one of these existing negative visual features, the impacts would result in an additive adverse effect to the existing visual impacts. However, locating the proposed transmission line adjacent to an existing utility corridor would typically be preferable to locating the line in a previously undisturbed landscape. The additive cumulative impacts for any alternative would not be significant.

4.17.9 Water Resources

Growth and development in the Sacramento area would increase water demand. Construction activities projected for the Proposed Action and alternatives would cause slight increases in surface-water sediment load and water use. These effects would be transitory. Incremental increases in surface-water sediment load from maintenance would not result in significant cumulative impacts.

4.18 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are defined as those impacts that could not be reduced to less than significant levels through EPMs (Table 3-4), other mitigation measures, or using another alternative. Short-term significant unavoidable impacts for air emissions (PM_{10}, VOCs, and NO_x) would occur for the Proposed Action and alternatives.

4.19 SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

During the 50- to 60-year life of the transmission line, the construction phase for the Proposed Action would cause the most ground disturbance, with 581 acres of temporary disturbance to the physical environment. Impacts would include approximately 414.5 acres of new ROW, 76 acres for transmission structure installation, 50.9 acres for access roads, 19.6 acres for pulling sites and approximately 20 acres for material storage areas.

After construction, the majority of disturbed areas, including new ROW, pulling sites, material storage areas, and structure sites, would be reclaimed to preconstruction use. Permanent land dedicated to the facilities, resulting in about 66 acres, would experience long-term disturbance for the transmission structures and access roads.

Potential adverse effects to air quality would be short term, mainly localized, and result from construction. These short-term impacts would exceed regulatory thresholds for PM_{10}, VOC, and NO_x emissions. Short-term and long-term impacts to soils and water quality would occur. Accelerated soil erosion would occur, particularly on steep slopes, from construction. Water quality impacts would be limited and short term.

Potential effects to biological resources, including sensitive plant species, sensitive habitats, and wildlife, primarily would be long term due to the permanent removal of vegetation and other wildlife species habitat. Habitat recovery in areas of temporary disturbance would vary according to the vegetation type and the presence or absence of special-status rare plant species.

Impacts to historical resources, related to additive adverse visual effects, would be for the life of the project, if facilities were removed when no longer needed. Similarly, direct physical impacts to Native American sites and paleontological resources are considered long term (permanent) and nonrenewable.

Potential land use effects would be largely short term and result from construction noise, dust, and equipment operations. Short-term impacts would occur primarily to recreational uses. Agricultural practices could continue on most of the ROWs, except where structures are proposed. Overall, transmission line corridor productivity would remain similar to existing conditions. Land uses would not change, except where access road spurs and structures would be located.

Visual effects would be both short term and long term. Long-term additive impacts would result from the presence of the new transmission lines. Visual impacts would be somewhat increased during construction due to the presence of equipment and related fugitive dust. Noise and transportation effects would be short term and would result from construction activities.

4.20 IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES

Resources committed to the proposed project would be material and nonmaterial, including financial resources. Irreversible commitment of resources means that those resources, once committed to the project, would continue to be committed throughout the 50- to 60-year life of the Proposed Action and alternatives. Irretrievable commitment of resources means that resources used, consumed,

destroyed, or degraded during construction, operations, maintenance, and abandonment of the Proposed Action and alternatives could not be retrieved or replaced for the life of the Proposed Action and alternatives or beyond. Irreversible and irretrievable commitments of resources for the Proposed Action and alternatives are summarized in Table 4.20-1.

4.21 GROWTH-INDUCEMENT

The following criteria are used to evaluate whether the alternatives would result in potential significant individual or cumulative growth-inducing impacts.

Growth-induced impacts would occur if the Proposed Action or alternatives:

- Directly or indirectly, foster economic or population growth,
- Remove obstacles to growth in the area,
- Provide new employment,
- Provide access to previously inaccessible areas or extend public services to previously unserved areas,
- Tax existing community services, or
- Cause development elsewhere.

4.21.1 Proposed Action and Alternatives

Economic and population growth in the Sacramento area has increased electrical demand. Based on new and approved residential and commercial development, electrical demand is projected to grow in the foreseeable future. The Proposed Action and alternatives would accommodate portions of existing and approved new development in the Sacramento area. Therefore, the Proposed Action and alternatives would not induce growth (directly or indirectly) as discussed in the following sections.

4.21.1.1 Remove Obstacles to Growth

Insufficient infrastructure in an area is generally an obstacle to growth because new development typically requires infrastructure improvements including water, wastewater treatment, roadways, and power facilities to be available before developments are approved by local jurisdictions. However, growth in the Sacramento area is presently occurring, and many more developments have been approved or are pending approval, regardless of the presence or absence of electric service. Moreover, local jurisdictions and developers assume that electric service would be provided regardless of where the development occurs.

Because a portion of the purpose of the Proposed Action and alternatives would respond to this development, it would not remove any current obstacles to growth. It is unlikely that implementing the Proposed Action and alternatives would encourage additional growth in the Sacramento area because growth is regulated by the local jurisdictions.

4.21.1.2 New Employment

The Proposed Action and alternatives would provide short-term construction employment but no permanent employment. A maximum of approximately 70 daily workers would be on the various job sites during peak construction periods. Construction of the Proposed Action and alternatives would draw the local labor workforce pool from the affected counties. Nonlocal labor would be employed for specialized skills that may not be available locally. The limited, temporary nature of this employment would not result in long-term growth. Table 3-2 provides a breakdown of employment skills for reconductoring and new transmission line construction.

4.21.1.3 Extended Access or Public Services

The Proposed Action and alternatives would not require extending public services to previously unserved areas. As discussed previously, the Proposed Action and alternatives is in response to new and proposed growth approved by the local jurisdictions. The proposed transmission line improvements are necessary to provide reliable power system operation and would not directly serve areas they pass through. New access roads would be required in some areas along the ROW for the Proposed Action and the alternatives. These would be primarily roads on private land maintained by Western and would not be accessible to the public. Western does not propose to provide public access along the transmission line ROW.

4.21.1.4 Existing Community Services

The Proposed Action and alternatives would not tax existing community services or require water, wastewater, or permanent solid waste services. The need for city- and county-provided services, such as road improvements, law enforcement, and fire protection, would be negligible.

4.21.1.5 New Development

As discussed previously, the Proposed Action and alternatives would not directly result in new development, either in the Sacramento area or elsewhere, but would be in response to existing and known planned development.

4.21.2 No Action Alternative

Under the No Action Alternative, there would be no growth-inducing impacts.

CHAPTER 5

Consultation and Coordination

The following is a list of Federal, state, and local agencies contacted during the preparation of the Draft EIS. Individual groups were contacted for background information, consultation, and general input.

5.1 FEDERAL

- U.S. Army Corps of Engineers
- U.S. Department of Agriculture
  - Natural Resource Conservation Service
- U.S. Department of Air Force
- U.S. Department of Commerce
  - National Marine Fisheries Service
- U.S. Department of Energy
  - Federal Energy Regulatory Commission
- U.S. Department of the Interior
  - Bureau of Land Management
  - Bureau of Reclamation
  - Fish and Wildlife Service
- U.S. Department of Navy
- U.S. Environmental Protection Agency

5.2 TRIBAL

- Amah/Mustan Tribal Band
- Auburn Rancheria
- Berry Creek Rancheria of Maidu Indians
- Buena Vista Rancheria of Me-Wuk Indians
- Butte Tribal Council
- California Valley Miwok Tribe
- Colusa Indian Community Council
- Cortina Indian Rancheria of Wintun Indians
- El Dorado County Indian Council
- Enterprise Rancheria of Maidu Indians
- Indian Canyon Mutson Band
- Ione Band of Miwok Indians
- Jackson Band of Miwok Indians
- Maidu Elders Organization
- Maidu Nation
- Maidu/Ohlone Tribe
- Mechoopda Indian Tribe
- Mooretown Rancheria of Maidu Indians
- North Valley Yokut
- Ohlone Indian Tribe
- Paskenta Band of Nomlaki Indians
- Plumas County Indians, Inc.
- Robinson Rancheria of Pomo Indians
- Sheep Ranch of Me-Wuk Indians
- Shingle Springs Band of Miwok Indians
- Sierra Native American Council
- Todd Valley Miwok-Maidu Cultural Foundation
- United Auburn Indian Community of the Auburn Rancheria
- Upper Lake Band of Pomo
- Washoe Archive and Cultural Center
- Wilton Rancheria

5.3 STATE

- California Air Resources Board
- California Department of Fish and Game
- California Department of Transportation
- California Energy Commission
- California Environmental Protection Agency
- California Native American Heritage Commission
- California Public Utilities Commission
- California Regional Water Quality Control Board
- California State Department of Parks and Recreation
- State Historic Preservation Office

5.4 CITIES AND COUNTIES

Cities

- Elk Grove
- Galt
- Lodi
- Roseville
- Sacramento
- Stockton

Counties

- Bay Area Air Quality Management District
- El Dorado County Air Pollution Control District
- Feather River Air Quality Management District
- Placer County Air Pollution Control District
- Placer County Planning Department
- Sacramento Metropolitan Air Quality Management District
- Sacramento County Planning Department
- San Joaquin County Planning
- San Joaquin Valley Unified Air Pollution Control District

5.5 OTHER

- Cosumnes River Preserve
- Stone Lakes Wildlife Refuge

CHAPTER 6

List of Agencies, Organizations, and Individuals Receiving the Sacramento Area Voltage Support Environmental Impact Statement

Western will provide an updated list of recipients for the Final EIS. The EIS News to be published in mid-October will include a response card to request either the electronic or hard copies of the Executive Summary or entire Draft EIS.

6.1 FEDERAL AGENCIES

Steve Barhite	U.S. Environmental Protection Agency	San Francisco	CA
Thomas Black	U.S. Department of the Army	Dublin	CA
Kim Bunn	Bureau of Land Management	Folsom	CA
David Cowell	U.S. Department of the Air Force	Beale AFB	CA
Gary Crammer	U.S. Fish and Wildlife Service	Willows	CA
Ginger Fodge	U.S. Army Corps of Engineers	Sacramento	CA
Steve Frankel	Moffett Federal Airfield	Moffett Field	CA
Laura Fuji	U.S. Environmental Protection Agency	San Francisco	CA
William Hogarth	U.S. Department of Commerce	Santa Rosa	CA
Marty Kjelson	U.S. Fish and Wildlife Service	Stockton	CA
Koji Kowamura	Western Area Power Administration	Lakewood	CO
Garry Krebbs	U.S. Defense Logistics Agency	Stockton	CA
Mark Littlefield	U.S. Fish and Wildlife Service	Sacramento	CA
Terence Martin	U.S. Department of the Interior	Washington	DC
Loreen McMahon	Western Area Power Administration	Folsom	CA
Chris Mobley	U.S. Department of Commerce	Santa Rosa	CA
Dennis Rankin	U.S. Department of Agriculture	Washington	DC
Lori Rinek	U.S. Fish and Wildlife Service	Sacramento	CA
Mark Robinson	Federal Energy Regulatory Commission	Washington	DC
Lester Snow	Bureau of Reclamation	Sacramento	CA
Dave Tedrick	U.S. Army Corps of Engineers	Sacramento	CA
John Verkerk	U.S. Department of the Navy	Stockton	CA
Wayne White	U.S. Fish and Wildlife Service	Sacramento	CA
Larry Williams	U.S. Fish and Wildlife Service	Willows	CA
	U.S. Environmental Protection Agency	Washington	DC

6.2 CALIFORNIA STATE AGENCIES

Richard Bilas	California Public Utilities Commission	San Francisco	CA
Jerry Boles	California Department of Water Resources	Red Bluff	CA
Bryon Buck	California Urban Water Agencies	Sacramento	CA
Banky Curtis	California Department of Fish and Game	Rancho Cordova	CA
Gary Drummond	California State Department of Corrections	Represa	CA
Bruce Kranz	California Department of Parks and Recreation	Folsom	CA
Peter Mackin	California Independent System Operator	Folsom	CA
Peter Maclaggan	California Urban Water Agencies	San Diego	CA
Jim McCluskey	California Energy Commission	Sacramento	CA
Roberta Mendonca	California Energy Commission	Sacramento	CA
Dave Morse	California Public Utilities Commission	San Francisco	CA
Terry Rivasplata	Governor's Office of Planning and Research	Sacramento	CA
Ann Marie Robinson	Caltrans District 03	Sacramento	CA
Peter Venturini	California Air Resources Board	Sacramento	CA
Douglas Wheeler	Secretary Resources Agency	Sacramento	CA

6.3 REGIONAL, COUNTY, AND LOCAL AGENCIES

Dick Akin	Sutter County	Yuba City	CA
Robert Barnett	Sutter County	Yuba City	CA
Lance Boyd	Provident/Princeton-Codora-Glenn Irrigation Districts	Willows	CA
George Carpenter	Sutter County	Yuba City	CA
Rick Coleman	Trinity Public Utilities District	Weaverville	CA
Larry Combs	Sutter County	Yuba City	CA
Rick Cooper	Cosumnes River Preserve	Galt	CA
Ken Corbin	Feather River Air Quality Management District	Marysville	CA
David Dockham	City of Roseville	Roseville	CA
Richard Doscher	Yuba City Police Department	Yuba City	CA
William Duarte	City of Healdsburg	Healdsburg	CA
James English	San Juan Water District	Granite Bay	CA
Tom Evans	Alameda Power and Telecom	Alameda	CA
James Filippi	Pacific Gas and Electric Company National Energy Group, California Center	San Francisco	CA
Matthew Foskett	Northern California Power Agency	Roseville	CA
George Fraser	Northern California Power Agency	Roseville	CA

Sean Giever	Terra Bella Irrigation District	Terra Bella	CA
Rick Gilmore	Byron-Bethany Irrigation District	Byron	CA
Ron Gorham	Sierra Conservation Center	Jamestown	CA
Mel Grandi	City of Lodi	Lodi	CA
Tom Habashi	City of Roseville	Roseville	CA
Richards Hall	Sutter County	Yuba City	CA
Michael Harrold	Sutter County	Yuba City	CA
Gary Heath	Oversight Board	Sacramento	CA
Susan Hitchcock	City of Lodi	Lodi	CA
Kam Hung	City of Roseville	Roseville	CA
Charles Johnson	Colusa County	Colusa	CA
Matt Jones	Sacramento Air Quality Management District	Sacramento	CA
Jess Kerekes	City of Lodi	Lodi	CA
Barbara Kleinert	West Side Irrigation District	Tracy	CA
Gary Kraus	Sutter County	Yuba City	CA
Garith Krause	Merced Irrigation District	Merced	CA
Harry Krug	Colusa County	Colusa	CA
Darrell Larsen	Sutter County	Yuba City	CA
Bill Lewis	City of Yuba	Yuba City	CA
John Mallyon	James Irrigation District	San Joaquin	CA
Keith Martin	Regional Waste Management Authority	Marysville	CA
James Maughan	Central Valley Water Quality Control Board	Sacramento	CA
Larry Munger	Sutter County	Yuba City	CA
Mike Negrete	Central Valley Water Quality Control Board	Sacramento	CA
Tim Nichols	City of Redding	Redding	CA
Jerry Noma	Northern California Youth Correctional Center	Stockton	CA
Paul Olmstead	Sacramento Municipal Utility District	Sacramento	CA
Les Pereira	Northern California Power Agency	Roseville	CA
Keith Roberts	University of California	Davis	CA
Ed Roman	Sacramento Municipal Utility District	Sacramento	CA
Gino Romano	Glenn-Colusa Irrigation District	Willows	CA
Ron Roos	West Stanislaus Irrigation District	Westley	CA
Garry Rothchild	City of Biggs	Biggs	CA
Paul Russell	Sutter Extension Water District	Yuba City	CA

Ted Schoppe	Sutter County	Yuba City	CA
James Staker	Reclamation District 2035	Woodland	CA
Alan Vallow	City of Lodi	Lodi	CA
Mike Wardell	City of Roseville	Roseville	CA
Lowell Watros	City of Redding	Redding	CA
Larry Weis	Turlock Irrigation District	Turlock	CA
Dana Wiyninger	Sutter County	Yuba City	CA

6.4 NATIVE AMERICAN TRIBES

Kenneth McKean	Miwok Indian Community, Wilton Rancheria	Wilton	CA
Katherine Perez	Yokut, Bay Miwok, Ohlone/Costanoan	Stockton	CA
Kathryn Ramey	Ione Band of Miwok Indians	Ione	CA
Glenn Villa, Jr.	Ione Band of Miwok Indians	Ione	CA

6.5 ORGANIZATIONS AND INSTITUTIONS

Ann Broadwell	California Unions for Reliable Energy (CURE)	S. San Francisco	CA
Marilyn Cundiff	Wildlife Conservation Board	Sacramento	CA
Brad Foster	Yuba-Sutter Farm Bureau	Yuba City	CA
Doris Joaquin	Yuba-Sutter Farm Bureau	Yuba City	CA
Gary Lewis	Deuel Vocational Institution	Tracy	CA
George Van Ruiten	Yuba-Sutter Farm Bureau	Yuba City	CA
	East Ranch Homeowners' Association	Sacramento	CA
	Sutter Basin Gun Club	Yuba City	CA

6.6 NEWS MEDIA AND LIBRARIES

Ross Farrow	Lodi News-Sentinel	Lodi	CA
Chris Gilbert	KUBA-AM Radio	Yuba City	CA
Todd Hanson	Marysville Appeal Democrat	Marysville	CA
Harold Kruger	Marysville Appeal Democrat	Marysville	CA
Gary Mortenson	Marysville Appeal Democrat	Marysville	CA
Laura Nicholson	Marysville Appeal Democrat	Marysville	CA
Carrie Peyton	Sacramento Bee	Sacramento	CA
Judith Smith	Colorado State University Libraries	Fort Collins	CO
	San Francisco Public Library	San Francisco	CA
	California Energy Commission Library	Sacramento	CA
	California State Library	Sacramento	CA
	Sutter County Library	Yuba City	CA

CHAPTER 7.0

List of Preparers

NAME	RESPONSIBILITIES	EXPERIENCE
WESTERN AREA POWER ADMINISTRATION		
McMahon, Loreen	Project Management	Ms. McMahon holds a Masters degree in Public Policy and Administration with an emphasis on environmental policy and a B.A. in Political Science. She has worked within the government for 20 years, including 10 years with Western Area Power Administration.
Barger, Mary	Cultural Resources	Ms. Barger has a B.A. in Cultural Resources from Western Illinois University. Ms. Barger's graduate studies were accomplished at Western Michigan University. Ms. Barger has 24 years as a Federal archeologist and 9 years of experience with the Western Area Power Administration.
Bridges, John	Biological Resources	John Bridges has a B.S. and M.S. in Zoology from Eastern Illinois University. He has 15 years as a consultant to the energy industry and 12 years working for Western Area Power Administration. His expertise includes terrestrial biological issues, avian protection program & endangered species consultations.
Burton, Gary L.	Natural Resources	Mr. Burton holds a B.S. in Fisheries/Microbiology from Colorado State University. He has worked as a Federal fishery biologist for 16 years, including 4 years with the Western Area Power Administration.
Christy, David	Public Involvement	Mr. Christy has a BA in Anthropology. He has over 20 years of experience in public involvement.
Cooper, Charles	Maintenance Engineering	Mr. Cooper holds a B.S. in Electrical Engineering and is a registered professional engineer in California. Mr. Cooper has 30 years experience in power system engineering with the Bureau of Reclamation and the Western Area Power Administration.
Cunningham, Catherine S.	Environmental Planning Health and Safety	Ms. Cunningham holds a B.S. in Animal Science. She has 3 years of experience in biological research and 11 years of experience in environment, safety, and health.
House, Phil	Power Resource Planning	Mr. House is a Hydraulic Engineer. He has worked for Western for 14 years in the area of power resource planning.
Kawamura, Koji	Legal	Mr. Kawamura holds a Juris Doctor from the University of Colorado at Boulder. His studies emphasized environmental and natural resource law. He has worked with the U.S. Forest Service and the Western Area Power Administration. He is admitted to the state and Federal bars in Colorado.
Kyriss, LaVerne	Communications Public Involvement	Ms. Kyriss holds a B.A. in Psychology and an M.A. in Communications. She has more than 20 years of communications, public involvement, and editing experience, including 13 years with Western.
Le Blanc, Frederick J.	Power System Operations	Mr. Le Blanc holds a B.S. in Business Administration and has 33 years of experience in power systems operations in public power. He has worked for the Western Area Power Administration since 1998.
Mathias, Kenneth, PE	Air Quality EMF Noise	Mr. Mathias is a Registered Professional Mechanical Engineer, with a BS in mechanical engineering and MS in geology and geophysics. He has over 20 years experience in power system design and development, geophysical exploration, and environmental planning and compliance.
Miller, Heidi R.	Lands	Ms. Miller holds a B.S. in Business Administration with a concentration in accounting. She has worked for the Western Area Power Administration for 12 years, with over 10 years experience in the Lands Division.

NAME	RESPONSIBILITIES	EXPERIENCE
Mirzadeh, Mariam A.	Transmission Planning	Ms. Mirzadeh holds a Masters degree in Electrical Engineering. She has over 20 years of experience in the field of electrical engineering. She has worked for the Western Area Power Administration since 1992 and has worked the last 3 years in transmission planning.
Roberts, Donald A.	Project Engineer	Mr. Roberts holds a B.S. in Civil Engineering. He has over 20 years of experience in the fields of heavy construction and project management. He has worked for the Western Area Power Administration since 1988.
Sabet, Morteza	Transmission Planning Operations	Mr. Sabet holds a B.S. degree in Electrical Engineering and has over 30 years of experience in power system operation, project development, and engineering. He has worked for the Western Area Power Administration since 1980. Before joining Western, Mr. Sabet worked with a variety of utilities and a state regulatory agency.
Sinclair, Susan	Real Estate Specialist	Ms. Sinclair has 5 years of experience as an employee with Western Area Power Administration. She has an M.A. in Art History from California State University Sacramento. At Western, Ms. Sinclair is employed as a real estate specialist. She is knowledgeable of property rights and has worked on three major transmission line projects in the last few years (Sutter Power Plant, Path 15, and SVS Draft EIS).
Swanson, Dave	Environmental Specialist	Mr. Swanson holds a B.A. in Biological Sciences. He has 20 years of environmental planning experience and 6 years of energy development experience.
Vader, David	Native American Liaison	Mr. David Vader has a B.S. and M.A. in Geography from the University of Nebraska at Omaha. He has worked for more than 10 years as a full-time Native American liaison. Mr. Vader is working on tribal consultation on several energy development and transmission projects.
ADVANCED INTEGRATED MANAGEMENT SERVICES		
Vigil, Jose	Real Estate Specialist	Mr. Vigil has a B.A. in Business Administration from the University of New Mexico. He is employed with Advanced Integrated Management Services, Inc. and provides real estate and ROW expertise. Mr. Vigil has over 20 years of experience and has worked with Western Area Power Administration since 1979.
BURLESON CONSULTING, INC.		
Tassey, Roberta	Deputy Project Manager/Project Manager	Ms. Tassey has a B.S. in Biology and is a senior scientist with Burleson Consulting, Inc. She has over 20 years of experience in the environmental field and is experienced with NEPA and CEQA requirements.
Burleson, Nadia, P.E.	Quality Control	Ms. Burleson is a registered professional engineer in California. She received her M.S. in Civil Engineering and B.S. in Chemical Engineering. Ms. Burleson has over 15 years of environmental engineering, project management, and quality control experience.
Sutton, Jacqueline	Editor	Ms. Sutton has a B.A. in advertising. She has more than 13 years of technical editing experience.
EDAW, INC.		
Farman, Mark	Technical Reviewer	Mr. Farman is an environmental planner with over 20 years of water, energy and other natural resource planning, policy analysis and economics experience. He has worked on a wide variety of assignments, including integrated water resource plans, energy facility siting studies, public land management plans, EISs, EIRs, habitat conservation plans, and FERC relicensing applications.

NAME	RESPONSIBILITIES	EXPERIENCE
Downs, Michael, PhD	Technical Reviewer	Dr. Downs has his doctorate in Anthropology. He has over 20 years of experience as a senior social scientist and project manager on complex environmental projects throughout the United States.
Davis, Cindy	Technical Reviewer	Ms. Davis holds a B.S. in Biological Conservation. Ms. Davis has focused her experience on conducting numerous field surveys and assessing impacts on biological resources for CEQA/NEPA compliance. She has over 8 years of experience in completing EIS/EIR documents.
Huang, Steven	Socioeconomics	Mr. Huang has an M.S. in Environmental Planning with 5 years experience with EIS/EIR documents. His specialty expertise includes socioeconomics, air quality, and noise modeling.
GREYSTONE CONSULTANTS, INC.		
Bacarri, Larry	Electrical Effects	Mr. Baccari is a licensed engineer with an M.S. in Civil Engineering from the University of Wyoming. Mr. Baccari has 32 years of experience on engineering and environmental projects in the western United States, including planning, permitting, designing, and building watershed development, hydroelectric power generation, transmission, and distribution systems projects.
Crain, Leon	Noise	Mr. Crain has an M.S. in Cybernetic Systems from San Jose State University. He is also a California Registered Environmental Assessor, REA 05302. Mr. Crain has extensive environmental engineering and project management experience dealing with a variety of environment areas, environmental situations, geographic regions, emissions inventories, and solid waste disposal.
Giles, Tim	Geology Soils	Mr. Giles has a B.S. in geology. He has over 20 years of experience in assessing geological and groundwater impacts associated with energy projects.
Havrey, Jeffrey, Ph.D.	Project Alternatives	Dr. Harvey is the Regional Manager of Greystone's California office. He has a Ph.D. in Geography from the University of California, Los Angeles, and more than 20 years of experience as a consultant in environmental planning and reporting, pursuant to requirements of the National Environmental Policy Act and the California Environmental Quality Act. Reports have been prepared for local, state, and Federal government agencies; nonprofit environmental groups; and private land developers.
LeCureux, Dave	Water Resources	David LeCureux has an M.S. in Civil Engineering from California State University, Sacramento. Mr. LeCureux has nearly 10 years of experience as both an Environmental Engineer and Planner for Federal, state, county, and private projects throughout California and Nevada. His areas of expertise include spill plan preparation, hazardous materials management, hazardous waste management, environmental compliance, occupational health and safety, and environmental resource planning.
Nommensen, Roger, RG	Geology Paleontological Resources Soils	Mr. Nommensen has a M.S. in hydrogeology. He has over 14 years of experience in assessing geological and soil conditions associated with remediation and energy projects throughout northern California. He is also experienced with determining based on the geological characteristics of the area if there is a potential for paleontological resources.
Zeff, Sally	Land Use Visual Resources	Ms. Zeff holds a Masters degree in Urban Planning and has more than 20 years of experience in a variety of environmental projects, including planning, management, and permitting experience. Ms. Zeff also has more than 12 years of experience in the management and preparation of multi-disciplinary environmental analyses in California.

NAME	RESPONSIBILITIES	EXPERIENCE
ROBERT SCOTT ENVIRONMENTAL SERVICES		
Scott, Robert	Technical Reviewer	Mr. Robert Scott received his M.L.A. in Landscape Architecture and Environmental Planning, and his B.S. in Parks and Recreation. Mr. Scott has over 25 years of experience as a land use and visual resources specialist and project manager. He has participated in more than 80 transmission line and other linear projects, including more than 25 with the Western Area Power Administration.
TETRA TECH NUS, INC.		
Taber, William	Project Manager	Mr. Taber holds a B.A. in Biology with an emphasis on Ecology. He has more than 27 years of environmental experience and has served as project manager for major U.S. Department of Energy environmental assessments and environmental impact statements for more than 20 years.
Dimmick, Ross	Geology Soils	Mr. Dimmick holds a B.S. and an M.S. in Geological Sciences with an emphasis on Paleontology. Mr. Dimmick has 15 years of environmental experience specializing in the areas of geology, soils, and paleontology.
Gaylor, Robert	Soils Floodplains	Mr. Gaylor holds a B.A. and an M.S. in Geology, with emphasis on sedimentary processes, and a B.S. in computer science. Mr. Gaylor has 18 years of environmental experience specializing in geology and environmental assessments with emphasis on computer applications.
Kaiser, Genevieve	Socioeconomics Environmental Justice	Genevieve Kaiser is an environmental planner specializing in socioeconomic analyses and GIS. She has a B.A. in Economics from the College of William and Mary and an M.S. in Energy Management and Planning from the University of Pennsylvania. She has 12 years of experience performing environmental assessments and preparing environmental impact statements.
Jones, Judy	Editor	Ms. Jones has more than 25 years of experience as a technical editor, technical writer, and publications manager. For more than 15 years, Ms. Jones has been directly involved in writing, editing, and managing environmental publications for the U.S. Department of Energy, U.S. Department of Defense, Bureau of Land Management, and numerous state and local agencies. Ms. Jones has served as lead editor on three major environmental impact statements.
Manka, Michael	Biology	Mr. Manka holds a B.S. in Biological Sciences with an emphasis on Ecology and Systematics. He has 9 years of experience as an environmental consultant specializing in fisheries and terrestrial wildlife.
Munro, David	Floodplains Wetlands	Mr. Munro has a B.A. in Psychology and an M.A. in Natural Resource Management from San Francisco State University. He has more than 7 years experience in general and wetlands ecology.
Peel, Robert	Technical Writer	Mr. Peel is an environmental scientist and technical reviewer with TtNUS. He has a B.S. in Geography and 26 years of experience. Mr. Peel has participated in more than 20 environmental impact statement projects.
Reed, Karol-Lynn	Document Publication Graphic Design Public Involvement	Ms. Reed has more than 20 years of experience in document publication management with extensive experience in formatting and layout solutions. Ms. Reed also has extensive graphic design and web development expertise. Ms. Reed has participated in two major environmental impact statements and several environmental assessment projects to date.
Roxlau, Katherine	Cultural Resources	Ms. Roxlau holds an M.A. in Anthropology. She has more than 13 years of experience in archaeology, Native American consultation, and NEPA documentation.

REFERENCES

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APPENDIX A

Alternatives Development

A.1 INTRODUCTION

Appendix A summarizes the process used to initially identify and screen project alternatives for the Draft EIS. Public Involvement was used to develop and refine alternatives. The public involvement process is further described in Appendix B. Terminology used and not defined in this appendix is listed in the Glossary.

Western began by considering short-term and long-term project alternatives. Short-term projects were defined as those completed within a 5-year period, and long-term projects were those requiring more than 5 years to complete. As specified in the NOI (published in the *Federal Register* [FR] August 2000), a near-term solution (short-term project) would be required to meet the project purpose.

A.2 ALTERNATIVES DEVELOPMENT

Although Western has sufficient capacity to serve its current customers, its transmission lines are part of a complex transmission system with other transmission line systems that extend beyond the Sacramento area. Demand for electricity through the transmission system can affect Western's ability to maintain the reliability and security of its transmission lines and maintain its necessary voltage profile. In response to these issues, several planning studies were conducted. The results of these studies are described below.

A.2.1 Power System Studies

Power system studies conducted by the Sacramento Area Transmission Planning Group (SATPG) and the River City Transmission Group (RCTG) concluded that transmission additions in the Sacramento area are necessary to alleviate voltage sag and ensure power system reliability. Results of the first phase of the SATPG study indicated that construction of a new 230,000-volt (230 kilovolt [kV]) circuit could provide short-term (3 to 5 years) system support to the region (SATPG 2000). The study concluded that long-term solutions (greater than 5 years) for area transmission security must also be developed. These solutions must include additional local generation or 500-kV transmission line options. Conclusions from the RCTG draft report also supported the need for additional transmission infrastructure to meet load growth and to provide for future generation (RCTG 2002-Draft). Western reviewed the recommendations and focused on the short-term solutions in the SVS alternatives development process.

A.2.2 Notice of Intent

Western published the NOI in the FR on August 8, 2000 (65 FR 48496). The NOI described Western's mission as an agency, the electrical power concerns in the Sacramento area, and issues to be considered in the development of the EIS. The NOI identified five broad alternative categories for consideration. These categories were compiled from Western's preliminary studies and the SATPG studies. The categories include:

- ***Upgrade existing transmission systems and facilities.*** Upgrading the existing transmission systems and facilities would involve modifications, such as reconductoring or replacing existing transmission lines with those that can carry more electricity. It could also include renovating and/or building new substations. These modifications could allow more power to be delivered to the load center or rerouting power more efficiently.
- ***New power generation.*** New powerplants, located close to the load centers or service areas, would reduce the amount of power flowing on the transmission system and boost the amount of power in the Sacramento service area.
- ***New transmission systems.*** New transmission lines would increase the transfer capability of the existing transmission system by reducing the load on the existing system, increasing the system's ability to distribute newly generated power. This would result in increasing the voltage level at the load center.
- ***Demand-side management.*** DSM would involve reducing the load in a critical area. This category would include energy conservation measures and prearranged means to reduce specific customer load during times of high demand. Air-conditioning cycling programs are an example of a prearranged DSM tool. This category would also include involuntary, automatic load shedding.
- ***Distributed generation.*** Distributed generation would consist of using solar, micro-turbines, fuel cells, or other generating devices at individual factories, farms, or homes. It is a relatively new concept of meeting individual customer's load by installing small sources of electrical power at designated sites. These sources (generators) would be sized to match a specific load such as a residence, industry, or community. Examples of these types of small generators are solar panels located at the load (panels on a residential roof), fuel cells using natural gas, small gas

turbines (micro- turbines), and traditional internal combustion engine/generator sets. These options are possible solutions because generation located at load sites would reduce the need to import power over the transmission system. Loads served by distributed generation would still be connected to the transmission system for regulation and backup power, should the small generator fail.

Following the NOI, public and agency scoping occurred from August 8, 2000 through October 2, 2000. Comments were also received at four public scoping meetings held in September 2000. Comments identified during the scoping period were organized into 12 issue categories and used to develop and refine alternatives for the Draft EIS. Scoping comments are summarized in Appendix B, Public Involvement.

A.2.3 Alternatives Development Phases

Following the scoping period, Western initiated a four-phased approach to identify a study region and project area, analyze alternative categories, select and screen alternatives for analysis, and identify a Proposed Action.

A.2.3.1 Phase One—Identification of Region of Influence

The phase began by identifying a study region of influence (ROI). The ROI focused on the electrical issues of the Sacramento area resulting from the preliminary planning and electrical systems studies and scoping. Proposed locations of new private generation facilities were considered in defining the ROI. The initial ROI was identified as 100-mile radius around the Sacramento area. The ROI was revised to a north-south elliptical circle overlaying the existing electrical transmission grid system. Appendix B, Public Involvement, presents a map of the ROI on Figure B-1.

A.2.3.2 Phase Two—Evaluation of Alternative Categories

The second phase examined the alternative categories presented in the NOI. Each category was required to meet the following four screening criteria. These criteria included:

- Provide adequate voltage support
- Provide reliable service
- Provide reliable transmission
- Technically feasible and can be implemented in the short-term time frame

From these criteria, Western eliminated three alternative categories from further consideration because they were not consistent with the Western's Purpose and Need. DSM, distributed generation, and new generation plants were eliminated due to their technical feasibility, time constraints, and/or limited effectiveness for providing reliable service or voltage support.

DSM has and continues to be implemented by Sacramento area utilities for its retail and nonretail customers. These programs have been successfully used in the Sacramento area and credited with helping the area avoid rotating blackouts during the summer of 2001. However, Western does not consider DSM to be a solution for resolving energy problems in the short-term. No new generation or transmission capacity would be created under this alternative to meet projected demands. Even with the current economic recession in the Sacramento area, California Independant System Operator Corporation (ISO)(www.caiso.com) forecast that the Sacramento area might experience its next shortfall in electricity by the summer of 2003, requiring more generation and transmission capability.

Distributed generation also helps to offset the customer's load by installing small sources of electrical power at or near the load. Distributed generation would require a substantial initial capital investment that may be beyond the individual homeowner's ability to purchase without government subsidy. This alternative category is also more expensive than current utility rates, creating consumer resistance for widespread implementation. Zoning, housing development restrictive covenants, and other restrictions may also limit the potential of implementing this category in urban areas. In addition, distributed generation would apply more to the retail level and not to Western's customers, the wholesale market.

Construction of new power generation facilities was the third alternative category, which did not meet all four screening criteria. Western's mission is to serve as a Federal power marketing administration charged with the responsibility to market electricity generated by powerplants operated by the Bureau, USACE, and the IBWC. Western's mission may be expanded at some point to include new generation. However, time required to design, permit, and construct such facilities could not be completed in the near term.

Results of the second phase of the alternatives development process concluded that the alternative categories for upgrading existing and construction of new transmission systems met each of the screening criteria. The categories of DSM, distributed generation, and new power generation were eliminated from further study.

A.2.3.3 Phase Three—Alternatives Screening

The third phase of the alternatives development process focused on potentially upgrading existing transmission line systems and facilities and constructing new transmission lines. Western reviewed the overall electrical grid in the Sacramento area together with known potential sites for locating new generation plants. Based on the potential sites identified, Western identified seven preliminary transmission system/line alternatives that could improve the voltage support, as well as the reliability and security of the power system. These alternatives included upgrading (reconductoring) existing transmission lines, constructing new 230-kV transmission lines, constructing new 500-kV transmission lines that would initially be energized at 230-kV (230/500-kV), and constructing new 500-kV transmission lines operated at 500 kV. Seven preliminary transmission system/line alternatives are displayed in Table A-1.

Western applied environmental and engineering screening criteria to the preliminary alternatives. Five engineering constraint criteria and 33 environmental exclusion and avoidance criteria were applied to each alternative. Below are a brief description of each alternative and a summary of environmental and engineering issues and constraints.

Alternative A—Reconductoring Existing Single- and Double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation

Reconductoring the existing 230-kV transmission line from O'Banion Substation to Tracy Substation would replace existing conductors with new conductors using most of the existing structures. Some existing structures would be replaced. No new ROW would be required. The reconductoring alternative route crosses irrigated agricultural areas along the existing ROW particularly from O'Banion Substation to Elverta Substation. The existing transmission line route also crosses recreation areas and passes near several areas of residences and structures.

Assessment of the reconductoring alternative indicates this route would potentially cross bald eagle winter ranges, surface waters (streams and rivers), wetlands, and other conservation areas, but the impact to these areas would be minimal. Work crews would be in the affected areas for a limited time, and new conductors could be spanned over most surface waters. A review of existing cultural resource surveys indicate that there have been isolated finds along the route.

Alternative B—New Double-circuit, 230/500-kV Transmission Line from O'Banion Substation to Elverta Substation

A new double-circuit, 230/500-kV transmission line from O'Banion Substation to Elverta Substation would be constructed adjacent to the existing O'Banion–Elverta double-circuit 230-kV transmission line and would traverse land similar to the northern portion of the reconductoring alternative to Elverta Substation. New ROW and access roads would be required. Much of this route would pass through agricultural areas and grasslands. Although potential impacts would be greater than reconductoring due to new transmission line construction, the alternative was not rejected by the environmental and engineering screening criteria.

Alternative C—New Double-circuit 230/500-kV Transmission Line from Elk Grove Substation to Tracy Substation

A new double-circuit, 230/500-kV transmission line from Elk Grove Substation to Tracy Substation would parallel the existing Elk Grove–Tracy double-circuit, 230-kV transmission line. This alternative would require new ROW for transmission line construction, and access roads. Potential impacts would be greater than reconductoring because of greater ground disturbance

Table A-1. Preliminary Transmission Line Alternatives

Alternative	Description of Alternative
A	Reconductoring existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation
B	New double-circuit, 230/500-kV transmission line from O'Banion Substation to Elverta Substation
C	New double-circuit, 230/500-kV transmission line from Elk Grove Substation to Tracy Substation
D	Upgrading to double-circuit, 500-kV the Cottonwood–Roseville double-circuit, 230-kV transmission line between Table Mountain Substation and Elverta Substation
E	New double-circuit, 230/500-kV transmission line from Elverta Substation to Tracy Substation
F	New double-circuit, 500-kV transmission line from Maxwell Substation to Elverta Substation
G	Two new single-circuit, 500-kV transmission lines from the Yolo area to Elverta Substation

Source: Original 2001

resulting from new construction. This alternative was not rejected from the environmental and engineering screening criteria.

Alternative D—Upgrading the Cottonwood to Roseville Line between Table Mountain and Elverta to Double-circuit 500-kV Transmission Line

A Cottonwood–Roseville double-circuit, 500-kV upgrade would result in a number of potential impacts. The existing transmission line passes through residential areas in Oroville and south of the Oroville area. Major wetland areas occur along the route. There are historical issues and associated sites including levees and extensive mine tailings (dredge materials) in the area. There are also areas of steep slopes (greater than 40 percent) near Oroville where access road construction would potentially result in soil erosion.

Alternative E—New Double-circuit 230/500-kV Transmission Line from Elverta Substation to Tracy Substation

Construction of a new Elverta–Tracy double-circuit, 230/500-kV transmission line would route the new transmission line through a densely populated portion of the metropolitan Sacramento area, south of the Elverta Substation. The alternative would require new ROW for most of the route, transmission line construction, and access roads. Numerous residential and recreation land use and visual impacts would result along the route in the metropolitan area.

Alternative F—New Double-circuit 500-kV Transmission Line from Maxwell Substation to Elverta Substation

Construction of a new Maxwell–Elverta double-circuit, 500-kV transmission line would parallel in certain locations existing transmission lines. However, a major portion of the route would not parallel existing utility ROWs. New ROW, transmission line construction, and access roads would be required. Impacts would potentially occur in several areas of previously undisturbed landscapes. Visual impacts could also result particularly where the route would not parallel other existing transmission line routes.

Alternative G—Two New Single-circuit 500-kV Transmission Lines from the Yolo Area to Elverta Substation

Construction of two single-circuit, 500-kV transmission lines from the Yolo area to Elverta Substation would require new ROW and access roads along certain portions of the route not paralleling existing transmission lines. Types of impacts would be similar to those described for Alternative F.

Phase Three Conclusions

Results of the screening criteria dropped several preliminary alternatives from further study. Construction of new 500-kV transmission lines would require lengthy planning and engineering studies to ensure that all suppliers of energy into the intertie system are protected. Construction of new 500-kV transmission lines, while crucial to providing a long-term solution to the Sacramento area, as well as California energy problems, could not be completed within the near term. Based on time constraints, 500-kV transmission line alternatives were not carried forward. Similarly, construction of new 230/500-kV transmission lines was dropped from further consideration and was only considered for 230-kV alternatives. The alternatives carried forward focused on improvements to and construction of double-circuit, 230-kV transmission lines which paralleled existing transmission line ROWs.

Based on the findings of the analysis during the third phase, Western dropped preliminary alternatives D, E, F, and G. Therefore, the alternatives carried forward were reconductoring the existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation; a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation; and a new double-circuit, 230-kV transmission line from Elk Grove Substation to Tracy Substation.

A.2.3.4 Phase Four—Development of Proposed Action and Alternatives

During the fourth phase of the alternatives development process, Western studied the alternatives carried forward and developed a Proposed Action. The Proposed Action would include the combination of reconductoring the existing Elverta–Tracy 230-kV transmission lines and constructing a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation. Four alternatives—three action and the No Action—were carried forward for detailed environmental analysis. The Draft EIS alternatives include:

- The Proposed Action
- Alternative 1—Reconductor the existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation
- Alternative 2—New double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation
- Alternative 3—New double-circuit, 230-kV transmission line from Elk Grove Substation to Tracy Substation
- No Action

APPENDIX C

Biological Resources

Appendix C contains two tables and correspondence with USFWS and NMFS. The USFWS correspondence contains an area species list. Table C-1 describes habitats from field surveys conducted from O'Banion Substation to Tracy Substation. Table C-2 is a list of Federally-listed endangered, threatened, proposed, and candidate species, which may be present in the study area.

Table C-1. Habitats Observed Along the Existing Right-of-Way from O'Banion Substation to Tracy Substation

Survey Reach	Starting Point (north)		Ending Point (south)		Habitat Type and Description
	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	
1	O'Banion Substation	A/0/1	Gilsizer Slough	A/1/5	Cropland—Ricefields with associated irrigation ditches and some scattered wetlands. This irrigation ditch contains some dense vegetation along its banks and may provide suitable giant garter snake habitat. In addition, there is a large slough just west of the ROW.
2	Gilsizer Slough north bank	A/1/5	Gilsizer Slough south bank	A/2/1	Freshwater emergent wetland
3	Gilsizer Slough south bank	A/2/1		A/6/4	Cropland—Ricefields
4		A/6/4	Where ROW turns east away from levee	A/8/4	Cropland—Ricefields, also the irrigation ditch that parallels the ROW becomes relatively barren
5	Where ROW turns east away from levee	A/8/4	North bank levee of Feather River Tower 146/1	A/11/0	Cropland
6	North Bank levee of Feather River	Structure 146/1 approx. A/10/4	South Bank levee of Feather River to the levee	A/11/4	Riparian, riverine, cropland—Riparian habitat on both sides of the river. Tower 146/4 is located within the floodplain in between levees. Cropland north and south of riparian corridor.
7	South Bank levee	A/11/4	Lee Rd-Tower 148/1	A/12/4	Cropland
8	Lee Rd	Structure 148/1 approx. A/12/4	Powerline Road	A/13/3	Cropland, riparian, riverine—Predominantly cropland. Small amount of riparian habitat where the ROW crosses Coon Creek.
9	Powerline Road	A/13/3	Pleasant Grove Slough/Creek	A/17/3	Cropland
10	Area immediately surrounding Pleasant Grove Slough/Creek	A/17/3	Approximately Howsley Road	153/2 approx. A/18/1	Wetland, Riparian, and riverine—Floodplain
11	Approximately Howsley Road Tower 153/2.	A/18/1	Proposed divergence point for Alternative 2 Tower 157/4 approx.	A/22/3	Urban, grassland, and cropland—cemetery, residential, ricefield, and a small irrigation ditch.

Table C-1. Habitats Observed Along the Existing Right-of-Way from O'Banion Substation to Tracy Substation

Survey Reach	Starting Point (north)		Ending Point (south)		Habitat Type and Description
	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	
12	Proposed divergence point for Alternative 2. Tower 157/4.	A/22/3	Baseline Road Tower 159/3	B/2/0	Grassland
13	Baseline Road Tower 159/3.	B/2/0	Rio Linda Road Tower 160/3.	B/2/4	Urban, grassland, and valley oak woodland—This area contains potential vernal pool habitat
14	Rio Linda Road Tower 160/3	B/2/4	Elverta switchyard	C/0/0	Grassland—Partially grazed
15	Elverta switchyard	C/0/0	Del Paso Road	C/4/2	Grassland
16	Del Paso Road	C/4/2	San Juan Road to American River Parkway	C/7/4	Urban
17	San Juan Road to American River Parkway	C/7/4	Tower 12/1	D/0/3	Riparian, floodplain with elderberry shrubs (evidence of valley elderberry longhorn beetle on some trees).
18	Near Santos Avenue Tower 12/1	D/0/3	North Levee at American River crossing	D/2/2	Urban
19	North Levee at American River crossing	D/2/2	South Levee at American River crossing	D/2/5	Urban, riparian, riverine—Contains an urban parkway and a very small riparian corridor
20	South Levee at American River crossing	D/2/5	Jackson Road Tower 15/2	D/3/2	Urban, grassland—The urban habitat is primarily industrial buildings devoid of vegetation
21	Jackson Road Tower 15/2	D/3/2	Florin Road Tower 19/1	D/7/4	Urban, grassland—Dump located immediately south of Jackson Road turning into annual grassland further south
22	Florin Road Tower 19/1	D/7/4	Gravel road Tower 20/5	D/9/4	Grassland, urban—Scattered housing located very close to ROW
23	Gravel road Tower 20/5	D/9/4	Road between Calvine and Gerber roads	D/10/0	Urban, potentially freshwater emergent wetland—Small wet depression located under ROW
24	Road between Calvine and Gerber roads	D/10/0	Tower 21/2	D/10/1	Urban—Residential park
25	Tower 21/2	D/10/1	Sheldon Road	D/10/7	Cropland—Currently tilled

Table C-1. Habitats Observed Along the Existing Right-of-Way from O'Banion Substation to Tracy Substation

Survey Reach	Starting Point (north)		Ending Point (south)		Habitat Type and Description
	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	
26	Sheldon Road	D/10/7	Bond Road	D/12/7	Grassland, riparian, riverine—At Bond Road, the ROW crosses Laguna Creek and its associated riparian corridor. This area looked to contain suitable red-legged frog habitat.
27	Bond Road	D/12/7	Route 99	E/1/4	Grassland, urban, potential lacustrine—Large graded housing development area with seasonal pond (currently empty). This area may also contain vernal pools, in particular between Calvine Road and Elk Grove Road.
28	Route 99	E/1/4	Eshlinger Road	E/1/5	Grassland, lacustrine—Stock pond located near tower 28/2
29	Eshlinger Road	E/1/5	Cosumnes River Riparian corridor	E/3/1	Pasture, riparian habitat 120 yards wide, containing predominantly willow and cottonwood trees with several large oaks.
30	Cosumnes River Riparian corridor	E/3/1	South of Laguna Creek	E/4/5	Riparian, riverine, grassland—Predominantly Cosumnes River Preserve land (CDFG parcels). Riparian habitat is approximately 120 yards wide, predominantly willow and cottonwood trees with several large oak trees. Also, small riparian corridor along Badger Creek.
31	South of Laguna Creek	E/4/5	Twin Cities Road	E/6/4	Riverine, cropland— Numerous sloughs (irrigation ditches).
32	Twin Cities Road	E/6/4	Robson Road Tower 34/2	E/7/4	Pasture, riparian, riverine—Riparian corridor for Deadman's Gulch
33	Robson Road Tower 34/2	E/7/4	Orr Road Tower 35/2	E/8/6	Orchard/vineyard—There is a sign to the north stating that this area is part of the Cosumnes River Preserve.
34	Orr Road Tower 35/2	E/8/6	New Hope Road	E/10/3	Orchard/vineyard, cropland, pasture—Scattered irrigation ditches
35	New Hope Road	E/10/3	Kost Road Tower 36/4	E/10/6	Grassland, pasture
36	Kost Road Tower 36/4	E/10/6	Peltier Road Tower 40/1	E/13/4	Riparian, riverine, orchard/vineyard, pasture—Riparian corridors associated with Mokelumne River and Dry Creek

Table C-1. Habitats Observed Along the Existing Right-of-Way from O'Banion Substation to Tracy Substation

Survey Reach	Starting Point (north)		Ending Point (south)		Habitat Type and Description
	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	Road Crossing or Other Descriptive Point	Segment/ MP mile/MP 0.1 mile[1]	
37	Peltier Road Tower 40/1	E/13/4	Immediately north of Thornton Road	E/17/5	Cropland, orchard/vineyard, pasture
38	Immediately north of Thornton Road	E/17/5	Eightmile Road Tower 49/4	E/23/3	Cropland, freshwater emergent wetlands—Wetlands are scattered.
39	Eightmile Road Tower 49/4	E/23/3	Brookside Road, north bank of San Joaquin River	E/29/0	Urban, riverine, freshwater emergent wetland, valley foothill riparian, cropland, annual grassland—Large graded area appears to be a future subdivision. Large riverine and riparian areas associated with Pixley Slough and Bear Creek. Croplands, mixed wetland, and grasslands north of slough.
40	Brookside Road at Buckley Cove	E/29/0	South bank of San Joaquin River	E/29/1	Riverine—Mostly rip rap adjacent to river; no substantial riparian corridor
41	South bank of the San Joaquin River	E/29/1	Tracy Substation	E/46/2	Cropland, riverine—The ROW does cross Middle River, Old River, and the Contra Costa Canal, but access was limited. As a result, we are uncertain whether these riverine crossings contain riparian corridors.

Source: Original
[1] E/29/1 refers to Segment E MP 29.1
approx: approximately
CDFG: California Department of Fish and Game
ROW: right-of-way

Table C-2. Federally Listed Endangered, Threatened, Proposed, and Candidate Species that may Occur in the Study Area

Species Name	Preferred Habitat	Likelihood of Occurrence	Status Federal/State/CNPS
Mammals			
Sylvilagus bachmani riparius Riparian brush rabbit	Dense, brushy areas of riparian forests above flood level	P	E/E
Neotoma fuscipes riparia Riparian (San Joaquin Valley) woodrat	Riparian habitats where trees and brush are available for cover and nesting	P	E/CSC
Vulpes macrotis mutica San Joaquin kit fox	Valley needle grassland, valley wildrye grassland, non-native grassland, and wildflower field	P	E/T/--
Birds			
Buteo swainsoni (Nesting) Swainsons hawk	Nests in oak or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	C	--/T
Charadrius montanus Mountain plover	Winter resident in valley and foothill grassland and cropland including valley needle grassland, valley wildrye grassland, non-native grassland, and wildflower field. Prefers short vegetation, bare ground, and flat topography	P	PT/--/--
Coccyzus americanus occidentalis (nesting) Western yellow-billed cuckoo	Great valley cottonwood riparian forest; great valley mixed forest; and great valley, valley oak riparian forest	P	C/E/--
Haliaeetus leucocephalus Bald eagle	Riverine and riparian that may include great valley cottonwood riparian forest; great valley mixed forest; and great valley, valley oak riparian forest. Prefers large bodies of water or free-flowing rivers with abundant fish and adjacent snags or other perches	P	T/--/--
Riparian riparia (nesting) Bank Swallow	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam to allow digging	P	--/T
Reptiles			
Thamnophis gigas Giant garter snake	Fresh water emergent wetland habitats, cropland (rice fields)	P	T/T/--
Amphibians			
Ambystoma californiense California tiger salamander	Grassland habitats that may include valley needlegrass grassland, valley wildrye grassland, non-native grassland and wildflower fields with vernal pools or other temporary ponds Other habitats include valley-oak woodland	P	C/CSC/--

Table C-2. Federally Listed Endangered, Threatened, Proposed, and Candidate Species that may Occur in the Study Area

Species Name	Preferred Habitat	Likelihood of Occurrence	Status Federal/State/CNPS
Rana aurora draytonii California red-legged frog	Lacustrine and riverine. Prefers standing or slow-moving water with overhanging vegetation	P	T/CSC/--
Fish			
Hypomesus transpacificus Delta smelt	Riverine. Mixing zone of the Sacramento-San Joaquin River Delta, where the delta smelt spends most of its adult life	P	T/--/--
H. transpacificus Critical habitat, delta smelt	Sacramento to San Joaquin River Delta	P	T/--/--
O. mykiss Central Valley steelhead	Riverine habitats; spawns in main stems and tributaries of the Sacramento and San Joaquin rivers	P, M	T/--/--
O. tshawytscha Critical habitat, winter-run chinook salmon	Critical habitat present within the Proposed Action and alternatives	P, M	E/--/--
O. tshawytscha Winter-run chinook salmon	Riverine habitats; spawns in main stems and tributaries of the Sacramento River	P, M	E/--/--
O. tshawytscha Central Valley spring-run chinook salmon	Riverine habitats; spawns in main stems and tributaries of the Sacramento and San Joaquin rivers	P, M	T/--/--
O. tshawytscha Critical habitat, Central Valley spring-run chinook salmon	Critical habitat present within the project area	P, M	T/--/--
O. tshawytscha Central Valley fall/late fall-run chinook salmon	Riverine habitats; spawns in main stems and tributaries of the Sacramento and San Joaquin rivers	P, M	C/--/--
Pogonichthys macrolepidotus Sacramento splittail	Riverine habitats, Sacramento/San Joaquin rivers, fresh water marsh, estuary, slow-moving river sections, and dead-end sloughs; require flooded vegetation for spawning and foraging for young	P	T/CSC/--
Invertebrates			
Branchinecta conservation Conservancy fairy shrimp	Vernal pools	P	E/--/--
B. lynchi Vernal pool fairy shrimp	Vernal pools	P	T/--/--
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	Riparian habitats that may include great valley cottonwood riparian forest; great valley mixed forest; and great valley, valley oak riparian forest, provided elderberry shrubs are present	C	T/--/--

Table C-2. Federally Listed Endangered, Threatened, Proposed, and Candidate Species that may Occur in the Study Area

Species Name	Preferred Habitat	Likelihood of Occurrence	Status Federal/State/CNPS
Lepidurus packardi Vernal pool tadpole shrimp	Vernal pools	P	E/--/--
Plants			
Castilleja campestris succulenta Fleshy owl's clover	Vernal pools	P	T/--/--
Cordylanthus. palmatus Palmate-bracted bird's-beak	Alkaline soils	U - preferred soils do not occur in Proposed Action or alternatives	E/--/--
Gratiola heterosepala Boggs Lake hedge-hyssop	Clay soils in areas of shallow water,lake margins and vernal pool margins	P	--/E
Neostapfia colusana Colusa grass	Vernal pools	P	T/--/--
O. tenuis Slender Orcutt grass	Vernal pools	P	T/E/1B
O. viscida Sacramento Orcutt grass	Vernal pools	P	E/--/--
T. mucronata Solano grass	Clay bottoms of drying vernal pools and lakes in valley and foothill grassland	P	E/--/--

Sources: CNDDB 2001, USFWS 2001, and NMFS 2001
CDFG: California Department of Fish and Game
CNDDB: California Natural Diversity Database
CNPS: California Native Plant Society
USFWS: U.S. Fish and Wildlife Service

Federal Status
E: Endangered
T: Threatened
PE: Proposed endangered
common elsewhere
PT: Proposed threatened
C: Candidate for listing

State/CDFG Status
E: Endangered
T: Threatened
R: Rare

CSC: California special concern species

CNPS Status
1A: Presumed extinct in California
1B: Rare and endangered in California and els ewhere
2: Rare, threatened or endangered in California but more

3: Plants about which more information is needed
4: Limited distribution

Likelihood of Occurrence
C: confirmed within project area
P: potentially occurring
U: unlikely to occur
M: migrant

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, California 95814-4706

April 27, 2001

In Reply Refer To:
SWR-01-SA-5660:MEA

Loreen McMahon
Environmental Project Manager
Department of Energy
Western Area Power Administration
Sierra Nevada Region
114 Parkshore Dr.
Folsom, California 95630-4710

Dear Ms. McMahon:

This is in response to your letter of February 21, 2001 indicating interest by the Western Area Power Administration (Western) in beginning informal consultation with the National Marine Fisheries Service (NMFS) to address concerns regarding the Sacramento Area Voltage Support Project and Endangered Species Act (ESA) issues. We appreciate the opportunity to enter into early consultation with your agency on issues which may effect species of concern to us.

Available information indicates that the following federally-listed fish species of concern to the NMFS may occur within the proposed project area:

Sacramento River winter-run chinook salmon (*Oncorhynchus tshawytscha*) - endangered
Central Valley ESU spring-run chinook salmon (*Oncorhynchus tshawytscha*) - threatened
Central California Coast ESU steelhead (*Oncorhynchus mykiss*) - threatened
Central Valley ESU steelhead (*Oncorhynchus mykiss*) - threatened

Designated critical habitat for the above listed species also occurs within the proposed project area.

As with the ESA, Federal action agencies are mandated by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (section 305[b][2]) to consult with NMFS on all actions that may adversely affect designated Essential Fish Habitat (EFH). The NMFS must provide EFH Conservation Recommendations (section 305[b][4][A]) on the proposed Federal action. To the extent possible, we strive to combine the ESA and EFH consultation processes.

Our records indicate that the project area includes EFH designated for fish species managed under the MSA with the following Fishery Management Plans (FMP's):

Pacific Salmon Fishery Management Plan (Chinook Salmon (*Oncorhynchus tshawytscha*))
Pacific Groundfish Fishery Management Plan (Starry Flounder (*Platichthys stellatus*))
Coastal Pelagics Fishery Management Plan (Northern Anchovy, (*Engraulis mordax*))

Any biological assessment prepared for ESA compliance should also include an EFH assessment for the species managed by the above FMPs. Complete species lists and information on EFH and the Fishery Management Plans can be found on our website (**http://swr.ucsd.edu**).

If you have any questions regarding this response, please contact me at the letterhead address, or by telephone at (916) 930-3600 or FAX at (916) 930-3629.

Sincerely,

Michael E. Aceituno,
Supervisor, Sacramento Area Office

cc: NMFS-PRD, Long Beach, CA

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-02-SP-0128

RECEIVED OCT 2001

October 29, 2001

Ms. Nancy Werdel
Environmental Manager
Department of Energy
Western Area Power Administration
Sierra Nevada Customer Service Region
114 Parkshore Drive
Folsom, California 95630-4710

Subject: Species List for Informal Section 7 Consultation For The Proposed Sacramento Area Voltage Support EIS Study Area, Reference FWS Letter 1-1-01-SP-0996 (this requests an updated list), Butte, Colusa, El Dorado, Nevada, Placer, Sacramento, Sutter, Yolo, and Yuba Counties, California.

Dear Ms. Werdel:

We are sending the enclosed list in response to your October 23, 2001, request for information about endangered and threatened species (Enclosure A). The list covers the following U.S. Geological Survey 7½ minute quads of Holt, Union Island, Clifton Court Forebay, Lodi North, Thornton, Terminous, Elk Grove, Rio Linda, Sacramento East, Carmichael, Pleasant Grove, Nicolaus, Sutter Causeway, Verona, and Gilsizer Slough.

Please read *Important Information About Your Species List* (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Please contact Harry Mossman, Biological Technician, at (916) 414-6674, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Mr. Mossman at this address. You may fax requests to him at 414-6712 or 6713.

Sincerely,

for Jan C. Knight
Chief, Endangered Species Division

Enclosures

APPENDIX D

Tribal Consultation

D.1 INTRODUCTION

Western recognizes the unique legal relationship between the United States and American Indian Tribes. The framework of this special relationship is based on the U.S. Constitution, treaties, Supreme Court decisions, EOs, statutes, existing Federal policies, tribal laws, and the dynamic political relationship between Indian Tribes and the Federal government. The most important doctrine derived from this relationship is the trust responsibility of the U.S. to protect tribal sovereignty and self-determination, tribal lands, assets, resources, and treaty and other federally recognized and reserved rights. In preparing the Draft EIS, Western has worked to fulfill its trust obligations and other responsibilities arising from this activity through meaningful consultation and coordination conducted through a government-to-government process.

D.2 GOVERNMENT-TO-GOVERNMENT RELATIONSHIP

The U.S. recognizes the ongoing right of Indian tribes to self-government and supports tribal sovereignty and self-determination. In conjunction with this special status, Federal agencies have a duty to consult with tribal governments on agency activities or decisions that may impact the interests or resources of a Tribe. As previously noted, the historic development of Federal relations with tribes is based on many important legal concepts and congressional actions that now form the basis of modern government-to-government relations. All interactions with Federally recognized Tribes must be conducted on a government-to-government basis.

These interactions go well beyond standard public involvement and community outreach efforts. Government-to-government consultation occurs between designated Federal agency representatives and elected Tribal officials or designated Tribal representatives. Consultation and coordination with individual tribal members, traditional/spiritual leaders, tribally-affiliated organizations and interests do not completely satisfy Western's consultation obligation, but are often necessary components to fully appreciate and better understand the perspectives and issues identified through the consultation process. The relationships developed within the entire consultation and coordination process are often invaluable to successfully completing meaningful and effective government-to-government consultation. Other associated groups or individual members of Tribes or tribally affiliated groups should also be identified and included in the discussion, coordination, and consultation process.

D.3 FEDERAL LAWS AND STATUTES RELATING TO TRIBAL INTERESTS

There is an extensive history of Federal laws, EOs, memoranda, regulations, and policies that define legal responsibilities on Federal executive branch agencies, including Western. Collectively, these legally binding authorities, which continue to form the basis of consultation requirements, have had a profound impact on Federal-Tribal relations. The primary authorities for conducting consultation with Tribes are as follows.

- NEPA establishes a framework of public and Tribal involvement in land management planning and actions. NEPA provides for consideration of historic, cultural, and natural aspects of our environment that may be important to American Indian Tribes.
- NHPA, as amended, along with new implementing regulations, explicitly directs Federal agencies to involve Tribes in the process of identifying historic properties. Specifically, places of traditional cultural significance to Tribes are to be considered by Federal agencies in policy and project planning.
- AIRFA establishes the policy of the United States to preserve and protect American Indians' rights to exercise their traditional religions. AIRFA requires consultation with American Indian tribes to determine the potential for Federal actions or policies to impact these rights.
- NAGPRA requires consultation with Tribes to determine affiliation with human remains, funerary objects, and objects of cultural patrimony discovered on or recovered from Federal lands.
- EO 13007, *Indian Sacred Sites of 1996*, requires Federal agencies to accommodate access to and ceremonial use of sacred sites on Federal lands. Identification of these sites and the accommodation of access require consultation with Tribes.
- The Executive Memorandum on *Government-to-Government Relations with Native American Tribal Governments of 1994* sets forth principles to be followed by Federal agencies in their consultations with Tribes. These principles are intended to reinforce the government-to-government relationships with Tribes, to ensure that Federal activities are implemented in a manner that is respectful of Tribal

sovereignty, and to build a more effective working relationship with Tribes.

- EO 13175, *Consultation and Coordination with Indian Tribal Governments of 2000*, establishes regular and meaningful consultation and collaboration with Tribal officials in the development of Federal policies. It also requires each Federal agency to have an accountability process to ensure meaningful and timely input by Tribal officials in the development of Federal policies and other activities that have Tribal implications.

D.3.1 WESTERN POLICY GUIDANCE ON TRIBAL CONSULTATION

Western is guided in its consultation and coordination with Indian tribal governments not only by the Federal statutes, regulations, and policies previously noted, but also by principles set forth in the DOE *American Indian & Alaska Native Government Policy*, as revised and published in October 2000. The Policy provides direction to all DOE officials, staff, and contractors regarding fulfillment of trust obligations and responsibilities arising from DOE actions which may impact American Indians and Alaska Native traditional, cultural and religious values and practices, natural resources, treaty, and other Federally recognized and reserved rights. In October 2001, DOE Secretary Spencer Abraham reaffirmed the DOE's policy noting "We must include tribal participation in the decision-making process where our action may impact their environment and cultural interests."

D.4 SACRAMENTO AREA VOLTAGE SUPPORT ENVIRONMENTAL IMPACT STATEMENT CONSULTATION AND COORDINATION PROCESS

The consultation and coordination process was initiated by Western in August 2000 with a letter to the California NAHC requesting assistance in identifying tribal governments and individuals who should be consulted regarding the Proposed action and Alternatives. In response, Western received a listing of 92 contacts for a general study area within a 100-mile radius surrounding Sacramento, California. Letters were sent to all 92 contacts in November 2000, describing the upcoming SVS EIS process, and providing information and various means for contacting Western staff and submitting scoping comments.

Following the scoping period, alternatives for the proposed SVS project were identified and the study area was further refined to include only six counties. Based on these changes, the American Indian contact list was revised in June 2001 in consultation with the NAHC and other sources. The list included three Federally recognized tribes (Shingle Springs Band of Miwok Indians, the Ione Band of Miwok Indians, and the United Auburn Indian Community of the Auburn Rancheria). Contacts also included groups that have petitioned for acknowledgment and Federal recognition status. These include the Muwekma Indian Tribe, the Miwok Indian Community of the Wilton Rancheria, and the Indian Canyon Mutsun Band of Costanoan. In addition, the contact list included four tribal-interest groups/organizations and 23 individual contacts.

A letter describing the alternatives and the refined study area was sent by Western to the 33 contacts in December 2001. The letter also contained background information on the proposed SVS project, the current project status, and schedule information. Indian tribal governments, organizations, and individuals were all invited to fully participate in the process of evaluating and commenting on the Proposed Action and Alternatives. Letter recipients were notified that Western would initiate government-to-government consultation with any Federally recognized Tribal government expressing an interest. Again, multiple means were provided for informing Western of the Tribal governments, organizations, or individuals had an interest in the SVS EIS process.

On April 3, 2002, Western sent a follow-up letter to the Federally recognized Tribal governments and others on the Native American contact list as a continuation of the consultation and coordination efforts. In addition to an update on the status of the project, Western provided a copy of the draft PA for review. Federally recognized Tribal governments and other parties were invited to become signatories to the agreement, if interested. All contacts were encouraged to provide comments.

The Ione Band of Miwok Indians contacted Western and indicated an interest in learning more about the SVS EIS. Western representatives met with tribal representatives on May 6, 2002. Western representatives provided information packets and details on proposed project alternatives. In return, tribal representatives assisted in the EIS process and development by indicating their areas of interest.

D.5 AFFECTED TRIBES AND BANDS

There are several Native American tribes and bands whose interests, rights, or resources may be impacted by the Proposed action and Alternatives identified in the Draft EIS. The Federally recognized Tribes include:

- Ione Band of Miwok Indians
- United Auburn Indian Community of the Auburn Rancheria
- Shingle Springs Band of Miwok Indians

Groups petitioning the BIA for acknowledgment but not receiving Federal recognition status include:

- Muwekma Indian Tribe
- Miwok Indian Community of the Wilton Rancheria
- Indian Canyon Mutsun Band of Costanoan

D.6 NATIVE AMERICAN ISSUES AND CONCERNS

No specific Native American issues have been identified through the consultation process thus far. Specific issues identified during the review and comment period of the Draft EIS and during the development of the PA will be addressed in the Final EIS.

APPENDIX E

Aerial Photographs of Proposed Action and Alternatives

Western recognized the need to accurately identify land uses that transect the transmission line routes. Aerial photographs for the transmission lines were completed in 2001. However, there are a few shaded areas where aerials were not prepared (parts of Segments D and E). The Segments and Mileposts are identified on Figures E-1 to E-20, and correspond to the color coding represented on Figure 3-1. Additionally, relative landmarks and land uses that have been described in the narrative are also presented on these figures.

Western surveyed the areas from O'Banion Substation south to the Sacramento County line (Figures E-1 to E-14) in the first and second quarters of 2002. The land use information is overlain onto the aerial photograph and is depicted by colored lines. From the beginning of San Joaquin County to the Tracy Substation (Figures E15 to E20), Western modified the aerial with land use information from the California Department of Water Resources database. This data is presented as colored dots as identified in the legend.

GLOSSARY

air basin

A defined area in which air-borne pollutants tend to circulate and mix.

alternating current (AC)

An electric current or voltage that reverses direction of flow periodically, as contrasted to direct current, and has alternately positive and negative values. Most electricity used in the U.S. today is alternating current.

ambient air quality

The normal or average prevailing quality of the surrounding air in a given area in terms of the type and amounts of various air pollutants present.

ambient noise level

The normal or average background noise level (usually recorded in decibels) within a given area for a certain period of time during the day.

area of potential effect

For cultural resources, the extent of land that could be altered by the proposed action or an alternative.

attainment area

A geographic region where the concentration of a criteria air pollutant does not exceed national ambient air quality standards.

authorization

The legislation enacted by Congress, which sets up or continues the legal operation of a Federal program or agency indefinitely or for a specific period, or permits a particular type of obligation or expenditure within a program.

cable

A conductor with insulation (single conductor cable) or a combination of conductors insulated from one another (multi-conductor cable). Cables up to 115 kV usually have solid-type insulation; cables rated 230 kV and above are oil-filled.

capacitor

Capacitor is an element used in electric power systems that is described through its principal function, which is to store electric energy. This property is called capacitance. In its simplest form, a capacitor is built with two conducting plates separated by a dielectric.

capacity

The maximum load that a generator, piece of equipment, substation, transmission line, or system can carry under existing service conditions. Sometimes used interchangeably with capability, although not a synonym.

carbon monoxide (CO)

A colorless, odorless gas which is the product of incomplete combustion when natural gas, oil, wood, coal, or other materials rich in carbon are burned. Carbon monoxide interferes with the delivery of oxygen throughout the body.

cascading

1) In a power system, the tendency of a local line fault to trigger problems elsewhere on the system and lead to a widespread power outage. 2) In a transmission line, a succession of mechanical failures along the line caused by one event such as a broken insulator.

Central Valley Project (CVP)

The multipurpose Federal reclamation project authorized by Congress under the *Central Valley Project Act*, as amended (50 Stat. 844, 850). The CVP gernerally runs from the Cascade Mountain Range in northern California to the plains along the Kern River, south of the City of Bakersfield.

circuit

A system of conductors through which an electric current is intended to flow; sometimes normally open paths that do not ordinarily conduct in a network can also be considered part of a circuit.

double-circuit

To place two separate electrical circuits (for alternating current, each circuit consists of three separate conductors or bundles of conductors) on the same transmission structures.

single-circuit

To place one electrical circuit that consists of three separate conductors or bundles of conductors on one tower.

***Clean Air Act* (CAA)**

1) A 1963 Federal law, amended several times since, giving the Federal government powers to limit air pollution. 2) A term loosely applied to the *Air Quality Act* of 1967, which gave the Federal government a stronger regulatory role. An especially important effect was the development of standards based on concentrations of pollutants in air.

***Clean Water Act* (CWA)**

A Federal law intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters and secure water quality that provides for the protection and propagation of fish, shellfish, and wildlife, as well as for recreation in and on the water.

conductor

1) Any metallic material, usually in the form of wire, cable, or bar, suitable for carrying an electric current. 2) The wire cable strung between transmission towers.

conservation

Synonymous with energy conservation, the reduction of electric energy consumption because of increases in the efficiency of production, distribution, and end use.

consultation

Includes, but is not limited to: prior to taking any action with potential impact upon American Indian nations, providing for mutually agreed protocols for timely communication, coordination, cooperation, and collaboration to determine the impact on traditional and cultural lifeways, natural resources, treaty and other Federally reserved rights involving appropriate tribal officials and representatives throughout the decision-making process, including final decision-making and action implementation as allowed by law, consistent with a government-to-government relationship.

contaminant

Any substance or matter that has an adverse effect on air, water, or soil. Also see pollutant.

corona

A luminous electrical discharge due to the ionization of the air surrounding a conductor caused by a voltage gradient exceeding a certain critical value. Can be seen as bluish tufts or streamers surrounding the conductor or conductor hardware, and generally a hissing sound can be heard. Transmission-line corona varies with atmospheric conditions and is more intense during wet weather.

corridor

A strip of land, one-half mile wide or more, forming a passageway for transportation or utility facilities. Also see right-of-way.

cultural resources

Include but are not limited to: archaeological materials (artifacts) and sites dating to prehistoric, historic, and ethno historic periods that are located on the ground surface or are buried beneath it; natural resources, sacred objects, and sacred sites that have importance for American Indian peoples; resources that the American Indian nations regard as supportive to their cultural and traditional lifeways.

current

1) In common usage, the flow of electric energy when an appliance or machine is turned on. 2) In technical sense, a term usually modified by an adjective, such as direct current, referring to the rate of electrical charge flowing through a conductor or circuit as compared to voltage (volts), which is the force or pressure that causes the current to flow; current and ampere are often used interchangeably.

decibel (dB)

1) A unit used to describe the strength or intensity of wave-propagated phenomena such as sound or transmitted signals. Technically, a logarithmic scale is used. 2) One dB equals the least sound level detectable by the human ear, while 70 dB is equivalent to busy traffic and 150 dB is equal to a nearby jet taking off.

deformed

Any change in the original form or volume of rock masses produced by tectonic forces; folding, faulting, and solid flow are common modes of deformation. As an example, folding implies that a structure that originally was planar, like a sedimentary bed, has been bent. Horizontal or vertical forces in the earth's crust may produce the deformation. Another type of deformation can result when large rock masses glide down an inclined bedding plane, fault plane, or unconformity under the force of gravity.

demand

1) In a consumer context, the amount of electricity used. 2) In a public utility context, the rate at which electric energy is delivered to or by a system over any designated period. Expressed in kW or MW, or in kVA or MVA. 3) The amount of electric energy, in kilowatts or megawatts, needed at any given time to meet a customer's or total system load.

demand-side management

Reducing the load in a critical area of the electrical distribution system. Traditionally, this effort has included energy conservation measures and pre-arranged means to reduce specific customer load during times of high demand. Air-conditioning cycling programs are an example of a pre-arranged demand-side management tool. See load shedding.

dispatcher

1) Individual at a control center who monitors and controls a power system. 2) At Western, dispatcher responsibilities include: operating the automatic generation control equipment to regulate the loading of the generators in the Federal power plants to help maintain scheduled system frequency and the scheduled power interchange with other utilities; issuing electrical clearances on the Western system for safe maintenance and repair of equipment; isolating system trouble and dispatching of maintenance forces to repair facilities and restore service; maintaining transmission voltage schedules.

disposal

Final placement or destruction of hazardous materials—toxic, radioactive, or other wastes; pesticides or other chemicals; and polluted soils at Federally approved sites.

distribution

The transport of electricity to ultimate use points, such as homes and businesses, from a source of generation or from one or more substations.

disturbance

Any occurrence that adversely affects normal power flow in a system, including a fault or loss of an interconnection carrying a large block of power.

double circuit

See circuit.

easement

The right, privilege, or interest obtained by Western through negotiated contract or condemnation to construct, maintain, and operate transmission facilities within a right-of-way.

electric and magnetic fields (EMF)

Fields of force caused by electric voltage and current around the electric wire or conductor when an electric transmission line or any electrical wiring is in operation. Magnetic fields exist only when current is flowing. Electric fields are present in electrical appliances and cords whenever they are plugged in.

electricity

1) The common term used for electric power and for electric energy (power designates the total electricity delivered and energy designates what is delivered over time). 2) A flow of electrons along a conductor from an area of high electric potential to an area of low potential and/or a waveform component of the electromagnetic spectrum.

electromagnetic

Of or pertaining to the magnetic forces produced in a surrounding medium by the flow of current in a conductor, as used in this document, meaning electric and magnetic fields.

endangered species

Under the Endangered Species Act animals, birds, fish, plants, or other living organisms whose existence is determined to be in danger throughout all or a significant portion of its range because its habitat is threatened with destruction, drastic modification, or severe curtailment, or because of overexploitation, disease, predation, or other factors.

environmental assessment (EA)

A document that evaluates the possible environmental effects of a Federal agency's proposed action and provides sufficient evidence to determine whether an EIS or a FONSI is warranted. An EA is one means of compliance with NEPA.

environmental impact statement (EIS)

A document that examines the possible environmental effects of a Federal agency's proposed actions. A tool for decision-making, it describes the positive and negative effects of proposed actions and lists alternative actions.

erosion

1) The wearing away of land surface by wind or water that occurs naturally from weather or runoff but can be intensified by land-clearing practices related to such activities as farming, residential or industrial development, road building, or timber-cutting. 2) A material wear mechanism resulting from suspended particles in a flow stream of water or other fluid.

floodplain

The lowlands adjoining inland and coastal waters. A relatively flat and flood-prone area.

forbs

A broad-leaved herb other than a grass, especially one growing in a field, prairie, or meadow.

gauss (G)

A unit used to measure magnetic field strength. The intensity of the earth's magnetic field, near the surface of the earth, is on the order of one-half gauss.

generation

1) The act or process of producing electricity from other forms of energy, such as hydro, coal-fired steam turbines, or photovoltaic conversion systems. 2) The amount of electrical energy produced.

generator

1) In a power plant, the machine that converts mechanical energy to electrical energy. 2) A utility that owns or acquires the output of a generating resource.

grid

See transmission grid.

ground

A connection from electrical equipment to a ground mat or to the earth, used to ensure that the equipment (housing or structure) would be at the same potential (voltage) as the earth.

ground wire

A protective wire strung above the conductors on a transmission line to shield the conductors from lightning; also called shield wire or overhead ground wire. Also see shield wire.

habitat

The place where a population (human, animal, plant, or microorganism) lives and its surroundings, both living and nonliving.

hazardous waste

The byproducts of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. See also RCRA.

high voltage

Descriptive of transmission lines and electrical equipment with voltage levels from 100 kV through 287 kV.

impact

Direct or indirect changes in the existing environment, whether beneficial or adverse, resulting from a specific act or series of acts.

insulator

A device, made of nonconducting material, used to give support to electrical conductors and shield them from ground or other conductors. An insulator inhibits the flow of current from the conductor to the earth or another conductor.

kilovolt (kV)

One kilovolt equals 1,000 volts.

lacustrine

Living or growing in or along the edges of lakes

lattice

Descriptive of structures and substation structures designed with skew as well as horizontal and vertical members.

load

The amount of electric energy delivered or required at any specified point or points on a system. Load originates primarily at the energy-using equipment of consumers, such as heaters, air conditioners, lights, and motors.

load shedding

Cutting off the electric current on certain lines when the demand becomes greater than the supply.

magnetic field

The invisible lines of magnetic force produced by electric current flowing in a conductor, such as a transmission line, service wires in a house, or household appliances. Measured in terms of lines of force per unit area with the measurement unit being tesla (T) or gauss (G) (one tesla equals 10,000 gauss). Also see electric and magnetic fields.

mitigate

In environmental usage, to either reduce or avoid an adverse environmental effect through various measures that seeks to make the effect less severe, less obvious, or more acceptable.

National Electric Safety Code (NESC)

Written standards, providing basic requirements for the design, construction, maintenance, and operation of electric supply and communication lines, equipment, and supply stations in order to safeguard persons from hazards associated with those activities.

National Environmental Policy Act (NEPA)

A 1969 Federal law that requires evaluation of the environmental impact of Federally funded projects and programs. Generally requires an environmental assessment and/or an environmental impact statement be submitted to the Federal government before a project can begin.

National Marine Fisheries Service (NMFS)

An agency of the U.S. Department of Commerce that oversees ocean and river fish harvest limits and determines which stocks are to be listed as endangered or threatened under the *Endangered Species Act*.

National Pollutant Discharge Elimination System (NPDES)

A provision of the Clean Water Act that prohibits discharge of pollutants into Waters of the United States unless a special permit is issued by the EPA, a state, or (where delegated) a tribal government on an Indian reservation.

navigable waters

Defined by the Federal Water Pollution Control Act, Section 502, as navigable waters, interstate waters, interstate lakes, rivers, and streams that are used for recreation and commercial fishing.

network

1) A system of interconnected circuit components. 2) A system of transmission (or distribution) lines interconnected and operated so that any principal point has multiple sources of power supply.

new transmission

Actions within an alternative that would require construction of new transmission lines including acquisition of new rights of way, placement of new structures, construction of new access roads, and the related activities that accompany the operation of a power transmission line.

nitrogen dioxide (NO_2)

A reddish-brown gas that forms during high temperatures of combustion. Is toxic at high concentrations and reacts with moisture in the air to form nitric acid, which is highly corrosive to metals. Is a key ingredient in the formation of photochemical smog and acid rain.

nonattainment area

A geographic area that does not meet one or more national air quality standards.

outage

In a power system, a period—scheduled or unexpected—during which the transmission of power stops or a particular power-producing facility ceases to provide generation.

overload

Operation of equipment in excess of its normal, full load rating or operation of a conductor in excess of ampacity, and if continued for a sufficient length of time, would cause damage or overheating.

palustrine

Of, pertaining to, or living in, a marsh or swamp; marshy.

particulates

Airborne particles including dust, smoke, fumes, mist, spray, and aerosols. Also see pollutant.

pollutant

A contaminant, such as sulfur dioxide, nitrous oxide, hydrocarbons, radionuclides, carbon monoxide, and lead, present in a concentration high enough to cause adverse effects to health or the environment.

pollution

The accumulation of wastes or byproducts of human or natural activity that occurs when wastes or byproducts are discharged faster than they can degrade, assimilate, or disperse by natural processes.

power system

1) In general, a group of one or more generating resources and connecting transmission lines operated under common management or supervision to supply load. 2) An entire interconnected electric power transmission and distribution network together with connected generating plants and loads.

prevention of significant deterioration (PSD) increment

Upper limits criteria pollutant concentrations allowed in clean air sheds. Established by the Environmental Protection Agency to protect existing air quality from being degraded significantly through new developments, such as construction and operation of new air pollution sources.

prime farmland

Prime farmland meets all the criteria in the USDA publications: Soil Taxonomy, Agriculture Handbook 436; Soil Survey Manual, Agriculture Handbook 18; Rainfall-Erosion Losses from Cropland, Agriculture Handbook 282; Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss, Agriculture Handbook 346; and Saline and Alkali Soils, Agriculture Handbook 60.

radio interference (RI)

Impairment of the reception of a wanted radio signal by an unwanted radio signal or disturbance, usually expressed in microvolts. Usually the result of partial electrical discharges (corona).

reactive organic gas (ROG)

A photochemically reactive chemical gas, composed of non-methane hydrocarbons, that may contribute to the formation of smog.

realignment

Relocating an existing transmission line as part of an overall strategy to optimize the use of an existing right-of-way and allow for the possible use of the right-of-way for another transmission line.

reconductoring

The process of installing larger or better conductors in place of existing conductors on existing towers/structures. In some cases, reconductoring incorporates changes to the existing structures to provide the necessary structural capability to support larger conductors.

record of decision (ROD)

The document notifying the public of a decision taken by a Federal agency on a proposed action, together with the reasons for the choices entering into that decision.

reliability

1) The measure of the ability of a power system to provide uninterrupted service, even while that system is under stress. 2) In a relay or relay system, a measure of the degree of certainty of correct performance. Denotes certainty of correct operation together with assurance against incorrect operation from all extraneous causes.

residual impact

A significant impact that when mitigated still exceeds an established standard or threshold.

right-of-way (ROW)

An easement for a certain purpose over the land of another, such as the strip of land used for a road, electric transmission line, ditch, or pipeline. Western usually acquires easements for its transmission lines, roads, and other facilities such as guys and anchors. Road rights-of-way are usually acquired in 20- or 50-foot widths; for 230-kV transmission lines, the width of the ROW is usually 125 feet.

riparian

Habitat or areas, usually adjacent to rivers, streams, or lakes, where the vegetation and microclimate are heavily influenced by water.

rolling blackouts

A rolling blackout occurs when a power company turns off electricity to selected areas to save power. The areas are selected using sophisticated computer programs and models. The blackouts are typically for one hour, then the power is restored and another area is turned off. Hospitals, airport control towers, police stations, and fire departments are often exempt from these rolling blackouts. These blackouts usually occur during peak energy usage times, usually between 4:00 p.m. and 7:00 p.m. on weekdays, but they can happen at any time of day. Blackouts may affect the same area more than once a day, and may exceed an hour's duration.

route segments

Alphabetic designation (A through H) of route activities associated with the alternatives.

scoping

For an environmental impact statement, the process of defining the range of issues requiring examination in studying the environmental effects of a proposed action, generally including public consultation with interested individuals and groups, as well as with agencies with jurisdictions over parts of the project area or resources in that area.

shield wire

Used to provide protection to a conductor from lightening strikes. Also see ground wire.

State Implementation Plan (SIP)

State plans approved by the EPA for establishing, regulating, and enforcing air pollution standards.

structure

A broad-base latticed steel support for line conductors (as differentiated from a wood or steel pole structure or line).

sulfur dioxide (SO_2)

One of the gases composed of sulfur and oxygen produced by the combustion of fuels containing sulfur and a key ingredient in the formation of smog and acid rain.

surface water

1) All water naturally open to the atmosphere, such as rivers, lakes, reservoirs, streams, impoundments, seas, and estuaries. 2) Refers to all springs, wells, or other collectors, which are directly influenced by surface water.

terrestrial

Living or growing on land; not aquatic: a terrestrial plant or animal.

thermal rating

The temperature that can be withstood by an object without losing structural or functional integrity.

threatened species

As defined in the *Endangered Species Act*, those species likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

traditional cultural property

A property that is eligible for inclusion on the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that are important in maintaining the continuing cultural identity of the Native American community.

transformer

A device for transferring electrical energy from one circuit to another by magnetic induction, usually between circuits of different voltages. Consists of a magnetic core on which there are two or more windings. In power systems, most frequently used for changing voltage levels.

transmission

The bulk transport of electricity from large generation centers over significant distances to interchanges with large industries and distribution networks of utilities.

transmission grid

An interconnected network of transmission lines including associated equipment for the transfer of electric energy in bulk between points of supply and points of demand.

transmission line

A high-voltage, extra-high-voltage, or ultra-high-voltage power line used to carry electric power efficiently over long distances.

undeformed

The opposite of deformed. The rocks masses have not been subject to structural forces or have been relaxed on geologic materials that have been previously stressed.

U.S. Army Corps of Engineers (USACE)

The builder and now the owner-operator of many of the Federal dams in the Columbia River Basin (as well as elsewhere in the U.S.).

U.S. Bureau of Land Management (BLM)

A Bureau within the DOI responsible for managing public lands, including resources such as timber, minerals, oil and gas, geothermal energy, wildlife habitat, endangered species, recreation and cultural values, and open space.

U.S. Bureau of Reclamation (Reclamation)

A Bureau within the DOI responsible for operating and maintaining dams and numerous water resource projects in the western U.S., for such purposes as irrigation and power production.

U.S. Department of Energy (DOE)

A Department established in 1977 by the *Department of Energy Organization Act* to consolidate the major Federal energy functions into one cabinet-level department that would formulate a comprehensive, balanced national energy policy. Responsible for regulatory, research, and marketing programs related to energy production and use.

U.S. Environmental Protection Agency (EPA)

The Federal agency created in 1970 to permit coordinated and effective governmental action for protecting the environment by the systematic abatement and control of pollution by integrating research, monitoring, standard setting, and enforcement activities.

U.S. Fish and Wildlife Service (USFWS)

An agency within the DOI responsible for guiding conservation, development, and management of U.S. fish and wildlife resources.

utility

A public or private organization created for the purpose of selling or supplying for general public use water, electric energy, telephone service, or other items or services.

vernal pool

Ephemeral pools that dry up periodically, typically holding water for only a few days to months. Vernal pools are of particular concern because human development has destroyed most of the pools, and yet there are many endemic animal and plant species found in these pools. Some of these species are even listed as threatened or endangered under the *Endangered Species Act*, and others have been identified as species of concern by state and federal officials. In addition, new species are being identified as surveys of remaining pools are completed.

volt (V)

The unit of electromotive force, or voltage, that if steadily applied to a circuit having a resistance of one ohm will produce a current of one ampere.

voltage

The driving force that causes a current to flow in an electric circuit. Voltage and volt are often used interchangeably.

voltage sag

A momentary decrease of more than 10 percent in voltage magnitude.

voltage support

Voltage support is provided by generators, transmission systems, and equipment within the system, designed to react during normal or contingency operating conditions and sudden changes in load and maintain the established power grid voltage requirements. If there are insufficient or ineffective voltage support devices in an area to support high transmission loading during normal or contingency operations, voltages in that area could cause voltage collapse resulting in blackouts.

waste minimization

The reduction in volume or quantity of hazardous waste by the entity responsible for generating the waste.

watershed

The land area that drains into a stream or lake.

Western

See Western Area Power Administration.

Western Area Power Administration (Western)

One of the DOE's four power marketing agencies. Headquartered in Lakewood, Colorado, its service area includes 15 central and western states.

wetlands

Areas that are inundated by surface water or groundwater often enough to support vegetation or aquatic life that requires saturated or seasonally saturated soil conditions, such as swamps, bogs, fens, marshes, and estuaries.

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