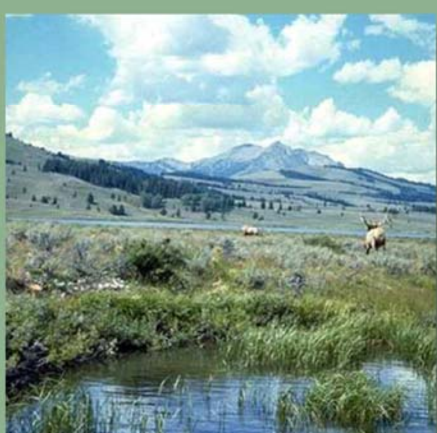

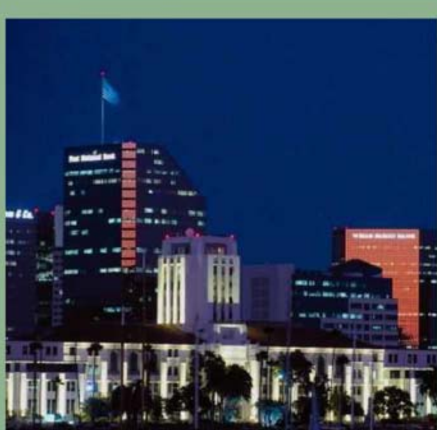

September 2007

Programmatic Environmental Impact Statement, *Designation of Energy Corridors on Federal Land in the 11 Western States* (DOE/EIS-0386)

Draft
Volume II: Appendixes

Lead Federal Agencies

U.S. Department of Energy

U.S. Department of the Interior,
Bureau of Land Management

Cooperating Federal Agencies

U.S. Department of Agriculture,
Forest Service

U.S. Department of Defense

U.S. Department of the Interior,
Fish and Wildlife Service

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NOTATION

The following is a list of acronyms and abbreviations, chemical names, and units of measure used in this volume. Some acronyms used only in tables may be defined only in those tables.

GENERAL ACRONYMS AND ABBREVIATIONS

AC	alternating current
AD	anno Domini
AIRFA	American Indian Religious Freedom Act of 1978
ANFO	ammonium nitrate/fuel oil
API	American Petroleum Institute
ARPA	Archaeological Resources Protection Act of 1979
ASME	American Society of Mechanical Engineers
BC	before the Christian era
BLM	Bureau of Land Management
CFR	*Code of Federal Regulations*
CO_2	carbon dioxide
CWA	Clean Water Act
DC	direct current
DOD	Department of Defense
DOT	U.S. Department of Transportation
E.O.	Executive Order
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
ESD	emergency shutdown
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FLMPA	Federal Land Policy and Management Act of 1976
FS	Forest Service
GIS	geographical information system
HTS	high-temperature superconductivity
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
ID	inside diameter

LN2	liquid nitrogen
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LPG	liquefied petroleum gas
MTR	military training route
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAIC	North American Industry Classification System
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act of 1976
NHPA	National Historic Preservation Act
NRHP	*National Register of Historic Places*
OD	outer diameter
OPS	Office of Pipeline Safety (U.S. Department of Transportation)
PEIS	Programmatic Environmental Impact Statement
PFYC	Potential Fossil Yield Classification
ROW(s)	right(s)-of-way
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SUA	special use area
TAPS	Trans-Alaska Pipeline System
TUP	temporary use permit
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WWEC	West-wide energy corridor

UNITS OF MEASURE

bhp	break horsepower
bpd	barrels per day
kV	kilovolt(s)
MW	megawatt
psig	pound(s) per square inch gauge

ENGLISH/METRIC AND METRIC/ENGLISH EQUIVALENTS

The following table lists the appropriate equivalents for English and metric units.

Multiply	By	To Obtain
English/Metric Equivalents		
acres	*0.4047*	hectares (ha)
cubic feet (ft^3)	0.02832	cubic meters (m^3)
cubic yards (yd^3)	0.7646	cubic meters (m^3)
degrees Fahrenheit (ºF) –32	0.5555	degrees Celsius (ºC)
Feet (ft)	0.3048	meters (m)
gallons (gal)	3.785	liters (L)
gallons (gal)	0.003785	cubic meters (m^3)
inches (in.)	2.540	centimeters (cm)
miles (mi)	1.609	kilometers (km)
miles per hour (mph)	1.609	kilometers per hour (kph)
pounds (lb)	0.4536	kilograms (kg)
short tons (tons)	907.2	kilograms (kg)
short tons (tons)	0.9072	metric tons (t)
square feet (ft^2)	0.09290	square meters (m^2)
square yards (yd^2)	0.8361	square meters (m^2)
square miles (mi^2)	2.590	square kilometers (km^2)
yards (yd)	0.9144	meters (m)
Metric/English Equivalents		
centimeters (cm)	0.3937	inches (in.)
cubic meters (m^3)	35.31	cubic feet (ft^3)
cubic meters (m^3)	1.308	cubic yards (yd^3)
cubic meters (m^3)	264.2	gallons (gal)
degrees Celsius (ºC) +17.78	1.8	degrees Fahrenheit (ºF)
hectares (ha)	2.471	acres
kilograms (kg)	2.205	pounds (lb)
kilograms (kg)	0.001102	short tons (tons)
kilometers (km)	0.6214	miles (mi)
kilometers per hour (kph)	0.6214	miles per hour (mph)
liters (L)	0.2642	gallons (gal)
meters (m)	3.281	feet (ft)
meters (m)	1.094	yards (yd)
metric tons (t)	1.102	short tons (tons)
square kilometers (km^2)	0.3861	square miles (mi^2)
square meters (m^2)	10.76	square feet (ft^2)
square meters (m^2)	1.196	square yards (yd^2)

APPENDIX A:

PROPOSED LAND USE PLAN AMENDMENTS

APPENDIX A:

PROPOSED LAND USE PLAN AMENDMENTS

TABLE A Proposed Land Use Plan Amendments for Designating EPAct Section 368 Energy Corridors on Federal Lands in the 11 Western States[a]

State	Land Use Plan to Be Amended	Responsible Office	Corridor	Nondefault Width (ft)[b]	Nondefault Energy Transport Mode[b]	Rationale[c]
Arizona	Arizona Strip RMP	BLM, Arizona Strip FO	113-116	5,280		Additional width is consistent with existing plan.
Arizona	Arizona Strip RMP	BLM, Arizona Strip FO	116-206			
Arizona	Arizona Strip RMP	BLM, Arizona Strip FO	68-116	5,280		Additional width is consistent with existing plan.
Arizona	Coconino NF LRMP	FS, Coconino NF	62-211			
Arizona	Coronado NF LRMP	FS, Coronado NF	234-235			
Arizona	Phoenix RMP	BLM, Hassayampa FO	61-207	2,900–16,300		Widths are consistent with existing plan.
Arizona	Lower Sonoran Mountain RMP	BLM, Lower Sonoran FO	115-208	5,280		Additional width is consistent with existing plan.
Arizona	Phoenix RMP	BLM, Tucson FO	234-235			
Arizona	Glen Canyon NRA LMP	NPS, Glen Canyon NRA	68-116			
Arizona	Lake Havasu RMP	BLM, Lake Havasu FO	41-46	10,560		Additional width is consistent with existing plan.
Arizona	Lake Havasu RMP	BLM, Lake Havasu FO	41-47			
Arizona	Yuma RMP	BLM, Yuma FO	115-238	5,280		Increased width is consistent with current plan revision.
Arizona	Yuma RMP	BLM, Yuma FO	30-52	5,280		Increased width is consistent with current plan revision.
Arizona	Havasu NWR Comprehensive Conservation Plan	USFWS, Lake Havasu NWR	41-46	1,500		Reduced width necessary to minimize potential wildlife impacts.
Arizona	Kaibab NF LRMP	FS, Kaibab NF	47-68			
Arizona	Kaibab NF LRMP	FS, Kaibab NF	61-207			
Arizona	Kingman RMP	BLM, Kingman FO	41-46			
Arizona	Kingman RMP	BLM, Kingman FO	41-47			
Arizona	Kingman RMP	BLM, Kingman FO	46-269			
Arizona	Kingman RMP	BLM, Kingman FO	46-270			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Arizona	Kingman RMP	BLM, Kingman FO	47-231			
Arizona	Kingman RMP	BLM, Lake Havasu FO	41-47			
Arizona	Kingman RMP	BLM, Lake Havasu FO	46-269	5,280		Additional width is consistent with existing plan.
Arizona	Lake Mead NRA LMP	NPS, Lake Mead NRA	47-231	1,660		
Arizona	Lower Gila North MFP	BLM, Hassayampa FO	30-52			
Arizona	Lower Gila North MFP	BLM, Hassayampa FO	46-269			
Arizona	Lower Gila North MFP	BLM, Hassayampa FO	46-270			
Arizona	Lower Gila North MFP	BLM, Kingman FO	46-270			
Arizona	Lower Gila North MFP	BLM, Lake Havasu FO	46-269	10,560		Additional width is consistent with existing plan.
Arizona	Lower Gila South RMP	BLM, Hassayampa FO	30-52			
Arizona	Lower Gila South RMP	BLM, Lake Havasu FO	30-52	5,280		Additional width is consistent with existing plan.
Arizona	Lower Gila South RMP	BLM, Lower Sonoran FO	115-208	5,280		Additional width is consistent with existing plan.
Arizona	Lower Gila South RMP	BLM, Lower Sonoran FO	115-238			
Arizona	Yuma RMP	BLM, Yuma FO	115-238	5,280		Increased width is consistent with current plan revision.
Arizona	Yuma RMP	BLM, Yuma FO	30-52	5,280		Increased width is consistent with current plan revision.
Arizona	Prescott NF LRMP	FS, Prescott NF	61-207			
Arizona	Safford RMP	BLM, Safford FO	81-213			
Arizona	Sitgreaves NF LRMP	FS, Apache-Sitgreaves NF	62-211			
Arizona	Tonto NF LRMP	FS, Tonto NF	62-211			
Arizona	Yuma Proving Ground INRMP	DOD, U.S. Army, Yuma Proving Ground	115-238			
California	Alturas RMP	BLM, Alturas FO	15-104	500		Reduced width is consistent with plan revision.
California	Alturas RMP	BLM, Alturas FO	16-104	500		Reduced width is consistent with plan revision.
California	Alturas RMP	BLM, Alturas FO	8-104	500		Reduced width is consistent with plan revision.
California	Angeles NF LRMP	FS, Angeles NF	107-268	1,000	Electric only	Reduced width and mode are consistent with existing plan and fragile soils limitations.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
California	Angeles NF LRMP	FS, Angeles NF	264-265	1,000	Electric only	Reduced width and mode are consistent with existing plan and fragile soils limitations.
California	Bishop RMP	BLM, Bishop FO	18-23	1,320	Electric only	Reduced width and mode are consistent with existing plan.
California	Caliente RMP	BLM, Bakersfield FO	18-23	1,320		Reduced width is consistent with existing plan.
California	Caliente RMP	BLM, Bishop FO	18-23	1,320		Reduced width is consistent with existing plan.
California	Caliente RMP	BLM, Ridgecrest FO	18-23	1,320		Reduced width is consistent with existing plan.
California	California Desert District RMP	BLM, Barstow FO	23-25			
California	California Desert District RMP	BLM, El Centro FO	115-238			
California	California Desert District RMP	BLM, Lake Havasu FO	41-47			
California	California Desert District RMP	BLM, Needles FO	41-47			
California	California Desert District RMP	BLM, Ridgecrest FO	18-23	1,320		Reduced width is consistent with existing plan.
California	California Desert District RMP	BLM, Ridgecrest FO	23-106			
California	California Desert District RMP	BLM, Ridgecrest FO	23-25			
California	California Desert District RMP	BLM, Barstow FO	27-225			
California	California Desert District RMP	BLM, Barstow FO	27-266			
California	California Desert District RMP	BLM, Barstow FO	27-41		Underground only	Above-ground uses constrained by military training requirements.
California	California Desert District RMP	BLM, Needles FO	27-225			
California	California Desert District RMP	BLM, Needles FO	27-41	500– 3,500	Underground only	Width is limited to avoid encroachment on the Mojave Reserve, and above-ground uses are constrained by military training requirements.
California	California Desert District RMP	BLM, Needles FO	41-46			
California	California Desert District RMP	BLM, Palm Springs-South Coast FO	30-52			
California	Cal-Neva MFP	BLM, Eagle Lake FO	15-104			
California	China Lake Naval Air Weapons Station INRMP	DOD, U.S. Navy, China Lake Naval Air Weapons Station	23-25			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
California	Cleveland NF LRMP	FS, Cleveland NF	115-238	1,000	Electric only	Reduced width and mode are consistent with existing plan and fragile soils limitations.
California	Cleveland NF LRMP	FS, Cleveland NF	236-237	2,000	Electric only	Reduced width and mode are consistent with existing plan and fragile soils limitations.
California	Havasu NWR Comprehensive Conservation Plan	USFWS, Lake Havasu NWR	41-46	1,500		Width is reduced to minimize potential wildlife impacts.
California	Honey Lake MFP	BLM, Eagle Lake FO	15-104			
California	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	6-15			
California	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	18-23			
California	Imperial Sand Dunes	BLM, El Centro FO	115-238			
California	Inyo NF LRMP	FS, Inyo NF	18-23		Electric only	Reduced mode is consistent with existing plan and fragile soils limitations.
California	Klamath NF LRMP	FS, Klamath NF	261-262			
California	Lassen NF LRMP	FS, Lassen NF	3-8	1,000		Width reduced because of protected areas on both sides of existing corridor
California	Modoc NF LRMP	FS, Modoc NF	3-8			
California	Modoc NF LRMP	FS, Modoc NF	8-104			
California	Mount Dome MFP	BLM, Alturas FO	7-8			
California	Plan unknown	BLM, Carson City FO	15-104			
California	Plan unknown	BLM, Eagle Lake FO	15-104			
California	Plan unknown	BLM, El Centro FO	115-238			
California	Plan unknown	BLM, Lake Havasu FO	41-46			
California	Plan unknown	BLM, Lake Havasu FO	41-47			
California	Plan unknown	BLM, Palm Springs-South Coast FO	30-52			
California	Redding RMP	BLM, Redding FO	101-263			
California	Redding RMP	BLM, Redding FO	261-262			
California	Redding RMP	BLM, Redding FO	4-247			
California	San Bernadino NF LRMP	FS, San Bernadino NF	108-267	10,500		Increased width is consistent with existing plan.
California	Shasta NF LRMP	FS, Shasta NF	261-262	2,000	Electric only	Reduced width and mode are consistent with existing plan and fragile soils limitations.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
California	Shasta NF LRMP	FS, Shasta-Trinity NF	3-8			
California	Sierra MFP	BLM, Folsom FO	6-15			
California	Six Rivers NF LRMP	FS, Six Rivers NF	101-263			
California	South Coast RMP	BLM, Palm Springs-South Coast FO	115-238	1,000–3,500	Electric only	Reduced width and mode are consistent with restrictions on the same corridor across adjacent Forest Service lands.
California	Tahoe NF LRMP	FS, Tahoe NF	6-15			
California	Trinity NF LRMP	FS, Shasta-Trinity NF	101-263			
California	Tuledad/Homecamp MFP	BLM, Surprise FO	16-104			
California	Willow Creek MFP	BLM, Eagle Lake FO	15-104			
Colorado	Arapaho NF LRMP	FS, Arapaho-Roosevelt NF	144-275	200–10,560	Electric only, multimodal	The 200-foot and other reduced widths apply where the corridor is confined by protected lands on each side. The increased width on the balance of the corridor is consistent with the existing plan. The electric-only limitation applies where the corridor crosses the Continental Divide to protect fragile soils and vegetation.
Colorado	Glenwood Springs RMP	BLM, Glenwood Springs FO	132-276		Electric only, multimodal	Electric-only limitation on a portion of this corridor is to provide separation integrity in Wyoming and Colorado.
Colorado	Grand Junction RMP	BLM, Grand Junction FO	132-136	21,120–26,400		Additional width is consistent with existing plan.
Colorado	Grand Junction RMP	BLM, Grand Junction FO	132-133	3,500–5,280	Underground only	Underground-only limitation is to provide separation integrity for this corridor throughout its length in Wyoming and Colorado. Increased width is consistent with the current plan and in anticipation of multiple facilities.
Colorado	Grand Junction RMP	BLM, Grand Junction FO	132-276		Electric only	Electric-only limitation is to provide separation integrity for this corridor in Wyoming and Colorado.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Colorado	Gunnison NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	87-277			
Colorado	Gunnison RMP	BLM, Gunnison FO	87-277	1,000–5,280		Variable widths above and below the default are consistent with the existing plan.
Colorado	Kremmling RMP	BLM, Kremmling FO	144-275			
Colorado	Little Snake RMP	BLM, Little Snake FO	126-133	3,500–4,500		Increased width is consistent with the existing plan.
Colorado	Little Snake RMP	BLM, Little Snake FO	132-133	3,500–5,950	Underground only	Underground-only limitation is to provide separation integrity for this corridor throughout its length in Wyoming and Colorado. Increased width is consistent with the current plan and in anticipation of multiple facilities.
Colorado	Little Snake RMP	BLM, Little Snake FO	132-276		Electric only	Electric-only limitation is to provide separation integrity for this corridor in Wyoming and Colorado.
Colorado	Little Snake RMP	BLM, Little Snake FO	133-142			
Colorado	Little Snake RMP	BLM, Little Snake FO	138-143		Electric only	Electric-only limitation is to provide separation integrity for this corridor in Wyoming and Colorado.
Colorado	Little Snake RMP	BLM, Little Snake FO	144-275			
Colorado	Little Snake RMP	BLM, Little Snake FO	73-133		Underground only	Underground-only limitation is to provide separation integrity for this corridor throughout its length in Wyoming and Colorado.
Colorado	Curecanti NCA LMP	NPS, Curecanti NCA	87-277			
Colorado	Rio Grande NF LRMP	FS, Rio Grande NF	87-277			
Colorado	Routt NF LRMP	FS, Routt NF	144-275			
Colorado	Royal Gorge RMP	BLM, Royal Gorge FO	87-277			
Colorado	San Isabel NF LRMP	FS, Pike-San Isabel NF	87-277			
Colorado	San Juan NF LRMP	FS, San Juan NF	130-274			
Colorado	San Juan/San Miguel RMP	BLM, Dolores FO	130-131 (N)		Electric only	Limited to electric-only because no underground use is anticipated.
Colorado	San Juan/San Miguel RMP	BLM, Dolores FO	130-274			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Colorado	San Juan/San Miguel RMP	BLM, Uncompahgre FO	130-131 (N)		Electric only	Limited to electric-only because no underground use is anticipated.
Colorado	San Juan/San Miguel RMP	BLM, Uncompahgre FO	130-131 (S)			
Colorado	San Juan/San Miguel RMP	BLM, Uncompahgre FO	130-274			
Colorado	Uncompahgre Basin RMP	BLM, Uncompahgre FO	132-136			
Colorado	Uncompahgre Basin RMP	BLM, Uncompahgre FO	134-136			
Colorado	Uncompahgre Basin RMP	BLM, Uncompahgre FO	134-139		Electric only	Limitation to electric-only is to protect fragile soils.
Colorado	Uncompahgre Basin RMP	BLM, Uncompahgre FO	136-139			
Colorado	Uncompahgre Basin RMP	BLM, Uncompahgre FO	139-277		Electric only	Limitation to electric-only is to protect fragile soils.
Colorado	Uncompahgre Basin RMP	BLM Uncompahgre FO	136-277			
Colorado	Uncompahgre NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	130-131 (N)		Electric-only	Limited to electric-only because no underground use is anticipated.
Colorado	Uncompahgre NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	130-131 (S)			
Colorado	Uncompahgre NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	130-274			
Colorado	Uncompahgre NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	131-134			
Colorado	Uncompahgre NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	134-136			
Colorado	Uncompahgre NF LRMP	FS, Grand Mesa-Gunnison-Uncompahgre NF	134-139		Electric only	Limitation to electric-only is to protect fragile soils.
Colorado	White River RMP	BLM, White River FO	126-133	3,500–9,000		Increased width is consistent with the current plan.
Colorado	White River RMP	BLM, White River FO	132-133	2,250–10,500	Underground only	Underground-only limitation is to provide separation integrity for this corridor throughout its length in Wyoming and Colorado. Increased width is consistent with the current plan and in anticipation of multiple facilities.
Colorado	White River RMP	BLM, White River FO	132-276		Electric only	Electric-only limitation is to provide separation integrity for this corridor in Wyoming and Colorado.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Idaho	Big Desert MFP	BLM, Upper Snake FO	252-253			
Idaho	Big Desert MFP	BLM, Upper Snake FO	50-203			
Idaho	Bruneau MFP	BLM, Bruneau FO	36-228			
Idaho	Cassia RMP	BLM, Burley FO	112-226			
Idaho	Cassia RMP	BLM, Burley FO	49-202			
Idaho	Emerald Empire MFP	BLM, Coeur d'Alene FO	229-254			
Idaho	Idaho Panhandle NF LRMP	FS, Idaho Panhandle NF	229-254			
Idaho	Jarbidge RMP	BLM, Bruneau FO	36-228			
Idaho	Jarbidge RMP	BLM, Four Rivers FO	29-36			
Idaho	Jarbidge RMP	BLM, Four Rivers FO	36-228	1,000		Width is restricted to reduce potential impacts to nesting raptors in the Snake River Birds of Prey NCA.
Idaho	Jarbidge RMP	BLM, Jarbridge FO	29-36			
Idaho	Jarbidge RMP	BLM, Jarbridge FO	36-112			
Idaho	Jarbidge RMP	BLM, Jarbridge FO	36-226			
Idaho	Jarbidge RMP	BLM, Jarbridge FO	36-228			
Idaho	Kuna MFP	BLM, Four Rivers FO	29-36			
Idaho	Little Lost-Birch Creek MFP	BLM, Upper Snake FO	50-260			
Idaho	Malad MFP	BLM, Pocatello FO	49-202			
Idaho	Medicine Lodge RMP	BLM, Upper Snake FO	50-203			
Idaho	Medicine Lodge RMP	BLM, Upper Snake FO	50-260			
Idaho	Monument RMP	BLM, Burley FO	49-112			
Idaho	Monument RMP	BLM, Burley FO	49-202			
Idaho	Monument RMP	BLM, Shoshone FO	112-226			
Idaho	Monument RMP	BLM, Shoshone FO	36-112			
Idaho	Monument RMP	BLM, Shoshone FO	49-112			
Idaho	Owyhee RMP	BLM, Four Rivers FO	36-228	1,000		Width is restricted to reduce potential impacts to nesting raptors in the Snake River Birds of Prey NCA.
Idaho	Owyhee RMP	BLM, Owyhee FO	11-228			
Idaho	Owyhee RMP	BLM, Owyhee FO	24-228			
Idaho	Owyhee RMP	BLM, Owyhee FO	36-228	1,000–3,500		Width is restricted to reduce potential impacts to nesting raptors in the Snake River Birds of Prey NCA.
Idaho	Targhee NF LRMP	FS, Caribou-Targhee NF	50-203	600		Reduced width is consistent with existing plan.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Idaho	Targhee NF LRMP	FS, Caribou-Targhee NF	50-260	600		Reduced width is consistent with existing plan
Idaho	Twin Falls MFP	BLM, Burley FO	111-226			
Idaho	Twin Falls MFP	BLM, Burley FO	112-226			
Idaho	Twin Falls MFP	BLM, Burley FO	36-226			
Montana	Beaverhead-Deerlodge NF LRMP	FS, Beaverhead-Deerlodge NF	50-260	2,640		Reduced width is consistent with existing plan.
Montana	Beaverhead-Deerlodge NF LRMP	FS, Beaverhead-Deerlodge NF	51-204			
Montana	Beaverhead-Deerlodge NF LRMP	FS, Beaverhead-Deerlodge NF	51-205			
Montana	Billings RMP	BLM, Billings FO	79-216			
Montana	Dillon RMP	BLM, Dillon FO	50-203	2,640		Reduced width is consistent with existing plan.
Montana	Dillon RMP	BLM, Dillon FO	50-260	2,640		Reduced width is consistent with existing plan.
Montana	Dillon RMP	BLM, Dillon FO	50-51	2,640		Reduced width is consistent with existing plan.
Montana	Garnet RMP	BLM, Missoula FO	229-254			
Montana	Headwaters RMP	BLM, Butte FO	51-204			
Montana	Headwaters RMP	BLM, Butte FO	51-205			
Montana	Lolo NF LRMP	FS, Lolo NF	229-254			
Nevada	Black Rock-High Rock NCA RMP	BLM, Winnemucca FO	16-24			
Nevada	Caliente MFP	BLM, Ely FO	110-233	2,640		Reduced width is consistent with existing plan.
Nevada	Caliente MFP	BLM, Ely FO	113-114			
Nevada	Caliente MFP	BLM, Ely FO	113-116	5,280		Increased width is consistent with plans in adjacent BLM St. George and Arizona Strip Field Offices.
Nevada	Caliente MFP	BLM, Ely FO	232-233 (E)			
Nevada	Caliente MFP	BLM, Ely FO	232-233 (W)	2,640		Reduced width is consistent with existing plan.
Nevada	Caliente MFP	BLM, Ely FO	37-232	2,640		Reduced width is consistent with existing plan.
Nevada	Caliente MFP	BLM, Ely FO	39-113			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Nevada	Desert NWR Complex Comprehensive Conservation Plan	USFWS, Desert NWR	223-224			
Nevada	Desert NWR Complex Comprehensive Conservation Plan	USFWS, Desert NWR	232-233 (W)	2,640		Reduced width necessary to minimize potential wildlife impacts.
Nevada	Desert NWR Complex Comprehensive Conservation Plan	USFWS, Desert NWR	37-223 (N)			
Nevada	Desert NWR Complex Comprehensive Conservation Plan	USFWS, Desert NWR	37-223 (S)	2,400	Underground only	Width and above-ground uses are constrained by military training requirements.
Nevada	Desert NWR Complex Comprehensive Conservation Plan	USFWS, Desert NWR	37-232	2,640		Reduced width necessary to minimize potential wildlife impacts.
Nevada	Egan RMP	BLM, Ely FO	110-114			
Nevada	Egan RMP	BLM, Ely FO	110-233	2,640		Reduced width is consistent with existing plan.
Nevada	Egan RMP	BLM, Ely FO	44-110	2,640		Reduced width is consistent with existing plan.
Nevada	Elko RMP	BLM, Elko FO	17-35	1,000–15,840		Reduced width in some portions of this corridor is to minimize potential impacts on sage grouse habitat. In other locations, the increased width is consistent with the existing plan.
Nevada	Hawthorne Army Depot INRMP	DOD, U.S. Army, Hawthorne AD	18-224	10,560		Increased width is consistent with existing plan in adjacent BLM Carson City Field Office.
Nevada	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	6-15			
Nevada	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	110-114			
Nevada	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	15-104			
Nevada	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	17-35	10,560		Increased width is less than the 3-mile width designated on adjacent BLM-administered land to avoid roadless-designated land on the forest.
Nevada	Humboldt NF LRMP	FS, Humboldt-Toiyabe NF	18-23			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Nevada	Lahontan RMP	BLM, Carson City FO	15-104			
Nevada	Lahontan RMP	BLM, Carson City FO	15-17	10,560		Increased width is consistent with existing plan.
Nevada	Lahontan RMP	BLM, Carson City FO	17-18	10,560		Increased width is consistent with existing plan.
Nevada	Lake Mead NRA Lake Management Plan	NPS, Lake Mead NRA	47-231	1,660		Reduced width is consistent with existing plan.
Nevada	Las Vegas RMP	BLM, Las Vegas FO	18-224			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	223-224	2,050–3,500		Width is constrained by proximity to Red Rocks NCA and military training requirements.
Nevada	Las Vegas RMP	BLM, Las Vegas FO	224-225			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	225-231			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	27-225			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	37-223 (N)			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	37-223 (S)	2,400	Underground only	Width and above-ground uses are constrained by military training requirements.
Nevada	Las Vegas RMP	BLM, Las Vegas FO	37-232	2,640		Reduced width is consistent with existing plan.
Nevada	Las Vegas RMP	BLM, Las Vegas FO	37-39			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	39-113			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	39-231			
Nevada	Las Vegas RMP	BLM, Las Vegas FO	47-231	2,000		Width is reduced to minimize potential impacts to Piute-El Dorado Valley ACEC, consistent with existing plan.
Nevada	Nellis AFB Plan 126-4 INRMP	DOD, U.S. Air Force, Nellis AFB	37-223 (S)	2,400	Underground only	Width and above-ground uses are constrained by military training requirements.
Nevada	Paradise-Denio MFP	BLM, Winnemucca FO	16-24			
Nevada	Paradise-Denio MFP	BLM, Winnemucca FO	17-35			
Nevada	Schell MFP	BLM, Ely FO	110-114			
Nevada	Schell MFP	BLM, Ely FO	110-233	2,640		Reduced width is consistent with existing plan.
Nevada	Sonoma Gerlach MFP	BLM, Winnemucca FO	15-17	10,560		Increased width is consistent with existing plan.
Nevada	Sonoma Gerlach MFP	BLM, Winnemucca FO	16-104			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Nevada	Sonoma Gerlach MFP	BLM, Winnemucca FO	16-17			
Nevada	Sonoma Gerlach MFP	BLM, Winnemucca FO	16-24			
Nevada	Sonoma Gerlach MFP	BLM, Winnemucca FO	17-18	10,560		Increased width is consistent with existing plan.
Nevada	Sonoma Gerlach MFP	BLM, Winnemucca FO	17-35			
Nevada	Tonopah RMP	BLM, Battle Mountain FO	18-224			
Nevada	Tuledad/Homecamp MFP	BLM, Surprise FO	16-104			
Nevada	Walker RMP	BLM, Carson City FO	17-18	10,560		Increased width is consistent with existing plan.
Nevada	Walker RMP	BLM, Carson City FO	18-224	10,560		Increased width is consistent with existing plan.
Nevada	Walker RMP	BLM, Carson City FO	18-23	10,560		Increased width is consistent with existing plan.
Nevada	Wells RMP	BLM, Elko FO	111-226	15,840		Increased width is consistent with existing plan.
Nevada	Wells RMP	BLM, Elko FO	17-35	15,840		Increased width is consistent with existing plan.
Nevada	Wells RMP	BLM, Elko FO	35-111			
Nevada	Wells RMP	BLM, Elko FO	35-43			
Nevada	Wells RMP	BLM, Elko FO	43-111	2,640		Reduced width is consistent with existing plan.
Nevada	Wells RMP	BLM, Elko FO	43-44	15,840		Increased width is consistent with existing plan.
Nevada	Wells RMP	BLM, Elko FO	44-110	2,640		Reduced width is consistent with existing plan.
Nevada	Wells RMP	BLM, Elko FO	44-239	15,840	Underground only	Underground-only restriction, to reduce potential visual impacts, and increased width are consistent with existing plan.
New Mexico	Carlsbad RMP	BLM, Carlsbad FO	89-271			
New Mexico	Farmington RMP	BLM, Farmington FO	80-273			
New Mexico	Fort Bliss INRMP	DOD, U.S. Army, Fort Bliss	81-272			
New Mexico	Mimbres RMP	BLM, Las Cruces DO	81-213			
New Mexico	Mimbres RMP	BLM, Las Cruces DO	81-272			
New Mexico	Mimbres RMP	BLM, Las Cruces DO	81-83			
New Mexico	Rio Puerco RMP	BLM, Rio Puerco FO	80-273			
New Mexico	Roswell RMP	BLM, Roswell FO	89-271			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
New Mexico	Sevilleta NWR Comprehensive Conservation Plan	USFWS, Sevilletta NWR	81-272	1,500		Reduced width necessary to minimize potential wildlife impacts.
New Mexico	Socorro RMP	BLM, Soccoro FO	81-272			
New Mexico	White Sands RMP	BLM, Las Cruces DO	81-272			
Oregon	Andrews-Steens RMP	BLM, Andrews FO	7-24			
Oregon	Baker RMP	BLM, Baker FO	250-251			
Oregon	Brothers-Lapine RMP	BLM, Central Oregon FO	11-228			
Oregon	Brothers-Lapine RMP	BLM, Deschutes FO	7-11			
Oregon	Brothers-Lapine RMP	BLM, Deschutes FO	11-228			
Oregon	Crooked River National Grasslands LRMP	FS, Crooked River National Grasslands	11-103			
Oregon	Deschutes NF LRMP	FS, Deschutes NF	7-11			
Oregon	Eugene RMP	BLM, Upper Willamette FO	4-247			
Oregon	Fremont NF LRMP	FS, Fremont NF	7-11			
Oregon	Fremont NF LRMP	FS, Fremont NF	7-24			
Oregon	Klamath Falls RMP	BLM, Klamath Falls FO	7-8			
Oregon	Klamath Falls RMP	BLM, Klamath Falls FO	7-11			
Oregon	Klamath Falls RMP	BLM, Klamath Falls FO	7-24			
Oregon	Klamath NF LRMP	FS, Klamath NF	4-247			
Oregon	Lakeview RMP	BLM, Lakeview FO	7-11			
Oregon	Lakeview RMP	BLM, Lakeview FO	7-24			
Oregon	Medford RMP	BLM, Ashland FO	4-247			
Oregon	Medford RMP	BLM, Butte Falls FO	4-247			
Oregon	Medford RMP	BLM, Glendale FO	4-247			
Oregon	Mt. Hood NF LRMP	FS, Mt. Hood NF	10-246	1,320	Electric only	Reduced width and electric-only restrictions are to protect fragile soils and are consistent with existing plan.
Oregon	Mt. Hood NF LRMP	FS, Mt. Hood NF	230-248			
Oregon	Roseburg RMP	BLM, South River FO	4-247			
Oregon	Roseburg RMP	BLM, Swiftwater FO	4-247			
Oregon	Roseburg RMP	BLM, Upper Willamette FO	4-247			
Oregon	Salem RMP	BLM, Cascades FO	10-246	1,320–3,500	Electric only, multimodal	Reduced width and electric-only restrictions on some portions of this corridor are to protect fragile soils and community watershed values and are consistent with existing plan.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Oregon	Salem RMP	BLM, Cascades FO	230-248	1,000–3,500		Reduced width on a portion of this corridor is to minimize impacts to Soosap Meadows ACEC.
Oregon	Salem RMP	BLM, Cascades FO	4-247			
Oregon	Salem RMP	BLM, Tillamook FO	5-201			
Oregon	Southeastern Oregon RMP	BLM, Jordan FO	7-24			
Oregon	Southeastern Oregon RMP	BLM, Jordan FO	16-24			
Oregon	Southeastern Oregon RMP	BLM, Jordan FO	24-228	1,500-3,500		Reduced width on a portion of this corridor is to minimize impacts to Alvord Desert and Bowden Hills WSAs.
Oregon	Southeastern Oregon RMP	BLM, Malheur FO	11-228	1,500-3,500		Reduced width on a portion of this corridor is to minimize impacts to Owyhee-Below-the-Dam ACEC.
Oregon	Southeastern Oregon RMP	BLM, Malheur FO	24-228			
Oregon	Southeastern Oregon RMP	BLM, Malheur FO	250-251			
Oregon	Three Rivers RMP	BLM, Three Rivers FO	11-228			
Oregon	Two Rivers RMP	BLM, Deschutes FO	11-103			
Oregon	Umatilla NF LRMP	FS, Umatilla NF	227-249		Electric only	Electric-only restriction is to protect fisheries habitat values.
Oregon	Upper Deschutes RMP	BLM, Deschutes FO	7-11			
Oregon	Upper Deschutes RMP	BLM, Deschutes FO	11-103			
Oregon	Upper Deschutes RMP	BLM, Deschutes FO	11-228			
Oregon	Winema NF LRMP	FS, Winema NF	7-11			
Utah	Beaver RMP	BLM, Kanab FO	116-206			
Utah	Beaver RMP – CBGA	BLM, Cedar City FO	113-114			
Utah	Book Cliffs RMP	BLM, Vernal FO	126-217			
Utah	Book Cliffs RMP	BLM, Vernal FO	126-218			
Utah	Book Cliffs RMP	BLM, Vernal FO	126-258			
Utah	Cache NF LRMP	FS, Cache NF	256-257	2,640		Reduced width is to avoid roadless areas and is consistent with the existing plan.
Utah	Cedar RMP – CBGA	BLM, Cedar City FO	113-114			
Utah	Diamond Mountain RMP	BLM, Vernal FO	126-218			
Utah	Diamond Mountain RMP	BLM, Vernal FO	126-258			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Utah	Dixie NF LRMP	FS, Dixie NF	113-114	4,250–10,800		Widths above the default 3,500 feet are consistent with the existing plan and vary to avoid roadless areas.
Utah	Fishlake NF LRMP	FS, Fishlake NF	116-206			
Utah	Garfield RMP	BLM, Kanab FO	116-206			
Utah	Grand RMP	BLM, Moab FO	66-212	2,300–29,300		Widths vary above and below the default 3,500 feet consistent with the current plan and to adjust to the variable conditions in Moab Canyon.
Utah	Grand Staircase-Escalante National Monument	BLM, Grand Staircase-Escalante NM FO	68-116			
Utah	Green River RMP	BLM, Vernal FO	126-218			
Utah	House Range RMP	BLM, Fillmore FO	114-241			
Utah	House Range RMP	BLM, Fillmore FO	116-206			
Utah	Mountain Valley MFP	BLM, Richfield FO	116-206			
Utah	Paria MFP	BLM, Kanab FO	68-116			
Utah	Pinyon MFP	BLM, Cedar City FO	110-114			
Utah	Pinyon MFP	BLM, Cedar City FO	113-114			
Utah	Pinyon MFP	BLM, Cedar City FO	114-241			
Utah	Pony Express RMP	BLM, Fillmore FO	116-206			
Utah	Pony Express RMP	BLM, Salt Lake FO	114-241			
Utah	Pony Express RMP	BLM, Salt Lake FO	116-206			
Utah	Pony Express RMP	BLM, Salt Lake FO	44-239			
Utah	Pony Express RMP	BLM, Salt Lake FO	66-209		Electric only	Limitation to electric-only because of unstable soils.
Utah	Pony Express RMP	BLM, Salt Lake FO	66-212			
Utah	Price River RMP	BLM, Price FO	66-212			
Utah	San Juan RMP	BLM, Moab FO	66-212			
Utah	San Juan RMP	BLM, Monticello FO	66-212			
Utah	St. George (Dixie) RMP	BLM, St. George FO	113-114			
Utah	St. George (Dixie) RMP	BLM, St. George FO	113-116	5,280		Additional width is consistent with existing plan.
Utah	Uinta NF LRMP	FS, Uinta NF	66-209		Electric only	Limitation to electric-only because of unstable soils.
Utah	Uinta NF LRMP	FS, Uinta NF	66-212			
Utah	Uinta NF LRMP	FS, Uinta NF	66-259			
Utah	Vermillion MFP	BLM, Kanab FO	116-206			

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Utah	Warm Springs RMP	BLM, Fillmore FO	110-114			
Utah	Warm Springs RMP	BLM, Fillmore FO	114-241			
Utah	Zion MFP	BLM, Kanab FO	116-206			
Washington	Snoqualmie NF LRMP	FS, Mount Baker-Snoqualmie NF	102-105	500– 3,450	Electric upgrade only	Reduced width and limitation to electric upgrade-only are to protect endangered marbled murrelet and bull trout.
Washington	Snoqualmie NF LRMP	FS, Mount Baker-Snoqualmie NF	244-245			
Washington	Spokane RMP	BLM, Wenatchee FO	102-105			
Washington	Wenatchee NF LRMP	FS, Wenatchee NF	102-105	500	Electric upgrade only	Reduced width and limitation to electric upgrade-only are to protect endangered marbled murrelet and bull trout.
Washington	Wenatchee NF LRMP	FS, Wenatchee NF	244-245			
Wyoming	Ashley NF LRMP	FS, Ashley NF	218-240	1,500	Underground only	Reduced width and limitation to underground-only are to reduce visual and recreational value impacts.
Wyoming	Cody RMP	BLM, Cody FO	79-216			
Wyoming	Grass Creek RMP	BLM, Worland FO	79-216			
Wyoming	Great Divide RMP	BLM, Rawlins FO	129-218			
Wyoming	Great Divide RMP	BLM, Rawlins FO	129-221			
Wyoming	Great Divide RMP	BLM, Rawlins FO	138-143			
Wyoming	Great Divide RMP	BLM, Rawlins FO	73-129			
Wyoming	Great Divide RMP	BLM, Rawlins FO	73-133		Underground only	Limited to underground-only to reduce visual impacts.
Wyoming	Great Divide RMP	BLM, Rawlins FO	73-138			
Wyoming	Great Divide RMP	BLM, Rawlins FO	78-138			
Wyoming	Great Divide RMP	BLM, Rawlins FO	78-255			
Wyoming	Great Divide RMP	BLM, Rawlins FO	78-85			
Wyoming	Green River RMP	BLM, Rock Springs FO	121-220		Electric only	Limited to electric-only because no underground use is anticipated.
Wyoming	Green River RMP	BLM, Rock Springs FO	121-221			
Wyoming	Green River RMP	BLM, Rock Springs FO	121-240			
Wyoming	Green River RMP	BLM, Rock Springs FO	126-218		Underground only, multimodal	Limited to underground-only on a portion because of high lightning and wildfire hazard and visual impacts.

TABLE A (Cont.)

State	Land Use Plan to Be Amended[b]	Responsible Office	Corridor	Nondefault Width (ft)	Nondefault Energy Transport Mode	Rationale[c]
Wyoming	Green River RMP	BLM, Rock Springs FO	129-221			
Wyoming	Green River RMP	BLM, Rock Springs FO	218-240			
Wyoming	Green River RMP	BLM, Rock Springs FO	219-220		Electric only	
Wyoming	Green River RMP	BLM, Rock Springs FO	220-221		Electric only	
Wyoming	Kemmerer RMP	BLM, Kemmerer FO	121-240			
Wyoming	Kemmerer RMP	BLM, Kemmerer FO	218-240			
Wyoming	Kemmerer RMP	BLM, Kemmerer FO	55-240			
Wyoming	Lander RMP	BLM, Lander FO	79-216			
Wyoming	Medicine Bow NF LRMP	FS, Medicine Bow NF	78-255			
Wyoming	Platte River RMP	BLM, Casper FO	78-255			
Wyoming	Platte River RMP	BLM, Casper FO	79-216			
Wyoming	Washakie RMP	BLM, Worland FO	79-216			

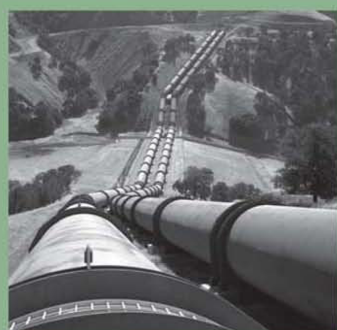
[a] ACEC = Area of Critical Environmental Concern; AFB = Air Force Base; BLM = Bureau of Land Management; CBGA = Cedar-Beaver-Garfield-Antimony; DO= district office; DOD = Department of Defense; E = east; FO = field office; FS = Forest Service; INRMP = Integrated Natural Resources Management Plan; LMP = Land Management Plan; LRMP = Land and Resource Management Plan; MFP = Management Framework Plan; N = north; NCA = National Conservation Area; NF = National Forest; NM = National Monument; NPS = National Park Service; NRA = National Recreation Area; NWR = National Wildlife Refuge; RMP = Resource Management Plan; S = south; USFWS = U.S. Fish and Wildlife Service; W = west.

[b] Land use plans will be amended to designate the energy corridors under EPAct Section 368. Unless otherwise shown, corridor designations will be for the default width of 3,500 feet and for compatible multimodal uses.

[c] Designation and use of energy transport corridors under EPAct Section 368 and in accordance with the IOPs and mitigating measures in the PEIS are consistent with other resource values and uses in the planning area. Where appropriate, the rationale for designation of specific corridors is presented.

APPENDIX B:

SUMMARY OF PUBLIC SCOPING COMMENTS FOR THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT, DESIGNATION OF ENERGY CORRIDORS ON FEDERAL LAND IN THE 11 WESTERN STATES (DOE/FS-0386)



February 2006

Summary of Public Scoping Comments for the Programmatic Environmental Impact Statement, *Designation of Energy Corridors on Federal Land in the 11 Western States* (DOE/EIS-0386)

Final Report

Lead Agencies

U.S. Department of Energy

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies

U.S. Department of Agriculture, Forest Service

U.S. Department of Defense

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Final Report

SUMMARY OF PUBLIC SCOPING COMMENTS
FOR THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT,
DESIGNATION OF ENERGY CORRIDORS ON FEDERAL LAND
IN THE 11 WESTERN STATES **(DOE/FS-0386)**

Lead Agencies
U.S. Department of Energy
U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies
U.S. Department of Agriculture, Forest Service
U.S. Department of Defense

February 2006

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NOTATION

BLM	Bureau of Land Management
BMP	best management practice
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
EIS	environmental impact statement
EMF	electric and magnetic fields or electromagnetic fields
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NPS	National Park Service
ORV	off-road vehicle
PEIS	programmatic environmental impact statement
ROD	record of decision
ROW	right-of-way
USFS	U.S. Forest Service

SUMMARY OF PUBLIC SCOPING COMMENTS FOR THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT, *DESIGNATION OF ENERGY CORRIDORS ON FEDERAL LAND IN THE 11 WESTERN STATES* (DOE/EIS-0386)

1 INTRODUCTION AND BACKGROUND

Section 368 of the Energy Policy Act of 2005 (the Act), Public Law 109-58 (H.R. 6), enacted August 8, 2005, directs the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior (the Agencies), under their respective authorities, to designate corridors on federal land in 11 Western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) for oil, gas, and hydrogen pipelines and electricity transmission and distribution infrastructure (energy corridors).

The Agencies have determined that designating energy corridors as required by Section 368 of the Act constitutes a major federal action that may have a significant impact on the environment, within the meaning of the National Environmental Policy Act of 1969 (NEPA). Thus the Agencies are preparing a programmatic environmental impact statement (PEIS). Entitled *Designation of Energy Corridors on Federal Land in the 11 Western States* (DOE/EIS-0386), this PEIS will address the potential environmental impacts from the proposed action and the range of reasonable alternatives. The U.S. Department of Energy (DOE) and the U.S. Department of the Interior's Bureau of Land Management (BLM) are co-lead agencies for this effort, with the U.S. Department of Agriculture's Forest Service (USFS) and the U.S. Department of Defense (DOD) participating as cooperating agencies.

For purposes of preparing the PEIS, an energy corridor is defined as a parcel of land (often linear in character) that has been identified as being a preferred location for existing and/or future utility rights-of-way (ROWs)[1] and that is suitable for accommodating one or more ROWs that are similar, identical, or compatible. Energy corridors may accommodate multiple

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[1] Section 503 of the Federal Land Policy and Management Act (FLPMA) specifically states, "Any existing transportation and utility corridors may be designated as transportation and utility corridors pursuant to this subsection **without further review**" (emphasis added). Existing ROWs that have not been designated corridors can be designated as such outside the scope of the PEIS. For example, see the Tucson Electric Power Company (TEP) Sahuarita-Nogales Transmission Line EIS (DOE/EIS-0336). Prior to completion of the EIS, the USFS designated an existing pipeline ROW that had not been previously identified as a corridor as such, and it cited this section of the FLPMA.

pipelines (such as those for oil, gas, or hydrogen), electricity transmission lines, and related infrastructure (such as access and maintenance roads, compressors, pumping stations, and other structures).

The PEIS will evaluate alternative energy corridor designations on federal lands in the 11 Western states, as well as a no action alternative under which no new energy corridors would be designated. The Agencies issuing the PEIS would, as applicable, amend their respective land use plans by designating a series of energy corridors effective upon the signing of the records of decision (RODs).

A notice of intent (NOI) to prepare the PEIS, amend relevant agency land use plans, and conduct public scoping meetings, as well as a notice of floodplain and wetlands involvement, was published in the *Federal Register* on September 28, 2005 (70 FR 56647). The Agencies advertised the opportunity for the public to become involved through a "scoping" process, in which interested parties can comment on the scope and content of the PEIS. The Agencies conducted scoping for the PEIS from September 28 to November 28, 2005. During that period, the Agencies invited the public and interested parties to provide comments for them to consider in establishing the scope and content of the PEIS. This report presents a summary of the comments that were received during the scoping period for consideration in preparing the draft PEIS. It does not present each individual comment received, nor does it present responses to the comments, conclusions, or decisions related to the content of the scoping comments.

2 SCOPING PROCESS

2.1 APPROACH

The NOI identified four methods by which the public could submit comments or suggestions to the Agencies on the proposal to designate energy corridors:

- Public scoping meetings,
- Traditional mail delivery,

- Facsimile transmission (fax), and

- Telephone.

The NOI also identified the cities in which public scoping meetings were to be held. They were held in 11 cities (one in each of the 11 potentially affected states). At each meeting location, two meetings were scheduled on the same day: one from 2:00 to 5:00 p.m., and the other from 7:00 to 9:00 p.m. The public could also provide comments or suggestions on the scope of the PEIS by using the project Web site (http://corridoreis.anl.gov/) to complete and submit a scoping comment form. The Agencies provided multiple ways to communicate about issues and submit comments in order to encourage maximum participation. All comments, regardless of how they were submitted, will receive equal consideration in the preparation of the draft PEIS.

2.2 SCOPING PARTICIPATION

A total of about 220 individuals and organizations provided comments on the scope of the PEIS. Nearly 150 organizations provided comment documents,[2] which accounted for about 80% of the all comment documents received during scoping (industry [48%]; local, state, and federal government agencies [18%]; environmental groups [8%]; and Native Americans [5%]). Individuals accounted for the other 20% of the comment documents. Comments originated from 17 states and Washington, D.C. Only 1% of the comment documents were from states outside the 11-state study area. The number of comment documents from individual states in the study area ranged from 8 (New Mexico) to 29 (California). Arizona had 23, Colorado and Utah each had 22. The number of comment documents from states not in the study area ranged from 1 (Ohio) to 7 (Texas).

Nearly 50% of the commentors used the West-wide Energy Corridor Information Center public Web site (http://corridoreis.anl.gov/) to submit comments, and 17% of these commentors also submitted their comments by using one or more of the other methods available (such as traditional mail). Since the Web site accepted only one file at a time, several commentors had to

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[2] A comment document is a written document, an email submission, or an oral presentation given during a scoping meeting that provided comments on the scope and content of the PEIS. A single comment document may contain one or more individual comments on one or more issues. In some instances, members of organizations who spoke at the public meetings also submitted written comments at the meeting and then later submitted the same written comments via regular mail and/or the project Web site (http://corridoreis.anl.gov/).

make multiple Web submittals to accommodate attachments (usually maps or figures). Submittal of comments solely via testimony at the public meetings accounted for about 30% of the comment documents received during the scoping period; an additional 13% of the commentors who testified at the meetings also submitted comment documents via one or more of the other methods available. Comment documents submitted by mail or fax accounted for about 20% of the submittals.

2.3 PUBLIC SCOPING MEETINGS

A total of 538 attendees registered for the meetings; of those, 75 provided oral comments. Of the attendees, approximately 43% were affiliated with private industry or industry associations; 36% were elected officials (or their representatives) or affiliated with federal, state, or local government; 3% were affiliated with Native American Tribes or Tribal associations; 3% were affiliated with environmental organizations; 6% were affiliated with various other organizations; and approximately 9% reported no organizational affiliation. The dates and locations of the meetings, number of registered attendees with an organizational affiliation, and number of commentors speaking at the public scoping meetings are summarized in Table 1.

3 SUMMARY OF SCOPING COMMENTS

The following text summarizes the categories of issues presented in the comments received during the scoping period. The summary does not evaluate the comments, nor does it determine or indicate which comments are viewed as being within or outside the scope of the PEIS. Inclusion of an issue is for the record only and does not imply that the comment will be addressed in the Draft PEIS. The wording is intended to categorize and summarize the substance of the comments, not reproduce the exact wording of individual comments. Individual comments may be viewed in their entirety on the West-Wide Energy Corridor EIS Information Center Web site at http://corridoreis.anl.gov/. There is a wide range of interest in and opinions about the West-wide Energy Corridor PEIS, and the comments summarized in each category illustrate the varied and, at times, contradictory issues, concerns, and desired future conditions expressed by individuals, organizations, industry, and public agencies.

TABLE 1 Scoping Meeting Summary Statistics[a]

Attendee Affiliation	Meeting Location and Date in 2005											
	Denver, CO Oct. 25	Albuquerque, NM Oct. 26	Salt Lake City, UT Oct. 26	Cheyenne, WY Oct. 27	Helena, MT Oct. 27	Boise, ID Nov. 1	Sacramento, CA Nov. 1	Las Vegas, NV Nov. 2	Portland, OR Nov. 2	Phoenix, AZ Nov. 3	Seattle, WA Nov. 3	Total no. of Registered attendees
Government	15	16	10	37	24	16	28	9	17	18	6	196
Industry	25	24	25	24	20	9	20	30	16	35	4	232
Environmental	2	0	2	1	1	2	2	4	1	0	0	15
Tribal	2	0	6	0	1	0	0	0	0	6	2	17
Other	6	2	5	2	2	3	0	4	2	3	2	31
Individual/none	4	3	13	7	3	1	1	1	1	12	1	47
Total no. of registered attendees	54	45	61	71	51	31	51	48	37	74	15	538
No. of attendees providing comments	10	5	9	4	8	4	8	10	6	9	2	75

[a] For each date, attendance figures represent the combined attendance of the two meetings held on that date.

PEIS Alternatives/General Corridor Alternatives: Comments that both supported and opposed corridor development in the Western states were received. Some commentors expressed support for the optimization criteria alternative, while others felt that the no action alternative was inappropriate because the Energy Policy Act of 2005 directs the Agencies to designate corridors on federal land in the 11 Western states. Some commentors proposed additional alternatives or modifications to the alternatives identified in the NOI; these included "environmentally protective" alternatives (such as increasing energy efficiency and/or conservation), an alternative that would consolidate existing corridors and ROWs, and an alternative that would limit new corridors to areas adjacent to federal highways and major state and municipal roads. There were also comments stating that the increased utilization alternative would be insufficient to meet the energy industry's needs, while others suggested consolidating existing corridors in favor of development.

Commentors discussed corridor selection but did not specify locations for possible corridors. Some commentors requested that new federal corridors be designated on DOD and National Park Service (NPS) lands, Tribal lands, and public lands. Some commentors requested that corridors be designated to support multiple energy transmission systems. Some commentors asked that corridor selection take into account energy delivery from Mexico and Canada, while others requested that renewable energy transmission be considered or given preference during corridor selection. Some commentors called for the exclusion of certain types of lands, such as Wilderness Areas and Wild and Scenic Rivers, from energy corridors. Others stated that current infrastructure ROWs, such as those associated with existing transmission lines, highways, and railroads, should be used to site corridors. Some commentors suggested that before new corridors are designated, energy transmission in all existing corridors and ROWs first be upgraded.

Commentors pointed out the need for new corridors to be located near existing roads to allow access for construction and maintenance equipment, and some requested that preference be given to potential corridors that include a renewable energy portfolio. Commentors also specified that the corridors be selected to address energy delivery congestion points and that the designation of corridors be consistent and coordinated with the Energy Policy Act's Section 1221 congestion study that is currently underway (see www.electricity.doe.gov/1221).

Specific Corridor Siting Suggestions: Commentors provided geographic suggestions regarding corridor siting; some identified specific existing or proposed corridors or ROWs and called for their designation as federal energy corridors. Many of these comments included maps showing the exact locations of the existing or proposed corridors and ROWs. Some commentors requested that all current corridors and ROWs be designated as corridors.

Land Use Issues: A number of concerns related to land use were raised by commentors. Some commentors stated that the siting of corridors must consider land use and planning on private lands. Commentors expressed concern that the designation of corridors on federal lands would affect private land use and place a burden on local land use planning. Some commentors requested that corridors be located on both federal and private lands and adhere to local land use plans. Concern was also raised that the designation of corridors on federal lands would lead to eminent domain seizures of private lands located between corridor segments. Several commentors requested that the PEIS identify compatible and incompatible land uses within the new corridors, specify land use restrictions for the corridors, and require enforcement of those restrictions.

Corridor Design Specifications: Some comments were related to engineering, reliability, safety, and security aspects of corridors. Concerns were raised with regard to multiuse corridors — specifically, on the risk of placing too many facilities in a common corridor and of the potential for placing incompatible transmission systems within a common corridor. Suggested corridor widths ranged from 200 feet to more than 5 miles for electric transmission corridors, 60 feet to 2 miles for oil and gas pipelines, and 1 to 5 miles for combined corridors. Some commentors did not specify corridor widths but did suggest that the designated corridors be wide enough to accommodate multiple projects. Commentors were concerned that the designated corridors would not be wide enough to accommodate multiple energy transmission systems. Some commentors requested that during corridor design and location decisions, advances in energy transmission technology be considered. Others requested that the PEIS specify ROW vegetation management procedures.

General Environmental Impacts: Commentors expressed concern that new or expanded corridor development would result in a variety of environmental impacts and requested that analyses be conducted to identify potential impacts. Concerns included impacts to fish and wildlife; impacts to areas of high biological importance, such as sage brush habitat and wetlands; habitat fragmentation; the introduction of noxious weeds; reductions in air quality; visual impacts; and impacts to recreation. Some commentors expressed concerns that new corridors would result in increased off-road vehicle (ORV) access to, and activity in, previously inaccessible areas, which would adversely affect the environment in these areas. Some commentors recommended that the PEIS include pipeline spill analyses.

Some commentors recommended that the PEIS evaluate environmental impacts from existing and future generating facilities that would use the energy corridors. Some commentors were concerned about the safety and health effects of energy transmission corridors, including effects related to electric and magnetic fields (EMFs), interference with aviation, and pipeline leaks. Some commentors recommended that the PEIS consider the effects of corridor development on archeological, historical, cultural, and paleontological resources.

Some commentors requested that the PEIS evaluate cumulative impacts and the impacts that new energy corridors (and any increases in energy production that might result from the new corridors) might have on climate change. Commentors also requested that the PEIS evaluate potential impacts not only within the corridor but also in other federal lands (such as NPS) and nonfederal lands (state and private) adjacent to any proposed corridors.

Socioeconomic Issues: Some commentors requested the PEIS to consider the economic aspects of energy transmission that are associated with consumer costs and benefits. Commentors also recommended that the PEIS include economic analyses of the land's economic value (both use and nonuse values) to wildlife and wildlife habitats and of how these values could be impacted by new corridors. Some commentors recommended that IMPLAN, a software package and database for estimating local economic impacts, not be used for the socioeconomic impact analyses because they felt that it does not adequately address regional growth or consider the role of retirement and investments in local economies. Commentors also expressed environmental justice concerns that minority or low-income populations could be disproportionately impacted as a result of corridor siting and subsequent energy development.

Time Frame of Analyses/Planning Horizons: Some commentors stated that the scope of the PEIS needs to be long term and the PEIS needs to be flexible enough to allow for future energy needs, including energy delivery. Comments suggested planning horizons ranging from 5 to 50 years for the PEIS. Some commentors raised concerns about how the PEIS will address energy projects that either now, or in the future, may occur outside the designated corridors, while others expressed concern that the PEIS would not allow transmission projects to deviate from a designated corridor.

Mitigation of Environmental Impacts: Some commentors asked that the PEIS identify specific mitigation measures (e.g., habitat restoration following land disturbance, the establishment of wildlife crossings) and best management practices (BMPs) to be followed by future energy transmission projects using designated corridors.

Scoping and Public Participation: Several commentors expressed concern that the public was not adequately notified about the PEIS, its public comment period, and the scoping meetings. Some commentors requested that the scoping period be extended, while others asked that additional meetings and/or workshops be held to further explain the PEIS process and the scope of the particular project and to identify the corridors that will be evaluated in the PEIS. Some commentors felt that there were not enough details provided in the NOI on which to comment.

Stakeholder Coordination and Consultation/Tribal Considerations: Numerous commentors stated that during the development of new energy corridors, there must be continuous coordination and consultation with other federal, state, and local governments and agencies; industry groups; private landowners; and other stakeholders. Commentors called for Tribal governments to be consulted throughout the corridor selection process and expressed concern that the designated corridors could impact Native American religious sites, practices, or hunting activities.

Streamlining of the NEPA Review, Regulatory Compliance, and Permitting: Many commentors called for the PEIS to identify a streamlined approach to be used for conducting NEPA assessments (and other regulatory evaluations such as a biological assessment for the Endangered Species Act) and for granting permits for using the designated corridors. Commentors also requested that permits for energy transmission projects require compliance with existing federal and state laws and regulations. Some commentors requested that the PEIS address permit transfers in the event of federal land sales or land swaps. Some commentors stated that the PEIS should be robust enough to allow NEPA analyses for individual projects within the designated corridors to "tier off" the PEIS,[3] and that only environmental assessments and not additional environmental impact statements (EISs) be done for future energy transmission projects. Other commentors, however, supported further detailed assessments of proposed energy projects and requested that each future transmission project proposed for a designated corridor require an EIS. One commentor called for a separate EIS to be conducted for each 10-mile stretch of each proposed corridor, and for site-specific EISs to be done prior to the designation and approval of any corridor. Some commentors requested that the PEIS identify categorical exclusions for activities such as ROW maintenance and pipeline construction, while other commentors requested that no such categorical exclusions be included.

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3 "Tiering" refers to the incorporation, by reference, of the general discussions found in broad EISs in site-specific environmental analyses, thereby allowing the site-specific analyses to concentrate solely on site-specific issues.

Corridor Review, Refinement, and Revision following Corridor Designation: Some commentors called for the PEIS to (1) require periodic NEPA review of the designated corridors to allow for changes that might be needed in response to the use of different transmission technologies and changes in energy demands and (2) specify procedures for conducting such reviews.

Other Issues: Commentors expressed concerns that the data used to evaluate the alternatives be the best available. Some commentors called for geographic information systems to be used in the PEIS analyses. Commentors asked whether the designation of federal corridors would require the relocation of existing facilities, and whether corridor designation would require upgrades of existing generation and transmission systems. One commentor suggested that electrical transmission lines be buried, while another requested that the PEIS specify unconditional access by utilities to the Federal Pipeline and Hazardous Materials Safety Administration's National Pipeline Mapping System electronic database (http://ops.dot.gov). One commentor questioned how expanded local power generation would be factored into corridor designation. Another asked that the PEIS require users of designated corridors to pay annual fees to private landholders whose property falls within those corridors. Another expressed concern that the proposed action is another example of the loss of state and personal rights to the federal government. Some commentors also requested that discussions be conducted with Mexico and Canada to specify border locations for the transboundary delivery of energy.

4 FURTHER PUBLIC INVOLVEMENT

Additional opportunities for public involvement will be provided during the preparation of the West-wide Energy Corridor Draft PEIS. The next public comment period, which will be at least 454 days in length and include several public hearings, will begin upon publication of the Draft PEIS, anticipated for the autumn of 2006.

The Agencies appreciate the participation and comments by the public and by organizations during the scoping process and welcome their continued participation at the next stage in the PEIS process. Please continue to access the project Web site (http://corridoreis.anl.gov/) for upcoming details regarding the PEIS and future opportunities for additional public participation. Interested parties may subscribe on the Web site to receive updates on the PEIS process.

APPENDIX C:

TRIBAL CONSULTATION

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C.1 INTRODUCTION

As a part of the government's Treaty and Trust responsibilities, federal agencies engage in government-to-government consultation with federally recognized Native American Tribes when assessing the impacts of projects that may affect Tribal Nations. Accordingly, government-to-government consultation with Native American groups has been ongoing throughout the production of this PEIS. This appendix contains a discussion of relevant statutes and orders requiring consultation, a description of the consultation process for this project, a summary of the consultation that has occurred to this point, lists of the Native American Tribes contacted, and copies of the materials provided to the Tribes.

The Energy Policy Act (EPAct) of 2005 addresses Tribal interests on many levels. Title V – Indian Energy establishes the Office of Indian Energy Policy and Programs within the DOE with mandates to promote Tribal Nation energy development. Section 504 requires maximum consultation with Tribal Nations regarding Title V. Section 1301 deals with the development of coal by Tribal Nations. Section 1813 mandates a study of energy rights-of-way on Indian lands. Sections 126 and 210 provide for grants to Tribal Nations for energy development. Sections 369, 372, and 1221 require consultation with affected Tribes regarding the development of oil shale/tar sand resources, the designation of energy rights-of-way on public lands, and the siting of interstate energy transport facilities, respectively.

Section 368, addressed in this PEIS, mandates the designation of federal energy corridors on federally managed lands and excludes Tribal lands. However Tribes retain an interest in federal lands that were their ancestral homelands. Many resources of cultural importance to Tribes are located on federally managed lands. In compliance with the laws, regulations, and orders discussed below, Tribes have been kept informed of the development of energy corridor proposals from early on in the project and have been invited to consult as described in this appendix.

C.2 THE SPECIAL STATUS OF TRIBES

Tribal Nations have as special status within the United States. The courts have found them to be "domestic dependent nations" that exercise sovereignty within their own territories. They existed as sovereign entities before the arrival of European immigrants, and the treaties between them and the government of the United States were treaties between sovereign governments. While they have ceded lands, usually under duress, and been removed from their ancestral homelands (see Appendix K), in many cases they have reserved rights on the lands they ceded, such as access to traditional hunting grounds, fishing areas, and sacred landscapes. Even federal lands where no treaty rights have been reserved include cultural properties still important to Native American religion and culture. While treaties have often been ignored and attempts have been made to end Tribal sovereignty, in the last three decades the federal government has reaffirmed the sovereign status of Tribal Nations, their right to their own cultural identity, and their right to practice their traditional religions. Recent federal statutes, regulations, and executive orders (Table C-1) require federal agencies to enter into government-to-government consultations when proposed actions have the potential to adversely affect Tribal resources. In general, these laws apply to federally recognized Tribes as determined by the Secretary of the Interior (25 USC 479a-1).

TABLE C-1 Laws, Orders, and Regulations Requiring Tribal Consultation

Law or Order Name	Intent of Law or Order
National Historic Preservation Act (NHPA), as amended (16 USC 470)	This law creates the legal framework for considering the effects of federal undertakings on cultural resources. It requires consultation with relevant Native American traditional cultural authorities regarding the status of potentially affected properties and the notification of affected Tribes before excavation or disposition of cultural materials.
National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 et seq.)	Implementing regulations (40 CFR 1500-1508) for NEPA studies assessing environmental effects of a proposed project or program require agencies to invite potentially affected Tribes to participate in the scoping process, notify Tribes of public meetings, invite comment from Tribes on the draft EIS, and provides for Tribes to act as cooperating agencies.
Federal Land Policy and Management Act (FLPMA) of 1976 (43 USC 1701)	FLPMA requires the Secretaries of Interior and Agriculture to consider the policies of land resource management programs on Tribal lands that have been developed and approved by Tribes when developing or revising agency land use plans.
National Forest Management Act (NFMA) of 1976 (16 USC 472 et seq.)	NFMA directs the Forest Service to consult with and coordinate forest planning with Tribes.
American Indian Religious Freedom Act (AIRFA) of 1978 (42 USC 1996)	AIRFA requires consultation with Native American organizations if an agency action will affect a sacred site on federal lands.
Archaeological Resources Protection Act (ARPA) of 1979 (16 USC 470aa-mm)	ARPA requires notification of the relevant Tribe(s) if granting an excavation permit may result in harm to, disturbance to, or destruction of any Tribal religious or cultural site.
Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 USC 3002)	NAGPRA requires federal agencies to consult with the appropriate Native American Tribes prior to the intentional excavation of human remains and funerary objects and to report unintentionally excavated human remains on federal land to the affected Tribe(s).
Executive Order 13007, “Indian Sacred Sites” (1996)	E.O. 13007 requires that a federal agency give notice to and consult with Tribes when planning actions that might affect sacred sites on federal land.
Executive Order 13175, “Consultation and Coordination with Indian Tribal Governments” (2000)	E.O. 13175 requires federal agencies to develop an “accountable process” for insuring meaningful and timely input by Tribal officials in the development of legislation and regulatory policies that have Tribal implications.

The action proposed here, the designation of energy corridors on federal lands throughout the West, would result in a change in land management plans that could potentially affect Native American resources (see Section 3.11). Executive Order (E.O.) 13175, "Consultation and Coordination with Indian Tribal Governments"; the Federal Land Policy and Management Act of 1976 (FLPMA); and the National Forest Management Act of 1976 (NFMA) all require consultation with affected Tribal governments while evaluating proposed land management changes. The National Historic Preservation Act (NHPA); the American Indian Religious Freedom Act of 1978 (AIRFA); the Archaeological Resources Protection Act of 1979 (ARPA); the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA); and E.O. 13007, "Indian Sacred Sites," all require some form government-to-government consultation with Tribal Nations when proposed actions of federal agencies have the potential to adversely affect Tribal resources. The regulations implementing the National Environmental Policy Act (NEPA) of 1969 require that in the course of the evaluation of environmental effects of proposed actions, federal agencies invite the participation of any affected Tribe in the scoping process (40 CFR 1501.7), invite comments on the draft EIS from Tribes when there could be effects of the proposed action on reservations (Part 1503.1), give Tribes notice of public hearings when there may be effects on reservations (Part 1506.6) and provide Tribes the opportunity to act as cooperating agencies when they may be affected (Part 1508.5).

The Agencies sought government-to-government consultation with Native American Tribes as set out in E.O. 13175 and the policies of the individual Agencies. These ongoing consultations are intended to ensure that the designation of energy corridors considers and accounts for the interests of Native American Tribes. These consultations will also provide working relationships that will assist the Agencies in compliance with Section 106 of the National Historic Preservation Act during the NEPA process.

There are 252 federally recognized Tribal groups with ancestral territorial claims in the 11 western states. Because traditional Tribal territories often lie well beyond modern reservation boundaries, steps were taken to inform all of these Tribes regarding the implementation of Section 368 and to provide opportunities for them to participate in scoping and government-to-government consultation (Table C-2). Because of the potential scale of consultation activities, a range of informative and consultative activities were employed. Tribes were encouraged to participate in the scoping and comment avenues open to all citizens, and were encouraged to use familiar and established channels of communication with local Agency personnel to get and give information about the project. In addition, special regional Tribal information meetings were held, a government-to-government consultation section was included on the project Web site (www.corrodoreis.anl.gov), an interagency Tribal consultation working group was established, and a central point of contact for receiving and tracking Tribal requests was designated.

Public scoping for the project began on September 28, 2005, with the publishing of the Notice of Intent to prepare the PEIS for the designation of federal energy corridors. The public scoping process remained open from September 28, 2005, to November 28, 2005. Scoping meetings were held in each of the 11 western states during the weeks of October 24 and October 31, 2005. During the public scoping period, potentially affected Tribes were contacted by letters from either Bureau of Land Management (BLM) state directors or Forest Service (FS) regional foresters. The letters outlined the scoping process and encouraged the Tribes to submit comments either at scoping meetings, by mail, or electronically through the project Web site (Exhibit C-1 is an example). Nine Tribes or

TABLE C-2 Tribal Leaders Contacted

Tribe	First	Middle	Last	Suffix	Title	Address	Address 2	City	State	ZIP
Arizona										
Ak Chin Indian Community Council	Delia	M.	Carlyle		Chairperson	42507 W. Peters & Nall Rd.		Maricopa	AZ	85239
Cocopah Tribal Council	Sherry		Cordova		Chairperson	County 15th & Avenue G		Somerton	AZ	85350
Colorado River Tribal Council	Daniel		Eddy	Jr.	Chairman	Rt. 1, Box 23-B		Parker	AZ	85344
Fort McDowell Yavapai Tribal Council	Raphael		Bear		President	P.O. Box 17779		Fountain Hills	AZ	85268
Gila River Indian Community Council	William	Roy	Rhodes		Governor	P.O. Box 97		Sacaton	AZ	85247
Havasupai Tribal Council	Thomas		Siyuja	Sr.	Chairman	P.O. Box 10		Supai	AZ	86435-0010
Hopi Tribal Council	Ivan	L.	Sidney	Sr.	Chairman	P.O. Box 123		Kykotsmovi	AZ	86039
Hualapai Tribal Nation	Charles		Vaughn		Chairman	P.O. Box 179		Peach Springs	AZ	86434
Kaibab Paiute Tribal Council	Carmen		Bradley		Chairperson	HC65, Box 2		Fredonia	AZ	86022
Navajo Nation	Joe		Shirley	Jr.	President	P.O. Box 9000		Window Rock	AZ	86515
Navajo Nation Council, Office of the Speaker	Lawrence		Morgan		Speaker of the House	P.O. Box 3390		Window Rock	AZ	86515
Pascua Yaqui Tribal Council	Herminia		Frias		Chairperson	7474 S. Camino de Oeste		Tucson	AZ	85746
Quechan Tribal Council	Mike		Jackson	Sr.	President	P.O. Box 1899		Yuma	AZ	85366
Salt River Pima-Maricopa Indian Community Council	Joni	M.	Ramos		President	10005 E. Osborn		Scottsdale	AZ	85256
San Carlos Tribal Council	Kathleen	W.	Kitcheyan		Chairperson	P.O. Box 0		San Carlos	AZ	85550
San Juan Southern Paiute Council	Evelyn		James		President	P.O. Box 1989		Tuba City	AZ	86045
Tohono O'odham Nation	Vivian		Juan-Saunders		Chairperson	P.O. Box 837		Sells	AZ	85634
Tonto Apache Tribal Council	Ivan		Smith		Chairman	Tonto Apache Reservation #30		Payson	AZ	85541
White Mountain Apache Tribal Council	Dallas		Massey	Sr.	Chairman	P.O. Box 700		Whiteriver	AZ	85941
Yavapai-Apache Community Council	Jamie		Fullmer		Chairman	2400 W. Datsi Rd.		Camp Verde	AZ	86322
Yavapai-Prescott Board of Directors	Ernest		Jones	Sr.	President	530 E. Merritt Street		Prescott	AZ	86301-2038
California										
Agua Caliente Band of Cahuilla Indians	Richard		Milanovich		Chairman	600 East Tahquitz Canyon Way		Palm Springs	CA	92262
Alturas Rancheria	Phillip		Del Rosa		Chairman	P.O. Box 340		Alturas	CA	96101
Augustine Band of Mission Indians	Mary Ann		Green		Chairperson	P.O. Box 846		Coachella	CA	92236
Barona Band of Mission Indians	Rhonda		Welch-Scalco		Spokeswoman	1095 Barona Road		Lakeside	CA	92040
Bear River Band of Rohnerville Rancheria	Leonard		Bowman		Chairman	32 Bear River Drive		Loleta	CA	95551
Benton Paiute Reservation	Joseph		Saulque		Chairman	567 Yellow Jacket Rd.		Benton	CA	93512
Berry Creek Rancheria	James		Edwards		Chairman	5 Tyme Way		Oroville	CA	95966
Big Lagoon Rancheria	Virgil		Moorehead		Chairman	P.O. Drawer 3060		Trinidad	CA	95570
Big Pine Paiute Tribe of the Owens Valley	Jessica		Bacoch		Chairperson	P.O. Box 700	825 South Main Street	Big Pine	CA	93513
Big Sandy Rancheria	Connie		Lewis		Chairperson	P.O. Box 337		Auberry	CA	93602
Big Valley Rancheria	Anthony		Jack		Chairperson	2726 Mission Rancheria Rd.		Lakeport	CA	95453
Bishop Paiute Tribe	Gerald		Howard		Chairman	50 Tu Su Lane		Bishop	CA	93514
Blue Lake Rancheria	Claudia		Brundin		Chairperson	P.O. Box 428		Blue Lake	CA	95525

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
California (Cont.)										
Bridgeport Indian Colony	Charlotte		Baker		Chairperson	P.O. Box 37		Bridgeport	CA	93517
Buena Vista Rancheria	Rhonda	L.	Morningstar Pope		Spokesperson	P.O. Box 162283		Sacramento	CA	95816
Bureau of Indian Affairs, Northern Califorina Agency						1900 Churn Creek, Suite 300		Redding	CA	96002-0292
Cabazon Tribal Business Committee	John	A.	James		Tribal Chairman	84-245 Indio Springs Drive		Indio	CA	92201
Cahto Tribal Executive Committee	Cristy		Taylor		Chairperson	P.O. Box 1239	Laytonville Rancheria	Laytonville	CA	95454
Cahuilla Band of Mission Indians	Lee	Ann	Salgado		Chairman	P.O. Box 391760		Anza	CA	92539-1760
California Valley Miwok Tribe					Chairman	10601 Escondido Place		Stockton	CA	95212
Campo Band of Mission Indians	H. Paul		Cuero	Jr.	Chairman	36190 Church Road, Suite 1		Campo	CA	91906
Cedarville Rancheria	Virginia		Lash		Chairperson	200 South Howard Street		Alturas	CA	96101
Chemehuevi Tribal Council	Charles		Wood		Chairman	P.O. Box 1976		Havasu Lake	CA	92362
Chicken Ranch Rancheria	Lloyd		Mathieson		Chairman	P.O. Box 1159		Jamestown	CA	95327
Cloverdale Rancheria	Patricia		Hermosillo		Chairperson	555 S. Cloverdale Blvd., Suite 1		Cloverdale	CA	95425
Cold Springs Rancheria	Travis		Coleman		Chairman	P.O. Box 209		Tollhouse	CA	93667
Colusa Rancheria	Wayne		Mitchum		Chairman	3730 Highway 45		Colusa	CA	95932
Cortina Rancheria	Elaine		Patterson		Chairperson	P.O. Box 1630		Williams	CA	95987
Coyote Valley Reservation	John		Feliz	Jr.	Chairman	P.O. Box 39		Redwood Valley	CA	95470
Dry Creek Rancheria	Harvey		Hopkins		Chairman	P.O. Box 607		Geyserville	CA	95441
Elem Indian Colony	Raymond		Brown	Sr.	Chairman	P.O. Box 989		Clearlake Oaks	CA	95423
Elk Valley Rancheria	Dale	A.	Miller		Chairman	2332 Howland Hill Road		Crescent City	CA	95531
Enterprise Rancheria	Glenda		Nelson		Chairperson	1940 Feather River Blvd. Suite B		Oroville	CA	95965
Ewiiaapaayp Band of Kumeyaay Indians	Harlan		Pinto	Sr.	Chairman	P.O. Box 2250	4054 Willows Road	Alpine	CA	91903-2250
Federated Indians of Graton Rancheria	Greg		Sarris		Chairman	320 Tesconi Circle Suite G		Santa Rosa	CA	95401
Fort Bidwell Reservation	Lawrence		Harlan		Chairman	P.O. Box 129		Fort Bidwell	CA	96112
Fort Independence Reservation	Carl	A.	Dahlberg		Chairman	P.O. Box 67		Independence	CA	93526
Fort Mojave Tribal Council	Nora		McDowell		Chairperson	500 Merriman Avenue		Needles	CA	92363
Greenville Rancheria	Lorie		Jaimes		Chairperson	P.O. Box 279	410 Main Street	Greenville	CA	95947
Grindstone Rancheria	Ronald		Kirk		Chairman	P.O. Box 63		Elk Creek	CA	95939
Guidiville Rancheria	Merlene		Sanchez		Acting Chairperson	P.O. Box 339		Talmage	CA	95481
Habematolel Pomo of Upper Lake	Carmella		Icay-Johnson		Interim Chairperson	P.O. Box 516	375 E. Hwy 20Suite I	Upper Lake	CA	95485
Hoopa Valley Tribal Council	Clifford	Lyle	Marshall		Chairman	P.O. Box 1348		Hoopa	CA	95546
Hopland Reservation	Wanda		Balderama		Chairperson	3000 Shanel Road		Hopland	CA	95449
Inaja-Cosmit Reservation	Rebecca		Osuna		Chairperson	309 S. Maple Street		Escondido	CA	92025
Ione Band of Miwok Indians	Mathew		Franklin		Chairman	P.O. Box 1190		Ione	CA	95640
Jackson Rancheria	Margaret		Dalton		Chairperson	P.O. Box 1090		Jackson	CA	95642
Jamul Indian Village	Leon		Acebedo		Chairman	P.O. Box 612		Jamul	CA	91935
Karuk Tribe of California	Arch		Super		Chairman	P.O. Box 1016		Happy Camp	CA	96039
La Jolla Band of Luiseno Indians	Tracy	Lee	Nelson		Chairman	22000 Highway 76		Pauma Valley	CA	92061
La Posta Band of Mission Indians	Gwendolyn		Parada		Chairperson	P.O. Box 1120		Boulevard	CA	91905
Lone Pine Paiute Shoshone Reservation	Marjianne		Yonge		Chairperson	P.O. Box 747	1103 S. Main St.	Lone Pine	CA	93545

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
California (Cont.)										
Los Coyotes Band of Cahuilla & Cupeno Indians	Catherine		Saubel		Chairwoman	P.O. Box 189		Warner Springs	CA	92086
Lower Lake Rancheria	Daniel	D.	Beltran		Chairman	P.O. Box 3162		Santa Rosa	CA	95402
Lytton Rancheria	Marjorie		Mejia		Chairperson	P.O. Box 7882	1300 N. Dutton Suite A	Santa Rosa	CA	95401
Manchester - Point Arena Band of Pomo Indians					Chairman	P.O. Box 623	24 Mamie Laiwa Dr.	Point Arena	CA	95468
Manzanita Band of Mission Indians	Leroy	J.	Elliott		Chairman	P.O. Box 1302		Boulevard	CA	91905
Mechoopda Indian Tribe of the Chico Rancheria	Steve	C.	Santos		Chairman	125 Mission Ranch Blvd.		Chico	CA	95926
Mesa Grande Band of Mission Indians	Mark		Romero		Chairman	P.O. Box 270		Santa Ysbel	CA	92070
Middletown Rancheria	Jose		Simon	III	Chairman	P.O. Box 1035	22223 Hwy 29 @ Rancheria R	Middletown	CA	95461
Mooretown Rancheria	Gary		Archuleta		Chairman	1 Alverda Drive		Oroville	CA	95966
Morongo Band of Mission Indians	Maurice		Lyons		Chairman	11581 Potrero Road		Banning	CA	92220
North Fork Rancheria	Judy	E.	Fink		Chairperson	P.O. Box 929		North Fork	CA	93643-0929
Pala Band of Mission Indians	Robert		Smith		Chairman	12196 Pala Mission Road		Pala	CA	92059
Paskenta Band of Nomlaki Indians	Everett		Freeman		Chairman	P.O. Box 398	1012 South Street	Orland	CA	95963
Pauma/Yuima Band of Mission Indians	Christobal	C.	Devers	Sr.	Chairman	P.O. Box 369		Pauma Valley	CA	92061
Pechanga Band of Mission Indians	Mark		Macarro		Chairman	P.O. Box 1477		Temecula	CA	92593
Picayune Rancheria of Chukchansi Indians	Dixie		Jackson		Chairperson	46575 Road 417		Coarsegold	CA	93614
Pinoleville Reservation	Leona		Williams		Chairperson	367 North State Street Suite 204		Ukiah	CA	95482
Pit River Tribal Council	Jessica		Jim		Chairperson	37118 Main Street		Burney	CA	96013
Potter Valley Tribe	Salvador		Rosales		Chairman	2251 South State Street		Ukiah	CA	95482
Quartz Valley Reservation	Ronald		Lincoln		Chairman	13601 Quartz Valley Road		Fort Jones	CA	96032
Ramona Band of Mission Indians	Manuel		Hamilton		Chairman	P.O. Box 391372		Anza	CA	92539
Redding Rancheria	Barbara		Murphy		Chairman	2000 Redding Rancheria Rd.		Redding	CA	96001
Redwood Valley Reservation	Elizabeth		Hansen		Chairperson	3250 Road I		Redwood Valley	CA	95470
Resighini Rancheria	Rick		Dowd		Chairman	P.O. Box 529		Klamath	CA	95548
Rincon Band of Mission Indians	John		Currier		Chairman	P.O. Box 68		Valley Center	CA	92082
Robinson Rancheria	Clara		Wilson		Chairperson	P.O. Box 4015		Nice	CA	95464
Round Valley Reservation	Shannon		Barney		President	P.O. Box 448		Covelo	CA	95428
Rumsey Rancheria	Marshall		McKay		Chairperson	P.O. Box 18		Brooks	CA	95606
San Manuel Band of Mission Indians	Deron		Marquez		Chairman	P.O. Box 266		Patton	CA	92369
San Pasqual Band of Diegueno Indians	Allen	E.	Lawson	Jr.	Spokesman	P.O. Box 365		Valley Center	CA	92082-0365
Santa Rosa Band of Mission Indians	John		Marcus		Vice-Chairman	P.O. Box 609		Hemet	CA	92546
Santa Rosa Rancheria	Clarence		Atwell	Jr.	Chairman	P.O. Box 8		Lemoore	CA	93245
Santa Ynez Band of Mission Indians	Vincent		Armenta		Chairman	P.O. Box 517		Santa Ynez	CA	93460
Santa Ysabel Band of Mission Indians	Johnny		Hernandez	Jr.	Spokesman	P.O. Box 130		Santa Ysabel	CA	92070
Scotts Valley Rancheria	Donald		Arnold		Chairman	301 Industrial Avenue		Lakeport	CA	95453
Sherwood Valley Rancheria	Michael		Fitzgerral		Chairman	190 Sherwood Hill Drive		Willits	CA	95490
Shingle Springs Rancheria	Nicholas	H.	Fonseca		Chairman	P.O. Box 1340		Shingle Springs	CA	95682

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
California (Cont.)										
Smith River Rancheria	Kara	L.	Miller		Chairperson	140 Rowdy Creek Road		Smith River	CA	95567
Soboba Band of Luiseno Indians	Robert		Salgado	Sr.	Spokesman	P.O. Box 487		San Jacinto	CA	92581
Stewarts Point Rancheria	Severino		Gomes		Chairman	3535 Industrial Drive Suite B-2		Santa Rosa	CA	95403
Susanville Indian Rancheria	Stacy		Dixon		Chairman	Drawer U		Susanville	CA	96130
Sycuan Band of the Kumeyaay Nation	Daniel		Tucker		Spokesman	5459 Sycuan Road		El Cajon	CA	92021
Table Mountain Rancheria	Leanne		Walker-Grant		Chairperson	P.O. Box 410	23736 Sky Harbour Road	Friant	CA	93626
Timbisha Shoshone Tribe	Joe		Kennedy		Chairman	785 N. Main Street Suite Q		Bishop	CA	93514
Torres-Martinez Desert Cahuilla Indians	Raymond		Torres		Chairman	P.O. Box 1160		Thermal	CA	92274
Trinidad Rancheria	Garth		Sundberg	Sr.	Chairperson	P.O. Box 630		Trinidad	CA	95570
Tule River Reservation	Neil		Peyron		Chairperson	P.O. Box 589		Porterville	CA	93258
Tuolumne Rancheria	Kevin		Day		Chairman	P.O. Box 699		Tuolumne	CA	95379
Twenty-Nine Palms Band of Mission Indians	Dean		Mike		Spokesman	46-200 Harrison Place		Coachella	CA	92236
United Auburn Indian Community	Jessica		Tavares		President	575 Menlo DriveSuite 2		Rocklin	CA	95765
Viejas Band of Mission Indians	Anthony		Pico		Chairman	P.O. Box 908		Alpine	CA	91903
Wiyot Tribe	Cheryl	A.	Seidner		Chairperson	1000 Wiyot Drive		Loleta	CA	95551
Woodfords Community Council	Mahlon		Machado		Chairman	96 Washoe Blvd.		Markleeville	CA	96120
Yurok Tribe	Howard		McConnell		Chairman	P.O. Box 1027		Klamath	CA	95548
Colorado										
Southern Ute Tribe	Clement	J.	Frost		Chairman	P.O. Box 737		Ignacio	CO	81137
Ute Mountain Ute Tribe	Manuel		Heart		Chairman	P.O. Box 248		Towaoc	CO	81334-0248
Ute Mountain Ute Tribe	Selwyn		Whiteskunk		Chair	General Delivery		Towaoc	CO	81334
Idaho										
Coeur d'Alene Tribal Council	Chief	J.	Allan		Chairman	P.O. Box 408	850 A Street	Plummer	ID	83851
Kootenai Tribal Council	Jennifer		Porter		Chairperson	P.O. Box 1269		Bonners Ferry	ID	83805-1269
Nez Perce Tribal Executive Committee	Rebecca		Miles		Chairman	P.O. Box 305		Lapwai	ID	83540-0305
Northwestern Band of Shoshone Nation	Ivan		Wongan		Chairman	427 North Main Street Suite 101		Pocatello	ID	83204-3016
Shoshone-Bannock Tribes	Blaine		Edmo		Chairman	Fort Hall Business Council P.O. Box 306		Fort Hall	ID	83203-0306
Montana										
Blackfeet Tribal Business Council	Patrick		Thomas		Chairman	P.O. Box 850		Browning	MT	89417
Chippewa Cree Business Committee	John		Houle		Chairman	RR 1, P.O. Box 544		Box Elder	MT	59521
Confederated Salish & Kootenai TribesTribal Council	James		Steele	Jr.	Chairman	Box 278		Pablo	MT	59855
Crow Tribal Council	Carl		Venne		Chairman	P.O. Box 400		Crow Agency	MT	59022
Fort Belknap Community Council	Julia		Doney		President	RR 1, Box 66		Harlem	MT	59526
Fort Peck Tribal Executive Board	John		Morales		Chairman	P.O. Box 1027		Poplar	MT	59255
Northern Cheyenne Tribal Council	Eugene		Littlecoyote		President	P.O. Box 128		Lame Deer	MT	59043

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
Nebraska										
Santee Sioux Nation	Roger		Trudell		Chairperson	108 Spirit Lake Ave. West		Niobrara	NE	68760
Nevada										
Battle Mountain Band Council	Joseph		Holley		Chairman	37 Mountain View Drive		Battle Mountain	NV	89820
Carson Community Council	Warner	Gary	Nevers		Chairman	2900 S. Curry Street		Carson City	NV	89703
Dresslerville Community Council	Anthony		Smokey		Chairman	919 Highway 395		Gardnerville	NV	89410
Duck Valley Shoshone-Paiute Business Council	Terry		Gibson		Chairman	P.O. Box 219		Owyhee	NV	89832
Duckwater Tribal Council	Ruby		Sam		Chairperson	P.O. Box 140068		Duckwater	NV	89314
Elko Band Council	Hugh		Stevens		Chairman	1745 Silver Eagle Drive		Elko	NV	89801
Ely Shoshone Tribe	Diana		Buckner		Chairperson	16 Shoshone Circle		Ely	NV	89301
Fallon Paiute Shoshone Tribal Business Council	Alvin		Moyle		Chairman	565 Rio Vista Road		Fallon	NV	89406-9159
Fort McDermitt Tribal Council	Karen		Crutcher		Chairperson	P.O. Box 457		McDermitt	NV	89421
Inter-Tribal Council of Nevada	Daryl		Crawford		Executive Director	680 Greenbrae Drive		Sparks	NV	89431
Las Vegas Tribal Council	Alfreda	L.	Mitre		Chairperson	Number One Paiute Drive		Las Vegas	NV	89106
Lovelock Paiute Tribe	Alfred		Happy	Sr.	Chairman	P.O. Box 878		Lovelock	NV	89419
Moapa Business Council	Dalton		Tom		Chairman	P.O. Box 340		Moapa	NV	89026-0340
Pahrump Paiute Tribe Las Vegas Indian Center Inc.	Richard		Arnold		Executive Director	2300 W. Bonanza Road		Las Vegas	NV	89107
Pyramid Lake Paiute Tribal Council	Norman		Harry		Chairman	P.O. Box 256		Nixon	NV	89424
Reno-Sparks Tribal Council	Arlan	D.	Melendez		Chairman	98 Colony Road		Reno	NV	89502
South Fork Band Council	Ronnie	L.	Woods		Chairman	HC 30, Box B-13 - Lee		Spring Creek	NV	89815
Stewart Community Council	Wanda		Batchelor		Chairperson	5300 Snyder Ave.		Carson City	NV	89701
Summit Lake Paiute Council	Robyn		Burdette		Chairperson	653 Anderson Street		Winnemucca	NV	89445
Te-Moak Tribe of Western Shoshone	Hugh		Stevens		Chairman	525 Sunset Street		Elko	NV	89801
Walker River Paiute Tribal Council	Genia		Williams		Chairperson	P.O. Box 220		Schurz	NV	89427
Washoe Tribe of Nevada and California	A. Brian		Wallace		Chairman	919 Highway 395 South		Gardnerville	NV	89410
Wells Band Council	Kristi		Begay		Chairperson	P.O. Box 809		Wells	NV	89835
Winnemucca Colony Council	Dennis		Bill		Acting Chairman	P.O. Box 1370		Winnemucca	NV	89446
Yerington Paiute Tribe	Wayne	M.	Garcia		Chairman	171 Campbell Lane		Yerington	NV	89447
Yomba Shoshone Tribe	Dennis	J.	Bill		Chairman	HC 61, Box 6275		Austin	NV	89310
New Mexico										
All Indian Pueblos Council	Amadeo		Shije		Chairman	2401 12th St. NW		Albuquerque	NM	87103
Eight Northern Indian Pueblos Council	Terry		Aguilar		Executive Director	P.O. Box 969		San Juan Pueblo	NM	87566
Five Sandoval Indian Pueblos	Roger		Madalena		Executive Director	1043 Highway 313		Bernalillo	NM	87004
Jicarilla Apache Nation	Levi		Pesata		President	P.O. Box 507		Dulce	NM	87528
Mescalero Apache Tribe	Mark	R.	Chino		President	P.O. Box 227		Mescalero	NM	88340
Ohkay Owingeh	Joseph		Garcia		Governor	P.O. Box 1099		San Juan Pueblo	NM	87566
Pueblo of Acoma	Jason		Johnson		Governor	P.O. Box 309		Acoma	NM	87034
Pueblo of Cochiti	Cippy		Crazyhorse		Governor	P.O. Box 70		Cochiti	NM	87072
Pueblo of Isleta	Robert		Benavides		Governor	P.O. Box 1270		Isleta	NM	87022
Pueblo of Jemez	James	Roger	Madalena		Governor	P.O. Box 100		Jemez Pueblo	NM	87024
Pueblo of Laguna	Roland	E.	Johnson		Governor	P.O. Box 194		Laguna	NM	87026-

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
New Mexico (Cont.)										
Pueblo of Nambe	Dennis	F.	Vigil		Governor	Route 1, Box 117-BB		Santa Fe	NM	87501
Pueblo of Picuris	Richard		Mermejo		Governor	P.O. Box 127		Penasco	NM	87553
Pueblo of Pojoaque	George		Rivera		Governor	17746 U.S. Highway 84/285		Santa Fe	NM	87506
Pueblo of San Felipe	Sam		Candelaria		Governor	P.O. Box 4339		San Felipe Pueblo	NM	87001
Pueblo of San Ildefonso	James		Mountain		Governor	Route 5, Box 315-A		Santa Fe	NM	87501
Pueblo of San Juan	Joe		Garcia		Governor	P.O. Box 1099		San Juan Pueblo	NM	87566
Pueblo of Sandia	Lawrence		Gutierrez		Governor	481 Sandia Loop		Bernalillo	NM	87004
Pueblo of Santa Ana	Leonard		Armijo		Governor	2 Dove Road		Santa Ana Pueblo	NM	87004
Pueblo of Santa Clara	Joseph	Michael	Chavarria		Governor	P.O. Box 580		Espanola	NM	87532
Pueblo of Santo Domingo	Julian		Coriz		Governor	P.O. Box 99		Santo Domingo Pueblo	NM	87052
Pueblo of Taos	James		Lujan		Governor	P.O. Box 1846		Taos	NM	87571
Pueblo of Tesuque	Gil		Vigil		Governor	RR 42, Box 360-T		Santa Fe	NM	87506-2632
Pueblo of Zia	Rudy		Shije		Governor	135 Capitol Square Drive		Zia Pueblo	NM	87053-6013
Pueblo of Zuni	Arlen	P.	Quetawki	Sr.	Governor	P.O. Box 339		Zuni	NM	87327
Ramah Navajo Chapter	Leo	L.	Pino		President	Route 2, Box 13		Ramah	NM	87321
North Dakota										
Standing Rock Sioux Tribe of North & South Dakota	Ron		His Horse Is Thunder		Chairperson	P.O. Box D		Fort Yates	ND	58538
Three Affiliated Tribes of the Fort Berthold Reservation	Tex		Hall		Chairperson	404 Frontage Road		New Town	ND	58763
Oklahoma										
Apache Tribe of Oklahoma	Nathan		Tselee		Chairperson	P.O. Box 1220		Anadarko	OK	73005
Cheyenne-Arapaho Tribes of Oklahoma	Darrell		Flyingman		Chairperson	P.O. Box 38		Concho	OK	73022
Commanche Nation	Wallace		Coffey		Chairperson	HC 32, Box 1720		Lawton	OK	73502
Fort Sill Apache Tribe of Oklahoma	Jeff		Houser		Chairman	Route 2, Box 121		Apache	OK	73006
Kiowa Tribe of Oklahoma	Billy	E.	Horse		Chairperson	P.O. Box 369		Carnegie	OK	73015
Oregon										
Burns Paiute Tribe General Council	Barbara		Sam		Chairman	100 Pasigo Street		Burns	OR	97720
Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians	Ron		Brainard		Chairman	1245 Fulton Avenue		Coos Bay	OR	97420
Confederated Tribes of the Grand Ronde Community of Oregon	Cheryl		Kennedy		Chairperson	9615 Grand Ronde Road		Grand Ronde	OR	97347-0038
Confederated Tribes of the Umatilla Indian Reservation	Antone		Minthorn		Chairman	P.O. Box 638		Pendleton	OR	97801-0638
Confederated Tribes of the Warm Springs Reservation Tribal Council	Ron		Suppah		Chairman	P.O. Box C		Warm Springs	OR	97761-3001
Coquille Indian Tribe	Ed		Metcalf		Chairman	P.O. Box 783	3050 Tremont Street	North Bend	OR	97549

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
Oregon (Cont.)										
Cow Creek Government Offices	Sue		Shaffer		Chairperson	2371 N.E. Stevens Suite 100		Roseburg	OR	97470-1338
Klamath General Council	Allen		Foreman		Chairman	P.O. Box 436		Chiloquin	OR	97624-0436
Siletz Tribal Council	Delores		Pigsley		Chairman	P.O. Box 549		Siletz	OR	97380-0549
South Dakota										
Cheyenne River Sioux Tribe of the Cheyenne River Reservation	Harold		Frazier		Chairperson	P.O. Box 590		Eagle Butte	SD	57625
Crow Creek Sioux Tribe of the Crow Creek Reservation	Duane		Big Eagle		Chairperson	P.O. Box 50		Fort Thompson	SD	57339
Lower Brule Sioux Tribe of the Lower Brule Reservation	Michael	G.	Jandreau		Chairperson	187 Oyate Circle		Lower Brule	SD	57548
Oglala Sioux Tribe of the Pine Ridge Reservation	Cecelia		Fire Thunder		President	P.O. Box 2070		Pine Ridge	SD	57770
Rosebud Sioux Tribal Council	Rodney		Bordeaux		President	P.O. Box 430		Rosebud	SD	57570
Texas										
Ysleta del Sur Pueblo	Arturo		Senclair		Governor	119 S. Old Pueblo Rd.		El Paso	TX	79917
Utah										
Goshute Business Council	Rupert		Steele		Chairman	P.O. Box 6104		Ibapah	UT	84034
Paiute Indian Tribe of Utah Tribal Council	Lora		Tom		Chairperson	440 N. Paiute Drive		Cedar City	UT	84720-2613
Skull Valley Band of Goshute Indians	Leon	D.	Bear		Chairman, Executive Committee	3359 South Main Street #808		Salt Lake City	UT	84029
Ute Indian Tribe	Maxine		Natchee		Chairperson	P.O. Box 190		Ft. Duchesne	UT	84026
Washington										
Confederated Tribes of the Chehalis Reservation	David		Burnett		Chairman	P.O. Box 536		Oakville	WA	98568
Confederated Tribes of the Colville Reservation	Harvey		Moses	Jr.	Chairman	P.O. Box 150		Nespelem	WA	99155-0150
Cowlitz Indian Tribe	John		Barnett		Chairman	P.O. Box 2547	1417 - 15th Ave.#5	Longview	WA	98632-8594
Hoh Tribal Business Committee	Vivian		Lee		Chairwoman	2464 Lower Hoh Road		Forks	WA	98331
Jamestown S'Klallam Tribal Council	Wm. Ron		Allen		Chairman	1033 Old Blyn Hwy.		Sequim	WA	98382
Kalispel Business Committee	Glen		Nenema		Chairman	P.O. Box 39		Usk	WA	99180-0039
Lower Elwha Tribal Council	Frances	G.	Charles		Chairwoman	2851 Lower Elwha Road		Port Angeles	WA	98363
Lummi Indian Business Council	Darrell		Hillaire		Chairman	2616 Kwina Road		Bellingham	WA	98226
Makah Indian Tribal Council	Ben		Johnson	Jr.	Chairman	P.O. Box 115		Neah Bay	WA	98357-0115
Muckleshoot Tribal Council	John		Daniels	Jr.	Chairman	39015 172nd Avenue S.E.		Auburn	WA	98092
Nisqually Indian Community Council	Dorian	S.	Sanchez		Chairman	4820 She-Nah-Num Drive S.E.		Olympia	WA	98513-9199
Nooksack Indian Tribal Council	Narcisco		Cunanan		Chairman	P.O. Box 157	5016 Deming Road	Deming	WA	98244-0157
Port Gamble S'Klallam Tribe	Ronald	G.	Charles		Chairman	31912 Little Boston Rd. N.E.		Kingston	WA	98346
Puyallup Tribal Council	Herman		Dillon	Sr.	Chairman	1850 Alexander Avenue		Tacoma	WA	98421
Quileute Tribal Council	Russell		Woodruff	Sr.	Chairman	P.O. Box 279		LaPush	WA	98350
Quinault Indian Nation – Business Committee	Pearl		Capoeman-Baller		President	P.O. Box 189		Taholah	WA	98587-0189
Samish Indian Nation	Tom		Wooten		Chairman	P.O. Box 217	1618 D Avenue	Anacortes	WA	98221

TABLE C-2 (Cont.)

Tribe	First	Middle	Last	Suffix	Title	Address	Address2	City	State	ZIP
Washington (Cont.)										
Sauk-Suiattle Tribal Council	Gloria	Y.	Green		Chairperson	5318 Chief Brown Ln.		Darrington	WA	98241-9421
Shoalwater Bay Tribal Council	Charlene		Nelson		Chairman	P.O. Box 130		Tokeland	WA	98590-0130
Skokomish Tribal Council	Gordan		James		Chairman	N. 80 Tribal Center Road		Skokomish Nation	WA	98584
Snoqualmie Tribal Organization	Bill		Sweet		Chairman	8130 Railroad Avenue	Suite 103	Snoqualmie	WA	98065
Spokane Business Council	Greg		Abrahamson		Chairman	P.O. Box 100		Wellpinit	WA	99040-0100
Squaxin Island Tribal Council	James	L.	Peters		Chairman	10 SE Squaxin Lane		Shelton	WA	98584-9200
Stillaguamish Board of Directors	Shawn	E.	Yanity		Chairman	P.O. Box 277		Arlington	WA	98223-0277
Suquamish Tribal Council	Leonard		Forsman		Chairman	P.O. Box 498		Suquamish	WA	98392-0498
Swinomish Indian Tribal Community	M. Brian		Cladoosby		Chairman	P.O. Box 817	11404 Moorage Way	LaConner	WA	98257-0817
Tulalip Board of Directors	Stanley	G.	Jones		Chairman	6700 Totem Beach Road		Marysville	WA	98271-9715
Upper Skagit Tribal Council	Marilyn		Scott		Chairperson	25944 Community Plaza Way		Sedro Woolley	WA	98284-9739
Yakama Nation	Louis		Cloud		Chairman	P.O. Box 151		Toppenish	WA	98948-0151
Wyoming										
Arapaho Tribe of the Wind River Reservation	Richard	B.	Brannon		Chairman	P.O. Box 396		Fort Washakie	WY	82514
Shoshone Tribe of Wind River Reservation	Ivan	D.	Posey		Chairman	P.O. Box 217		Fort Washakie	WY	82514

Tribal organizations presented issues and concerns to the project team through the public scoping process.

In April 2006, following the scoping period, Mr. Kevin Kolevar, Director of the Office of Electricity Delivery and Energy Reliability, sent letters to Tribal entities in the 11 western states inviting Tribal representatives to regional information meetings to be held in May throughout the West (Exhibit C-2). Twenty-nine Tribes sent representatives to these meetings. These meetings were intended to provide sufficient information to allow Tribes to decide whether they wished to enter into formal government-to-government consultations. In these information sessions, the project was discussed, Tribal concerns were aired, and Tribes were invited to enter into consultation. The Tribes were also invited to comment on the draft corridor map to be released in June. Five Tribes submitted comments on the map. All Tribes invited to the information meetings, along with all attendees, received a summary report of the meetings (Exhibit C-3) and updated state-wide corridor maps. Later, letters inviting consultation and summarizing the information presented at the Tribal meetings were sent to 13 additional Tribes with traditional territorial claims in the 11 western states, but with reservations in other states.

Forty-four Tribal groups have entered into some kind of one-on-one dialogue with the Agencies (Table C-3). As early as the scoping process, Tribes began to request government-to-government consultation. A single point of contact was established at Argonne National Laboratory to answer Tribal requests for information and facilitate consultation. At the same time, an interagency Tribal Consultation Group was set up to implement consultation with the Agencies. It developed a consultation protocol, including points of contact (POCs) within each agency, to manage contacts with interested Tribes (Exhibit C-4) and approved a packet of basic information on the Proposed Action to be provided to Tribes desiring consultation (Exhibit C-5). The protocol takes advantage of existing relationships between local Agency representatives and the Tribes. Once a request for consultation was received, it was forwarded to the Tribal Consultation Group, which assigned a local Agency POC to initiate discussions. Consultation was made available at any level desired by the Tribe. In general, local POCs provided basic information and fielded requests for additional information such as for more detailed maps. In cases where further consultation was desired, the Agency POCs acted as facilitators setting up consultation with program managers. As necessary, Agency project managers traveled to the West to meet with Tribal groups, or Tribal representatives came to Washington, D.C., for discussions. One Tribe, the Coeur d'Alene of Idaho, became a consulting agency.

The incorporation of local Agency experience with Native American concerns in their areas played an important role in the consultation process. Even before the onset of government-to-government consultations, local Agency knowledge of areas of cultural concern to Native Americans was incorporated into the siting process. As consultation got under way, state and local BLM and FS offices used their knowledge to follow up on the initial contacts with letters, telephone calls, and meetings with those groups expressing a desire to consult, or who would be most directly affected by the proposed corridors. The most common Tribal request was for more detailed maps (which were provided), to meet again after the Draft PEIS was issued, and to be given adequate notice of any planned development in the proposed corridors. Other concerns commonly expressed throughout the consultation process included potential effects on Tribal economic development, potential effects on the availability of energy to Tribal groups, potential effects on the environment, as well as potential effects on traditional cultural properties. Information on potentially culturally sensitive areas was also acquired. When requested, proposed corridors were moved to avoid areas of Native American

TABLE C-3 Tribal Groups Requesting Consultation or Additional Information as of April 2007

Tribe	Responsible Agency	Status
Arizona		
Cocopah Tribal Council	BLM FS	Initial consultation completed – desires further contact
Hualapai Nation	BLM	Initial contact made – consultation being arranged
Kaibab Paiute Tribe	BLM	Initial consultation completed – updates desired
Navajo Nation	Working Group	Initial contact made – consultation under way
Pascua Yaqui Tribal Council	BLM	Consultation being arranged
California		
Quechan Tribal Council	BLM	Initial contact made – consultation being arranged
Enterprise Rancheria	FS	Initial consultation completed
Lytton Band of Pomo Indians	FS	Information request filled
Morongo Band of Mission Indians	FS	Initial consultation completed
Pechanga Band of Mission Indians	FS	Initial consultation completed
Pit River Tribe of California	FS BLM	Initial consultation completed – opposed to new corridors
Robinson Rancheria	FS	Information request filled
Timbisha Shoshone	BLM	Initial contact made – consultation being arranged
Viejas Band of Mission Indians	FS	Information request filled
Colorado		
Southern Ute Tribal Council	BLM FS	Information request filled
Idaho		
Coeur d'Alene Tribe	BLM	Cooperating agency
Shoshone-Bannock	BLM	Initial consultation completed – desires further contact
Northwestern Band of the Soshone Nation	BLM	Initial consultation completed – updates desired
Montana		
Blackfeet Nation	BLM	Initial consultation completed – desires updates
Crow Tribal Council	BLM	Initial consultation completed
Northern Cheyenne	BLM	Information request filled
Confederated Salish & Kootenai Tribes	BLM	Initial consultation completed
Nevada		
Fallon Paiute – Shoshone	BLM	Consultation on designation completed
Pyramid Lake Paiute Tribe	BLM	Initial consultation – TCPs identified
Reno-Sparks Tribal Council	BLM	Consultation on designation completed
Duck Valley Shoshone-Paiute	BLM	Initial consultation completed – desires further contact
Walker River Paiute Tribe	BLM	Initial consultation completed
Washoe Tribe	BLM	Consultation on designation completed
Yerington Paiute Tribe	BLM	Consultation on designation completed
New Mexico		
Canoncito Band	BLM	Initial consultation completed – no current concerns
Pueblo of Santa Ana		Initial consultation completed – desires updates
Pueblo of Santo Domingo		Initial consultation completed – desires further consultation
Pueblo of Zia		Initial consultation completed – environmental concerns; desires further consultation
Pueblo of Zuni		Initial consultation completed – environmental concerns

TABLE C-3 (Cont.)

Tribe	Responsible Agency	Status
New Mexico (Cont.)		
Navajo Nation – Ojo Encino Chapter	BLM	Initial consultation completed – desires updates
Navajo Nation – Torreon Chapter	BLM	Initial consultation completed – desires updates
Pueblo of Acoma	BLM	Initial consultation completed – information request filled
Pueblo of Isleta	BLM	Initial consultation completed
Pueblo of Jemez	BLM	Initial consultation completed – desires updates
Pueblo of Sandia	BLM	Initial consultation completed – desires further consultation
Pueblo of Santa Ana	BLM	Initial consultation completed
Pueblo of Santo Domingo	BLM	Initial consultation completed
Pueblo of Zia	BLM	Initial consultation completed
Pueblo of Zuni	BLM	Consultation scheduled
Oregon		
Confederated Tribes of the Umatilla	FS	Consultation initiated
Confederated Tribes of the Warm Springs Reservation	FS	Initial consultation completed – desires further contact
Utah		
Confederated Goshute Tribe	FS BLM	Information request filled
Washington		
Colville Reservation	FS	Consultation under way

concern. Where there was local precedent and the established working relationship with local Tribes required it, Agency offices included Native Americans in the internal review process of the draft of this document.

It is likely that Native American groups will have additional comments on the PEIS. This PEIS is being made available to all 252 federally recognized Tribal groups with traditional interests in the 11 western states. The Agencies will remain in communication with them during the PEIS process.

Exhibit C-1

NA 131.00

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Idaho State Office
1387 South Vinnell Way
Boise, Idaho 83709
http://www.id.blm.gov

TAKE PRIDE IN AMERICA

SURNAME/DATE	
BRose-Supv. PA Specialist-912	
CZwang-Office of Communications Manager-912	
K Lynn Bennett-SD-910-Sign	
Return to: S.Henry (933)	

In Reply Refer To:
9105 (912)

[SEE ATTACHED LIST]

Dear [SEE ATTACHED LIST]:

As part of the Bureau of Land Management's ongoing government-to-government consultation with the [SEE ATTACHED LIST], I would like to invite you to become involved in the process of designating energy corridors on Federal lands in the Western U.S.

The Energy Policy Act of 2005 requires that the Secretaries of the Interior, Energy and Agriculture undertake efforts to (1) designate corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land in the 11 contiguous Western states; (2) perform any environmental reviews that may be required to complete the designation of such corridors; and (3) incorporate the designated corridors into the relevant agency land use and resource management plans or equivalent plans.

The Bureau of Land Management (BLM) and the Department of Energy (DOE) will prepare a Programmatic Environmental Impact Statement (PEIS) in cooperation with the U.S. Department of Agriculture's Forest Service (FS) to evaluate issues associated with energy corridor designation in the 11 contiguous Western States.

The BLM is a co-lead agency with DOE and the FS is a cooperating agency in preparing the PEIS. The West-wide Energy Corridor PEIS will evaluate issues associated with energy corridor designation and consider the need to amend individual land use plans throughout the Western region. Preparation and implementation of the PEIS will proceed over the next 24 months in a multi-step process that will include publication of the Draft PEIS, the Final PEIS, and Records of Decision (RODs) by the BLM, DOE and the FS.

Gaining your specific knowledge and perspective during development of the PEIS is critical and valuable to the overall success of the PEIS and its implementation. We would like to facilitate discussion and information sharing in a manner that would be useful to you and your Tribe.

NA 131.092

A public scoping meeting on the PEIS will be held in Boise on November 1 at the Harrison Plaza Suite Hotel, located at 409 S. Cole. If you or a representative would like to attend, the scoping meeting will be held from 2:00 to 5:00 p.m. and from 7:00 to 9:00 p.m. The complete schedule of scoping meetings in western cities follows:

October 25, 2005 – Denver, Colorado
October 26, 2005 - Albuquerque, New Mexico and Salt Lake City, Utah
October 27, 2005 - Cheyenne, Wyoming and Helena, Montana
November 1, 2005 – Boise, Idaho and Sacramento, California
November 2, 2005 – Las Vegas, Nevada and Portland, Oregon
November 3, 2005 – Phoenix, Arizona and Seattle, Washington

The interagency project team has developed a Website specific to this project where users can gain further information: http://corridoreis.anl.gov . This Website also includes the means to submit comments electronically and to subscribe to an email list service for updates on the project.

If you are interested in further consultation on this corridor designation, or in becoming a cooperating agency in preparing the PEIS, please let me know so that we may begin our discussions. You may reach me at 208-373-4001.

Thank you for your consideration. I look forward to our interaction and discussions.

Sincerely,

K Lynn Bennett
State Director

ROSE:smh:10/19/05:U:\WP\931stuff\Barry\tribal letters-surnamed.doc
CF 912 RF AUTHOR

NA 131.00

DISTRIBUTION LIST

Coeur d'Alene Tribe
Tribal Chairman
P.O. Box 408
Plummer, Idaho 83851

Coeur d'Alene Tribe
Natural Resource Department
P.O. Box 408
Plummer, Idaho 83851

Kootenai Tribe of Idaho
Tribal Chairman
P.O. Box 1269
Bonners Ferry, Idaho 83805

Kootenai Tribe of Idaho
Natural Resource Department
P.O. Box 1269
Bonners Ferry, Idaho 83805

Nez Perce Tribe
Tribal Chairwoman
P.O. Box 365
Lapwai, Idaho 83540

Nez Perce Tribe
Natural Resource Department
P.O. Box 365
Lapwai, Idaho 83540

Shoshone-Bannock Tribes
Tribal Chairman
Fort Hall Indian Reservation
P.O. Box 306
Fort Hall, Idaho 83203

Shoshone-Bannock Tribes
Yvette Tuell
Fort Hall Indian Reservation
P.O. Box 306
Fort Hall, Idaho 83203

Shoshone-Paiute Tribes
Chairman Gibson
Duck Valley Indian Reservation
P.O. Box 219
Owyhee, Nevada 89832

Shoshone-Paiute Tribe
Natural Resource Department
Duck Valley Indian Reservation
P.O. Box 219
Owyhee, Nevada 89832

Exhibit C-2

Department of Energy
Washington, DC 20585

Dear

We are pleased to invite you and your tribal members to consult with us on energy corridors being considered for designation on Federal lands as outlined in Section 368 of the Energy Policy Act of 2005 (EPAct). The Project Team (described below) is preparing a preliminary map of energy corridors that we would like to discuss with you in person. A copy of the most recent working draft of this map is enclosed for your advance information and review.

EPAct, P.L. 109-58, Section 368, directs the Secretaries of Agriculture, Defense, Energy and the Interior to prepare a Programmatic Environmental Impact Statement (PEIS) to evaluate issues associated with the designation of energy corridors on federal lands in the eleven Western States.

A 60-day public scoping period for the PEIS started with the publication of the "Notice of Intent" in the Federal Register on September 28, 2005, and ended on November 28, 2005. Public scoping meetings were held in each of the 11 Western States during the period of October 25, 2005, to November 3, 2005. The scoping report has been completed and is available on the EIS web site at www.corridoreis.anl.gov.

We are arranging follow-up meetings, as described below, with Tribes to discuss any concerns you might have regarding these corridors. We want to assure you that the Federal agencies will continue to engage in government-to-government consultation at the local level on issues with tribal implications.

The Project Team for the PEIS is composed of representatives from the four Federal agencies and senior staff of Argonne National Laboratory, the contractor assisting us with the preparation of the PEIS. Argonne will provide technical assistance and administrative support to the tribal consultation process. Comments from Tribal leaders and their constituents will be collected by Argonne and then forwarded to the federal agencies for their response.

Accordingly, the Team, on behalf of the Departments of Agriculture, Defense, Energy and the Interior, extends this invitation to you or your designated representative(s) to meet with us at whichever of the following meetings is most convenient for you:

Monday, May 9:	**Portland, Oregon 97204** Oregon-Washington State Office Bureau of Land Management (U.S. Dept. of the Interior) 333 SW 1st Avenue Tel. 503-808-6026
Friday, May 12:	**Sacramento, California 95815** Radisson Hotel 500 Leisure Lane Tel. 916-922-2020
Monday, May 15:	**Las Vegas, Nevada 89130** Las Vegas Field Office Bureau of Land Management (U.S. Dept. of the Interior) 4701 Torrey Pines Drive Tel. 702-515-5000
Tuesday, May 23:	**Albuquerque, New Mexico 87107** Albuquerque Field Office Bureau of Land Management (U.S. Dept. of the Interior) 435 Montano Road, NE Tel. 505-761-8700
Thursday, May 25:	**Denver, Colorado** Rocky Mountain Regional Office U.S. Forest Service (U.S. Dept. of Agriculture) 740 Simms Street Golden, CO 80401 Tel. 303-275-5350

All of these meetings will begin at 10:00 am local time, and will continue as long as required into the afternoon, with a break at noon. However, lunch will not be provided. Please confirm your availability to join us, including the city of your choice, by Monday, May 1, 2006, to Ms. Janet Lyons, Government-to-Government Meetings, West-wide Corridor Study, Argonne National Laboratory, Building 900, 9700 South Cass Avenue, Argonne, IL 60439-4832. Ms. Lyons' phone number is 630-252-4587 and her e-mail address is JLyons@anl.gov.

Your participation in the consultation process is greatly appreciated.

Sincerely,

Kevin M. Kolevar
Director, Office of Electricity Delivery
and Energy Reliability

encl.: Working draft corridor map

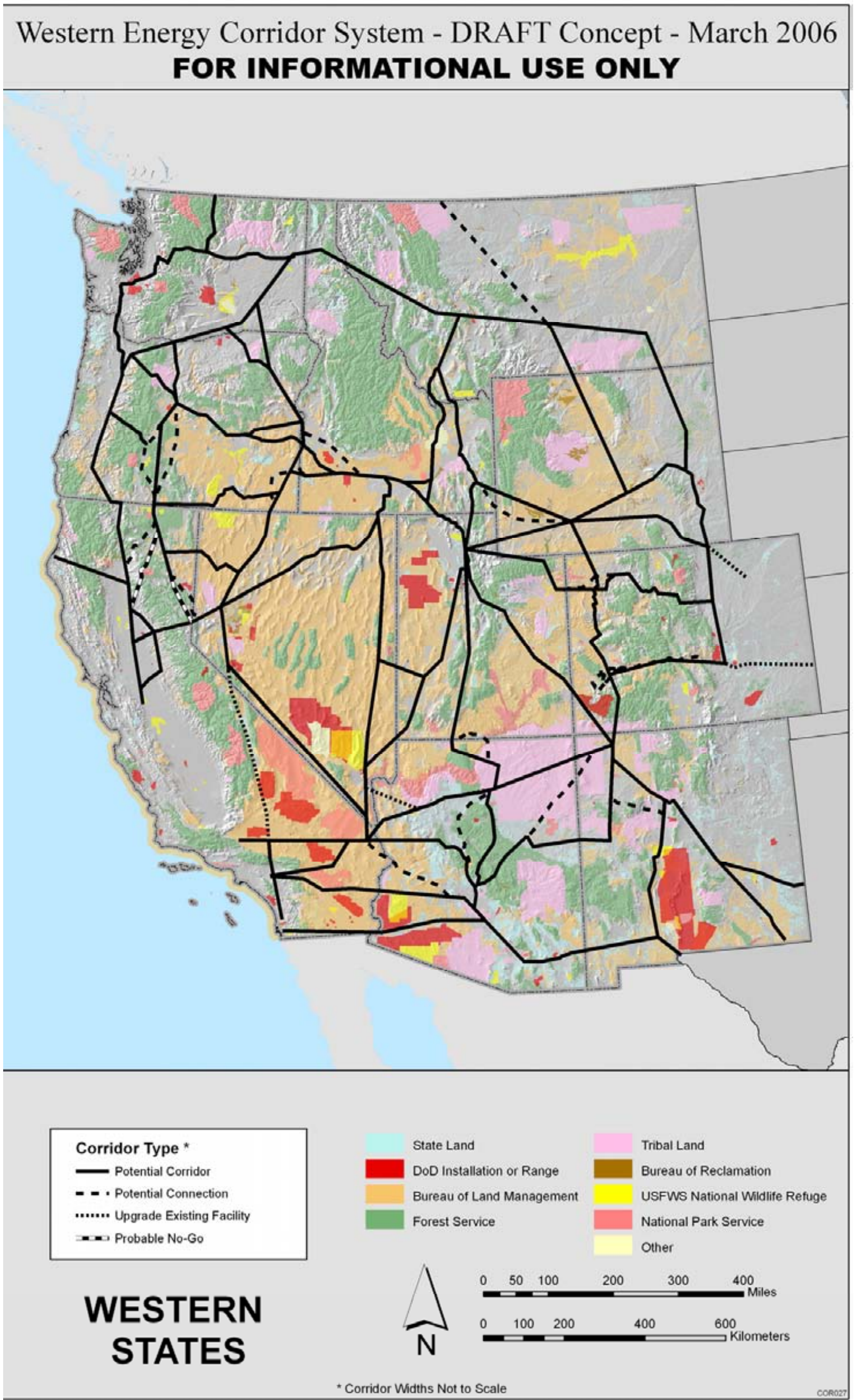

Western Energy Corridor System - DRAFT Concept - March 2006
FOR INFORMATIONAL USE ONLY
Corridor Type *
Potential Corridor
Potential Connection
Upgrade Existing Facility
Probable No-Go
State Land
DoD Installation or Range
Bureau of Land Management
Forest Service
Tribal Land
Bureau of Reclamation
USFWS National Wildlife Refuge
National Park Service
Other
0 50 100 200 300 400 Miles
0 100 200 400 600 Kilometers
N
WESTERN STATES
* Corridor Widths Not to Scale
COR027

Exhibit C-3

Department of Energy
Washington, DC 20585

Dear Tribal Leader:

This letter and enclosure follows up on our letter of April 14, 2006, at which time we announced five Tribal information meetings on the designation of energy corridors on Federal lands as outlined in Section 368 of the Energy Policy Act of 2005 (EPAct). In short, the enclosed "Tribal Information Update" describes the meetings, provides the latest version of the preliminary draft energy corridor maps, and advises the procedure for initiation of Tribal consultation with us on concerns or questions you might have on the above.

For those of you who attended the Tribal information meetings, thank you very much for your participation and contribution toward ensuring that we carry out the provisions of Section 368 as well as possible. If you did not attend, please note the background information below and in the enclosure, especially the latest maps and the Tribal consultation process.

The EPAct, P.L. 109-58, Section 368, directs the Secretaries of Agriculture, Defense, Energy and the Interior to prepare a Programmatic Environmental Impact Statement (PEIS) to evaluate issues associated with the designation of energy corridors on federal lands in the eleven Western States.

The Project Team for the PEIS is composed of representatives from the four Federal agencies and senior staff of Argonne National Laboratory, the contractor assisting us with the preparation of the PEIS. Argonne will provide technical assistance and administrative support to the Tribal consultation process. Comments from Tribal leaders and their constituents will be collected by Argonne and then forwarded to the federal agencies for their response.

As described in the enclosure, please bring your interest in consultation or any questions you might have to the attention of Ms. Janet Lyons, Government-to-Government Meetings, West-wide Corridor Study, Argonne National Laboratory, Building 900, 9700 South Cass Avenue, Argonne, IL 60439-4832. Ms. Lyons' phone number is 630-252-4587 and her e-mail address is JLyons@anl.gov.

Your interest in the "Section 368" Project and participation in the consultation process is greatly appreciated.

Sincerely,

Kevin M. Kolevar
Director, Office of Electricity Delivery
and Energy Reliability

encl.: Tribal Information Update

West-wide (EPAct Section 368) 6 July 2006

Tribal Information Update

Summary of the Tribal Information Meetings

Background

The Energy Policy Act (EPAct) was signed into law in August 2005. Section 368 of EPAct (provided as an Appendix) directs the Secretaries of Agriculture, Defense, Energy and the Interior to prepare a Programmatic Environmental Impact Statement (EIS) to evaluate issues associated with the designation of energy corridors on Federal lands in the eleven Western States. "Energy corridors" should be suitable for any combination of one or more electricity transmission lines and oil, gas, and hydrogen pipelines. The Project Team for the EIS is composed of representatives from the four Federal agencies and senior staff of Argonne National Laboratory, the contractor assisting with the preparation of the EIS. Also participating on the Team as cooperating agencies are the Fish and Wildlife Service and the State of California Energy Commission.

A 60-day public scoping period for the EIS started with the publication of the "Notice of Intent" in the Federal Register on September 28, 2005, and ended on November 28, 2005. Public scoping meetings were held in each of the 11 Western states during the period of October 25, 2005, to November 3, 2005. The scoping report is available on the EIS web site at www.corridoreis.anl.gov, along with a great deal of other information on the "Section 368" project.

On April 14, 2006, Mr. Kevin M. Kolevar, Director, Office of Electricity Delivery and Energy Reliability of the Department of Energy wrote to you, on behalf of the Project Team, extending an invitation to you or your designated representative(s) to meet with us at any of five public Tribal information meetings. Included with the letter was the most recent working draft of the preliminary map of energy corridors. With this Update, we are now providing the most recent version of this map which was released on June 9, 2006, and also 11 individual State maps. PDF-format downloadable electronic copies of these maps are available on our web site at http://corridoreis.anl.gov/eis/pdmap/index.cfm.

Five Tribal Information Meetings were convened as follows:

1. Portland, Oregon — May 9, 2006
2. Sacramento, California — May 12, 2006
3. Las Vegas, Nevada — May 15, 2006
4. Albuquerque, New Mexico — May 23, 2006
5. Denver, Colorado — May 25, 2006

The meetings were intended to provide an opportunity to discuss any concerns you might have regarding these corridors. We assured you that the Federal agencies will engage in government-to-government consultation at the local level on issues with Tribal implications.

The list of attendees follows as an appendix.

Conduct of the Meetings

Each of the meetings was a little bit different, depending on the people present. In general, however, they all commenced with local Federal agency staff welcomes (from the Bureau of Land Management or the U.S. Forest Service), general introductions, a review of the provisions of Section 368, the status of the corridor designations, and the EIS process. In some of the meetings a PowerPoint presentation was shown, which is provided here as an appendix.

All of the meetings had a lively discussion among the attendees regarding computer-projected views of the Geographic Information System (GIS) data that were available and considered to develop the preliminary draft corridors. Several important issues raised by Tribal representatives that were relatively common to all of the meetings are summarized and commented upon below.

Summary of the Major Issues Raised

- **Tribal consultation:**
  - Many of the Tribal attendees stated that they did wish to commence government-to-government consultation, but some said they would decide subsequent to receipt of this Update and the June 9 map. Some of the attendees requested a 45-day review period prior to consultation.
  - The procedure that we are suggesting for implementing consultation is described below in the "Tribal Consultation Process" section.

- **EPAct coordination:**
  - An often-heard concern was that some Tribes were being contacted separately by the Department of Energy (DOE) for consultation on other sections of EPAct, specifically Section 1813 and to a lesser extent Section 1221.
  - The staff of the DOE Office of Electricity Delivery and Energy Reliability (OE) has met internally to address and resolve this issue. Measures are being taken to ensure greater coordination among the staff working on these sections, both amongst themselves and also with the Tribes.

- **Ancestral and treaty lands:**
  - Concern was expressed that energy corridor designation, in addition to circumventing Tribal lands, should be sensitive also to ancestral lands that may fall beyond Tribal land boundaries, and to existing treaties with governmental entities that provide for Tribal rights on federal lands.
  - The Team appreciates having these concerns brought to its attention, and is initiating procedures to address them in the form of a GIS layer for those areas where treaty rights exist.

- **Some other issues:**
  - Some questions were asked about such concerns as condemnation of Tribal lands, whether there would be compensation by the Federal government, Tribal access to the energy corridors, and potential economic benefits for the Tribes.
  - It's important to note that the Federal government is not proposing to actually build or authorize the construction of any real-life energy transmission projects. Once an energy corridor is designated on Federal land, any private or public party may apply at any time to the pertinent Federal agency(ies) to use the corridor for whatever energy purpose. It would be up to the applicant to negotiate any access across private or Tribal lands with the land owners; the Federal government would not be involved. Also, the proposed specific project would be subject to environmental review additional to that contained in the EIS pursuant to the National Environmental Policy Act (NEPA); the level of environmental review could be an Environmental Analysis or even an Environmental Impact Statement, depending on the significance of possible environmental impacts.

Tribal Consultation Process

A great deal of consideration was devoted to how the Tribal consultation process would function subsequent to the Tribal information meetings. A few Tribes expressed an interest in commencing the consultation process as soon as possible, but many of the attendees wanted to wait for the June 9 release of the preliminary energy corridor map, after which time they request 30 to 45 days to review the map prior to initiating consultation.

Because of the potentially large number of consultation requests, it was generally agreed that the following process would be instituted:

1. This newsletter would be issued to the entire Bureau of Indian Affairs list of Tribes in the Western States and to all of the attendees at the information meetings, along with the June 9 preliminary energy corridor map and the 11 individual State maps.

West-wide (EPAct Section 368) 6 July 2006

2. At their convenience, Tribes that wish to enter into government-to-government consultation would so advise the Project contractor, Argonne National Laboratory (Argonne) of the U.S. Department of Energy, as follows:
   Ms. Janet Lyons
   West-wide Government-to-Government Meetings
   Building 900
   Argonne National Laboratory
   9700 South Cass Avenue
   Argonne, IL 60439-4832
   Tel. 630-252-4587
   JLyons@anl.gov
3. In turn, Argonne would document the Tribal request and advise the Project's Tribal Working Group, comprised of Bureau of Land Management (Department of the Interior), U.S. Forest Service (Department of Agriculture), and DOE personnel.
4. The Tribal Working Group will immediately notify their respective local offices in the vicinity of the Tribe, who would then contact the Tribe to arrange the commencement of government-to-government consultation.
5. As the consultation process progresses, the local Federal staff will keep the Tribal Working Group informed, which will then advise the Project Team of issues or concerns that require their attention for response or remediation, as appropriate.

APPENDICES

1. Section 368 of EPAct
2. Attendees list
3. Pell PowerPoint presentation
4. June 9-release energy corridor map (complete with introduction), along with eleven individual State maps.

Appendix 1; Section 368 of the Energy Policy Act

SECTION 368. ENERGY RIGHT-OF-WAY CORRIDORS ON FEDERAL LAND.

(a) WESTERN STATES.—Not later than 2 years after the date of enactment of this Act, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Defense, the Secretary of Energy, and the Secretary of the Interior (in this section referred to collectively as ''the Secretaries''), in consultation with the Federal Energy Regulatory Commission, States, tribal or local units of governments as appropriate, affected utility industries, and other interested persons, shall consult with each other and shall—

(1) designate, under their respective authorities, corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land in the eleven contiguous Western States (as defined in section 103(o) of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1702(o));

(2) perform any environmental reviews that may be required to complete the designation of such corridors; and

(3) incorporate the designated corridors into the relevant agency land use and resource management plans or equivalent plans.

(b) OTHER STATES.—Not later than 4 years after the date of enactment of this Act, the Secretaries, in consultation with the Federal Energy Regulatory Commission, affected utility industries, and other interested persons, shall jointly—

(1) identify corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land in States other than those described in subsection (a); and

(2) schedule prompt action to identify, designate, and incorporate the corridors into the applicable land use plans.

(c) ONGOING RESPONSIBILITIES.—The Secretaries, in consultation with the Federal Energy Regulatory Commission, affected utility industries, and other interested parties, shall establish procedures under their respective authorities that—

(1) ensure that additional corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land are promptly identified and designated as necessary; and

(2) expedite applications to construct or modify oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities within such corridors, taking into account prior analyses and environmental reviews undertaken during the designation of such corridors.

(d) CONSIDERATIONS.—In carrying out this section, the Secretaries shall take into account the need for upgraded and new electricity transmission and distribution facilities to—
(1) improve reliability;
(2) relieve congestion; and
(3) enhance the capability of the national grid to deliver electricity.

(e) SPECIFICATIONS OF CORRIDOR.—A corridor designated under this section shall, at a minimum, specify the centerline, width, and compatible uses of the corridor.

Appendix 2; Attendees at the Tribal Information Meetings

PLEASE NOTE: Names and affiliations are spelled as best as can be determined from sign-in sheets. We regret any errors, and would appreciate being advised of corrections.

PORTLAND, OREGON; 9 MAY 2006

Department of Energy	Dr. Jerry Pell
U.S. Forest Service	Marsha Butterfield
	Gary Harris
Bureau of Land Management	Cathy Harris
	Bob DeViney
	Leslie Frewing-Runyon
	Maya Fuller
Argonne National Laboratory	Dr. John Krummel
Yakama Nation	Elmer Ward
	Ruben Bending
	Rocco Clark, Jr.
	HollyAnna Pinkham
	Anna Ward
	Patricia Goudy
Warm Springs Tribe	Jim Noteboom
	Robert Brunoe
	Jim Manion
	Ron Suppah
	Delvis Heath
	Reuben Henry
	Joe Moses
	Stanley Smith
Coeur d'Alene Tribe	Clay Courtright
Confederated Tribes of the Umatilla Indian Reservation	Bill Quaempts

SACRAMENTO, CALIFORNIA; 12 MAY 2006

Department of Energy	Dr. Jerry Pell
U.S. Forest Service	Mike Chapel
	Dan McCarthy
Bureau of Land Management	Duane Marti
	James Haerter
	Ken Wilson
Department of Defense	Gary Munsterman
Bureau of Indian Affairs	James Fletcher
	Troy Burdick
	Clay Gregory
California Energy Commission	Jim Bartridge
California Public Utility Commission	Billie Blanchard

Native American Heritage Commission	Larry Myers Darcie Houck
Argonne National Laboratory	Bob Moore
Susanville Indian Reservation	Teresa Dixon Melany Johnson
Morongo Band of Mission Indians	Ralph Hitchcock Karen Woodward Karl Munsey Melissa Schlichting
Agua Caliente Band of Cahuilla Indians	Margaret Park
Pechanga Band of Mission Indians	Donald Clary

LAS VEGAS, NEVADA; 15 MAY 2006

Department of Energy	Dr. Jerry Pell
U.S. Forest Service	Marsha Butterfield Stephanie Phillips Dale Kanen Diana Yupe
Bureau of Land Management	Jerry Cordova
Argonne National Laboratory	Bob Moore
Fort Mojave Indian Tribe	Linda Otero Nora McDowell
Barona Tribal Government	Sheilla Alvarez Kathy Clenney
Kaibab Band of Piute Indians	Daniel Bulletts
Hualapai Tribe	Charlie Vaughn

ALBUQUERQUE, NEW MEXICO; 23 MAY 2006

Department of Energy	Julia Souder
U.S. Forest Service	Marsha Butterfield Juddu G. Propper
Bureau of Land Management	Ed Singleton Jerry Cordova Dave Simons
Argonne National Laboratory	Dr. John Krummel
Sonosky Chambers	Gary Brownell
Navajo Nation	Christopher L. Clark Deschene Ronail P. Maldonado Frank Dayish, Jr.
Diné Power Authority	Steven C. Begay Margaret Schaff
Pueblo of Laguna	Jim Hooper Jr.
Pueblo of Isleta	Antonio Chewiwi Jr. Nick Padilla J. Robert Benavides
Pueblo of Santa Clara	Gilbert Gutierra Joseph Mark Chavarria
Pueblo of Santa Ana	Sean Flynn

Pueblo of Sandia	Alex A. Puglisi Michael Ferguson
Pueblo of Acoma	Laura Watchempino Petuuche Gilbert
Pueblo of Zuni	Clayton Seoutewa Arlen Quetawki Sr.
Ute Mountain Ute Tribe	William Johnson
Yavapai-Apache Nation	Jamie B. Navennia

DENVER, COLORADO; 25 MAY 2006

U.S. Forest Service	Marsha Butterfield Michele O'Connell Alan Stanfill Susan Johnson Jim Bedwell
Bureau of Land Management	Scott Powers John Lancelot Tamara Gertsch Dan Haas
Argonne National Laboratory	Dr. Ihor Hlohowskyj
Crow Tribe	William C. Watt Cedric Black Eagle
Colorado Commission of Indian Affairs	Corrine Lindsey
Rosebud Sioux Transit (RST) Tribal Land Enterprise	Rose Corridor

Section 368 of the Energy Policy Act of 2005

Jerry Pell, PhD

Project Manager
Permitting, Siting and Analysis
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
Washington, DC

Tribal Information Meetings
May 2006
Portland, Sacramento, Las Vegas, Albuquerque, Denver

Section 368

Energy Right-of-Way Corridors on Federal Lands

(a) WESTERN STATES

Not later than 2 years after the date of enactment of this Act [8 August 2005], Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior, are required to:

2

(a) WESTERN STATES continued

- Designate corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land in the eleven contiguous Western states;
- Perform any environmental reviews required to complete the designation of such corridors;
- Incorporate the designated corridors into the relevant agency land use and resource management plans.

3

Section 368

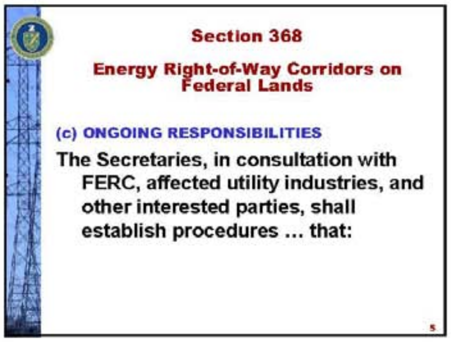
Energy Right-of-Way Corridors on Federal Lands

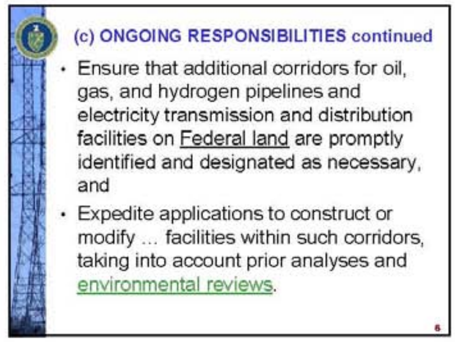
(b) OTHER STATES

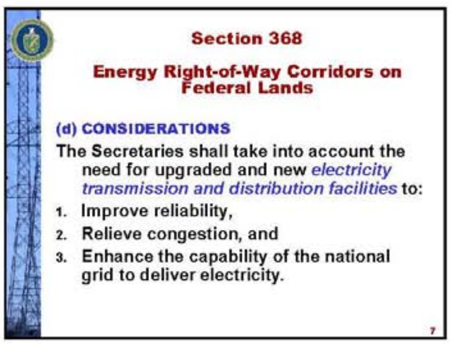
Not later than 4 years after the date of enactment of this Act … in States other than those described in subsection (a).

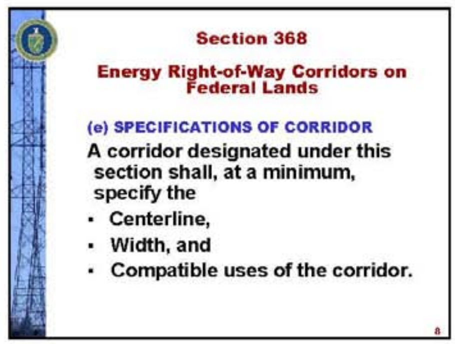
[We will not discuss this provision here.]

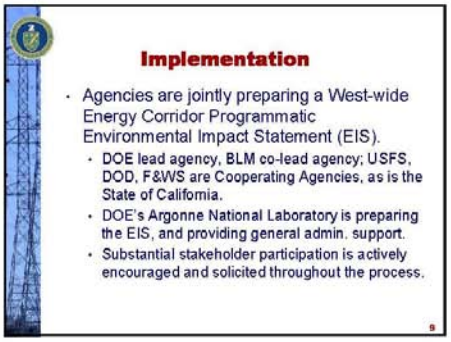
4


Section 368
Energy Right-of-Way Corridors on Federal Lands
(c) ONGOING RESPONSIBILITIES
The Secretaries, in consultation with FERC, affected utility industries, and other interested parties, shall establish procedures … that:
5

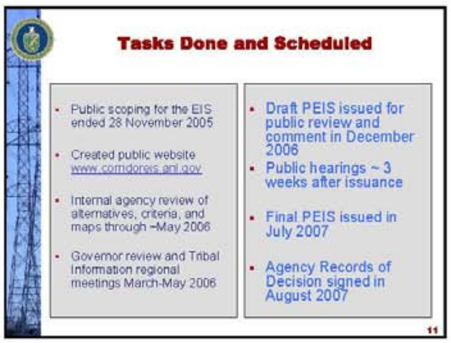

(c) ONGOING RESPONSIBILITIES continued
• Ensure that additional corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land are promptly identified and designated as necessary, and
• Expedite applications to construct or modify … facilities within such corridors, taking into account prior analyses and environmental reviews.
6

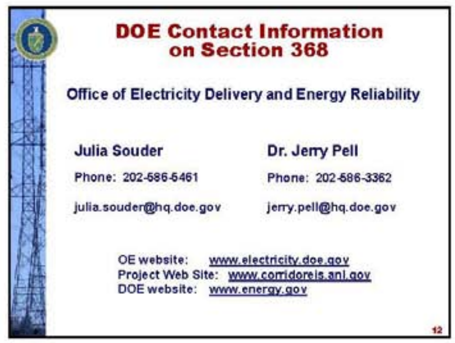

Section 368
Energy Right-of-Way Corridors on Federal Lands
(d) CONSIDERATIONS
The Secretaries shall take into account the need for upgraded and new electricity transmission and distribution facilities to:
1. Improve reliability,
2. Relieve congestion, and
3. Enhance the capability of the national grid to deliver electricity.
7


Section 368
Energy Right-of-Way Corridors on Federal Lands
(e) SPECIFICATIONS OF CORRIDOR
A corridor designated under this section shall, at a minimum, specify the
• Centerline,
• Width, and
• Compatible uses of the corridor.
8


Implementation
Agencies are jointly preparing a West-wide Energy Corridor Programmatic Environmental Impact Statement (EIS).
DOE lead agency, BLM co-lead agency; USFS, DOD, F&WS are Cooperating Agencies, as is the State of California.
DOE's Argonne National Laboratory is preparing the EIS, and providing general admin. support.
Substantial stakeholder participation is actively encouraged and solicited throughout the process.
9


Planning Requirements
Provide a comprehensive analysis and identification of West-wide energy corridors;
Including best management practices for each corridor.
Include analysis of alternatives that meets West-wide energy supply and demand needs.
Alternatives for the EIS were developed following a 60-day public scoping period.
Provide a level of analysis and procedure that allows individual BLM and FS land use plans be amended or revised with approval of the respective agency Record of Decisions.
10


Tasks Done and Scheduled
Public scoping for the EIS ended 28 November 2005
Created public website www.corridoreis.anl.gov
Internal agency review of alternatives, criteria, and maps through ~May 2006
Governor review and Tribal information regional meetings March-May 2006
Draft PEIS issued for public review and comment in December 2006
Public hearings ~ 3 weeks after issuance
Final PEIS issued in July 2007
Agency Records of Decision signed in August 2007
11


DOE Contact Information on Section 368
Office of Electricity Delivery and Energy Reliability
Julia Souder
Phone: 202-586-5461
julia.souder@hq.doe.gov
Dr. Jerry Pell
Phone: 202-586-3362
jerry.pell@hq.doe.gov
OE website: www.electricity.doe.gov
Project Web Site: www.corridoreis.anl.gov
DOE website: www.energy.gov
12

3

PRELIMINARY DRAFT MAP OF POTENTIAL ENERGY CORRIDORS ON FEDERAL LANDS

The U.S. Departments of Energy, Interior, Agriculture, and Defense (the Agencies) are preparing a draft Programmatic Environmental Impact Statement (PEIS) pursuant to the National Environmental Policy Act to identify the impacts associated with designating energy corridors on federal lands in 11 Western States. Energy corridors may contain oil, gas, and hydrogen pipelines and electricity transmission facilities. The Agencies are preparing the PEIS at the direction of Congress, as set forth in Section 368 of the Energy Policy Act of 2005. On the basis of the information and analyses developed in the PEIS, the Agencies will designate energy corridors by amending their respective land use plans.

Public scoping meetings were held in October and November 2005, and the comments received during scoping have helped the Agencies to identify preliminary energy corridors on federal lands that the Agencies propose to analyze in the draft PEIS. The Agencies are presenting this preliminary energy corridor map to inform the public of their progress and to obtain public comment on the proposed corridor locations. The Agencies encourage your views, criticism, and suggestions about these preliminary energy corridor locations.

The potential energy corridor locations depicted on this map represent ongoing work by the Agencies. **Therefore, the corridor locations shown in this map are subject to change until they are officially established in August 2007**. All officially designated corridors will be in compliance with applicable laws and regulations. The majority of the preliminary energy corridors utilize existing corridors and/or rights-of-way, however, there are a small number of potential new corridor locations.

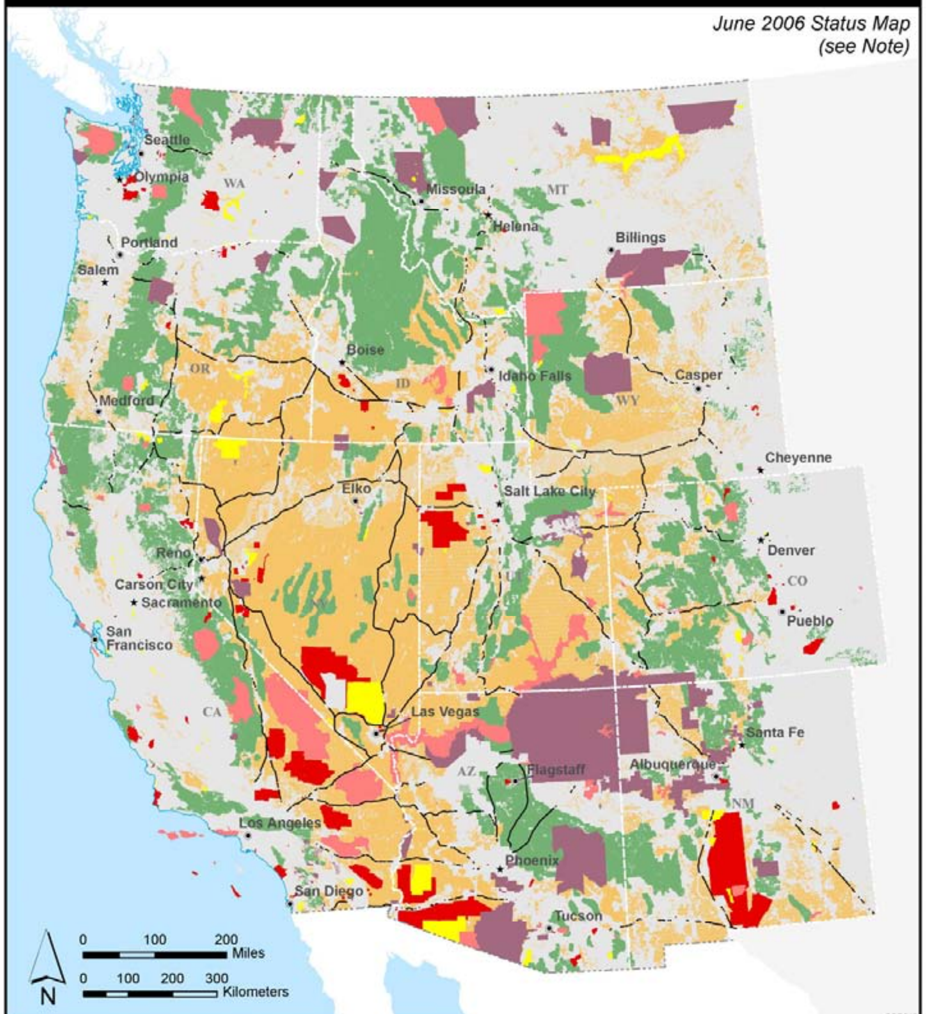
Comments on the preliminary energy corridor map may be submitted electronically through the public comment form on the West-wide Energy Corridor Programmatic EIS Information Center Web Site at http://corridoreis.anl.gov. Written comments can also be mailed or faxed and should be addressed to:

Office of Electricity Delivery and Energy Reliability
Room 8H-033
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, DC 20585
Fax: (202) 586-1472

The Agencies request that all comments on the preliminary energy corridor map be provided no later than July 10, 2006. The Agencies will review and consider all comments that are received by the deadline in preparation of the draft PEIS. The opportunity for comment provided here is in addition to the opportunity the public will have to comment on the draft PEIS.

More information about the preliminary draft energy corridor map and the West-wide Energy Corridor PEIS is available on the West-wide Energy Corridor Programmatic EIS Information Center Web site at http://corridoreis.anl.gov.

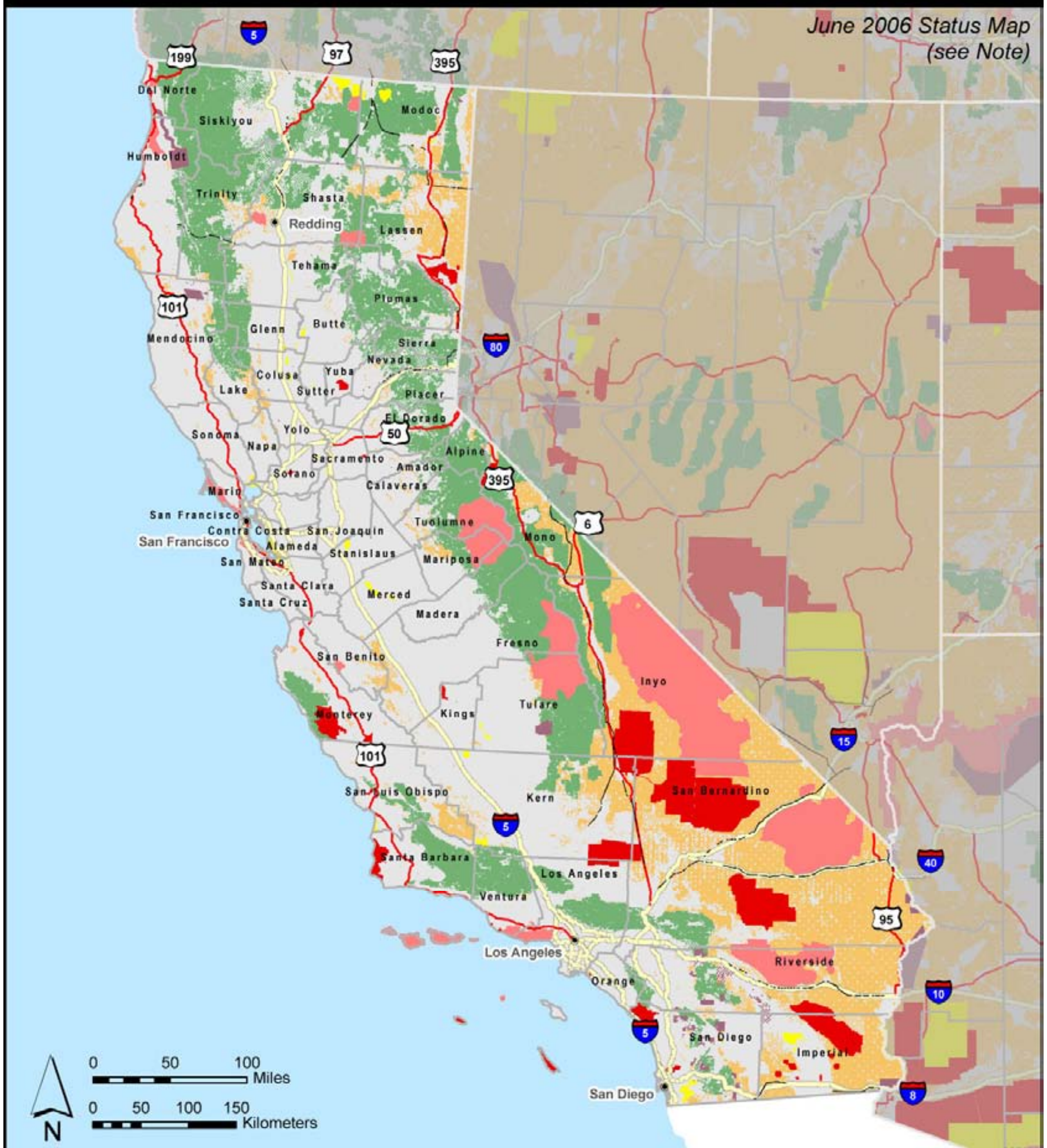
Ongoing Work by Federal Agencies on Potential Energy Corridors in the Western States (Preliminary Draft - Subject to Change)



Note:
The potential energy corridors depicted on this map represent ongoing work by the Agencies to establish energy corridors in 11 Western states as required by the Energy Policy Act of 2005. The corridors are subject to change until they are officially established in August 2007. All officially designated corridors will be in compliance with applicable laws and regulations. The majority of the preliminary energy corridors utilize existing corridors and/or rights-of-way, but there are a small number of potential new corridor locations. Based upon the information and analyses developed in the West-wide Energy Corridor Programmatic EIS, the Agencies will designate energy corridors by amending their respective land use plans. Corridors shown on this map are not to scale. Widths of 3,500 feet are currently under consideration, but are too small to be clearly depicted on this map.

- Potential Energy Corridor (see Note)
- Bureau of Land Management
- U.S. Forest Service
- U.S. Department of Defense
- National Park Service
- U.S. Fish and Wildlife Service
- Tribal Land

Ongoing Work by Federal Agencies on Potential Energy Corridors (Preliminary Draft - Subject to Change) California



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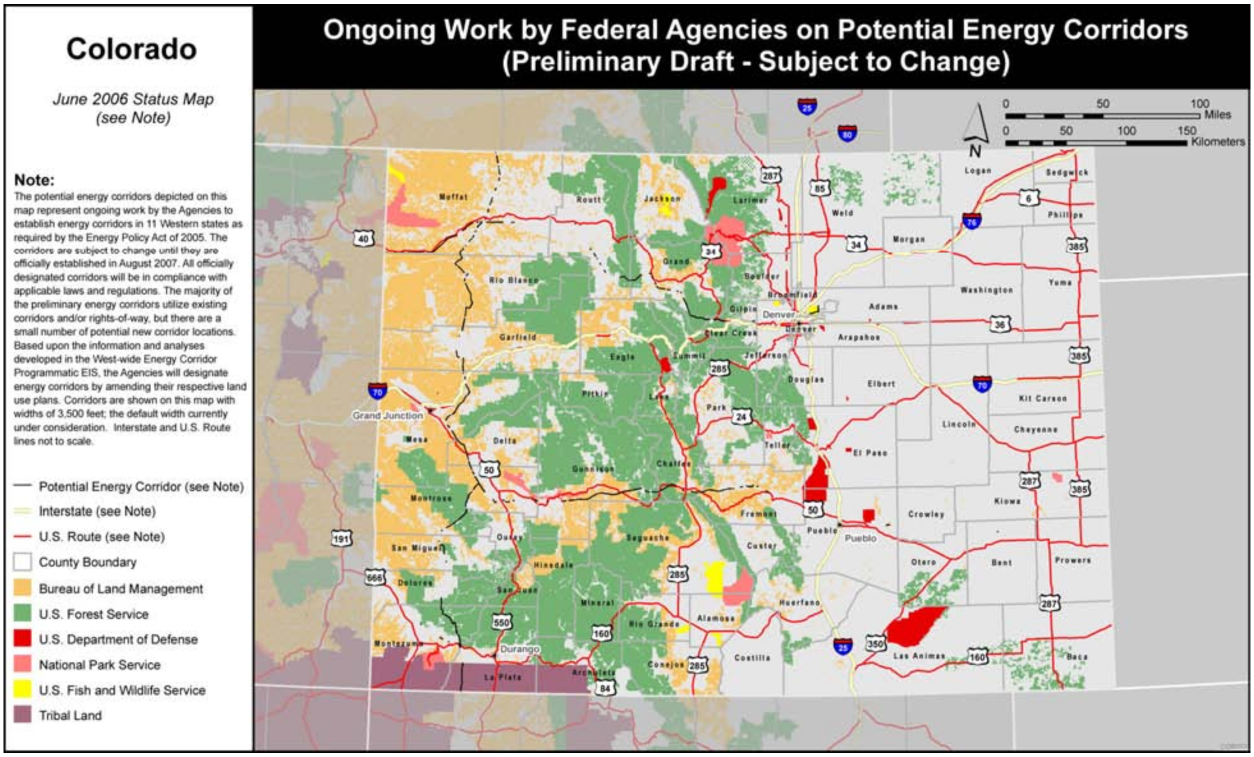
- Potential Energy Corridor (see Note)
- Interstate (see Note)
- U.S. Route (see Note)
- County Boundary
- Bureau of Land Management
- U.S. Forest Service
- U.S. Department of Defense
- National Park Service
- U.S. Fish and Wildlife Service
- Tribal Land


Colorado
June 2006 Status Map
(see Note)
Note:
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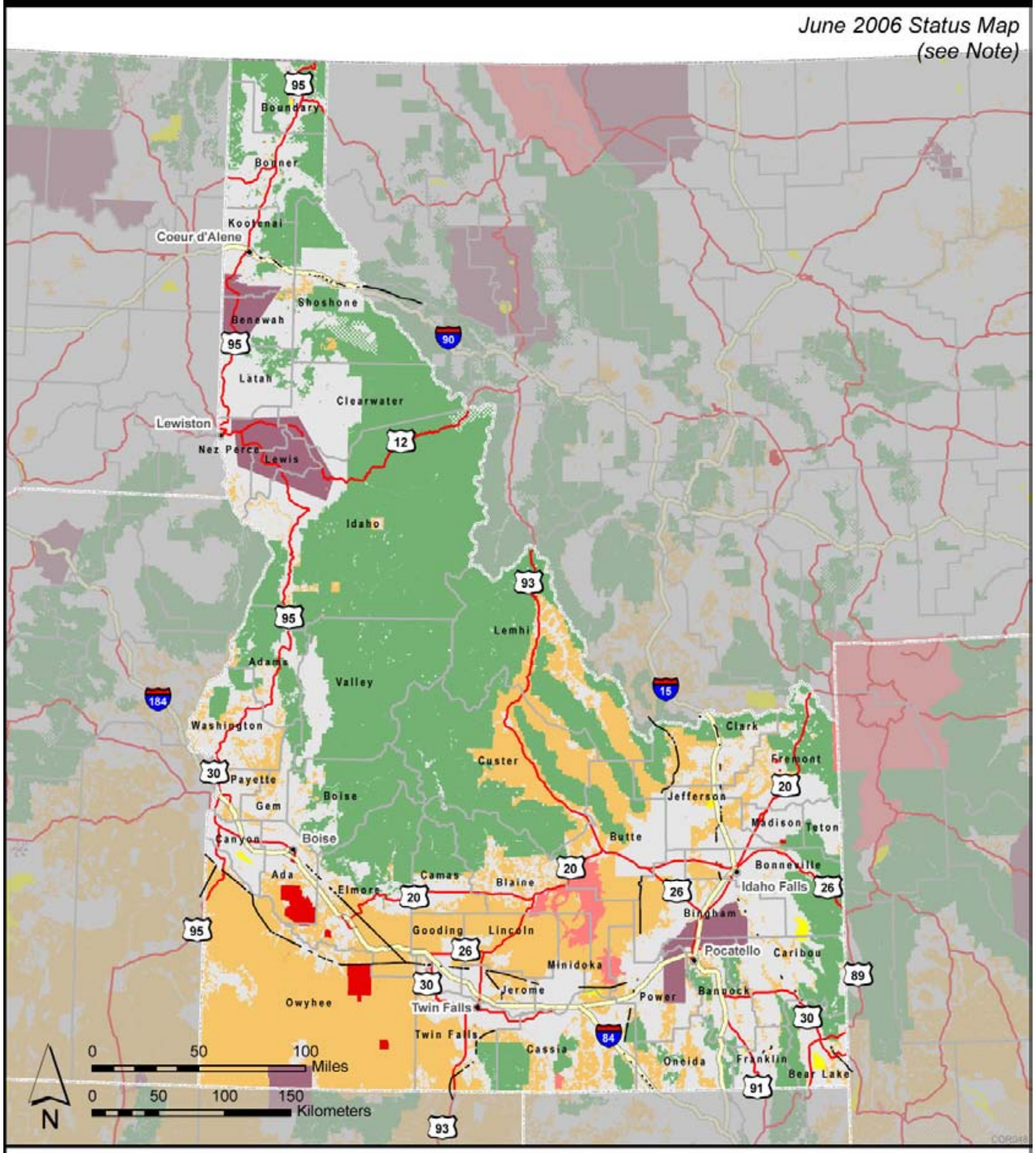
Potential Energy Corridor (see Note)
Interstate (see Note)
U.S. Route (see Note)
County Boundary
Bureau of Land Management
U.S. Forest Service
U.S. Department of Defense
National Park Service
U.S. Fish and Wildlife Service
Tribal Land
Ongoing Work by Federal Agencies on Potential Energy Corridors
(Preliminary Draft - Subject to Change)
0 50 100 Miles
0 50 100 150 Kilometers
N
Denver
Grand Junction
Pueblo
Durango

Ongoing Work by Federal Agencies on Potential Energy Corridors (Preliminary Draft - Subject to Change) Idaho

June 2006 Status Map (see Note)



Note:

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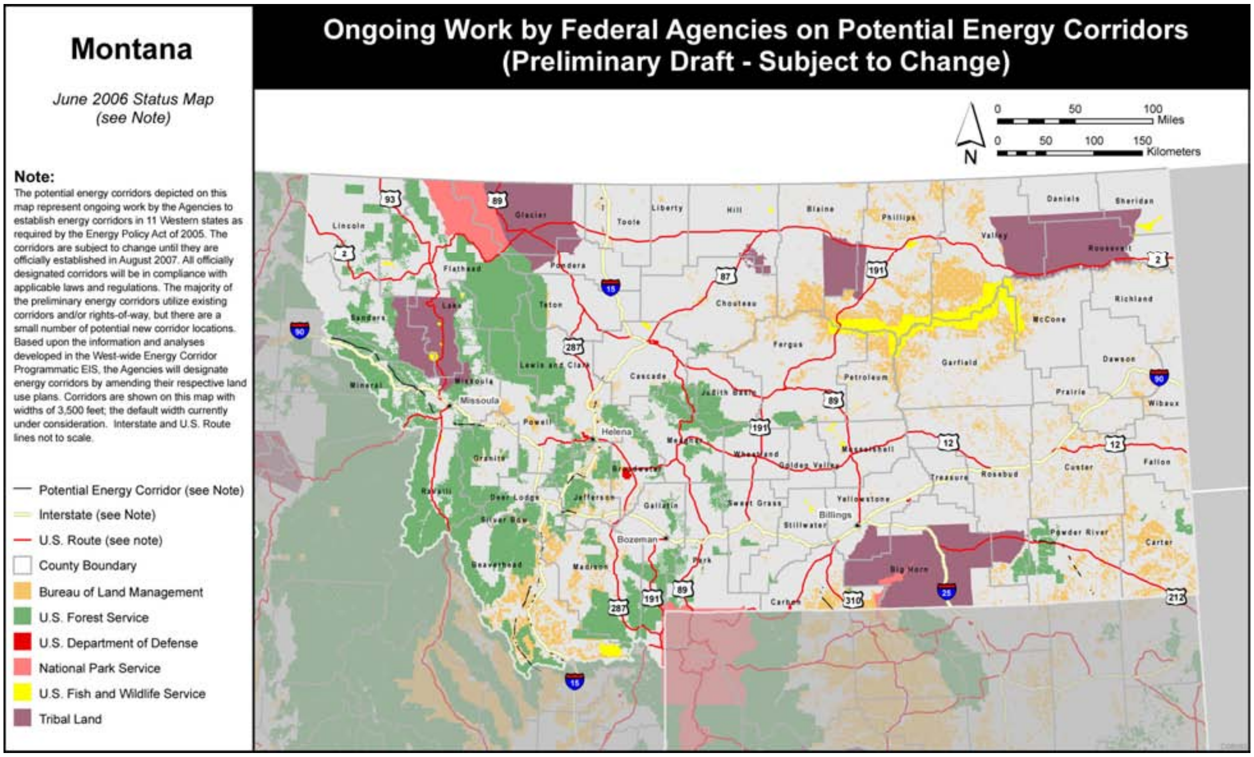
- Potential Energy Corridor (see Note)
- Interstate (see Note)
- U.S. Route (see Note)
- County Boundaries
- Bureau of Land Management
- U.S. Forest Service
- U.S. Department of Defense
- National Park Service
- U.S. Fish and Wildlife Service
- Tribal Land

COR054


Montana
June 2006 Status Map
(see Note)
Note:
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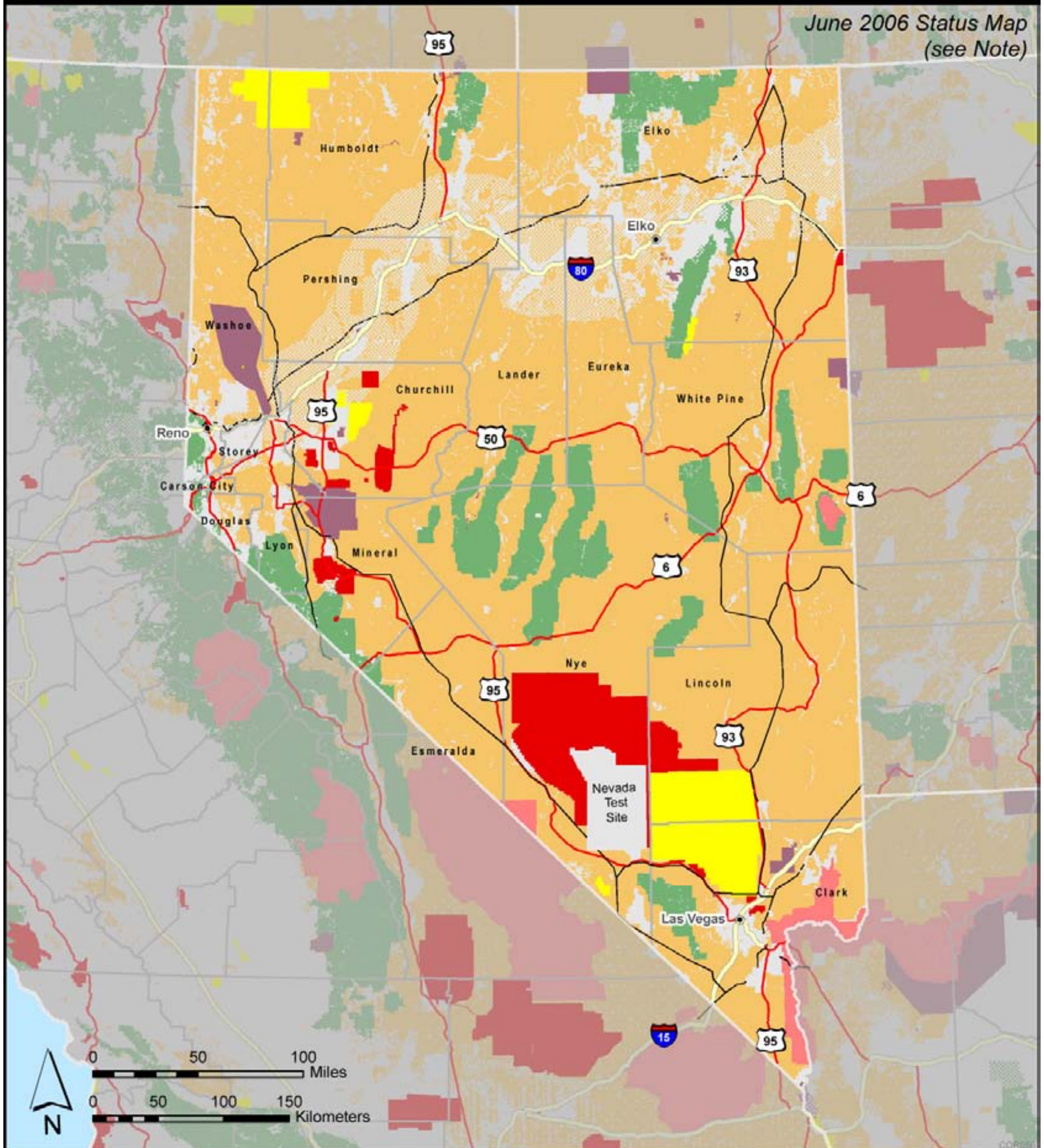
Potential Energy Corridor (see Note)
Interstate (see Note)
U.S. Route (see note)
County Boundary
Bureau of Land Management
U.S. Forest Service
U.S. Department of Defense
National Park Service
U.S. Fish and Wildlife Service
Tribal Land
Ongoing Work by Federal Agencies on Potential Energy Corridors
(Preliminary Draft - Subject to Change)
0 50 100 Miles
0 50 100 150 Kilometers
N
Missoula
Helena
Bozeman
Billings

Ongoing Work by Federal Agencies on Potential Energy Corridors (Preliminary Draft - Subject to Change)
Nevada



Note:
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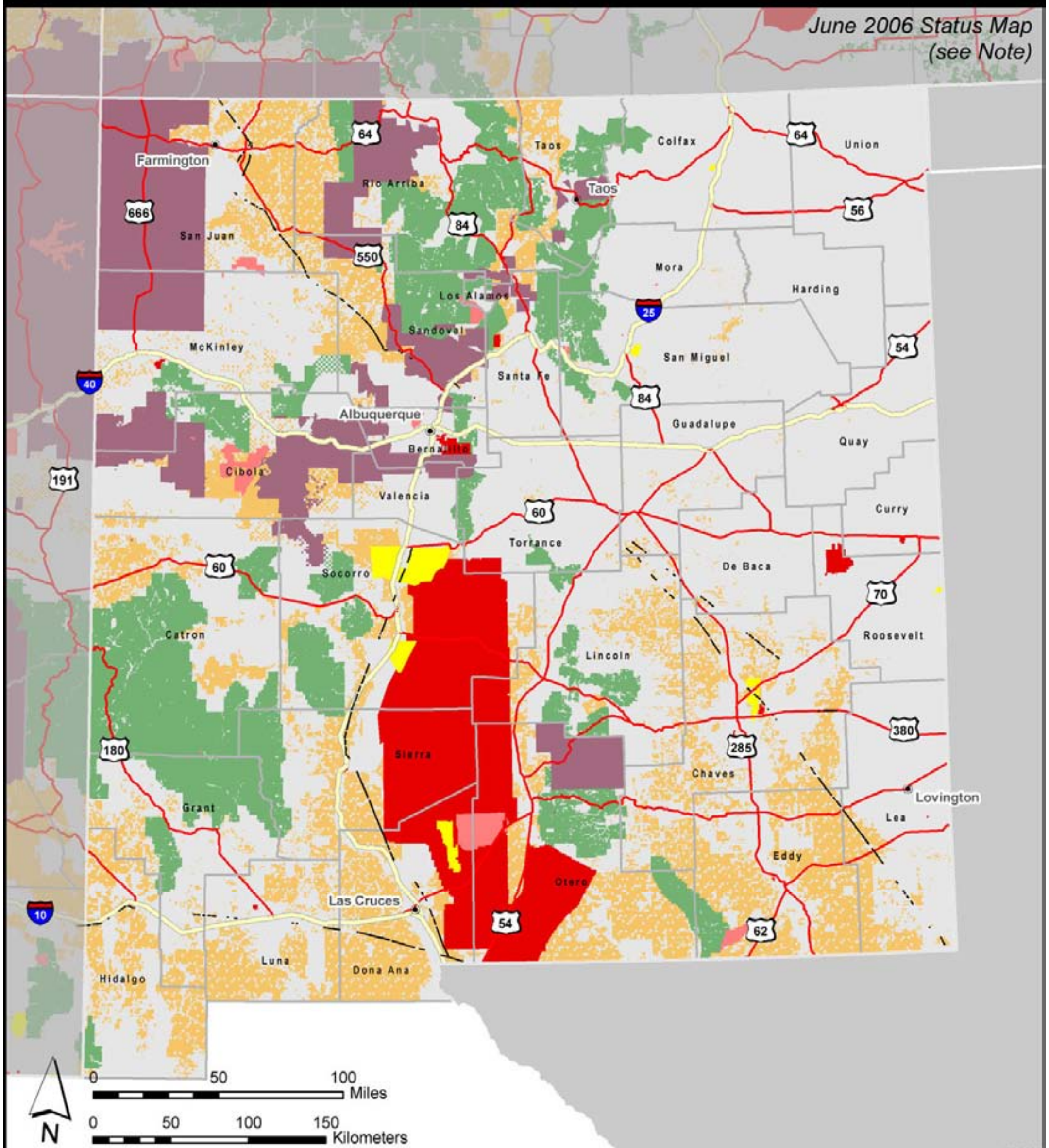
- Interstate (see Note)
- U.S. Route (see Note)
- County Boundary
- Bureau of Land Management
- U.S. Forest Service
- U.S. Department of Defense
- National Park Service
- U.S. Fish and Wildlife Service
- Tribal Land

Ongoing Work by Federal Agencies on Potential Energy Corridors (Preliminary Draft - Subject to Change) New Mexico



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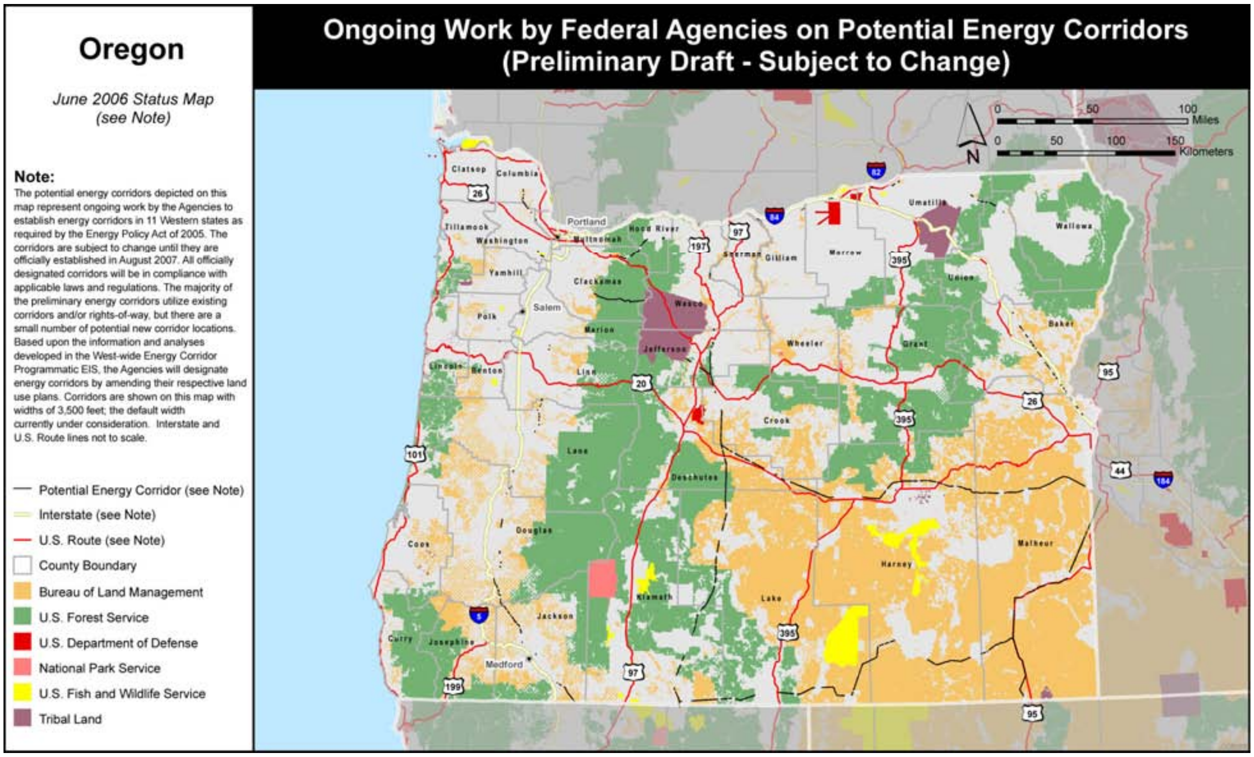
- Potential Energy Corridor (see Note)
- Interstate (see Note)
- U.S. Route (see Note)
- County Boundary
- Bureau of Land Management
- U.S. Forest Service
- U.S. Department of Defense
- National Park Service
- U.S. Fish and Wildlife Service
- Tribal Land


Oregon
June 2006 Status Map
(see Note)
Note:
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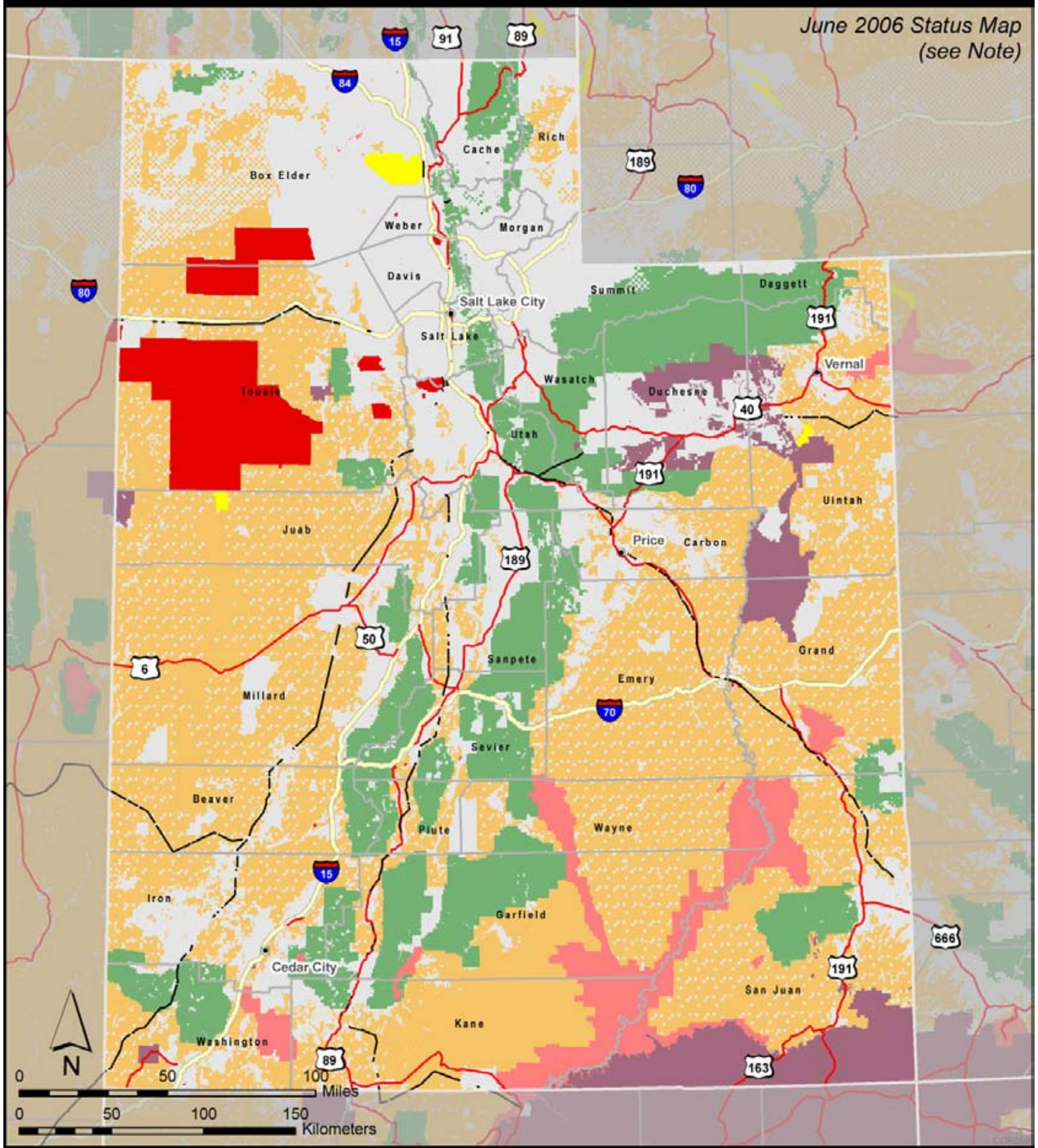
Interstate (see Note)
U.S. Route (see Note)
County Boundary
Bureau of Land Management
U.S. Forest Service
U.S. Department of Defense
National Park Service
U.S. Fish and Wildlife Service
Tribal Land
Ongoing Work by Federal Agencies on Potential Energy Corridors
(Preliminary Draft - Subject to Change)
0 50 100 Miles
0 50 100 150 Kilometers
N
Portland
Salem
Medford
Clatsop
Columbia
Tillamook
Washington
Multnomah
Hood River
Yamhill
Clackamas
Polk
Marion
Wasco
Jefferson
Lincoln
Benton
Linn
Lane
Sherman
Gilliam
Morrow
Umatilla
Union
Wallowa
Baker
Wheeler
Grant
Crook
Deschutes
Douglas
Coos
Curry
Josephine
Jackson
Klamath
Lake
Harney
Malheur

Ongoing Work by Federal Agencies on Potential Energy Corridors (Preliminary Draft - Subject to Change) Utah



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- County Boundary
- Bureau of Land Management
- U.S. Forest Service
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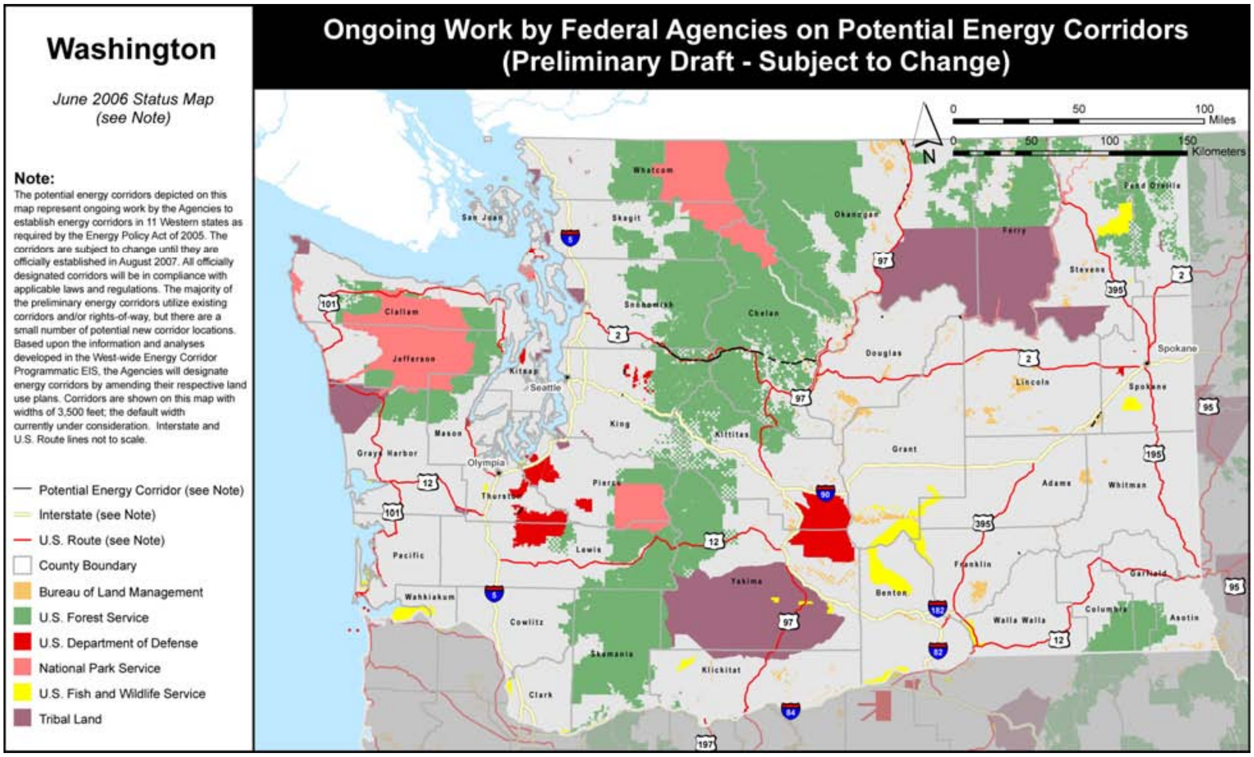
- National Park Service
- U.S. Fish and Wildlife Service
- Tribal Land


Washington
June 2006 Status Map
(see Note)
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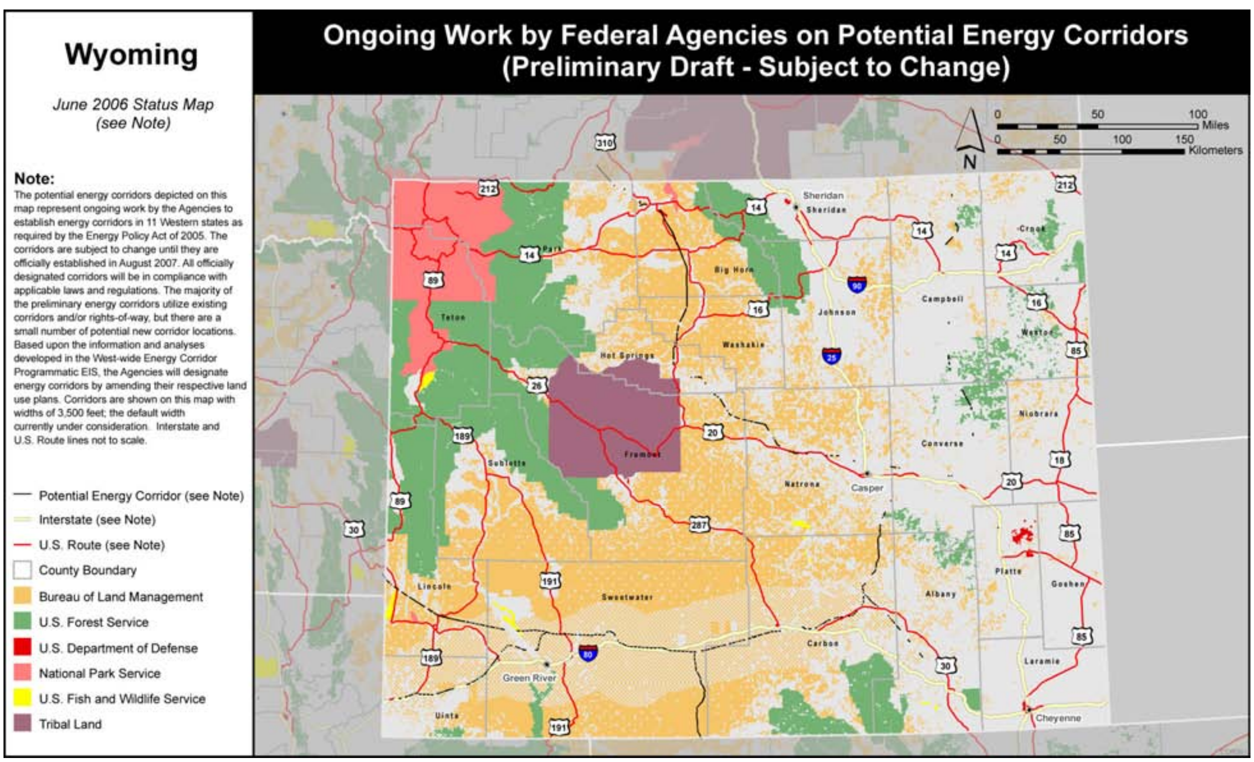
Interstate (see Note)
U.S. Route (see Note)
County Boundary
Bureau of Land Management
U.S. Forest Service
U.S. Department of Defense
National Park Service
U.S. Fish and Wildlife Service
Tribal Land
Ongoing Work by Federal Agencies on Potential Energy Corridors
(Preliminary Draft - Subject to Change)
0 50 100 Miles
0 50 100 150 Kilometers
N


Wyoming
June 2006 Status Map
(see Note)
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County Boundary
Bureau of Land Management
U.S. Forest Service
U.S. Department of Defense
National Park Service
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Ongoing Work by Federal Agencies on Potential Energy Corridors
(Preliminary Draft - Subject to Change)
0 50 100 Miles
0 50 100 150 Kilometers
N

Ongoing Work by Federal Agencies on Potential Energy Corridors (Preliminary Draft - Subject to Change) Arizona

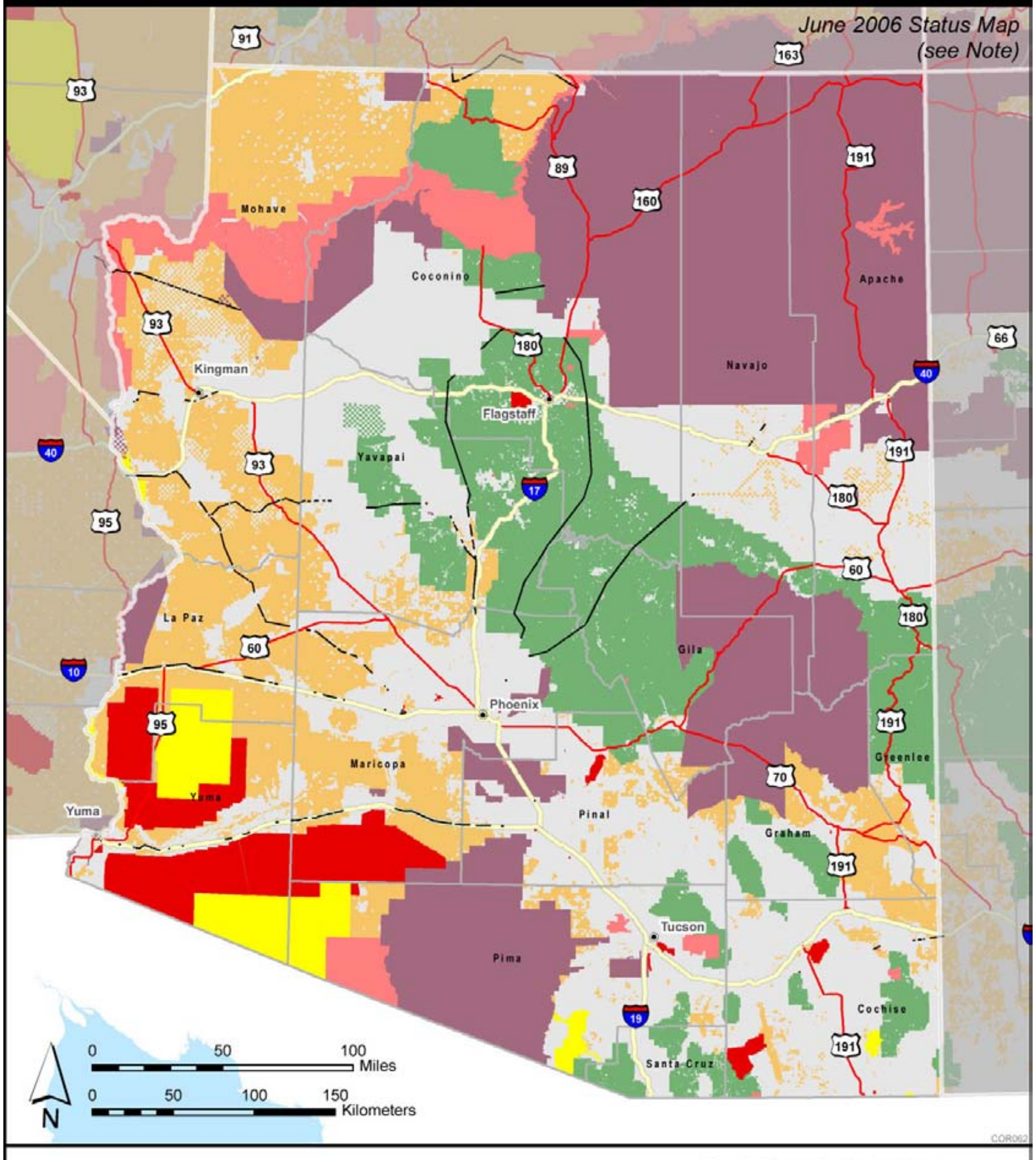

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Exhibit C-4

Date: Sept. 1, 2006

Memo to: West-wide Energy Corridor – PEIS Tribal Consultation Points of Contact

Through: West-wide Energy Corridor – PEIS Management Team

From: West-wide Energy Corridor – PEIS Tribal Consultation Working Group

Re: PEIS Tribal Consultation Protocol

Tribal Consultation Procedures:
The purpose of this memo is to clarify Tribal consultation procedures concerning the West-wide Energy Corridor (WEC) Programmatic Environmental Impact Statement (PEIS). If consultation is already occurring or if regional, state, or local offices initiate consultation with local Tribes, then these efforts should be documented and forwarded to Argonne National Laboratory so that Argonne can track which Tribes, agencies, and contacts are involved. It is also important that information resulting from consultation is forwarded to Argonne to ensure its consideration in the PEIS and to be entered into the official administrative record.

Process Outline:
Each Tribal contact will be referred to a single Agency Point of Contact (POC) who will serve as the primary "consultation coordinator" for the Tribe(s) assigned to him or her. This Agency POC will usually be the BLM/USFS Tribal Coordinator from the home state of the Tribe. The Agency POC will contact the Tribe to provide information and answer questions as needed; facilitate government-to-government consultation and meetings or correspondence; coordinate among agencies involved, document contacts and consultation; and ensure that information important to the PEIS is forwarded to Argonne and the Washington Office (WO) Tribal Consultation Group, as appropriate. The Agency POC should work through the normal consultation channels established by his/her agency. The PEIS management team will be available to attend in person for government-to-government consultation if necessary, although, whenever possible, consultation should involve state, regional, and local managers. The WO Tribal Consultation Group will provide the Agency POC assignment; advise the Agency POC on consultation efforts; and assist with meetings, if necessary. Argonne will track Tribal requests, ensure that every Tribe is assigned a POC, collate and consider information conveyed by Tribes, and maintain the administrative record.

An Excel spreadsheet for the purpose of tracking and documenting consultation activities is attached for your consideration. This file would become part of the administrative record for the PEIS.

Roles and Responsibilities:

Argonne National Laboratory

- Argonne has assigned Dr. Bruce Verhaaren to review incoming Tribal contacts, assess the request, and respond as appropriate. Contact information follows.
- When a Tribe simply wishes to convey information, Argonne will incorporate that information into the PEIS and respond to the Tribe with an acknowledgment.
- When the Tribe wishes to initiate government-to-government consultation or requests information or some form of involvement, Argonne will inform the WO Tribal Consultation Group (USFS/BLM) that the tribe wishes to consult or requests information. The WO Tribal Consultation Group will determine the appropriate Agency POC for the Tribe and will notify Argonne who that Agency POC will be along with their contact information. Argonne will respond to the Tribe with the name of the POC and an information packet consisting of the attached Tribal Information Packet, the Tribal Information Update, etc., and will copy the POC on this correspondence.
- During consultation, the WO Tribal Consultation Group will be kept informed of all interactions. This is critically dependent on the receipt of real-time information from Agency POCs.
- Argonne will maintain a database of Tribal contacts, responses, and the Agency POC assignments for reference by the WEC-PEIS management team and WO Tribal Consultation Group, and as part of the Administrative Record. The Agency POCs will provide Argonne with a record of their interactions with the Tribes to be included in the administrative record for the PEIS.
- Argonne will provide Agency POCs with access to the project restricted extranet site to facilitate the transfer of information to the Tribes. (Please note this site is intended for internal use only: https://web.ead.anl.gov/corridorteam/index.cfm) The process for gaining access to the extranet is attached.
- Argonne will track information received from Tribes regarding the PEIS and incorporate such information into the project analysis (e.g., location of sensitive areas for avoidance) as appropriate.
- Argonne will ensure that Tribes, the Agency POCs, and the WO Tribal Consultation Group are informed about the project, such as when more detailed maps are available for Tribal review, when the Draft PEIS is available for review, and the time frames for review.
- Argonne will maintain the administrative record for Tribal consultation.

Department of Energy

- When the DOE (Julia Souder) receives requests from Tribes, these requests will be forwarded to Argonne, who will proceed as above.
- The DOE will make Dr. Jerry Pell available to assist as a project expert when requested for Tribal consultation meetings or as in-person support for POCs in the field.

Agency POC (BLM/USFS Tribal Coordinators)

- Once assigned, the Agency POC will follow up with the Tribe by answering questions, providing information, and facilitating in-person government-to-government consultation as requested. Consultation should proceed along normal channels established by the agency.
- Government-to-government consultation may occur at any level. If needed, project management team members can meet with the Tribe; if Tribal concerns can be met with local managers, it is preferable to do so.
- If the Agency POC is a State or Regional Tribal Coordinator, he or she may refer the request to the appropriate agency subdivision (e.g., Field Office, District, Forest) but will remain the Agency POC for coordination purposes.
- If Tribal concerns include land administered by another federal agency, the Agency POC will coordinate interaction with his/her counterpart in that agency with assistance from the WO Tribal Consultation Group if necessary, but will remain the single POC for that Tribe.
- The Agency POC will be responsible for documenting all consultation and forwarding the documentation to Argonne for the administrative record.
- The Agency POC may convey information from Tribes that is pertinent to the PEIS to Argonne (e.g., sensitive cultural resource site locations, visual impact concerns, etc.).
- The Agency POC will track Tribal concerns and ensure that there is an appropriate response.
- The Agency POC will ensure that all appropriate information is shared with Tribes in a timely manner.

Washington Office Tribal Consultation Group

- The WO Tribal Consultation Group (Jerry Cordova/Kate Winthrop, BLM; Marsha Butterfield, USFS; Jerry Pell, DOE) will make the initial Agency POC assignment, contact the POC, provide Argonne with the Agency POC's contact information, and sponsor POC access to the restricted extranet site.
- The WO Tribal Consultation Group will be available to consult with Argonne on the appropriate response to a Tribal contact and assist the POCs as needed with project information, consultation assistance, interagency coordination, and participation if necessary.

Project Management Team and PEIS Project Leads

- The PEIS project management team represents agency management and is the appropriate contact for government-to-government consultation when it cannot be accommodated fully at the state, regional, and local level.
- State, regional, and local PEIS project leads are usually the appropriate contacts for POCs for project information, maps, and local issues.

Tribes

- When Tribes contact state, regional, or local BLM/USFS with concerns directly without going through Argonne or DOE, BLM/USFS will notify Argonne and then proceed as outlined above.

Exhibit C-5

EPAct Section 368
West-wide Energy Corridor Programmatic Environmental Impact Statement
Tribal Information Packet

Thank you for your interest in the West-wide Energy Corridor Programmatic Environmental Impact Statement (PEIS). This packet provides basic information regarding the PEIS project with particular regard to the interests of Tribal Nations. Further information on this project is available on the project website: http://corridoreis.anl.gov/index.cfm.

Copies of letters and updates previously sent to Tribes are attached.

Project Overview

Section 368 of the Energy Policy Act of 2005 (EPAct) requires that the U.S. Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior (the Agencies) cooperate to designate energy corridors on federal land for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities in the 11 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming). A PEIS is underway to assess the environmental impacts of this action. The Agencies have established a management team to facilitate coordination on this PEIS. Argonne National Laboratory (Argonne) is the contractor conducting this study.

Corridor designation will be accomplished by the coordinated amendment of appropriate land management plans by each agency. No actual specific construction or development project would be required or approved by this programmatic action. It would facilitate, not require, the construction of energy transmission facilities within the corridors. Some of the advantages of designated corridors are listed below:

- Streamlined interagency project siting and permitting would provide an incentive to use designated corridors by reducing the time and resources needed to implement a project, thus more expeditiously providing for the delivery of energy to demand areas.
- Consistent and uniform implementing guidelines accepted by all agencies would serve to provide an effective and efficient method of protecting environmental, cultural, and social resources.
- When a specific project is proposed, environmental analysis could focus on critical site-specific issues and tier off the findings presented in the PEIS.

Selection of Corridor Routes

Input on the selection of appropriate end points was received from government agencies, energy providers, and the general public during the scoping process. Taking this input into account, the proposed energy corridors are designed to enhance the reliability and capacity of the existing energy transmission and conveyance network in the West for moving electricity, oil, natural gas, and hydrogen from their sources to end users. The PEIS is a federal action and deals only with those corridor sections that cross federal lands, as dictated by Section 368 of the EPAct.

EPAct requires the Agencies to specify center lines and widths for energy corridors designated on federal lands. Specific corridor routes are being laid out (1) to avoid areas inappropriate for corridor development because of legal, regulatory, or Agency-mission requirements, and (2) to take into account local resource-management considerations. Routes are being laid out to avoid known significant natural and cultural resources, including archaeological sites and known traditional cultural properties. While this should minimize the adverse effects of developing the energy corridors, it does not eliminate the requirement for future National Environmental Policay Act (NEPA) and National Historic Preservation Act (NHPA) Section 106 reviews. No field surveys for cultural resources will be carried out in conjunction with this PEIS. Any construction or development projects that are later proposed for these corridors would require their own NEPA and NHPA Section 106 reviews.

Tribal Nation Input

The opportunity for government-to-government consultation is offered to all federally recognized Tribes in the 11 western states. We recognize that the Tribes are the best source for information on sensitive areas on ancestral lands, traditional resources, and treaty rights on federal lands. Any information on these topics that can be provided to the PEIS team would be greatly appreciated and would be kept confidential. This information will help to ensure that the final corridor configuration has the least possible adverse effect on resources important to Tribal communities. While Tribal Nations may consult at any level of government, an Agency Point of Contact (Agency POC) will be assigned to individual Tribes to facilitate consultation and coordination among entities whenever a Tribe expresses an interest in the PEIS. These Agency POCs will usually be local Tribal Coordinators from the BLM or USFS. Once assigned, you can communicate directly with the Agency POC.

Contact Information

If you wish to obtain information or engage in consultation, you may contact your local BLM or USFS office, or contact any of the following people. An Agency POC will be assigned to assist with further information or consultation needs.

Dr. Jerry Pell, DOE
Office: 202-586-3362
Fax: 202-318-7761
jerry.pell@hq.doe.gov

Jerry Cordova, BLM, Tribal Coordinator
202-452-7756
jerry_cordova@blm.gov

Marsha Butterfield, USFS Tribal Coordinator
202-205-4095
mbutterfield@fs.fed.us

Dr. Kate Winthrop, BLM Washington Office POC
202-452-5051
Kate_winthrop@blm.gov

Dr. Bruce Verhaaren, Argonne POC
630-252-3240
bverhaaren@anl.gov

Timeline

28 Sep 2005	Notice of Intent to prepare an Environmental Impact Statement published
28 Sep – 28 Nov 2005	Public scoping
25 Oct – 3 Nov 2005	Scoping meetings in each of the 11 western states
14 Apr 2006	All federally recognized Tribes invited to regional Tribal information meetings
9 May – 25 May 2006	Five Regional Tribal information meetings
10 Jul 2006	Summary of regional meetings (Tribal Information Update) and invitation to consultation sent to all western Tribes.
Dec 2006/Jan 2007	Projected release of the Draft PEIS
Jan – Mar 2007	90-day public comment period
Jul 2007	Projected release of the Final PEIS
Aug 2007	Record(s) of Decision to be issued.

Questions and Answers

Who is the lead agency for the PEIS?

- The Department of Energy (DOE) is the lead agency with the Bureau of Land Management (BLM) as co-lead.

- The BLM is the lead agency for compliance with Section 106 of the NHPA. However, all agencies are coordinating on the project through an interagency management team. This team has established a Tribal Consultation Group to assist with coordinating Tribal consultation on the PEIS. Argonne National Laboratory (Argonne) is the contractor for the project and provides a centralized coordinating function for consultation.

With multiple agencies, how do we consult?

There are two ways Tribes can initiate consultation or convey requests for information:

- Tribes can contact Argonne with a request for information and/or consultation, or simply to convey information that they wish considered in the PEIS. Argonne will refer requests for information or consultation to the BLM or Forest Service (USFS), who will assign a point of contact (POC, usually a BLM or USFS Tribal Coordinator) to the Tribe. The Tribe will be notified who that POC will be and can contact that person or wait for him/her to contact the Tribe.

- Tribes can use whatever agency (BLM or USFS) channels they are already familiar with at a local, state, or regional level to request information or consultation. It will be up to the agency contacted to inform Argonne of the consultation and to ensure that information important to the PEIS is forwarded to the appropriate contacts. An Agency POC will be assigned to coordinate and facilitate communication and consultation.

What is an Agency POC?

This project involves potentially hundreds of interested Tribes, multiple agencies, and 11 states. To ensure that each interested Tribe has someone to respond to Tribal issues and concerns, to answer questions and provide information, and to facilitate government-to-government consultation, an Agency Pont of Contact (POC) will be assigned to each Tribe expressing an interest in this project. This Agency POC will coordinate with the Tribe and other involved entities, and will serve as the POC for the PEIS management team with regard to that Tribe. Tribes that do not wish to participate in this process will not have an Agency POC. Once assigned, Tribes are encouraged to work through the Agency POC but are not limited to doing so.

Where can Tribes get information about the project?

- Tribes can request information about the project from local, state, or regional BLM/USFS offices, through their normal channels, and/or through agency Tribal coordinators.
- Tribes can request information about the project from Argonne, who will provide basic project information or refer requests to an Agency POC to respond.

How can Tribes keep informed?

- Tribes can register on the project website (http://corridoreis.anl.gov/index.cfm) to receive project updates and announcements by entering an e-mail address in the "Subscribe" box.
- Tribes can send a request to Argonne to be kept on a mailing list and notified as important deadlines, such as the release of the Draft PEIS for comment, approach.
- Tribes can work through local agency contacts or their Agency POCs to obtain current information regarding the project.

How can Tribes get information, especially maps, specific to their interests?

- Tribes can work through local agency contacts and/or their Agency POCs to obtain the best available maps and information.

How can Tribes convey specific concerns about this project?

- Tribes can contact Argonne with their issues, and Argonne will incorporate their concerns into the PEIS as appropriate. Argonne will notify the PEIS management team in the event that agency consideration is indicated. If Tribes wish to consult on their issues, they should notify Argonne. Argonne will refer them to an Agency POC to arrange consultation.
- Tribes can also contact the agencies directly through their usual state, regional, and local contacts. Agencies will then be responsible for forwarding whatever concerns the Tribe may convey.
- If the Tribe has already contacted Argonne and received a referral to a POC, the Tribe can work through that person.

Will information be confidential?

- Argonne will collect and analyze information and will not release confidential information to the public. The agencies can provide confidentiality to the extent that information is exempted from the Freedom of Information Act (FOIA).

Do Tribes need to consult separately on National Historic Preservation Act Section 106 concerns?

- No. Tribes may have multiple issues and can consult on these together. Section 106 compliance is being integrated into the PEIS. BLM is the lead agency on Section 106 but is primarily concerned that Tribes are given the opportunity to consult. Tribes do not need to separate out their 106 issues or initiate separate consultation.

How is the West-wide Energy Corridor PEIS related to the Indian Lands Energy Rights-of-Way Study (EPAct Section 1813)?

- Both the PEIS and the Indian Lands Energy Rights-of-Way Study are required by the EPAct. The PEIS is mandated by Section 368 and the Indian Lands study by Section 1813.
- Although related, the two studies are separate. The PEIS deals only with federal lands, while the Section 1813 study deals exclusively with Indian lands.
- For information on the 1813 process, see http://1813.anl.gov/

How is the West-wide Energy Corridor PEIS related to the Electric Transmission Congestion Study (EPAct Section 1221(a))?

- Both the PEIS and the "Congestion Study" are required by the EPACT. The PEIS is mandated by Section 368 and the Congestion Study by Section 1221.
- Results from the Congestion Study were used in the selection of the proposed energy corridors considered in the PEIS.
- The Congestion Study may result in the designation of National Interest Electric Transmission Corridors, some of which may require Tribal consultation.
- Further information on Section 1221 can be obtained from a DOE website: http://www.oe.energy.gov/epa_sec1221.htm.

How can We obtain a copy of the Draft West-wide Energy Corridor Programmatic EIS when it is published?

- Upon its release, a Notice of Availability will appear in the *Federal Register* giving details for obtaining a copy and commenting on the Draft PEIS.
- Everyone on record as attending any of the public meetings will be notified of the availability of the Draft EIS and provided the opportunity to request paper or electronic copies at no cost.

- The Draft Programmatic EIS will be available online in a downloadable and searchable format. The website will also provide an online request form and other information regarding obtaining a copy of the Draft PEIS at no cost. If you do not have access to the Internet, contact :

  Bruce Verhaaren
  Argonne National Laboratory, Bldg. 900
  9700 S. Cass Ave.
  Argonne, IL 60439
  (630) 252-3240
  bverhaaren@anl.gov

EIS and Energy Corridor Basics

What is an EIS?

- EIS is the abbreviation for environmental impact statement, a document prepared to describe the effects of proposed activities on the environment as required by the National Environmental Policy Act (NEPA) *Environment*, in this case, is defined as the natural and physical environment and the relationship of people with that environment. This means that the *environment* considered in an EIS includes land; water; air; structures; living organisms; environmental values at the site; and social, cultural, and economic factors.

- An *impact* is a change or consequence that results from an activity. Impacts can be positive, negative, or both. An EIS describes impacts, as well as ways to *mitigate* impacts. To *mitigate* means to lessen or remove negative impacts.

- Therefore, an EIS is a document that describes the potential impacts on the environment as a result of a proposed action. It also describes potential impacts of alternatives, as well as measures to mitigate the impacts.

What is a Programmatic EIS?

- A Programmatic EIS evaluates the environmental impacts of broad agency actions, such as the development of programs or the setting of national policies. Designation of segments of West-wide energy corridors that are on lands under BLM, USFS, or Department of Defense jurisdiction would involve the proposed amendment of several land use plans and would facilitate processing of future right-of-way applications. Therefore, the proposed action will define and implement a program that sets the stage for site-specific actions to follow.

Why is an EIS needed for energy corridor designation in the western states?

- The Energy Policy Act of 2005 (EPAct), Public Law 109-58 (H.R. 6), enacted August 8, 2005, directs the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior (the Agencies) to designate under their respective authorities corridors on federal land in the 11 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors).

- Section 368 of the EPAct, entitled "Energy Right-of-Way Corridors on Federal Land," and specifically subsection 368(d) require the Agencies to designate energy corridors, taking into account the "need for upgraded and new electricity transmission and distribution facilities" in order to:

  - "Improve reliability,"
  - "Relieve congestion," and
  - "Enhance the capability of the national grid to deliver electricity."

- The Agencies have determined that designating corridors as required by Section 368 of the EPAct constitutes a major federal action which, may have a significant impact upon the environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). For this reason, the Agencies are preparing a PEIS entitled, "Designation of Energy Corridors on Federal Land in the 11 Western States" (DOE/EIS-0386) to address the potential environmental impacts from the proposed action and reasonable alternatives.

What is an Energy Corridor?

- For purposes of preparing the West-wide Energy Corridor PEIS, an energy corridor is defined as a parcel of land that has been identified through the land use planning process as being a preferred location for existing and future utility rights-of-way, and that is suitable to accommodate one or more rights-of-way that are similar, identical, or compatible.

What are the components of an Energy Corridor?

- Energy corridors can accommodate multiple pipelines (such as for oil, gas, or hydrogen), electricity transmission lines, and related infrastructure, such as access and maintenance roads, compressors, pumping stations, and other structures.

What is the scope of the analysis in the PEIS?

- The scope of the analysis in the PEIS will include an assessment of the potential positive and negative environmental, socioeconomic impacts of energy corridor designation; discussion of relevant mitigation measures to address these impacts; and identification of appropriate programmatic policies to be included in the Agencies' land use plans. Section 368 of the the EPAct divides the Agencies' schedules for designating transmission corridors on public lands into two groups: (1) western states, consisting of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming, and (2) all other states. This PEIS relates solely to corridors in the western states. The PEIS addresses land use plan amendments to designate energy corridors, but the scope of analysis does not include the site-specific issues related to subsequent applications for rights-of-way within the designated corridors.

What alternatives are being considered?

The following alternatives are being considered in the preparation of the PEIS. In addition, the Agencies are considering any additional reasonable alternatives that result from comments received in response to the scoping process.

- **Proposed Action and Alternatives** – The proposed action in this PEIS is to designate corridors on federal lands in the 11 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) for oil, gas and hydrogen pipelines and electricity transmission and distribution facilities. On the basis of the information and analyses developed in this PEIS, each Agency would amend its respective land use plans by designating a series of energy corridors effective upon signing of the Record(s) of Decision.

- **No Action Alternative** – Under the no action alternative, no new energy corridors would be designated through this coordinated approach. The No Action alternative would identify the environmental impacts associated with each of the Agencies continuing to designate energy corridors through use of their present practices. These practices would include the application of local planning criteria by each regional land management office.

- **Additional Alternatives** – Additional alternatives may also be considered.

What are land use plans?

- Land use plans are planning and management documents that define how resources will be managed within a specific planning area and establish restrictions on activities to be undertaken in that planning area. They are developed by federal agencies in accordance with applicable regulations and in conjunction with interested stakeholders.

- The land use planning process is the key tool used by the agencies to protect resources and designate uses on federal lands managed by the agencies. These plans help ensure that the public lands are managed in accordance with applicable laws and regulations under the principles of multiple use and sustained yield, recognizing the nation's need for domestic sources of minerals, food, timber, and fiber, while protecting the quality of scientific, scenic, historical, ecological, environmental, air, water, and archaeological values.

- Environmental issues identified should be related to restriction of conflicting uses within the corridors, adequacy of potential plan direction within the corridors, and broadening any identifiable environmental concerns within the potential corridors. Any corridor designation and subsequent incorporation into an agency's land use plan by this plan amendment process does not, itself, authorize project activities. These project activities, such as construction of a new pipeline or electric transmission line or retrofitting utilities within an existing corridor, would be subject to analysis under all pertinent laws and regulations, including the National Energy Policy Act and the National Historic Preservation Act and their requirements for Tribal consultation.

What impacts and issues will be addressed in the West-wide Energy Corridor PEIS?

The following is a list of potential environmental issues that the Agencies have tentatively identified for analysis. This list is not intended to be all-inclusive or to imply any predetermination of impacts. Following is a preliminary list of issues that may be analyzed in the PEIS:

- Socioeconomic and recreational impacts of development of the land tracts and their subsequent uses;

- Impacts on protected, threatened, endangered, or sensitive species of animals or plants, or their critical habitats;
- Impacts on floodplains and wetlands;
- Impacts on archaeological, cultural, or historic resources;
- Impacts on human health and safety;
- Impacts on existing and future land uses;
- Visual impacts; and
- Disproportionately high and adverse impacts on minority and low-income populations, also known as environmental justice considerations.

APPENDIX D:

FEDERAL AND STATE REGULATORY REQUIREMENTS POTENTIALLY APPLICABLE WHEN DESIGNATING ENERGY CORRIDORS

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FEDERAL AND STATE REGULATORY REQUIREMENTS POTENTIALLY APPLICABLE WHEN DESIGNATING ENERGY CORRIDORS

The tables that follow list the major federal and state laws and Executive Orders that establish requirements, permits, approvals, or consultations that may apply to the designation of energy corridors in the 11 western states that are the subject of this PEIS. The general application of these federal and state authorities and other regulatory considerations associated with energy corridors are discussed in Chapter 1.

The tables are divided into general environmental impact categories. The citations in the tables are those of the general statutory authority that governs the indicated category of activities to be undertaken under the Proposed Action and the No Action Alternative. Under such statutory authority, the lead federal and state agencies may have promulgated implementing regulations that set forth the detailed procedures for permitting and compliance.

Definitions of abbreviations used in the tables are provided here.

ARS	*Arizona Revised Statutes*
CRS	*Colorado Revised Statutes*
IC	*Idaho Code*
MCA	*Montana Code Annotated*
NMSA	*New Mexico Statutes Annotated*
NRS	*Nevada Revised Statutes*
ORS	*Oregon Revised Statutes*
P.L.	*Public Law*
RCW	*Revised Code of Washington*
UCA	*Utah Code Annotated*
USC	*United States Code*
WS	*Wyoming Statutes*

TABLE D-1 Air Quality

Authority	Citation
Federal	Clean Air Act (42 USC 7401 et seq.)
Arizona	Air Quality (ARS 49-401 et seq.)
California	Air Resources (Health and Safety Code, Section 39000 et seq.)
Colorado	Air Quality Control (CRS 25-7-101 et seq.)
Idaho	Registration of Persons Engaged in Operations or Construction Where Air Pollution Is a Factor – Reports (IC 39-110) Pollution Source Permits (IC 39-115) Relationship to Federal Law (IC 39-118B)
Montana	Air Quality (MCA 75-2-101 et seq.)
Nevada	Air Pollution (NRS 445B.100 et seq.)
New Mexico	Air Pollution (NMSA 74-2-1 et seq.)
Oregon	Air Quality (ORS 468A.005 et seq.)
Utah	Air Conservation Act (UCA 19-2-101 et seq.)
Washington	Washington Clean Air Act (RCW 70.94.011 et seq.)
Wyoming	Air Quality (WS 35-11-201 et seq.)

TABLE D-2 Cultural Resources

Authority	Citation
Federal	Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.) American Indian Religious Freedom Act (42 USC 1996 et seq.) Archeological Resources Protection Act (16 USC 470(aa) et seq.) Archeological and Historic Preservation Act (16 USC 469 et seq.) Historic Sites, Buildings, and Antiquities Act (Historic Sites Act) (16 USC 461 et seq.) Antiquities Act (16 USC 431 et seq.) National Historic Preservation Act (16 USC 470 et seq.) Theft and Destruction of Government Property (18 USC 641 et seq., 1361 et seq.) Executive Order 11593, "Protection and Enhancement of the Cultural Environment," May 13, 1971 Executive Order 13007, "Indian Sacred Sites," May 24, 1996 Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," Nov. 6, 2000 Executive Order 13287, "Preserve America," Mar. 3, 2003
Arizona	Duties; Board; Partnership Fund; State Historic Preservation Officer (ARS 41-511.04) Arizona Historical Society (ARS 41-821 et seq.) Archeological Discoveries (ARS 41-841 et seq.) Historic Preservation (ARS 41-861 et seq.)
California	Historical Resources (Public Resources Code, Section 5020 et seq.)
Colorado	Historical, Prehistorical, and Archeological Resources (CRS 24-80-401 et seq.) Unmarked Human Graves (CRS 24-80-1301 et seq.)
Idaho	Idaho Archeological Survey (IC 33-3901 et seq.) Protection of Graves (IC 27-501 et seq.) Preservation of Historic Sites (IC 67-4601)
Montana	Antiquities (MCA 22-3-401 et seq.) Human Skeletal Remains and Burial Site Protection (MCA 22-3-801 et seq.) Repatriation of Human Remains and Funerary Objects (MCA 22-3-901 et seq.)
Nevada	Historic Preservation and Archeology (NRS 383.011 et seq.)
New Mexico	Cultural Properties (NMSA 18-6-1 et seq.)
Oregon	Historic Property (ORS 358.475 et seq.) Indian Graves and Protected Objects (ORS 97.740 et seq.)
Utah	History Development (UCA 9-8-102 et seq.) Native American Graves Protection and Repatriation Act (UCA 9-9-102 et seq.)
Washington	Archeological Sites and Resources (RCW 27.53.010 et seq.) Indian Graves and Records (RCW 27.44.020 et seq.) State Historical Societies – Historic Preservation (RCW 27.34.010 et seq.)
Wyoming	Protection of Prehistoric Ruins (WS 36-1-114 et seq.)

TABLE D-3 Energy Projects

Authority	Citation
Federal	Natural Gas Act (15 USC 717 et seq.) Natural Gas Policy Act (15 USC 3301 et seq.) Federal Power Act (16 USC 791a et seq.) Public Utilities Regulatory Policies Act (16 USC 2601 et seq.) Energy Supply and Environmental Coordination Act (15 USC 791 et seq.) Energy Policy and Conservation Act (42 USC 6201 et seq.) Surface Mining Control and Reclamation Act (30 USC 1201 et seq.) Accountable Pipeline Safety and Partnership Act of 1996 (49 USC 60101 et seq.) Energy Policy Act of 2005 (P.L. 109-58) Executive Order 10485, "Providing for the Performance of Certain Functions Heretofore Performed by the President with Respect to Electric Power and Gas Facilities Located on the Borders of the United States," Sept. 3, 1953 Executive Order 13337, "Issuance of Permits with Respect to Certain Energy-Related Facilities and Land Transportation Crossings on International Boundaries of the United States," May 11, 2004
Arizona	Power Plant and Transmission Line Siting Committee (ARS 40-360 et seq.)
California	Power Facility and Site Certification (Public Resources Code, Section 25500 et seq.) Certificates of Public Convenience and Necessity (Public Utilities Code, Section 1001 et seq.)
Colorado	Local Government Regulation – Location, Construction, or Improvement of Major Electrical or Natural Gas Facilities – Legislative Declaration (CRS 29-20-108) New Construction-Extension (CRS 40-5-101)
Idaho	Powers and Duties of Public Utilities Commission (IC 61-501 et seq.) Certificate of Convenience and Necessity (IC 61-526 et seq.) Idaho Energy Resources Authority Act (IC 67-8901 et seq.)
Montana	Major Facility Siting (MCA 75-20-101 et seq.) Regulation of Utilities (MCA 69-3-101 et seq.) Utility Lines and Facilities (MCA 69-4-101 et seq.) Pipeline Carriers (MCA 69-13-101 et seq.)
Nevada	Construction of Utility Facilities: Utility Environmental Protection Act (NRS 704.820 et seq.) Oil Pipelines (NRS 708.010 et seq.)
New Mexico	Electric, Gas, and Water Utilities (NMSA 62-1-1 et seq.)
Oregon	Regulation of Energy Facilities (ORS 469.300 et seq.) Energy Facility Siting Council (ORS 469.450 et seq.) Publicly Owned Utilities (ORS 469.649 et seq.) Pacific Northwest Electric Power and Conservation Planning Council (ORS 469.802 et seq.) Small Scale Local Energy Projects (ORS 470.050 et seq.) Utility Regulation Generally (ORS 757.005 et seq.) Rights of Way (ORS 758.010 et seq.) Underground Electric and Communication Facilities (ORS 758.210 et seq.)

TABLE D-3 (Cont.)

Authority	Citation
Oregon (Cont.)	Electric and Gas Utilities; Allocation of Territories and Customers (ORS 758.400 et seq.) Cogeneration and Small Power Production Facilities (ORS 758.505 et seq.)
Utah	Electric Power Facilities Act (UCA 54-9-101 et seq.) Natural Gas Pipeline Safety (UCA 54-13-1 et seq.) Electricity Facility Review Board Act (UCA 54-14-101 et seq.)
Washington	Energy Facilities – Site Locations (RCW 80.50.010 et seq.) Gas and Hazardous Liquid Pipelines (RCW 81.88.005 et seq.)
Wyoming	Industrial Development and Siting (WS 35-12-101 et seq.) Electric Utilities (WS 37-16-101 et seq.) Wyoming Energy Commission (WS 30-7-101)

TABLE D-4 Floodplains and Wetlands

Authority	Citation
Federal	Clean Water Act (33 USC 1344) Rivers and Harbors Act of 1899 (33 USC 401 et seq.) Executive Order 11988, "Floodplain Management," May 24, 1977 Executive Order 11990, "Protection of Wetlands," May 24, 1977
Arizona	Floodplain Delineation, Regulation of Use (ARS 48-3609)
California	Wetlands Preservation (Keene-Nejedly California Wetlands Preservation Act) (Public Resources Code, Section 5810 et seq.) Cobey-Alquist Flood Plain Management Act (Water Code, Section 8400 et seq.)
Colorado	Drainage of State Lands (CRS 37-30-101 et seq.) Marsh Land (CRS 37-33-101 et seq.)
Idaho	Local Governments May Adopt Floodplain Zoning Ordinances (IC 46-1022)
Montana	Aquatic Ecosystem Protections (MCA 75-7-101 et seq.) Flood Plain and Floodway Management (MCA 76-5-101 et seq.)
Nevada	Establishment, Use and Operation of Wetland Mitigation Bank (NRS 244.388) Contents of Regional Plans (NRS 278.0274)
New Mexico	Additional County and Municipal Powers; Flood and Mudslide Hazard Areas; Floodplain Permits; Land Use Control; Jurisdiction; Agreement (NMSA 3-18-7(C))
Oregon	Drainage and Flood Control Generally (ORS 549.010 et seq.) Wetlands (ORS 196.600 et seq.) Wetlands Conservation Plans (ORS 196.668 et seq.) Removal of Material; Filling (ORS 196.795 et seq.) Submersible and Submerged Lands (ORS 274.005 et seq.)
Utah	Siting Criteria (UCA 19-3-307)
Washington	Wetlands Mitigation Banking (RCW 90.84.005 et seq.) Floodplain Management (RCW 86.16.010 et seq.)
Wyoming	Wyoming Wetlands Act (WS 35-11-308 et seq.)

TABLE D-5 Groundwater, Drinking Water, and Water Rights

Authority	Citation
Federal	Safe Drinking Water Act (42 USC 300(f) et seq.)
Arizona	Water Quality Control (ARS 49-201 et seq.) Groundwater Code (ARS 45-401 et seq.) Appropriation of Water (ARS 45-151 et seq.)
California	California Safe Drinking Water Act (Health and Safety Code, Section 116270 et seq.) Water (Water Code, Section 1000 et seq.)
Colorado	Water Right Determination and Administration (CRS-37-92-101 et seq.) Water Quality Control (CRS 25-8-101 et seq.)
Idaho	Irrigation and Drainage – Water Rights and Reclamation (IC 42-101 et seq.) Groundwater Recharge (IC 42-4201) Domestic Water to Be Protected (IC 37-2102) State Policy on Environmental Protection (IC 39-102)
Montana	Surface Water and Groundwater (MCA 85-2-101 et seq.) Public Water Supplies, Distribution and Treatment (MCA 75-6-101 et seq.)
Nevada	Underground Water and Wells (NRS 534.010 et seq.) Public Water Systems (NRS 445A.800 et seq.)
New Mexico	Compliance with Federal Safe Drinking Water Act (NMSA 74-1-12) Water Rights in General (NMSA 72-1-1 et seq.) Appropriation and Use of Surface Water (NMSA 72-5-1 et seq.) Ground Water Storage and Recovery (NMSA 72-5A-1 et seq.) Underground Waters (NMSA 72-12-1 et seq.)
Oregon	Ground Water (ORS 468B.150 et seq.) Water Systems (ORS 448.115 et seq.) Potable Water Treatment Plants (ORS 448.405 et seq.) Water Resources Administration (ORS 536.007 et seq.) Appropriation of Water Generally (ORS 537.010 et seq.) Withdrawal of Certain Waters from Appropriation; Special Municipal and County Water Rights (ORS 538.010 et seq.) Determination of Water Rights Initiated before February 24, 1909; Determination of Water Rights of Federally Recognized Indian Tribes (ORS 539.005 et seq.) Distribution of Water; Watermasters; Change in Use, Transfer, or Forfeiture of Water Rights (ORS 540.010 et seq.) Watershed Enhancement and Protection; Water Development Projects; Miscellaneous Provisions on Water Rights; Stewardship Agreements (ORS 541.010 et seq.)
Utah	Safe Drinking Water Act (UCA 19-4-101 et seq.) Ground Water Recharge and Recovery Act (UCA 73-3b-101 et seq.) Appropriation (UCA 73-3-1 et seq.) Determination of Water Rights (UCA 73-4-1 et seq.) Withdrawal of Unappropriated Water (UCA 73-6-1 et seq.)

TABLE D-5 (Cont.)

Authority	Citation
Washington	Aquifer Protection Areas (RCW 36.36.010 et seq.) Public Water Supply Systems – Operators (RCW 70.119.010 et seq.) Public Water Supply Systems – Penalties and Compliance (RCW 70.119A.020 et seq.) Water Code (RCW 90.03.005 et seq.) Water Rights – Registration – Waiver and Relinquishment (RCW 90.14.010) Appropriation of Water for Public and Industrial Purposes (RCW 90.16.010 et seq.) Water Rights of the United States (RCW 90.40.010 et seq.) Water Resource Management (RCW 90.42.005 et seq.) Regulation of Public Ground Waters (RCW 90.44.020 et seq.)
Wyoming	Water Rights; Administration and Control (WS 41-3-101) Board of Control; Adjudication of Water Rights (WS 41-4-101)

TABLE D-6 Hazardous Materials

Authority	Citation
Federal	Hazardous Materials Transportation Act (49 USC 5101 et seq.) Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11001 et seq.) Oil Pollution Control Act (33 USC 2701 et seq.) Pollution Prevention Act of 1990 (42 USC 13101 et seq.) Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements," Aug. 3, 1993
Arizona	Transporting Hazardous Material; Violation; Classification (ARS 28-1523) Emergency Panning and Community Right-to-Know Act (ARS 26-341 et seq.)
California	Unified Hazardous Waste and Hazardous Materials Management and Regulatory Program (Health and Safety Code, Section 25404 et seq.) Hazardous Materials Release Response Plans and Inventory (Health and Safety Code, Section 25500 et seq.) Safe Drinking Water and Toxics and Enforcement Act of 1986, Section 25249.5
Colorado	Implementation of Title III of Superfund Act (CRS 24-32-2601 et seq.) Hazardous Substances (CRS 25-5-501 et seq.) Pollution Prevention (CRS 25-16.5-101 et seq.)
Idaho	Hazardous Substances Emergency Response Act (IC 39-7101 et seq.) Hazardous Materials/Hazardous Waste Transportation Enforcement (IC 49-2201 et seq.)
Montana	Response to Hazardous Materials Incidents Act (MCA 10-3-1201 et seq.)
Nevada	Regulation of Highly Hazardous Substances and Explosives (NRS 459.380 et seq.) Handling of Hazardous Materials (NRS 459.700 et seq.)
New Mexico	Hazardous Chemicals Information Act (NMSA 74-4E-1 et seq.) Hazardous Material Transportation (NMSA 74-4F-1 et seq.)
Oregon	Spill Response and Cleanup of Hazardous Materials (ORS 466.605 et seq.) Oil and Hazardous Material Spillage (ORS 468B.300 et seq.) Hazardous Substances; Radiation Sources (ORS 453.001 et seq.) Applicability of Hazardous Material Safety Regulations; Rules (ORS 823.061)
Utah	Hazardous Materials – Transportation Regulations (UCA 41-6a-1639) Hazardous Materials Emergency – Recovery of Expenses (UCA 53-2-105)
Washington	Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56.005 et seq.) Hazardous Substance Information (RCW 70.102.010 et seq.) Hazardous Materials Incidents (RCW 70.136.010 et seq.)
Wyoming	Authority of Department to Adopt Rules and Regulations Governing…Hazardous Materials (WS 31-18-303)

TABLE D-7 Hazardous Waste and Polychlorinated Biphenyls (PCBs)

Authority	Citation
Federal	Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act and the Hazardous Solid Waste Amendments of 1984 (42 USC 6901 et seq.) Toxic Substances Control Act (15 USC 2601)
Arizona	Hazardous Waste Disposal (ARS 49-901 et seq.)
California	Hazardous Waste Control (Health and Safety Code, Section 25100 et seq.)
Colorado	Hazardous Waste (CRS 25-15-101 et seq.)
Idaho	Hazardous Waste Management (IC 39-4401 et seq.) PCB Waste Disposal (IC 39-6201 et seq.)
Montana	Hazardous Waste Management (MCA 75-10-401 et seq.)
Nevada	Disposal of Hazardous Waste (NRS 459.400 et seq.)
New Mexico	Hazardous Wastes (NMSA 74-4-1 et seq.) Hazardous Waste Feasibility Studies (NMSA 74-4C-1 et seq.)
Oregon	Hazardous Waste and Hazardous Materials I (ORS 465.003 et seq.) Hazardous Waste and Hazardous Materials II (ORS 466.005 et seq.
Utah	Solid and Hazardous Waste Act (UCA 19-6-101 et seq.)
Washington	Hazardous Waste Management (RCW 70.105.005 et seq.)
Wyoming	Solid Waste Management (WS 35-11-501 et seq.)

TABLE D-8 Land Use

Authority	Citation
Federal	Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.) BLM Right of Way Regulations (43 CFR 2800 et al.) Mineral Leasing Act (30 USC 181 et seq.) BLM Right of Way Regulations (43 CFR 2800 et al.) Coastal Zone Management Act, as amended by Coastal Zone Reauthorization Amendments of 1990 (16 USC 1451 et seq.) Wild and Scenic Rivers Act (16 USC 1271 et seq.) National Trails System Act (16 USC 1241 et seq.) National Park Service Organic Act (16 USC 1 et seq.) Wilderness Act (16 USC 1311 et seq.) Federal Land Exchange Facilitation Act (43 USC 1716) Federal Land Transaction Facilitation Act (43 USC 2301 et seq.) Farmland Protection and Policy Act (7 USC 4201) Soil and Water Resources Conservation Act of 1977 (16 USC 2001 et seq.) Sikes Act, as amended by the Sikes Act Improvement Act, 16 USC 670a et seq.) Federal Cave Resources Protection Act of 1988, 16 USC 4301 et seq.) Oregon and California Grant Lands Act of 1937 (43 USC 1181 a, b, d-f) The Northwest Forest Plan
Arizona	Public Lands (ARS 37-101 et seq.) Administration of State and Other Public Lands (ARS 37-201 et seq.) Acts of Congress Relating to State and Federal Lands (ARS 37-701 et seq.) Natural Resource Conservation District (ARS 37-1001) State Claims to Streambeds (ARS 37-1101) Arizona Agricultural Protection Act (ARS 3-3301)
California	California Wild and Scenic Rivers Act (Public Resources Code, Section 5093.50 et seq.) Coastal Resources and Energy Assistance (Public Resources Code, Section 35000 et seq.)
Colorado	Areas and Activities of State Interest (CRS 24-65.1-101 et seq.) Local Government Land Use Control Enabling Act (CRS 29-20-101 et seq.) County Planning (CRS 30-28-101 et seq.) (Municipal) Planning and Zoning (CRS 31-23-101 et seq.)
Idaho	Local Land Use Planning (IC 67-6501 et seq.)
Montana	Land Use Regulations (MCA 76-15-701 et seq.) Wild and Scenic Resources (MCA 76-12-101 et seq.) Timber Resources (MCA 76-13-101 et seq.) Rangeland Resources (MCA 76-14-101 et seq.)
Nevada	Regulations for Use of Land (NRS 548.410 et seq.) Planning and Zoning (NRS 278.010 et seq.)

TABLE D-8 (Cont.)

Authority	Citation
New Mexico	Land Development Fees and Rights (NMSA 5-8-1 et seq.)
	Land Use Easements (NMSA 47-12-1 et seq.)
	Natural Lands Protection (NMSA 75-5-1 et seq.)
	Rangeland Protection (NMSA 76-7B-1 et seq.)
	Range Management Plans (NMSA 76-7C-1)
	Zoning Regulations (NMSA 3-21-1 et seq.)
Oregon	Comprehensive Land Use Planning Coordination (ORS 197.005 et seq.)
	County Planning, Zoning, Housing Codes (ORS 215.010 et seq.)
	City Planning and Zoning (ORS 227.010 et seq.)
	Use and Disposition of Public Lands (ORS 271.005 et seq.)
Utah	Quality Growth Act (UCA 11-38-101 et seq.)
	Environmental Institutional Control Act (UCA 19-10-101 et seq.)
	Municipal Land Use, Development, and Management (UCA 10-9a-101 et seq.)
	County Land Use, Development, and Management (UCA 17-27a-101 et seq.)
	Critical Land Near State Prison – Definitions – Preservation as Open Land – Management and Use of Land – Restrictions on Transfer – Wetlands Development – Conservation Easement (UCA 23A-5-222)
Washington	Shoreline Management Act of 1971 (RCW 90.58.010 et seq.)
	Public Lands Management – General (RCW 79.02.010 et seq.)
	Mineral, Coal, Oil, and Gas Leases (RCW 79.14.010 et seq.)
	Easements over Public Lands (RCW 79.36.310 et seq.)
	Natural Area Preserves (RCW 79.70.010 et seq.)
	Washington Natural Resources Conservation Areas (RCW 79.71.010 et seq.)
	(Counties) Planning Enabling Act (RCW 36.70.010 et seq.)
	(Counties) Growth management – planning by selected counties and cities (RCW 36.70A.010 et seq.)
Wyoming	Land Quality (WS 35-11-401 et seq.)
	Mineral Leases (WS 36-6-101 et seq.)
	Carey Act Lands (WS 36-7-101 et seq.)
	Sale of State Lands (WS 36-9-101 et seq.)
	United States Lands (WS 36-10-101 et seq.)
	State Control of Certain Land (WS 36-12-101 et seq.)
	(Counties) Planning and Zoning (WS 18-5-101 et seq.)

TABLE D-9 Noise

Authority	Citation
Federal	Noise Control Act, as amended by Quiet Communities Act (42 USC 4901 et seq.)
Arizona	No specific primary statutory authority
California	Noise Control Act (Health and Safety Code, Section 46000 et seq.)
Colorado	Noise Abatement (CRS 25-12-101 et seq.)
Idaho	No specific primary statutory authority
Montana	No specific primary statutory authority
Nevada	Prevention of Excessive Noise (NRS 244.363)
New Mexico	No specific primary statutory authority Nuisances and Offenses; Regulations and Prohibitions (NMSA 3-18-17) Board; duties (NMSA 74-1-8(6))
Oregon	Noise Control (ORS 467.010 et seq.)
Utah	No specific primary statutory authority
Washington	Noise Control (RCW 70.107.010 et seq.)
Wyoming	No specific primary statutory authority

TABLE D-10 Paleontological Resources

Authority	Citation
Federal	Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.) National Environmental Policy Act of 1969 (42 USC 4321 et seq.) Federal Cave Resources Protection Act of 1988 (16 USC 4302 et seq.) Archeological Resources Protection Act (16 USC 470(aa) et seq.) Archeological and Historic Preservation Act (16 USC 469-469c) Archeological and Paleontological Salvage Act (16 USC 305) Organic Act of March 3, 1879 (20 USC 59) Theft and Destruction of Government Property (18 USC 641 et seq., 1361 et seq.) National Wildlife Refuge System Administration Act (16 USC 668dd) Executive Order 11593, "Protection and Enhancement of the Cultural Environment," May 13, 1971
Arizona	Archeological Discoveries (ARS 41-841 et seq.) State Museum Responsibilities include Paleontological Resources (ARS 15-1631) Paleontological Resources Are Heritage Resources (M06-388) State Lands: Fossils Belong to the Mineral Estate (ARS 37-231, AAC R12-5-1807)
California	Archeological, Paleontological, and Historical Sites (Public Resources Code, 5097.1 et seq.) State Lands: Fossils Belong to the Mineral Estate (PRC 6407) Protection of Paleontological Resources (PRC 5097-5097.6, PRC 30244)
Colorado	Historical, Prehistorical, and Archeological Resources (CRS 24-80-401 et seq.) Paleontological Resources Are Prehistorical Resources Reserved to the State (CRS 24 80 401)
Idaho	Protection of Archeological and Vertebrate Paleontological Sites and Resources (IC 67-4119 and 4120) Vertebrate Paleontological Sites and Resources Are Protected (IS 67-4121)
Montana	Antiquities (MCA 22-3-421 et seq.) Paleontological Remains Belong to the State and Are Protected (MCA 22-3 Part 4)
Nevada	Preservation of Prehistoric and Historic Sites (NRS 381.195 et seq.) Paleontological Sites Belong to the State and Are Protected (NRS 381.195-381.227, NRS 321.5977)
New Mexico	Cultural Properties (NMSA 18-6-1 et seq.) Theft and Destruction of Paleontological Sites (NMAC 19.2.19.16)
Oregon	Permits and Conditions for Excavation or Removal of Archaeological or Historical Material (ORS 390.235) Paleontological Resources are Protected under the Natural Heritage Program (ORS 273.563 to 273.591)
Utah	Permit Required to Excavate Critical Paleontological Resources (UCA 63-73-12 and 13) Paleontological Resources (UC 63-73 et seq.)

TABLE D-10 (Cont.)

Authority	Citation
Washington	Powers and Duties of Fish and Wildlife (RCW 77.12) (authorizes WAC 232-12-251, Removal of Minerals, Wood, and Artifacts from Department Lands)
	Fossils Are Property That belong to the State (RCW 79.01.748, WAC 232-12-251)
Wyoming	Protection of Prehistoric Ruins (WS 36-1-114 et seq.)
	Paleontological Deposits Are Protected (WS 36-1-114-116; W.S. 36-2-107; WSLCR Ch. 11)

TABLE D-11 Pesticides and Noxious Weeds

Authority	Citation
Federal	Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136 et seq.) Noxious Weed Act of 1974, as amended by Sec. 15 – Management of Undesirable Plants on Federal Lands, 1990 (7 USC 2801 et seq.)
Arizona	Pesticides (ARS 3-341 et seq.) Pesticide Control (ARS 3-361 et seq.) Pesticide Contamination Prevention (ARS 49-301 et seq.)
California	Agricultural Chemicals, Livestock Remedies, and Commercial Feeds (Food and Agriculture Code, Section 12500 et seq.) Weeds (Food and Agriculture Code, Section 7201 et seq.)
Colorado	Pesticide Act (CRS 35-9-101 et seq.)
Idaho	Application of Fertilizers and Pesticides (IC 39-127) Pesticides and Chemigation (IC 22-3401 et seq.) Noxious Weeds (IC 22-2401 et seq.)
Montana	Pesticides (MCA 80-8-101 et seq.) Weed Control (MCA 80-7-701 et seq.)
Nevada	Control of Insects, Pests, and Noxious Weeds (NRS 555.005 et seq.)
New Mexico	Pesticide Control (NMSA 76-4-1 et seq.) Noxious Weed Control (NMSA 76-7-1 et seq.)
Oregon	Pesticide Control (ORS 634.005 et seq.)
Utah	Utah Pesticide Control Act (UCA 4-14-1 et seq.)
Washington	Washington Pesticide Application Act (RCW 17.21.010 et seq.) Noxious Weeds (RCW 17.10.007 et seq.)
Wyoming	Weed and Pest Control (WS 11-5-101 et seq.)

TABLE D-12 Solid Waste

Authority	Citation
Federal	Solid Waste Disposal Act (42 USC 6901 et seq.)
Arizona	Solid Waste Management (ARS 49-701 et seq.)
California	Solid Waste Handling and Disposal (Health and Safety Code, Section 117575 et seq.) Waste Management (Public Resources Code, Section 40000 et seq.)
Colorado	Solid Waste Disposal Sites and Facilities (CRS 30-20-100.5 et seq.)
Idaho	Idaho Solid Waste Facilities Act (IC 39-7401 et seq.)
Montana	Montana Solid Waste Management Act (MCA 75-10-201 et seq.)
Nevada	Collection and Disposal of Solid Waste (NRS 444.440 et seq.)
New Mexico	Solid Waste Incineration (NMSA 74-8-1 et seq.) Solid Waste Act (NMSA 74-9-1 et seq.) Solid Waste Authority (NMSA 74-10-1 et seq.)
Oregon	Solid Waste Management (ORS 459.005 et seq.) Solid Waste Recovery Generally (ORS 459A.005 et seq.)
Utah	Solid Waste Management Act (UCA 19-6-501 et seq.)
Washington	Solid Waste Management – Reduction and Recycling (RCW 70.95.010 et seq.) Solid Waste Incinerator and Landfill Operators (RCW 70.95D.010)
Wyoming	Solid Waste Management (WS 35-11-501 et seq.) Solid Waste Disposal Districts (WS 18-11-101 et seq.)

TABLE D-13 Source Water Protection

Authority	Citation
Federal	Safe Drinking Water Act (42 USC 300h et seq.)
Arizona	Aquifer Protection Permits (ARS 49-241 et seq.)
California	Water Wells and Cathodic Protection Wells (Water Code, Section 13700 et seq.) Water Supply Provisions (Public Resources Code, Section 116975 et seq.)
Colorado	Water Quality Control (CRS 25-8-101 et seq.)
Idaho	Groundwater Recharge (IC-4201)
Montana	Montana Wellhead Protection Program (MCA 75-6-120)
Nevada	Underground Water and Wells (NRS 534.010 et seq.)
New Mexico	Ground Water Protection (NMSA 74-6B-1 et seq.)
Oregon	Ground Water (ORS 468B.150 et seq.)
Utah	Water Quality Act (UCA 19-5-101 et seq.)
Washington	Protection of Ground Water Aquifers if Sole Drinking Water Source (RCW 90.54.140) Ground Water Management Areas (RCW 90.44.400)
Wyoming	Protection of Public Water Supply (WS 35-4-201 et seq.)

TABLE D-14 Water Bodies and Wastewater

Authority	Citation
Federal	Clean Water Act (33 USC 1251 et seq.)
Arizona	Water Quality Control (ARS 49-201 et seq.)
California	Water Quality (Water Code, Section 13000 et seq.)
Colorado	Water Quality Control (CRS 25-8-101 et seq.) Water and Wastewater Treatment Plant Operations (CRS 25-9-101 et seq.)
Idaho	Water Quality (IC 39-3601 et seq.)
Montana	Water Quality (MCA 75-5-101 et seq.)
Nevada	Water Pollution Control (NRS 445A.300 et seq.)
New Mexico	Water Quality (NMSA 74-6-1 et seq.)
Oregon	Water Pollution Control (ORS 468B.005 et seq.) Sewage Treatment and Disposal Systems (ORS 454.010 et seq.) Water and Sewage Systems (ORS 448.005 et seq.)
Utah	Water Quality Act (UCA 19-5-101 et seq.)
Washington	Water Pollution Control (RCW 90.48.010 et seq.) Domestic Wastewater Treatment Plans – Operators (RCW 70.95B.010 et seq.) On-site Sewage Disposal Systems (RCW 70.118.010 et seq.) Chemical Contaminants and Water Quality (RCW 70.142.010 et seq.)
Wyoming	Water Quality (WS 35-11-301 et seq.)

TABLE D-15 Vegetation and Wildlife

Authority	Citation
Federal	Fish and Wildlife Coordination Act (16 USC 661 et seq.) Bald and Golden Eagle Protection Act (16 USC 668 et seq.) National Wildlife Refuge System Administration Act (16 USC 668dd) Migratory Bird Act (16 USC 703 et seq.) Endangered Species Act (16 USC 1531 et seq.) Wild Free-Roaming Horses and Burros Act (16 USC 1331 et seq.) Executive Order 12996, "Management and General Public Use of the National Wildlife Refuge System," Mar. 25, 1996 Executive Order 13112, "Invasive Species," Feb. 3, 1999 Executive Order 13148, "Greening the Government through Leadership in Environmental Management," April 21, 2000 Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," Jan. 10, 2001
Arizona	Powers and Duties (ARS 17-231 et seq.) Taking and Handling of Wildlife (ARS 17-301 et seq.) Wildlife Habitat Protection (ARS 17-451)
California	Migratory Birds (Fish and Game Code, Section 355 et seq.) Wildlife Conservation Law of 1947 (Fish and Game Code, Section 1300 et seq.) Fish and Game Management (Fish and Game Code, Section 1500 et seq.) Fish and Wildlife Protection and Conservation (Fish and Game Code, Section 1600 et seq.) Native Species Conservation and Enhancement (Fish and Game Code, Section 1750 et seq.) Conservation of Wildlife Resources (Fish and Game Code, Section 1800 et seq.) Endangered Species (Fish and Game Code, Section 2050 et seq.) Protected Reptiles and Turtles (Fish and Game Code, Section 5000 et seq.) California Wilderness Preservation System (Public Resources Code, Section 5093.30 et seq.)
Colorado	Nongame and Endangered Species Conservation (CRS 33-2-101 et seq.) Migratory Birds – Possession of Raptors – Reciprocal Agreements (CRS 33-1-115) Protection of Fishing Streams (CRS 33-5-101 et seq.) Nongame and Endangered Species Conservation (CRS 33-2-101 et seq.) Colorado Natural Areas CRS 33-33-101 et seq.)
Idaho	Species Conservation (IC 36-2401 et seq.)
Montana	Nongame and Endangered Species (MCA 87-5-101 et seq.) Wild Birds – Regulation of Raptors (MCA 87-5-201 et seq.) Grizzly Bear (MCA 87-5-301 et seq.) Game Preserves and Closed Areas (MCA 87-5-401 et seq.) Stream Protection (MCA 87-5-501 et seq.)
Nevada	Wildlife (NRS 501.003 et seq.) Preservation of Endangered Species or Subspecies in County Whose Population Is 400,000 or More (NRS 244.386)

TABLE D-15 (Cont.)

Authority	Citation
New Mexico	Wildlife Conservation Act (NMSA 17-2-37 et seq.) Endangered Plant Species (NMSA 75-6-1 et seq.) Protection of Native New Mexico Plants (76-8-1 et seq.) Habitat Protection (NMSA 17-6-1 et seq.)
Oregon	Application, Administration, and Enforcement of Wildlife Laws (ORS 496.002 et seq.) Threatened or Endangered Wildlife Species (ORS 496.171 et seq.) Hunting, Angling, and Trapping Regulations; Miscellaneous Wildlife Protective Measures (ORS 498.002 et seq.) Fish Passage; Fishways; Screening Devices; Hatcheries Near Dams (ORS 509.580 et seq.) Wildflowers; Threatened and Endangered Plants (ORS 564.010 et seq.)
Utah	Wildlife Resources Code of Utah (UCA 23-13-1 et seq.)
Washington	Protection of Bald Eagles and Their Habitats (RCW 77.12.650 et seq.) Fish and Wildlife Enforcement Code (RCW 77.15.005 et seq.)
Wyoming	Bird and Animal Provisions (WS 23-3-101 et seq.) Predatory Animals – Control Generally (WS 11-6-101 et seq.)

APPENDIX E:

ENERGY TRANSPORT TECHNOLOGIES AND HYPOTHETICAL ENERGY TRANSPORT PROJECTS

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E.1 ENERGY TRANSPORT TECHNOLOGIES

E.1.1 Electricity Transmission

Centralized power production brings the advantage of economies of scale, but may require long-distance transfers of power to reach customers. Long-distance transmission is most efficiently accomplished by economical high-voltage transmission lines.

The most important parameter dictating the size of an electric power system is the peak electrical demand. This peak demand determines the minimum amount of generating capacity and the corresponding amount of transmission and distribution facilities required to maintain a reliable electric system. The peak demand is expressed in units of power (kilowatts, megawatts, gigawatts, terrawatts) and is the maximum instantaneous requirement for electricity that occurs during a specified time period. Normally, peak demand is specified separately for the summer and winter seasons. Some regions have a higher summer peak demand, others a higher winter peak demand. The peak summer demand on the entire North American system was approximately 817,000 MW in 2004. The peak winter demand was 716,000 MW. This peak demand was supplied by approximately 990,000 MW of generating capacity, which constituted a reserve margin of about 20%.

The bulk transmission system in the United States operates at voltages between 115,000 V (115 kV) and 765 kV. Over 207,200 miles of the bulk transmission system consists of lines operating at over 230 kV. In the 11-state study area, the highest operating voltage is 500 kV for long-distance transmission.

The most visible components of the electricity transmission system are the conductors that provide paths for the power and the towers that keep these conductors at safe distances from each other and from the ground and the natural and built environments through which the transmission line passes. Also visible but less common elements along the corridor may include switching stations, or substations, where lines of similar or different voltages meet to transfer power. Common elements that are generally less visible (or at least more easily overlooked) include the maintained right-of-way (ROW) along the path of the towers, access roads needed for maintenance, and staging areas used for initial construction that may be restored after initial construction is complete but may be reestablished to support repair, upgrade, or replacement actions or transmission line decommissioning.

The voltage required for economical transmission of electric power exceeds the voltage appropriate for distribution to customers. Customer equipment generally operates at only a few hundred volts rather than at the hundreds of thousands of volts used for long-distance power transmission. If high voltages were maintained up to the point of customer connection, fault protection would be extremely expensive. Therefore, transformers are required to reduce voltage before the power is introduced to a distribution or sub-transmission system. These transformers mark the end of the transmission line and are located at substations.

E.1.2 Natural Gas Transport

The United States has several major natural gas production basins and an extensive natural gas pipeline network. Of the natural gas consumed in the United States, 85% is produced domestically; most of the balance is imported from Canada.

The natural gas system is generally described in terms of production, processing and purification, transport and storage, and distribution. The transport segment of the gas industry is responsible for transporting natural gas from the producer to the market areas via pipelines. The transport system is composed of pipelines, compressor stations, city gate stations, and storage facilities. All aspects of design and operation of natural gas pipeline systems are addressed in regulations promulgated by the U.S. Department of Transportation's Office of Pipeline Safety (OPS) and in accepted industry practices.

Transport pipelines are made of steel and generally operate at pressures ranging from 500 to 1,400 pounds per square inch gauge (psig). Pipelines can measure anywhere from 6 to 48 inches in diameter, although certain component pipe sections can consist of small-diameter pipe as small as 0.5 inches in diameter. Mainline pipes, comprising the principal pipeline in a given system, are usually between 16 and 48 inches in diameter and are constructed of steel. Coatings are often applied as a means of controlling corrosion. Additional corrosion-control systems may also be installed along the mainline.

Natural gas is highly pressurized as it travels through a pipeline, to expedite its flow. To ensure that the natural gas flowing through any one pipeline remains pressurized, compression of the natural gas is required periodically along the pipe. This is accomplished by compressor stations, usually placed at 40- to 100-mile intervals along the pipeline. The natural gas enters the compressor station, where it is compressed by a turbine, motor, or engine.

In addition to compressor stations to reduce natural gas volume and push the gas through the pipe, metering stations are placed periodically along interstate natural gas pipelines. These stations allow pipeline companies to monitor and manage the natural gas in their pipes.

The natural gas for most distribution systems is received from transport pipelines and fed through one or more city gate stations, sometimes called *town border* or *tap* stations. The basic function of these stations is to meter the gas and reduce its pressure from that of the pipeline to that of the distribution system. The latter operates at a much lower pressure (reduced from approximately 500 to 1,400 psig to about 0.25 to 300 psig). Most city gate stations measure the gas flow with metering devices and reduce gas pressure with mechanical devices called pressure regulators. These devices control the rate of gas flow and/or pressure through the station and maintain the desired pressure level in the distribution system. Natural gas is odorless, and gas received at city gate stations may or may not contain an odorant, the compound that gives gas its distinctive smell; however, odorant will always be added before the gas is delivered to the consumer.

"Pigging facilities" are positioned within the interstate pipeline network to launch and recover "pigs," devices that clean the mainline pipe and monitor its condition for such critical faults as cracks or corrosion. Pigging can be done without interruption of pipeline operation, with the flow of the gas moving the pig along the mainline pipe.

Pipelines are typically operated remotely through a supervisory control and data acquisition (SCADA) system. These computerized systems allow operators in a central location to change operating parameters on pumps and valves, so as to control the flow of liquids through the lines. These control systems communicate across a range of potential telecommunication options from landlines to satellites. Many times, structures to support cellular, microwave, or satellite communications must be constructed along the pipeline to support communication of monitoring data and operating instructions via the SCADA system.

All pipeline construction is accomplished along a relatively narrow ROW, approximately 50 feet wide. The construction is accomplished with multi-skilled crews working sections of the project called "spreads." Each spread will start offset activities and move in a continuous fashion until its section is completed. After preconstruction surveying and soil and geological studies are completed, the mainline path is cleared of vegetation and support and access roads are constructed. Typically, a trenching tool or other excavation techniques are used to dig a long trench down the center of the ROW, which will serve to bury the pipeline underground. Appropriate bedding material is installed in the bottom of the trench to provide a stable base for the pipe. Unique excavation and burial techniques are used to cross under rivers, roadways, and railroads or to excavate in rocky areas.

After excavation and the addition of bedding material, sections of pipe are laid adjacent to the pipeline route on the ROW. The individual piping sections are "strung" together and welded. After extensive evaluation of the welds, the pipeline is wrapped with a protective coating as it is laid into the trench. Once the entire pipeline, including all pumps and tanks, is constructed, the pipeline is filled with water and tested under pressure (typically 125% of the maximum design operating pressure) to check for leaks. Water from this "hydrostatic" test is typically treated for contaminants before being released. The original dirt extracted from the trench is filled in, burying the pipeline, and the area is graded and revegetated.

Corrosion in pipelines is a common phenomenon, and must be controlled to effectively prevent pipeline leaks or structural problems. Beside the corrosion-control coatings applied to the pipe when it is manufactured, additional corrosion-control devices are installed in the pipeline trench to protect all segments of the pipeline system that are buried. Such devices include "ground beds," or "sacrificial anodes," that are electrically bonded to the pipe and consist of a metal that corrodes preferentially to the steel of the pipe. Impressing a current on the pipe can also provide corrosion control by counteracting the current that would be produced as the steel corrodes from metallic iron to iron oxide.

Once the natural gas pipeline is in service, the pipeline's control center continuously monitors critical operating parameters electronically. A computerized gas monitoring system reads the pressures along the pipeline on a continuous basis. The compressor stations include an emergency shutdown (ESD) system that would vent the mainline pipe (expel the gas to the atmosphere) in the event of an emergency. Additionally, each compressor unit and mainline valve facility typically includes a blowdown valve that would be used in association with maintenance activities (e.g., to relieve pressure when a unit is taken off-line). Leak detection methods may be divided into two categories, direct and inferential. Direct methods detect leaking commodity outside the pipeline. Inferential methods deduce a leak by measuring and comparing the amount of product moving through various points of a line. Routine operation would include inspection and maintenance of all above-ground facilities, vegetation maintenance along the entirety of the system for fire safety, and replacements of buried mainline pipeline segments when remote inspection and monitoring indicates potential problems with system integrity or unacceptable levels of deterioration.

E.1.3 Liquid Petroleum Transport

The U.S. liquid pipeline industry is comprised of approximately 200,000 miles of pipe in all of the fifty states, which carried more than 40 million barrels per day, or 4 trillion barrel-miles, of crude oil and refined products during 2001. Approximately 66% of domestic petroleum moves by pipeline, with marine movements accounting for 28% and rail and truck making up the balance. Pipelines may be small or large, up to 48 inches in diameter. With only minor exceptions, the pipe is buried. Some lines are as short as a mile, while others may extend 1,000 miles or more.

The materials carried in liquid pipelines embrace a wide range of liquids. Crude systems gather production from onshore and offshore fields, while transport lines carry crude oil feedstocks to terminals, interconnection points, and refineries. Pipelines also connect refineries with petrochemical plants for the transfer of secondary feedstocks. Typical refined products transported include motor gasoline, aviation fuels, kerosene, diesel fuel, heating oil, and various fuel oils as well as various liquefied petroleum gases (LPGs).

There are several types of pipeline systems. Flowlines, as part of a gathering system, are used to move produced oil from individual wells to a central point in the field for treating and storage. Crude trunk lines are used to move crude oil from central storage facilities over long distances to refineries or other storage facilities. Product pipelines carry finished products from refineries to distribution terminals. Product pipelines can carry multiple types of products concurrently in a batch-wise manner. Slurry pipelines carry coal slurry consisting of finely ground solids in water or other extremely heavy material recovered from shale oil.

The elements of a pipeline are tanks for storage, pump stations for pressure, metering stations for measuring flows, valves and manifolds for controlling flows of liquids, facilities for launching and receiving maintenance devices transferred through the pipeline, and electronic monitoring and control systems and telecommunication components.

When designing pipelines, consideration must be given to sizing, pressure, liquids being transported, and any thermal stress interactions, especially for lighter materials, such as ethane or ethylene. Soil-load issues from the weight of the soil, roads or railroads crossing over the pipeline, buoyancy effects from groundwater, impacts of local adjacent mining and blasting, and even unanticipated events like earthquakes and landslides must all be considered in siting and installing buried pipelines. For safety, most pipelines employ automated leak detection systems, pressure-relief systems, and isolation valves to minimize environmental and public safety impacts in the event of an emergency or off-normal event. All aspects of design and operation of natural gas pipeline systems are addressed in regulations promulgated by the U.S. Department of Transportation's OPS and published standard industry practices.

All pipeline construction is accomplished along a relatively narrow ROW. The construction is accomplished with multi-skilled crews working offset activities that move in a continuous path along the pipeline. Major construction phases include surveying, soil studies, clearing and site preparation, and trenching. Then, the pipe segments are welded together, coated for protection, and lowered into the trench. After testing the pipe for leaks with pressurized water, a process known as hydrostatic testing, the pipe is buried in the trench and the soil and surrounding areas are restored to their original conditions.

Corrosion in pipelines is a common phenomenon, and must be controlled to effectively prevent pipeline leaks or structural problems. Beside the corrosion-control coatings applied to the pipe when it is manufactured, additional corrosion-control devices are installed in the pipeline trench to protect all segments of the pipeline system that are buried. Such devices include "ground beds," or "sacrificial anodes," that are electrically bonded to the pipe and consist of a metal that corrodes preferentially to the steel of the pipe. Impressing a current in the soil adjacent to the pipe can also provide corrosion control by counteracting the current that would be produced as the steel corrodes from zero-valent metallic iron to iron oxide.

Pigging facilities are positioned within the pipeline network to launch and recover pigs, devices that clean the mainline pipe and monitor its condition for such critical faults as cracks or corrosion. Pigging can be done without interruption of pipeline operation, with the flow of the product moving the pig along the mainline pipe. Automated leak detection and routine integrity assessments also enhance the safety and reliability of pipeline operations.

Once the pipeline is in service, the pipeline's central control center remotely monitors critical operating parameters and controls movements of materials into, through, and out of the pipeline through a sophisticated SCADA system. The control center also monitors all leak detection systems, isolation valves, and other fire and building monitoring systems of remote facilities, such as pump stations.

Routine operation would include inspection and maintenance of all above-ground facilities, vegetation maintenance along the entirety of the system for fire safety, and replacements of buried mainline pipeline segments when remote inspection and monitoring indicate potential problems with system integrity or unacceptable levels of deterioration.

E.1.4 Hydrogen Transport

Although hydrogen pipelines date back to late 1930s, long-distance transport of hydrogen via pipeline is in its infancy when compared to natural gas or liquid petroleum pipeline systems. The existing hydrogen transport system in the United States is estimated to be from about 450 to 800 miles in total length. Estimates in Europe range from about 700 to 1,100 miles. Hydrogen pipelines in the United States are predominately along the Gulf Coast and connect major hydrogen producers with well-established, long-term customers.

Significant growth in hydrogen use is projected in the refining sector and in the mining and processing of tar sands and other energy resources, as the quality of the raw crude decreases. Furthermore, the use of hydrogen as a transportation fuel has been proposed both by automobile manufacturers and the federal government. It is anticipated that pipelines will be the dominant mode of transporting large quantities of hydrogen.

From an engineering perspective, hydrogen pipeline systems are fundamentally the same as natural gas pipeline systems. As the hydrogen pipeline network expands, many of the same construction and operating features of natural gas networks would likely be replicated. Historically carbon steel or stainless steel has been used in hydrogen pipelines. Austenitic stainless steels, aluminum (including alloys), copper (including alloys), and titanium (including alloys) are generally applicable for most hydrogen service applications. Welding provides the preferred joint for hydrogen pipelines.

Although design requirements for interstate hydrogen pipelines are yet to be established, some reasonable assumptions can be made. These assumptions are based on operating experience with both natural gas and hydrogen and on the expectations for large-scale hydrogen delivery. For example, it is likely that hydrogen pipelines would be constructed of carbon- or stainless steel, welded pipe. The pipe would be buried at least 30 inches below-ground and would rest on as much as 12 inches of bedding materials consisting of crushed rock or soft clay base. It can also be assumed that the pipe would be precoated on its exterior with a fusion-bonded epoxy or a polyethylene sleeve to inhibit corrosion. Pipe segments would likely be precoated with a corrosion inhibitor at their points of manufacture, but field applications of corrosion inhibitor may also take place. This inhibitor could be a polyethylene sleeve or wrap or a fusion-bonded epoxy. It is likely that standards promulgated by the American Petroleum Institute (API) would be used in the construction and operation of hydrogen pipelines.

Welding procedures and leak testing can be expected to be more exacting for hydrogen pipelines. Other construction practices are likely to be very similar to those for natural gas pipelines.

At a given pressure, the energy density for hydrogen is approximately one-third that of natural gas. However, for the same pipe diameter and pressure, hydrogen flows approximately three times as fast as natural gas. As a result, if hydrogen compressors can be operated to meet similar pressure requirements as natural gas compressors, it can be expected that hydrogen pipe diameters could approach those for natural gas transport pipelines.

The recompression ratio for hydrogen is four times lower than that for natural gas for a given compressor rotor speed. This necessitates a greater number of stages. Three to five stages of compression are required to elevate hydrogen to pipeline pressures. Compressor stations are each powered by compressors rated at several thousand horsepower. The compressors are typically housed in a metal building with pipe appurtenances and other critical elements above-ground. If the hydrogen pipeline shares a common corridor with a natural gas pipeline or an electricity transmission line, it would be comparatively easy to bleed some natural gas or electricity to energize the hydrogen compressor. Alternatively, a quantity of the hydrogen could be fed to the compressor directly from the pipeline that the compressor serves.

The spacing between hydrogen compressors along a pipeline would be determined by operational and economic factors. It is likely that the spacing between hydrogen compressors would be equal to or greater than the 40 to 100 miles common for natural gas transport pipelines.

Depending on transport and delivery pressure requirements, hydrogen pressures would probably have to be reduced from transport pipeline levels to distribution system levels. In a manner similar to that for natural gas systems, pressure regulators would be used to control the hydrogen flow rate through the station and to maintain the desired pressure in the distribution system. If any additives need be added to the hydrogen as it enters a distribution system, such as the odorant added to natural gas, it is likely that this would be done at the city gate stations.

Hydrogen pipeline requirements for access roads for construction, operations, and maintenance activities are likely to be virtually identical to those for natural gas pipelines. Hydrogen pipeline construction standards are currently under development. A number of federal and state agencies have standards and regulations that affect natural gas pipelines, and these would likely also govern hydrogen pipelines. The American Society of Mechanical Engineers' (ASME's) Board on Pressure Technology Codes and Standards has initiated the development of an independent consensus standard or code for hydrogen pipelines. Although it is anticipated that many of the codes and standards will be similar to those for natural gas pipelines, differences in physical properties of natural gas and hydrogen would necessitate some differences.

Because the construction, operation, and decommissioning of hydrogen pipelines would be similar to those for natural gas pipelines, it is reasonable to expect that the great majority of attendant environmental impacts would also be similar. However, some physical differences exist between hydrogen and natural gas at the molecular level, and these differences could influence potential health and safety hazards and dictate unique mitigation and emergency response strategies. Among the most important differences are the differences in fire and explosion risks. Like natural gas, hydrogen gas is colorless and odorless (i.e., before any ordorants are added to more easily detect leaks). However, hydrogen is substantially less dense than air, and, while it has a broader explosive range than natural gas (4 to 75% volume percentage in air for hydrogen versus 3.8 to 17% for natural gas), its extremely low density and rapid dispersal when released into the air make it difficult for clouds of explosive mixtures to form.

Hydrogen's activation energy for ignition is about 10% the energy needed to ignite natural gas; however, burning hydrogen releases substantially less heat energy than conventional petroleum distillate fuels, and explosions of hydrogen vapor clouds release substantially less energy and cause substantially less damage than explosions of a stoichiometric equivalent of conventional petroleum distillate fuels such as gasoline. Although the only combustion product of hydrogen is water, the extremely high temperature of hydrogen burning in air would cause conversion of the nitrogen in the air to nitrogen oxides in proportionally greater amounts than results from the combustion of natural gas.

E.1.5 Alternative and Advanced Energy Transmission

E.1.5.1 HVDC Transmission Lines

Although long-distance transmission of high-voltage alternating current (HVAC) electricity is likely to continue to predominate over the 20-year planning horizon of this PEIS, long-distance transmission of direct current (DC) is equally technically feasible and brings with it some distinct advantages. Electricity transmission through superconductivity may also become commercially viable over the 20-year planning horizon. Finally, applications of nanotechnology to energy transmission could be introduced to designated energy corridors within the next 20 years. Each of these alternative or advanced energy transmission technologies is summarized below.

High-voltage direct current (HVDC) electricity transmission lines are employed around the world mainly for long-range and undersea transmission. Their use has been growing in recent decades due to technology developments that overcome the historical disadvantages of the systems, especially improving their interfaces with the more prevalent AC systems used by the majority of electric power consumers.

In general, HVDC lines of perhaps 500 kV are used to interconnect two AC regions of the power distribution grid. Expensive electronic equipment is required to convert between AC and DC power, representing a major cost factor in power transmission. However, because fewer and smaller conductors may be used for the same power level, HVDC transmission lines cost less to construct than HVAC lines delivering equivalent power. Above a break-even distance of perhaps 400 to 500 miles for overhead lines, the lower cost of the HVDC cable outweighs the cost of the electronic conversion equipment. Because of even greater advantages for submarine cables, the break-even distance for undersea HVDC is around 30 miles.

When installed as overhead lines, HVDC transmission lines are constructed in much the same way as HVAC lines. However, for a given power level, HVDC lines are smaller, lighter, and the towers from which they are suspended have a lower profile than HVAC lines. Smaller diameter conductors are used, due to the greater carrying efficiency of HVDC and reduced insulating requirements, due to lower voltages being employed. Thus, construction as well as visual impacts for HVDC overhead lines are similar to, but somewhat lower than, those from comparable HVAC lines. Converter stations, on the other hand, would be expected to be as large as, or larger than, HVAC substations, so construction impacts of these facilities could be similarly larger.

The operational impacts of overhead HVDC transmission lines are similar to those of HVAC in some respects and different in character in others. Visual impacts are similar in nature, but generally reduced due to the lower profiles, simpler designs, and ostensibly greater spacing of support structures compared to HVAC lines. Impacts for line maintenance and ROW maintenance are similar in nature and magnitude to those for HVAC. Impacts associated with high-voltage electric currents in the lines, however, are of a different character in HVDC lines than in HVAC lines.

Overall, operational impacts from HVDC transmission lines are lower than those from comparable HVAC lines. HVDC produces negligible magnetic fields, does not induce voltages in adjacent metallic conductors (such as pipelines), produces less radio interference, less corona noise, and negligible amounts of ozone or nitrogen oxides in air around conductors. Ground currents can lead to corrosion and other problems when monopolar DC systems are used, but overhead lines would typically use bipolar transmission, which does not produce ground currents during normal operation. Operational impacts from converter stations, on the other hand, would be of similar overall magnitude to those from HVAC substations.

When installed as underground or undersea cables, HVDC transmission lines likewise have construction impacts similar to, but of generally lower magnitude than, impacts from HVAC lines. Because HVDC lines run at lower voltages and produce less heat than comparable HVAC lines, smaller trenches are needed, resulting in reduced construction impacts. Less heat generated during operation reduces ground and water warming and attendant impacts, so operational impacts are lower, as well. Since both underground and undersea cables have lower transmission losses than comparable HVAC lines, the indirect impacts of carbon dioxide and criteria pollutant emissions from generating sources that burn fossil fuels to initially produce the electricity carried in those lines are also reduced.

E.1.5.2 Superconducting Systems

Electrical conductors made from superconducting materials are being rapidly developed around the world because of their promise of virtually eliminating energy losses due to electrical resistance. Conductor wires tens of meters in length constructed from superconducting filaments tens of kilometers in length are in active prototyping and are expected to be commercialized in the next few years.

The leading superconducting technologies employ so called “high temperature superconductors,” which become superconducting at liquid nitrogen (LN2) temperatures. Such technologies have a cost advantage over earlier “low temperature superconductors,” which required liquid helium for cooling. Superconducting wires are made of filaments of ceramic materials made from copper oxide combined with various other metals. Since the filaments are brittle, they are embedded in a metallic matrix or adhered to a metallic backing in the form of tapes. First-generation superconductors, which are the most developed technology, use filaments embedded in a silver matrix, which is costly. Second-generation wires are being developed that have greater potential to be cost competitive with existing technologies when energy efficiency factors are included.

Any practical transmission line using high-temperature superconductors would most probably employ LN2 cooling, which would likely require periodic chilling stations. Transmission lines would most likely be installed in underground conduits because of their rigid form and vulnerability to the elements. Construction impacts would be similar to those from underground pipelines. However, operational impacts (regular inspection, maintenance and repair of conductor joints and cooling equipment) may be greater.

E.1.5.3 Nanotechnology Applications

Nanotechnology applications have the potential to improve the efficiency of electricity transmission. Research initiatives that are focused on the energy sector include:

- A new electrical conductor material in which nanocrystalline fibers are embedded in a high-purity aluminum matrix core wire to produce an aluminum conductor composite wire with increased power carrying capacity that can withstand extreme temperatures with no chemical reactions or appreciable decreases in strength.

- "Quantum wire" made of a particular type of carbon nanotube (atoms of carbon linked into tubular shapes that can make materials extremely light, strong, and resilient) is more conductive than copper at one-sixth the weight and is twice as strong as steel. Transmission wires made with quantum wire would have no line losses or resistance, would be resistant to temperature changes, and would help minimize or eliminate sagging of conductors, allowing for greater spacing between support towers or towers of lesser dimension.

- "Nanodots" (ultra-small particles of inorganic materials typically consisting of less than 100 atoms) introduced into high-temperature superconductivity (HTS) wire allow higher amounts of electrical current to flow, even in the presence of strong magnetic fields and at relatively high operating temperatures, thus mitigating one of the major challenges to commercialization of HTS.

Other nanotechnology applications are directed at improving the efficiency (and reliability) of other components of the electricity transmission infrastructure:

- **Transformers**. Fluids containing nanomaterials could provide more efficient coolants in transformers, possibly reducing the footprint of, or even the number of, the transformers required.

- **Substations**. Smaller, more efficient batteries made possible with nanotechnologies could reduce the footprints of substations and possibly the number of substations within a corridor.

- **Nanoelectronics**. Self-calibrating and self-diagnosing nanotechnology-enabled sensors could allow for remote monitoring of infrastructure on a real-time basis and could direct maintenance or adjustment that preempts wholesale system failures.

E.1.5.4 Other Energy-Related Transport Systems

Section 368 of the Energy Policy Act of 2005 (EPAct) explicitly directs the Secretaries of Agriculture, Commerce, Defense, Energy, and Interior, in consultation with the Federal Energy Regulatory Commission (FERC), states, and other interested parties, to (in part) designate corridors for oil, gas, and hydrogen pipelines, and electricity transmission and distribution facilities on federal lands in the 11 contiguous western states. When read alone, that section appears to limit eligibility for installation in energy corridors to these few specified energy transport systems. However, when read in a broader context, the EPAct directs development or reorientation of myriad energy-related programs and initiatives involving such diverse energy sectors as renewable energy, oil and gas, oil shale and tar sands, coal, nuclear, ethanol, biofuels, hydropower, and geothermal. To the extent that they would provide logistic support for the development of any of these energy initiatives, it can be argued that energy corridors should be made available for the movements of raw materials, intermediates, and resulting fuels and power from all energy initiatives addressed in EPAct.

Among the energy-related systems that might otherwise be considered for installation in designated energy corridors are the following:

- Slurry pipelines that deliver pulverized low-sulfur coal from mines in Wyoming to coal-fired power plants located elsewhere within the 11 western states and slurry pipelines that return fly ash and sludge from sulfur dioxide exhaust gas scrubbers to mine sites, to aid in mine stabilization and reclamation.

- Carbon dioxide (CO_2) pipelines (gaseous or supercritical fluid) that deliver CO_2 from power plants and from other industries burning large amounts of fossil fuels to conventional oil and gas fields for use in enhanced oil recovery operations, and as a means of sequestering what is believed to be one of the primary compounds responsible for global warming when released into the atmosphere.

- Carbon dioxide pipelines (gaseous or supercritical fluid) that deliver CO_2 from power plants and from other industries burning large amounts of fossil fuels to oil shale and tar sands development facilities to aid in fracturing subsurface deposits as part of in-situ retorting and recovery of the organic fractions of those deposits, and simultaneously as a way to sequester the CO_2 and prevent its release into the environment.

- Pipelines that transfer secondary feedstocks between refineries and/or between refineries and petrochemical plants.

- Ethanol pipelines that deliver ethanol produced from corn or through other biochemical processes to refineries for blending with conventional gasoline stocks.[1]

- Raw materials (e.g., harvested switchgrass and other biomass materials) delivered by slurry pipeline to processing facilities that convert the biomass into biofuels.

- "Produced water" recovered from conventional oil and gas fields or coalbed methane deposits delivered by pipeline to arid or semiarid regions in the West for myriad beneficial uses, including oil shale and tar sand processing, livestock watering, irrigation, potable water use (after appropriate treatment), and public reservoir fill.[2]

- Waters derived from combustion of fossil fuels (waters of combustion) delivered by pipeline to oil shale and tar sands facilities and other energy-related industries located in arid or semiarid regions for use in processing and associated materials and waste management.

- Pipelines transporting anhydrous ammonia, which can later be catalytically converted to hydrogen and nitrogen.[3]

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1 Transporting ethanol by pipeline is rarely done in the United States. When it occurs, it generally involves small pipelines with few shippers and a limited slate of products. This is because ethanol tends to absorb water and other impurities in a pipeline, so the pipeline would have to be dedicated only to ethanol service and would require frequent pig cleaning, etc. There is also some evidence that ethanol in high concentrations can lead to various forms of corrosion, including internal stress corrosion cracking, which is very hard to detect.

2 As used here, "produced water" is water that is brought up from hydrocarbon-bearing strata along with produced oil and gas. Produced water can include formation water, injection water, well treatment, completion, and workover compounds added downhole and compounds used during the oil/water separation process. Formation water, also called connate water for fossil water, originates in the permeable sedimentary rock strata and is brought up to the surface comingled with oil or gas or both. Injection water is water that was injected into the formation to enhance oil and gas recovery.

3 Currently ammonia is transported by pipeline over long distances within the Midwest and Plains states and is being considered as a "hydrogen carrier" in a hydrogen economy.

- Pipelines transporting helium, a by-product of natural gas processing, from points of manufacture to major fossil fuel combustion sources, to act as coolants in condensing heat exchangers used to capture and separate CO_2 and water of combustion from exhaust gas streams.[4]

- Pipelines for the transfers of wastes associated with energy production to treatment facilities or to areas more environmentally suitable to their disposal.

- Pipelines that connect oil shale and tar sands production facilities with refineries or with Strategic Petroleum Reserve (SPR) storage sites.

The above examples happen to all involve transport by pipeline. However, if indeed the broader purpose of EPAct is to support a multitude of energy initiatives, thereby improving the overall security of the nation's energy portfolio, then movements of energy-related materials should involve all efficient and practical means, including rail and motor vehicle. However, nothing in any section of EPAct implies rail or highway transport within designated energy corridors to be within the scope of Congressional intent. The absence of specific directives to the Department of Transportation (DOT) and the Federal Highway Administration to participate in the designation of energy corridors that would involve highways or railways further supports the conclusion that highways and railways were not intended for inclusion in the energy corridors. (Despite the absence of a directive to participate in corridor designation, the DOT is the federal safety authority for the nation's natural gas and hazardous liquid pipelines and retains authority over pipelines, regardless of their location.)

Ultimately, the list of potential candidates for inclusion in energy corridors is limited only by the imagination and the degrees of separation allowed between the material being transported and its conversion to, or enhancement of, consumable energy. This is a dilemma, since there is no basis for choosing one or more of the above examples over others for inclusion in the National Environmental Policy Act (NEPA) analysis. Further, there is no basis for ensuring that the list of possible candidates is exhaustive, so even if all identified transport and support options were to be included in the NEPA analysis, there would be no guarantee that the analysis would be sufficient. Other systems not directly related to energy would also conceivably need to be addressed; for example, communication systems. Further, such a broad reading of EPAct would create an unmanageable scope of analysis for this PEIS and would divert necessary attention and focus away from the explicitly stated directives of Section 368.

Consequently, the NEPA analysis contained in this PEIS is limited to impacts from those energy transport systems explicitly identified in Section 368 (electricity and oil, gas, and hydrogen pipelines), as hypothetically defined in the foregoing discussions and in Section E.2.1 below. However, at the same time, it is important to note that, both by design (i.e., the nominal width) and by intent, designated corridors could be made available for other energy-related transport systems beside those identified in Section 368, provided that the inclusion of such other transport systems would not in any way preempt the future use of the corridors from their expressed purpose and that the proponent for such systems can successfully demonstrate that inclusion of their facility in a designated corridor would not in any way interfere with the construction and safe and continued operation of explicitly designated energy transport systems that are now present in the corridor segment in question or that could be installed in that segment at a later date.

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4 BLM currently operates and maintains a helium storage reservoir and pipeline system located in the states of Kansas, Oklahoma, and Texas for the Federal Government (http://www.nm.blm.gov/amfo/helium_regs/helium_regs.html).

E.2 A HYPOTHETICAL ENERGY TRANSPORT PROJECT DEVELOPMENT

E.2.1 What Is the Purpose of Identifying Hypothetical Energy Transport Projects?

Under the Proposed Action, federal lands in the 11 western states would be designated as federal energy corridors under Section 368 of EPAct. Designation as a Section 368 federal energy corridor does not mandate or direct development of energy transport projects within the corridors, nor does it guarantee that any energy transport projects will actually be sited and built within any designated corridor. Rather, designation merely identifies areas on federal land that have been determined to be suitable for potential energy transport projects. Thus, selection of proposed corridors does not in and of itself necessarily result in the permitting, construction, and operation of any specific energy transport project or any of the associated impacts.

To better understand what form future energy transport development might take within the designated corridors, a hypothetical set of energy transport projects was identified that could plausibly be developed within the corridors. The hypothetical projects provide a frame of reference for future corridor development. The hypothetical projects include the following types of energy transport systems:

- Three 500-kV electricity transmission lines:
  - Two AC transmission lines (overhead).
  - One DC transmission line (overhead).

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- Two liquid petroleum product pipelines.
- Two gaseous product pipelines.

Although the number and types of energy transport systems that have been included in this reference scenario are hypothetical, the systems themselves nevertheless collectively reflect the entire array of energy transport systems that may be proposed for installation within the next 20 years under any of the alternatives evaluated in this PEIS. This scenario does not identify the actual developments that may occur within the designated energy corridors. Figures E-1 and E-2 depict various electricity transmission and pipeline systems, respectively. Although these photographs and illustrations accurately portray energy transport systems and represent standard industry practices with respect to their construction and installation, the images do not necessarily represent the appearances of transport systems that potentially may be installed in any designated energy corridor.

Technologies for transmitting electricity and liquid and gaseous energy commodities are constantly changing, with advancements replacing older technologies in commercial systems. While some technologies now under development offer the promise of substantial benefits in costs, efficiencies, and lessened environmental impacts, their development schedules are often ill defined, and the dates by which they would see widespread commercial application are unknown. Accordingly, the reference scenario does not include such new and emerging technologies unless published forecasts, together with professional judgment, suggest that they could be introduced into energy corridors within a 20-year planning horizon. As with all project-specific developments that may occur in the future in designated energy corridors, such introductions would be accompanied by appropriate levels of NEPA analyses.

Although it is technically feasible to transmit both DC and AC by underground (buried or vaulted) lines, such installations are not currently considered likely over long distances because of their substantially higher costs relative to conventional overhead lines. Transmission of electricity over long distances

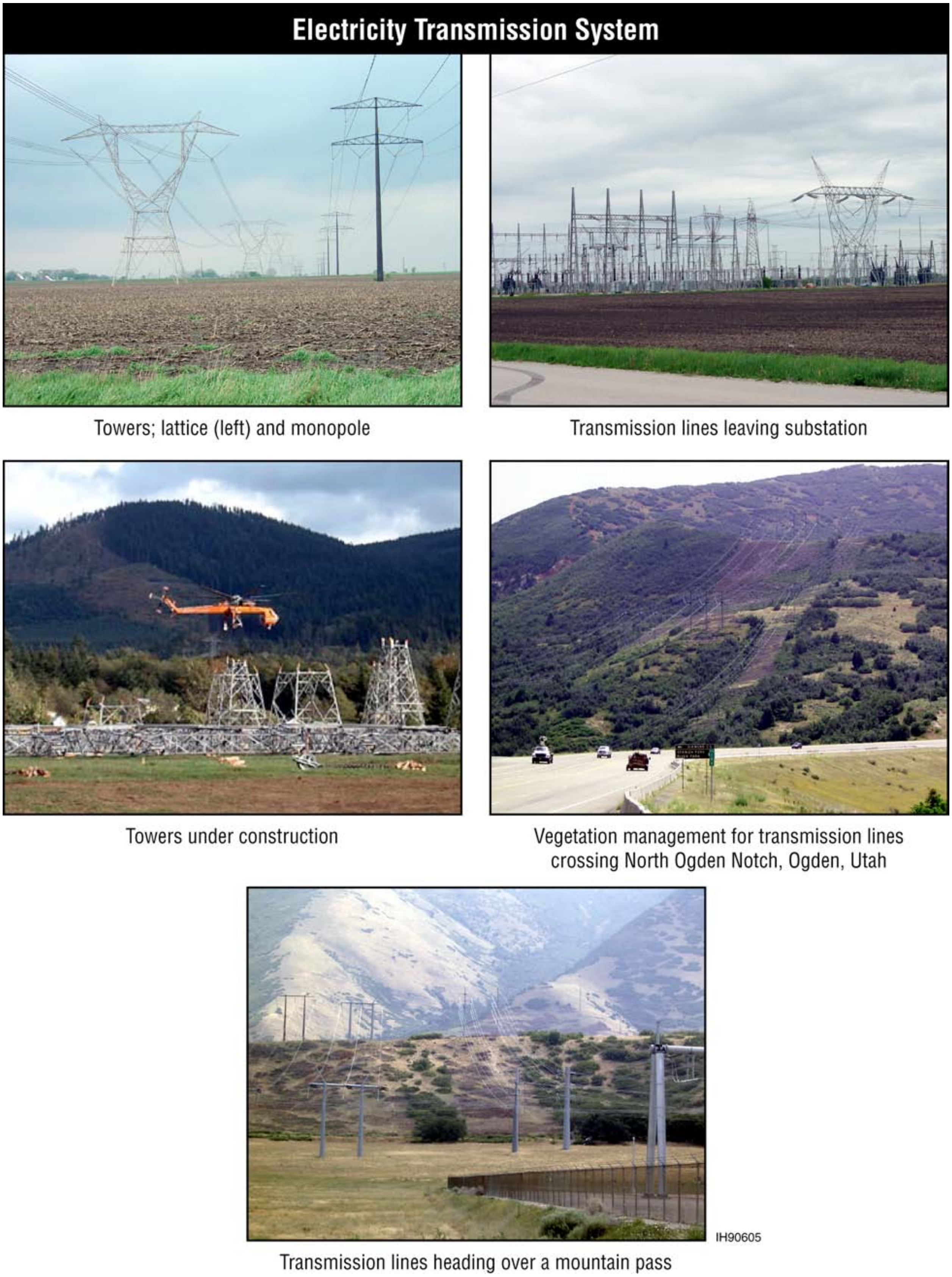

FIGURE E-1 Possible Visual Impacts of Electricity Transmission Systems

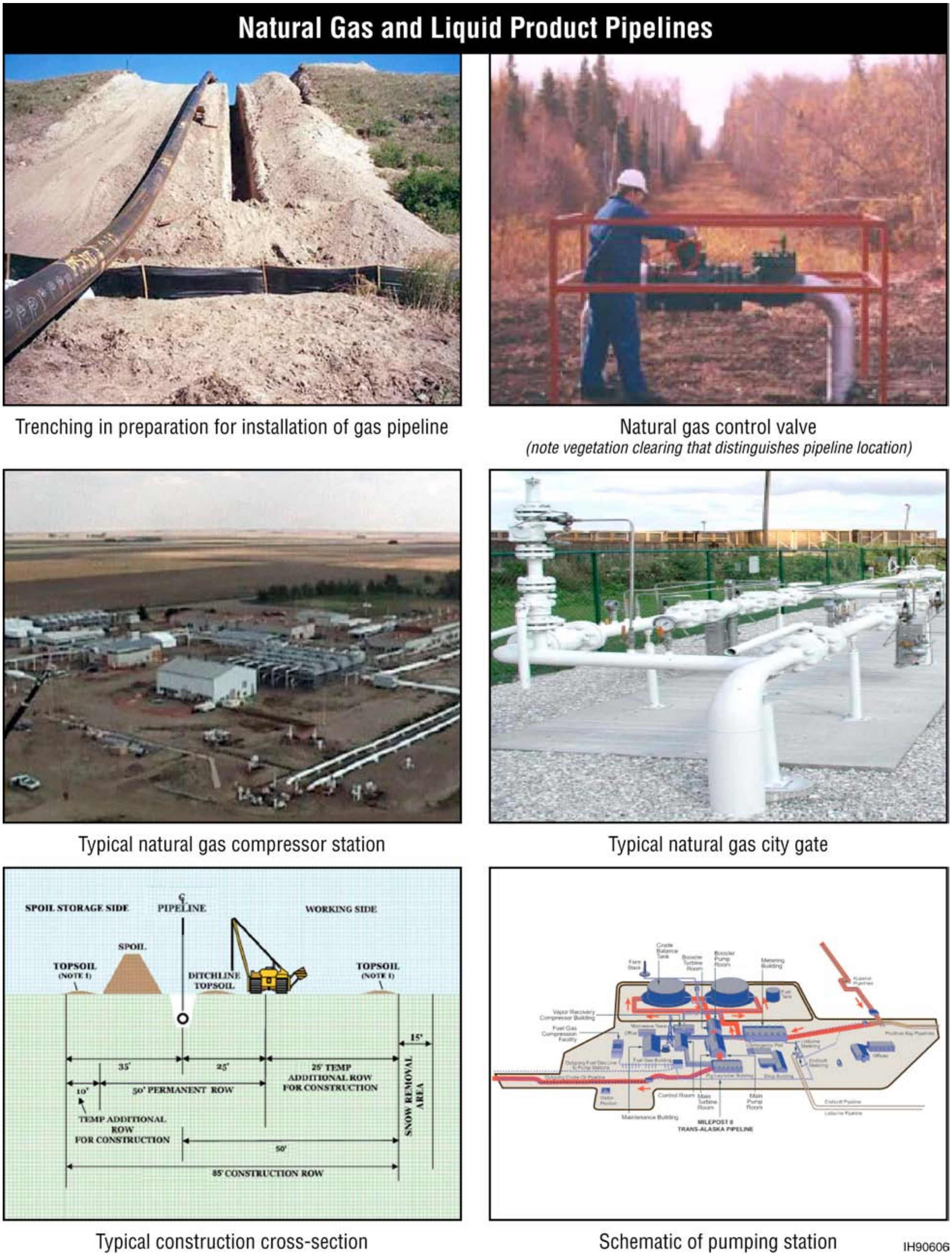

FIGURE E-2 Possible Impacts of Natural Gas and Liquid Product Pipelines

by high-temperature superconductivity is in its early stages of technological development, and its commercial application within a 20-year planning horizon is considered unlikely. Therefore, two of the three electricity transmission systems considered consist of conventional overhead AC transmission lines, each having as many as two circuits. The third involves overhead DC transmission lines having a maximum of two circuits.

Transport of liquefied natural gas (LNG) by pipeline over long distances is not considered to be a likely development within a 20-year planning horizon.[5] Likewise, transport of liquefied hydrogen by pipeline over long distances is considered technically infeasible at this time, and long-distance liquefied hydrogen pipelines are not likely to be installed within the next 20 years. Accordingly, only the transport of liquid petroleum was considered. Liquid petroleum can include crude oil; crude or partially upgraded bitumen (including Syncrude produced from tar sand deposits and shale oils); partially refined petroleum feedstocks (secondary feedstocks); and refined petroleum distillates, including fuel oils, gasoline, diesel fuel, jet fuel, and kerosene. Liquid petroleum also includes liquefied petroleum gas (LPG).[6] Gaseous products considered include natural gas, raw gas produced from conventional gas wells, fuel gas derived from oil shale and/or tar sand production, and hydrogen.[7]

The assumptions and quantitative values contained in the hypothetical scenario are purposely conservative, and in some cases overly conservative, in order to reflect the possible worst-case scenario with respect to potential impacts from the implementation of the energy transport systems within Section 368 corridors. Consequently, the probability is low that all facets of the scenarios described below would actually materialize.

Assumptions about the size and capacity of energy transport systems are based primarily on historical precedent, as well as on a consideration of probable energy developments within or otherwise affecting the 11 western states. Thus, while electricity transmission lines have been constructed in the United States that operate at voltages as high as 765 kV, the maximum (and predominant) size of transmission lines in the 11 western states is 500 kV, so that value was selected for anticipated future developments. DC transmission of electricity results in less line loss than does AC transmission; consequently, DC lines, if constructed, are also unlikely to be operated at voltages greater than 500 kV.

The largest crude petroleum feedstock pipeline in operation in the United States is the 48-inch Trans-Alaska Pipeline System (TAPS) that extends from the North Slope to Valdez, Alaska, having a design capacity of over 2 million barrels per day (bpd). However, it is unlikely that production rates for crude petroleum feedstock within a concentrated geographic area in the 11 western states would attain such production values within the 20-year

5 Currently, seven LNG terminals are being planned for locations along the West Coast of the United States. Although many of these facilities will become operational within a 20-year planning horizon, it is assumed that liquefied natural gas received at these facilities by ship will be converted back to its gaseous state before being transported by pipeline. Additional information on LNG terminals is available on the FERC website: http://www.ferc.gov/industries/lng/indus-act/terminals/exist-term.asp.

6 Here, the term LPG is intended to mean commercially available propane or butane, as well as all varieties of LPG generally available in commerce, including mixtures that also contain propylenes and butylenes that liquefy when compressed and are typically transported as a liquid under pressure.

7 Although they would be eligible for installation within an energy corridor, materials transported by pipeline expressly for the purpose of energy production (e.g., carbon dioxide gas used for enhanced crude oil recovery) are not considered in the following impact assessments.

planning horizon to require such a large-capacity pipeline. Likewise, facilities (terminals and/or refineries) with the capacities to receive crude feedstock or deliver products at such volumetric rates do not now exist within the 11 western states, and no published forecasts indicate that they are likely to come into existence within the next 20 years. Thus, future feedstock and product pipeline capacity requirements are likely to be less than TAPS.

The estimated pipeline dimensions for the hypothetical scenario are based upon a maximum hypothetical flow between any two geographic locations of 500,000 barrels per day (bpd) of crude feedstock. Such a volume of flow can be accommodated easily by a pipeline with a diameter of 32 inches.[8] Further, for the purpose of analysis, it is reasonable to assume that pipelines carrying refined petroleum products of lesser viscosity (i.e., higher American Petroleum Institute [API] gravities) also will not need to be greater than 32 inches in diameter. Typical diameters of interstate pipelines for natural gas can be as high as 42 inches, and natural gas pipelines of such dimensions already exist within the 11-state study area. Thus, for analysis purposes, gaseous product pipelines that might be built within designated energy corridors are assumed to have diameters as large as 42 inches.

An oil and gas pipeline network already exists within the 11 western state study area. Within the planning horizon, the collective capacity of raw natural gas pipelines can be expected to expand in the study area, with new or expanded pipelines transporting not only the raw gas produced from the rapidly expanding conventional oil and gas industry in Colorado's Piceance Basin, but also the "fuel gas" expected to be produced at oil shale facilities exploiting the Green River Shale Formation basins in Colorado, Utah, or Wyoming. Likewise, the crude oil pipeline network that now supports the ongoing conventional oil production in Colorado, Utah, and Wyoming and also delivers Syncrude from Canada to refineries in the 11 western states can be expected to expand in order to handle not only the expanding volume of Canadian Syncrude, but also crude or partially upgraded shale oil from production facilities in Colorado, Utah, and Wyoming. Bitumen from tar sands can also be expected to be produced in the special tar sands areas in Utah and will likely be transported by this expanded pipeline network to refineries within the 11 western states. In the later years of the 20-year planning horizon, if oil shale and tar sand facilities in Colorado, Utah, and Wyoming become fully operational at projected commercial scales as those industries mature, pipelines to transport their products to refineries within and outside of the 11 western states will probably be built.

To further ensure that worst-case conditions are analyzed, all seven developments that are considered are assumed to be contemporaneous, thus simultaneously imposing their individual impacts on surrounding receptors.[9] Although contemporaneous, the developments are further presumed to occur without a high degree of coordination between the individual project operators. Thus, the impacts assigned to each project are those that would occur if the project was the sole occupant of the specified corridor and mitigation dividends resulting from

8 The actual throughput of a liquid pipeline is dependent on numerous factors, including the specific gravity and viscosity of the commodity and design factors such as operating pressure. In general, however, a good approximation of throughput for most liquid petroleum results from multiplying the square of the pipeline's internal diameter by 500. Thus, a 32-inch pipeline will delivery approximately 512,000 bpd.

9 It can be argued that consecutive rather than simultaneous construction schedules would extend the period of potential environmental impacts, thus creating greater overall impacts to some natural resources. However, simultaneous construction periods were selected to maximize the potential impacts on local infrastructures and economies.

consolidation opportunities (e.g., shared access roads) were not taken.[10]

Although the cumulative ROW widths of the seven energy transport projects is less than half the nominal corridor width, the entire width of a corridor is thought to be available for development, thus allowing each ROW to meander within the corridor boundaries to avoid unique conditions within the corridors that might otherwise increase environmental impacts, increase the severity of unavoidable impacts, increase the technological complexity, or reduce the operational reliability of the transport system. Although it can be anticipated that multiple ROWs would remain generally parallel to each other throughout the length of the portion of the corridor over which they travel, when it is technically feasible and/or necessary to do so, ROWs may cross each other within a corridor.[11] Portions of the corridor where overlapping or crossing ROWs exist may be subject to additional design and/or operating requirements to ensure that all potential interferences between individual projects are adequately addressed by both parties, as well as any public safety or system reliability issues.

The project parameters reflected in the assumptions below are derived from standards of practice extant within the respective industries. Whenever possible, the extremes of the ranges of project parameters were selected, since they could be expected to create maximum impacts during construction or operation, or off-normal events such as spills or leaks. Even so, unique project-specific features could generate additional impacts during construction, operation, or decommissioning.

Finally, for any given future development, myriad other design and operating decisions as well as site-specific factors could introduce additional impacts during construction, operation, or decommissioning. The issues addressed below are considered to collectively represent the majority of major impactive factors for each of the technologies addressed.

E.2.2 What General Assumptions Does the Hypothetical Scenario Make?

- To the greatest extent feasible, corridors would be developed from their centerlines outward, preserving outmost buffer areas to the greatest extent and longest possible periods of time; however, the entire designated width of a corridor would be available for ROW meandering, when necessary.[12]

- Each project developer and/or operator would utilize accepted industry practices and standards in the design, installation, and operation of the energy transport project and would conform to all applicable or relevant federal, state, and local regulations.

- Construction and decommissioning ROWs would be 50 to 100% wider than operation ROWs (unless specified otherwise in the technology-specific assumptions below) and would exist only for the period necessary to support construction. Temporary use permits (TUPs) may be necessary for extra ROW widths. ROW widths would reduce to operational widths, and rehabilitation of the construction ROW

[10] However, simultaneous construction activities on adjacent ROWs would still be limited by safety factors and by the natural limitations of supporting logistical systems (e.g., railroad transport of construction materials to the general area).

[11] However, it is incorrect to assume that ROWs that are parallel to one another necessarily share a common boundary. It is altogether possible that federal land managers may chose to keep fallow portions of the corridor lying between granted ROWs.

[12] Although possible, the granting of a ROW that extends beyond the boundaries of a designated energy corridor is considered to be unlikely.

would commence once construction is completed.

- Staging areas for components and construction equipment and materials would be located on nonfederal lands.

- Access roads from existing paved roads to the ROW would have an average distance of 5 miles or less and would be gravel; access roads would be constructed of gravel pack, meet the specifications for a minimal 100-ton load, have a nominal width of 15 feet, and exist within the center of a nominal 25-foot-wide ROW. All access roads critical to operation would be authorized under a ROW or TUP prior to any road building and/or use.

- Access roads of the type minimally necessary to support operation and maintenance would be maintained along the mainline ROW throughout the operating period.

- Access roads to critical support facilities located along the mainline ROW, such as pump stations, compressor stations, and electric substations, would be maintained in gravel throughout the operating life of the transport system; vegetation at these facilities would be continuously managed for security, operational expediency, and fire safety purposes.

- All energy transport systems would be installed over the entire length of a given energy corridor.

- All energy transport systems would run at or near design capacity on a continuous basis.[13]

- The rates at which each energy transport system project would be constructed are dependent on myriad local factors; for the sake of consistent analyses and to allow comparisons with baseline data for one particular year, it is assumed that each of the projects would be installed in each corridor at the rate of 150 miles in any given year and would become fully operational in the following year.[14]

- Technological interferences and instabilities have been identified when certain energy transport technologies exist adjacent to one another; the ROW widths specified below, together with other specific design modifications and/or additions, are considered to be sufficient to adequately address and eliminate those interferences and maintain sufficient reliability for adjacent energy transport systems.

E.2.2.1 What Electricity Transmission Line Assumptions Does the Hypothetical Scenario Make?

- Transmission lines would have nominal voltages of 500 kV; two lines would carry AC, and one would carry DC.[15]

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[13] Continuous operation is selected to produce the maximum possible impact; however, it is recognized that the actual impacts of operation may be less, since each of the energy transport systems under consideration would be shut down (or de-energized) periodically for maintenance, upgrading, and/or repair.

[14] For the sake of analysis, “installation” begins with the activity that first causes disturbance of one or more resources. Thus, initial surveys and testing are not considered “installation,” whereas site preparation (clearing and grading) is.

[15] Power (voltage × current) is not specified because the voltage of a line determines the majority of the parameters of interest to the environmental impact analysis; however, transmission lines intended to carry exceptionally large amounts of current may be designed with larger (heavier) conductors, and thus may require a closer tower spacing.

- Nominal mainline ROW width would be 400 feet, based on the following:
  - Nominal tower height would be 150 feet.[16]
  - Nominal tower designs/materials would be lattice/metal (predominates) and monopole/ metal.
  - Only one three-phase circuit would be installed on each tower, together with the required aerial ground wire (or static wire).[17]
  - Nominal tower width (the width of a cross-arm, if present) would be 100 feet.[18]
  - Clear space to each side of the line would be maintained at a minimum of 150 feet to ensure that a tower would not impact an adjacent tower or transmission line if it were to fall in the direction of that other tower or line.
- Tower spacing on level ground without special concerns for wind or ice loading on the power cables would be 1,000 to 1,200 feet for lattice towers and 800 feet for monopole towers. Different spacings can be expected over radical changes in grade or with changes in direction; towers might be either closer together or father apart, with some extra-tall towers used on severe slopes to ensure adequate ground clearances.[19]
- Tower construction/erection would require special ROW construction considerations:[20]
  - Each tower would require a tower assembly area of at least 100 feet × 200 feet.[21]
  - Lattice towers would require at least 80,000 square feet per tower for construction.[22]
  - Grades within tower construction/ erection areas would be made level to facilitate lifting-equipment placement and operation.
  - Tower construction area needs would be reduced by 25% for impact calculations because of overlapping assembly areas.

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16 Substantially taller towers may be required for crossing valleys.

17 Additional circuits likely could be accommodated on typical lattice towers. However, the added cable weight and wind and ice loading may dictate closer tower spacing than is presumed here. Ground wires are not insulated from the towers and are intended to bond the towers electrically to enhance protection against lightning.

18 Although the typical maximum width of tower "arms" is 75 feet or less, a dimension of 100 feet was selected to maximize potential visual impact and to ensure that safe distances are maintained between energized conductors, regardless of transmission line configurations and voltages or the presence of adjacent transmission lines.

19 A change in direction would necessitate a differently designed tower (known as a diversion tower); however, changes to tower design have little effect on the nature or degree of construction or operation impacts over a conventional lattice tower. For DC transmission, power cables would be lighter weight than AC power cables operating at equivalent voltages; thus, support towers for DC transmission could be less substantial in design and placed at greater spacings, notwithstanding similar unique requirements for severe grades.

20 See ANL (2007a) for additional details.

21 Tower sections are typically assembled on the ground and lifted into place by cranes.

22 Monopole towers would require 31,415 square feet per tower for construction.

- At any given time during construction, two cable-pulling sites of 37,500 square feet each (150 feet × 250 feet) would be in use or in preparation.

- Tower installation would utilize conventional construction equipment; however, tower erection in very remote and rugged areas where conventional equipment could not be used would include the use of airlift helicopters.

- Tower foundations would be constructed in accordance with good engineering practice and in consideration of local conditions.

  - Foundations for towers would be installed at a nominal depth of 14 to 35 feet, after consideration of climate and local soil and subsurface conditions. At least four such foundations would be required for each typical lattice-type tower, while only one foundation would be required for each monopole tower; however, the monopole foundation typically would be deeper (by as much as 20%) and wider than the corresponding dimensions of a lattice tower's foundation installed in the same subsurface conditions.

  - Each typical foundation would utilize as much as 10 cubic yards of concrete.

  - Typical working time for ready-mixed concrete would be 45 minutes or less, depending on weather conditions; special tactics may be necessary to conduct concrete work in remote areas.[23]

  - Foundations would likely utilize steel-reinforced annular concrete rings of nominal widths of 4 feet and nominal thicknesses of 8 inches, the centers of which would be backfilled with indigenous soils[24]; excess excavation materials would be disposed of off the ROW.

- In addition to tower construction/ erection areas, material laydown areas would be located every 10 miles along the construction ROW.

  - Laydown areas would be nominally 3 acres in size.

  - Laydown areas would be maintained free of vegetation throughout the construction period for fire safety.

  - Minimal grade alterations would be made.

  - Temporary roads would be constructed for access to laydown areas by haul vehicles. Laydown areas for substations would be located entirely within the footprint granted in the lease for the substation.

  - Laydown areas would not be used for long-term storage of equipment or materials (except that such storage would occur at substations).

  - Laydown areas would be reclaimed at the end of the construction period, or as soon as the need for each laydown area has ended.

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[23] Special tactics may include separate delivery of water and dry cement/aggregate mix to the site and mixing on-site, construction of a temporary cement plant near the site, or delivery of ready-mixed concrete by helicopter.

[24] Foundations for monopole towers are typically wider at their base to help resist the tipping/lifting actions imposed by cables reacting to wind. For the purpose of impact analysis, however, foundations are considered cylindrical.

- Substations, switchyards, and other facilities integral to the operation of the transmission line would be located on the mainline ROW; expansions to ROW dimensions would be made to accommodate such essential facilities when necessary.

  – Transformers, capacitors, switches, bushings, and other electrical devices typically containing dielectric fluids would be free of polychlorinated biphenyls (PCBs).

  – Electrical equipment containing liquid dielectric fluids would be installed within adequate secondary containment features.

  – Substations would have a nominal footprint of 20 acres; for fire safety, safety of the operators, and to provide all-weather access, the entire footprint of the substation would be compacted gravel and maintained free of all vegetation throughout the operating period.

  – Substations would be underlain with grounding grids generally extending over the entire aerial extent of the substation; in arid areas, grounding grids may need to extend beyond the substation footprint or, alternatively, wells would be drilled to the nearest aquifer for the purpose of establishing adequate electrical ground.

- Other support facilities such as maintenance or repair facilities, material storage yards, administrative buildings, and operational control centers would be located off the mainline ROW on nonfederal property, whenever possible.

- Natural gas or propane and conventional air-conditioning equipment would be used for heating or cooling any facility or enclosure located on the mainline ROW that requires such temperature controls.

- No maintenance-related wastes would be disposed of within the mainline ROW.

- Vegetation would be maintained along the ROW using a combination of herbicides and physical clearing/cutting.

- Decommissioning would be initiated immediately after the end of the operating period.

  – Decommissioning would involve removal of all above-ground facilities and gravel workpads and roads; subsurface facilities (grounding rods and grids, tower and building foundations, natural gas pipelines, etc.) would be removed to a depth of 3 feet from the surface and otherwise abandoned in place.

  – Laydown areas, each nominally 3 acres in size, would be established to support decommissioning; some may be located on the laydown areas used during construction.

  – Dismantled components would be staged at laydown areas for only as long as necessary to arrange for their removal to disposal, reclamation, or recycling facilities.

  – All spills and contaminated soils would be remediated.

  – All gravel packs would be removed.

  – Reclamation of laydown areas, substations, access roads, and other “deconstruction” areas would commence immediately upon completion of the dismantlement of the system.

E.2.2.2 What Liquid Petroleum Pipeline Assumptions Does the Hypothetical Scenario Make?

- Pipe inside diameter (ID) would be 32 inches.[25]
- Nominal mainline ROW width would be 50 feet; nominal construction ROW width may be as much as 100% larger than the operating ROW.
- Material laydown areas would be located every 10 miles along the mainline within the construction ROW.
  - Laydown areas would be nominally 3 acres in size.
  - Laydown areas for pump stations would be contained entirely within the footprint for the pump station.
  - Vegetation would be cleared from laydown areas for fire safety.
  - Minimal grade alterations would be made.
  - Temporary gravel access roads may be installed to facilitate haul vehicle access to laydown areas.
  - Laydown areas would not be used for long-term storage of equipment or materials (except that such storage would occur at pump stations).
  - Laydown areas would be reclaimed immediately after the end of the construction period or as soon as the need for each laydown area has ended.
- In any given segment, pipelines would be buried unless subsurface features make excavation prohibitively expensive or technologically infeasible; no more than 10% of mainline pipe length would be above ground in any given segment.
- Ancillary facilities such as pump stations, electrical substations, break-out tanks, and pig launch/recovery facilities that are integral to pipeline operation would be located on the mainline ROW; expansions of ROW widths (but within corridor boundaries) would be made to accommodate such facilities, when necessary.
- Other support facilities such as maintenance or repair facilities, material storage yards, administrative facilities, and control centers would be located off the mainline ROW and energy corridor, on nonfederal land, to the greatest extent possible.
- Pump stations would be located within the mainline ROW.

[25] The largest pipe that can be produced in the United States or Canada has a 42-inch outer diameter (OD). Larger diameter pipes would involve purchase of the pipe from overseas sources. The maximum volume expected to be produced in any existing or future single point or consumed (refined) at any single destination would be 500,000 bpd. An accepted pipeline rule of thumb, which estimates flow = (pipeline diameter)^2 × 500, yields a pipeline size of 32 inches to support 500,000 bpd flow (as also highlighted in Footnote 8). Substantially different operating pressures from the norm and the use of drag-reducing agents could greatly influence this size requirement.

– Pump stations would be 50 miles apart[26] (assuming the average API gravity of the product being moved to be °25 [at 140°F]).[27]

– Pump stations would occupy a nominal area of 25 acres, including a cleared perimeter maintained for security and fire safety; the industrial area would be maintained in compacted gravel for all-weather access and fire safety.

– Pump station structures and any storage tanks would be no more than 30 feet high.

– Mainline pumps would be powered predominantly by electric motors, with power supplied from commercial sources and occasionally by gas supplied from commercial sources; when electric motors are used, substations may exist at the pump station for power management.

– Nominal power of each pump would be 5,500 brake horsepower (bhp).

– For reliability and to facilitate repairs or maintenance without mainline shutdown, three pumps would be installed in a parallel array and two pumps would operate at all times.

– Pig launch/recovery facilities would always be colocated at pump stations.

• Control valves and check valves would be installed on the mainline pipe in accordance with technological requirements and applicable regulations and standards of practice; all valves would have remote-operation capabilities; valves would be located such that the mainline pipe would never contain more than 50,000 barrels of product between valves (assuming a full face of liquid product in the pipeline).

• Vegetation along the mainline would be maintained to the extent necessary to provide for fire safety and to protect system reliability; woody plants whose roots may compromise the integrity of the buried pipe would be controlled; both clearing activities and herbicide applications would be performed.

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26 Long-distance lines can be expected to have pump station spacings up to 200 miles, whereas short-distance pipelines would have a closer pump station spacing. The 50-mile spacing is taken to be a predictable average spacing, given the variety of lengths of pipelines that could be installed in the designated corridors. This pump station spacing also anticipates that the pipelines would include a number of associated facilities and interconnections, all of which would require an increased number of pump stations.

27 API °25 approximates the viscosity and bulk density of a heavy fuel oil distillate such as #6 oil or bunker fuel. Pump stations at this spacing and operating at typical power ratings that are sufficient to move materials of that API gravity would easily be capable of moving lighter weight refined distillates that have higher API gravity values (e.g., gasoline API is about °55) and less bulk density and exhibit less frictional drag against the inner walls of the pipe. This API gravity was also selected to ensure that the pump station spacing was adequate to deliver crude shale oil to existing refineries from facilities within Colorado, Utah, and Wyoming after only moderate degrees of upgrading or mixing with diluents at the mine sites. Pipelines that are designed to convey petroleum products with greater viscosities (i.e., lower API gravities) would require pump stations at closer spacings or pump stations at this spacing with increased power capacities. Adding drag-reducing agents to the material (a technique often employed with the long-distance movement of crude oils) would also reduce pump station demands.

- In rocky soils, explosives (typically, ammonium nitrate/fuel oil [ANFO]) would be used for trench excavations.[28]

- Excavations for pipe burials would provide for 1.5 feet of bedding material below the pipe and a minimum of 3 feet of overburden above the pipe, resulting in a trench depth of 4.5 feet in addition to the outside diameter of the pipe — that is, 7.25 feet in the case of a 32-inch pipe.

- Widths of excavation trenches would be nominally twice the diameter of the pipe, allowing for stable side slopes during construction and the ability to lay the pipe in a serpentine fashion when necessary to accommodate thermal distortions, resulting in a nominal minimum trench width of 5.25 feet for a 32-inch pipe.[29]

- In no more than 10% of the length of a given segment, excavated indigenous soils or rocks would not be suitable for bedding materials, and appropriate sands or gravels would be imported to the site from the nearest available location, or excavated rock would be crushed to a uniform size on-site.

- Original grades would be reestablished after pipe burial; excess soils would be disposed of off the ROW.

- In arid regions, wells would be dug to the nearest groundwater aquifer for the purpose of installing adequate and reliable electrical grounding for all elements of the pipeline that exist above ground.[30]

- No solid or liquid wastes associated with the operation and maintenance of the pipeline would be disposed of on the ROW.

- Pipeline would undergo hydrostatic testing at the completion of construction and before being put into service and on every occasion thereafter when the pipeline is opened for repairs or replacements. Hydrostatic test water would be obtained from local resources or commercial suppliers; hydrostatic test water would be disposed of along the ROW (including discharge to the ground surface or to surface waterbodies) under the auspices of state-issued permits.

- River crossings would occur beneath the water with the depth of burial beneath the streambed (to the top of the pipe) dictated by regulation plus 10% additional thickness to allow for river scouring over the entire operating period of the pipeline[31]; trench burial of the pipeline in the streambed would occur only in nonnavigable watercourses.

- Decommissioning would begin immediately after the end of the operating period.

  – Decommissioning would involve removal of all above-ground features, gravel workpads, and gravel access roads, and the removal

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[28] Rock cutters are also sometimes used in lieu of explosives; however, explosives were selected for the model system to maximize impact.

[29] However, for the purpose of impact calculations, the sides of the trench are presumed to be vertical; thus, the cross-sectional area is the nominal depth multiplied by the nominal width, without correction for the slope angle of the sides.

[30] As is customary, segments of the pipeline that exist above ground would be electrically isolated from segments that are buried for the purpose of corrosion control.

[31] The DOT's Office of Pipeline Safety specifies a depth of burial ranging from 36 inches to 48 inches (see Title 40, Part 195.248, of the *Code of Federal Regulations* [40 CFR 195.248]).

of subsurface equipment to a depth of 3 feet.

- Mainline pipe existing at depths of 3 feet or greater would be emptied, cleaned, plugged, and abandoned in place; wastes from pipe cleaning would be disposed of off the ROW.
- Original laydown areas would be reestablished or new laydown areas would be established to support decommissioning/dismantlement.
- Laydown areas would be maintained clear of vegetation throughout the decommissioning period.
- All tanks would be emptied and cleaned prior to dismantlement or movement to recycling or salvage facilities off the ROW.
- Materials and equipment would remain in the laydown area only for as long as required to relocate the materials and equipment to salvage or recycling facilities.
- All spills and contaminated soils would be remediated.
- Original grades would be reestablished.

E.2.2.3 What Gaseous Product Pipeline Assumptions Does the Hypothetical Scenario Make?

- Pipe diameter is assumed to be 42 inches.
- Nominal mainline ROW width would be 50 feet; nominal construction ROW may be as much as 120% of the operating ROW.
- Operating pressure would be as high as 1,400 pounds per square inch gauge (psig).
- Material laydown areas would be located every 10 miles along the mainline within the construction ROW.
  - Laydown areas would be nominally 3 acres in size.
  - Laydown areas for compressor stations would be contained entirely within the footprint for the pump station.
  - Vegetation would be cleared from laydown areas for fire safety.
  - Minimal grade alterations would be made.
  - Temporary gravel access roads may be installed to facilitate haul-vehicle access to laydown areas.
  - Laydown areas would not be used for long-term storage of equipment or materials (except that such storage would occur at compressor stations).
  - Laydown areas would be reclaimed immediately after the end of the construction period or as soon as the need for each laydown area has ended.
- Compressor stations would be located within the mainline ROW.
  - Compressor stations would be nominally 40 miles apart.
  - Compressors would be powered by natural gas drawn from the pipelines they serve or drawn from commercial sources.

   - Compressor stations would be have a maximum footprint of 20 acres, including a cleared perimeter for security and safety; the industrial footprint would be compacted gravel for fire safety and to provide all-weather access.

   - Average compressor station total power capacity would be 13,000 bhp.

   - For reliability and to facilitate repairs or maintenance without mainline shutdown, compressor station design allows three compressors to be installed in parallel, with two compressors operating at all times.

   - Compressor station structures would be no more than 20 feet high, except for the exhaust stacks for each compressor, which would be 50 feet high.

   - Pig launch/recovery facilities would be located on the mainline ROW, but may not be located at compressor stations.

- Other facilities that are integral to the operation of the pipeline, such as city gates and pig launch/recovery facilities, would be located on the mainline ROW. Expansions of ROW widths would be made to accommodate such facilities, when necessary; the nominal size of pig launch/recovery facilities not located at compressor stations would be 0.5 acres; the nominal size of city gates would be 3 acres.

- Other support facilities, such as maintenance facilities, material storage yards, administrative facilities, and operational control centers, would be located off the mainline ROW on nonfederal land to the greatest extent possible.

- In any given segment, pipelines would be buried unless subsurface features make excavation prohibitively expensive or technologically infeasible (e.g., seismically active zones); no more than 10% of mainline pipe length would be above ground in any given segment.

- Control valves and check valves would be installed on the mainline pipe in accordance with technological requirements, applicable regulations, and standards of practice; all valves would have remote operation capability. Each transmission line would have sectionalizing block valves spaced as follows, unless it is determined that an alternative spacing would provide an equivalent level of safety:

   - Each point on the pipeline in a Class 4 location must be within 2.5 miles of a valve.

   - Each point on the pipeline in a Class 3 location must be within 4 miles of a valve.

   - Each point on the pipeline in a Class 2 location must be within 7.5 miles of a valve.

   - Each point on the pipeline in a Class 1 location must be within 10 miles of a valve.[32]

   - Control valves would be installed on either side of a river crossing (as per standard industry practice).

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32 As per Office of Pipeline Safety regulations, 40 CFR 192. Class locations are defined in 40 CFR 192.5. See http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=192a5d9ec2f41944f3af0dc1af118227&rgn=div8& view=text&node=49:3.1.1.1.3.4.10.22&idno=49 for valve location requirements.

- Compressor stations, city gate stations, ground valves, and other above-ground features of the pipeline would be secured by fencing; compressor stations and city gate stations would have security lighting and remote surveillance features.

- The entire lengths of buried sections of metallic pipelines would have cathodic protection in accordance with DOT regulations (49 CFR 192, Appendix D).

- Portions of the pipeline above ground would be electrically isolated from belowground segments, appropriately coated for corrosion control, and protected against lightning; in arid areas, wells may be dug to the nearest aquifer to allow a ground rod to reach adequate grounding conditions.

- Blowdown valves would be located within each pipeline segment (between mainline valves); when pipelines are adjacent to electrical transmission lines, gas venting from blowdown valves would be directed away from the electrical conductors.

- Vegetation along the mainline would be maintained in accordance with applicable regulations and standards of practice utilizing a combination of clearing/cutting and herbicide application; woody plants whose roots may compromise the integrity of the buried pipe would be controlled.

- In rocky soils, explosives (typically, ANFO) would be used for trench excavations.[33]

[33] Rock cutters are sometimes used in lieu of explosives for trench excavations. Explosives were selected for the model facility in order to maximize the potential for environmental impact.

- Excavations for pipe burials would provide for 1 foot of bedding material below the pipe and a minimum of 3 feet of overburden above the pipe, resulting in a nominal trench depth of 7.5 feet for a 42-inch-diameter pipe.

- Widths of excavation trenches would be nominally twice the diameter of the pipe, allowing for stable side slopes during construction and access to the sides of the pipe as it is being installed, for the purpose of installing corrosion-control coatings and devices, resulting in a nominal minimum trench width of 7 feet for a 42-inch-diameter pipe.[34]

- In no more than 10% of the length of pipe in a given segment, excavated indigenous soils or rocks would not be suitable for bedding materials, and appropriate sands or gravels would be imported to the site from the nearest available location, or excavated rock would be crushed and sized on-site so it can be used as bedding.[35]

- Original grades would be reestablished after pipe burial; excess soils would be disposed of off the ROW.

- Pipeline would undergo hydrostatic testing at the completion of construction and before being put into service and on every occasion thereafter when the pipeline is opened for repairs or replacements. Hydrostatic test water would be obtained from local resources or commercial suppliers; hydrostatic test water would be disposed of along the

[34] However, for the purpose of impact calculations, trench sides are presumed to be vertical.

[35] Heavy clay soil that retains water and unevenly sized rock with sharp edges would be considered unsuitable for bedding material. Using unevenly sized materials as fill would introduce the potential for later subsidence.

ROW (including discharge to the ground surface or to surface waterbodies) under the auspices of state-issued permits.

- No solid or liquid wastes associated with the operation and maintenance of the pipeline would be disposed of on the ROW or within the designated corridor.

- River crossings would occur beneath the water with the depth of burial beneath the streambed (to the top of the pipe) dictated by regulation plus 10% additional thickness to allow for river scouring over the entire operating period of the pipeline[36]; trench burial of the pipeline in the streambed would occur only in nonnavigable watercourses.

- Decommissioning would begin immediately after the end of the operating period.

  – Decommissioning would involve removal of all above-ground features, gravel workpads, and gravel access roads, and removal of subsurface equipment to a depth of 3 feet.

  – Mainline pipe existing at depths of 3 feet or greater would be emptied, cleaned, plugged, and abandoned in place; wastes from pipe cleaning would be disposed of off the ROW.

  – Original laydown areas would be reestablished or new laydown areas would be established to support decommissioning/dismantlement.

  – Laydown areas would be maintained clear of vegetation throughout the decommissioning period.

  – Materials and equipment would remain in the laydown area only for as long as required to relocate the materials and equipment to salvage or recycling facilities.

  – All spills and contaminated soils would be remediated.

  – Original grades would be reestablished.

[36] DOT's Office of Pipeline Safety specifies a depth of burial ranging from 36 inches to 48 inches (see 40 CFR 195.248).

APPENDIX F:

SECTION 368 CORRIDOR PARAMETERS

APPENDIX F: SECTION 368 CORRIDOR PARAMETERS

TABLE F Lengths, Widths, and Compatible Energy Uses for Section 368 Corridors on Federal Lands under the Proposed Action

State	Corridor Segment	Map	Description
Arizona	30-52	D9, E9	29.1 miles, 3,500 feet, multimodal
	41-46	D8, E8	2.5 miles, 1,500 feet, multimodal; 13.7 miles, 3,500 feet, multimodal
	41-47	D8, E8	15.7 miles, 3,500 feet, multimodal
	46-269	E8, E9	12.4 miles, 3,500 feet, multimodal; 20.7 miles, 3,500 feet, multimodal; 32.9 miles, 3,500 feet, multimodal
	46-270	E8, E9	43.2 miles, 3,500 feet, multimodal
	47-231	D8, E8	6.7 miles, 1,660 feet, multimodal; 32.2 miles, 3,500 feet, multimodal
	47-68	E8	19.0 miles, 3,500 feet, multimodal
	61-207	E8, E9	16.2 miles, 2,900 to 16,300 feet, multimodal; 72.6 miles, 3,500 feet, multimodal
	62-211	E8, E9, F8	85.9 miles, 3,500 feet, multimodal
	68-116	E7	3.0 miles, 3,500 feet, multimodal; 17.5 miles, 3,500 feet, multimodal
	81-213	F9	6.8 miles, 3,500 feet, multimodal
	113-116	D7, E7	67.7 miles, 5,280 feet, multimodal
	115-208	E9	39.4 miles, 5,280 feet, multimodal
	115-238	D9, E9	31.5 miles, 3,500 feet, multimodal; 29.4 miles, 5,280 feet, multimodal
	116-206	E7	4.1 miles, 3,500 feet, multimodal
	234-235	E10, F10	4.2 miles, 3,500 feet, multimodal
California	3-8	B5	5.4 miles, 1,000 feet, multimodal; 29.4 miles, 3,500 feet, multimodal
	4-247	B5	0.5 miles, 3,500 feet, multimodal
	6-15	B6	25.6 miles, 3,500 feet, multimodal
	7-8	B5	1.4 miles, 3,500 feet, multimodal
	8-104	B5	23.2 miles, 500 feet, multimodal; 46.5 miles, 3,500 feet, multimodal
	15-104	B6, C6	2.1 miles, 500 feet, multimodal; 40.7 miles, 3,500 feet, multimodal
	16-104	B5, C5	9.9 miles, 500 feet, multimodal; 7.8 miles, 3,500 feet, multimodal
	18-23	C6, C7, C8	110.9 miles, 1,320 feet, multimodal
	23-106	C8	43.2 miles, 3,500 feet, multimodal
	23-25	C8	40.9 miles, 3,500 feet, multimodal
	27-225	D8	72.4 miles, 3,500 feet, electric only
	27-266	C8, D8	22.3 miles, 3,500 feet, multimodal
	27-41	D8	90.7 miles, 3,500 feet, underground only; 10.8 miles, 500 to 3,500 feet, underground only
	30-52	D9	54.9 miles, 3,500 feet, multimodal
	41-46	D8	0.9 miles, 1,500 feet, multimodal; 8.7 miles, 3,500 feet, multimodal

TABLE F (Cont.)

State	Corridor Segment	Map	Description
California (Cont.)	41-47	D8	4.6 miles, 3,500 feet, multimodal
	101-263	A5, B5	25.9 miles, 3,500 feet, multimodal
	107-268	C8	17.3 miles, 1,000 feet, electric only
	108-267	C8	11.3 miles, 10,500 feet, multimodal
	115-238	D9	15.9 miles, 1,000 feet, electric only; 52.3 miles, 3,500 feet, multimodal
	236-237	C9	6.8 miles, 2,000 feet, electric only
	261-262	B5	18.1 miles, 2,000 feet, electric only; 1.0 miles, 3,500 feet, multimodal
	264-265	C8	12.7 miles, 1,000 feet, electric only
Colorado	126-133	F5	25.8 miles, 3,500 to 9,000 feet, multimodal; 7.8 miles, 3,500 feet, multimodal
	130-131 (N)	F6	15.5 miles, 3,500 feet, electric only
	130-131 (S)	F6	4.0 miles, 3,500 feet, multimodal
	130-274	F6, F7	36.7 miles, 3,500 feet, multimodal
	131-134	F6	7.3 miles, 3,500 feet, multimodal
	132-136	F6	6.9 miles, 21,120 feet, multimodal; 22.1 miles, 26,400 feet, multimodal; 20.4 miles, 3,500 feet, multimodal
	132-133	F5, F6	40.7 miles, 2,250 to 10,500 feet, underground only; 3.7 miles, 3,500 feet, underground only; 6.1 miles, 5,280 feet, underground only
	132-276	F6, G5, G6	6.9 miles, 3,500 feet, multimodal; 25.8 miles, 3,500 feet, electric only
	133-142	F5, G5	7.2 miles, 3,500 feet, multimodal
	133-217	F5	7.76 miles, 3,500 feet, multimodal
	133-222	F5	1.07 miles, 3,500 feet, underground only
	134-136	F6	12.6 miles, 3,500 feet, multimodal
	134-139	F6, G6	9.2 miles, 3,500 feet, electric only
	136-139	F6	5.0 miles, 3,500 feet, multimodal
	138-143	G5	8.5 miles, 3,500 feet, electric only
	136-277	F6, G6	7.8 miles, 3,500 feet, multimodal
	138-277	G6	4.7 miles, 3,500 feet, electric only
	144-275	G5, G6	23.6 miles, 3,500 feet, multimodal; 6.0 miles, 10,560 feet, multimodal; 0.7 miles, 1,000 feet, electric only; 1.5 miles, 2,000 feet, electric only; 5.1 miles, 900 feet, electric only; 2.6 miles, 2,500 feet, electric only; 0.5 miles, 500 feet, electric only; 5.2 miles, 200 feet, multimodal
	217-222	F5	0.52 miles, 3,500 feet, multimodal
	73-133	F5, G5	12.3 miles, 3,500 feet, underground only
	87-277	G6	3.2 miles, 1,000 feet, multimodal; 44.7 miles, 3,500 feet, multimodal; 0.1 miles, 3,500 feet, electric only; 29.4 miles, 5,280 feet, multimodal; 12.3 miles, 3,500 feet, underground only; 0.2 miles, 1,000 feet, multimodal
Idaho	111-226	D4, D5	6.2 miles, 3,500 feet, multimodal
	112-226	D4	33.2 miles, 3,500 feet, multimodal
	11-228	C4, D4	4.1 miles, 3,500 feet, multimodal
	229-254	D2	12.2 miles, 3,500 feet, multimodal

TABLE F (Cont.)

State	Corridor Segment	Map	Description
Idaho (Cont.)	24-228	C4, D4	19.2 miles, 3,500 feet, multimodal
	252-253	E4	26.8 miles, 3,500 feet, multimodal
	29-36	D4	48.5 miles, 3,500 feet, multimodal
	36-112	D4	16.3 miles, 3,500 feet, multimodal
	36-226	D4	41.4 miles, 3,500 feet, multimodal
	36-228	D4	20.0 miles, 1,000 feet, multimodal; 65.5 miles, 3,500 feet, multimodal
	49-112	D4, E4	43.9 miles, 3,500 feet, multimodal
	49-202	E4	17.5 miles, 3,500 feet, multimodal
	50-203	E3, E4	16.7 miles, 3,500 feet, multimodal; 5.6 miles, 600 feet, multimodal; 0.1 mile, 2,640 feet, multimodal
	50-260	E3	27.8 miles, 3,500 feet, multimodal; 5.0 miles, 600 feet, multimodal
Montana	229-254	D2, E2	29.6 miles, 3,500 feet, multimodal
	50-203	E3	7.9 miles, 2,640 feet, multimodal
	50-260	E3	31.5 miles, 2,640 feet, multimodal
	50-51	E3	4.9 miles, 2,640 feet, multimodal
	51-204	E2	13.4 miles, 3,500 feet, multimodal
	79-216	F3	5.2 miles, 3,500 feet, multimodal
	51-205	E3	9.0 miles, 3,500 feet, multimodal
Nevada	6-15	C6	1.9 miles, 3,500 feet, multimodal
	110-114	D6	66.7 miles, 3,500 feet, multimodal
	110-233	D6, D7	159.0 miles, 2,640 feet, multimodal
	111-226	D5	26.1 miles, 15,840 feet, multimodal
	113-114	D7	12.6 miles, 3,500 feet, multimodal
	113-116	D7	8.7 miles, 5,280 feet, multimodal
	15-104	C5, C6	9.2 miles, 3,500 feet, multimodal
	15-17	C6	21.4 miles, 10,560 feet, multimodal
	16-104	C5	47.4 miles, 3,500 feet, multimodal
	16-17	C5, C6	51.5 miles, 3,500 feet, multimodal
	16-24	C5	110.4 miles, 3,500 feet, multimodal
	17-18	C6	44.2 miles, 10,560 feet, multimodal
	17-35	C5, C6, D5	23.4 miles, 1,000 feet, multimodal; 92.3 miles, 3,500 feet, multimodal; 26.8 miles, 15,840 feet, multimodal
	18-224	C6, C7, D7	86.7 miles, 10,560 feet, multimodal; 160.2 miles, 3,500 feet, multimodal
	18-23	C6	49.1 miles, 10,560 feet, multimodal; 15.0 miles, 3,500 feet, multimodal; 0.5 mile, 1,320 feet, multimodal
	223-224	D7	10.68 miles, 2,050 to 2,800 feet, multimodal; 53.1 miles, 3,500 feet, multimodal
	224-225	D7, D8	85.9 miles, 3,500 feet, multimodal
	225-231	D8	6.0 miles, 3,500 feet, multimodal
	232-233 (E)	D7	45.3 miles, 3,500 feet, multimodal
	232-233 (W)	D7	34.3 miles, 2,640 feet, multimodal
	27-225	D8	12.0 miles, 3,500 feet, multimodal
	35-111	D5	17.9 miles, 3,500 feet, multimodal

TABLE F (Cont.)

State	Corridor Segment	Map	Description
Nevada (Cont.)	35-43	D5	8.4 miles, 3,500 feet, multimodal
	37-223 (N)	D7	7.1 miles, 3,500 feet, multimodal
	37-223 (S)	D7	11.5 miles, 2,400 feet, underground only
	37-232	D7	37.7 miles, 2,640 feet, multimodal; 12.0 miles, 3,500 feet, multimodal
	37-39	D7	9.5 miles, 3,500 feet, multimodal
	39-113	D7	49.7 miles, 3,500 feet, multimodal
	39-231	D7, D8	31.7 miles, 3,500 feet, multimodal
	43-111	D5	19.9 miles, 2,640 feet, multimodal
	43-44	D5	16.0 miles, 15,840 feet, underground only
	44-110	D5, D6	109.4 miles, 2,640 feet, multimodal
	44-239	D5	17.6 miles, 15,840 feet, underground only
	47-231	D8	4.9 miles, 1,660 feet, multimodal; 16.2 miles, 2,000 feet, multimodal
New Mexico	80-273	F7, G7, G8	84.4 miles, 3,500 feet, multimodal
	81-213	F9, G9	47.9 miles, 3,500 feet, multimodal
	81-272	G8, G9	3.7 miles, 1,500 feet, multimodal; 102.9 miles, 3,500 feet, multimodal
	81-83	G9	5.9 miles, 3,500 feet, multimodal
	89-271	G8, H8, H9	69.1 miles, 3,500 feet, multimodal
Oregon	7-8	B4, B5	1.4 miles, 1,500 feet, multimodal
	7-11	B4	35.9 miles, 3,500 feet, multimodal; 51.7 miles, 1,500 feet, multimodal
	7-24	B4, C4	95.9 miles, 3,500 feet, multimodal; 38.7 miles, 1,500 feet, multimodal
	10-246	B3	15.1 miles, 1,320 feet, electric only; 1.1 miles, 3,500 feet, electric only
	11-103	B3, B4	4.9 miles, 1,000 feet, multimodal; 20.2 miles, 1,500 feet, multimodal
	11-228	B4, C4	143.2 miles, 3,500 feet, multimodal
	16-24	C4	31.7 miles, 1,500 feet, multimodal
	227-249	C3	7.5 miles, 3,500 feet, electric only
	230-248	B3	2.3 miles, 1,000 to 3,500 feet, multimodal; 46.7 miles, 3,500 feet, multimodal
	24-228	C4	38.6 miles, 3,500 feet, multimodal; 11.4 miles, 1,500 feet, multimodal
	250-251	C3	11.8 miles, 3,500 feet, multimodal
	4-247	A4, B3, B4	0.9 miles, 3,500 feet, multimodal; 19.7 miles, 1,500 feet, multimodal; 4.8 miles, 2,000 feet, multimodal
	5-201	A3, B3	5.6 miles, 3,500 feet, multimodal
Utah	110-114	D6, E6	68.1 miles, 3,500 feet, multimodal
	113-114	D7, E6, E7	59.8 miles, 3,500 feet, multimodal; 16.3 miles, 4,300 to 11,500 feet, multimodal
	113-116	E7	13.2 miles, 5,280 feet, multimodal

TABLE F (Cont.)

State	Corridor Segment	Map	Description
Utah (Cont.)	114-241	E5, E6	26.7 miles, 3,500 feet, multimodal; 64.6 miles, 2,000 feet, multimodal
	116-206	E5, E6, E7	89.5 miles, 3,500 feet, multimodal; 8.7 miles, 1,500 feet, multimodal
	126-217	F5	4.7 miles, 3,500 feet, multimodal
	126-218	F5	52.6 miles, 3,500 feet, multimodal
	126-258	F5	25.4 miles, 3,500 feet, multimodal
	256-257	E5	0.7 miles, 3,500 to 5,800 feet, multimodal; 1.9 miles, 2,640 feet, multimodal
	44-239	E5	48.0 miles, 3,500 feet, multimodal
	66-209	E5, E6	5.9 miles, 3,500 feet, electric only
	66-212	E6, F6, F7	66.9 miles, 3,500 feet, multimodal; 29.1 miles, 5,000 to 27,700 feet, multimodal; 3.3 miles, 2,300 to 16,000 feet, multimodal; 17.3 miles, 17,000 to 28,800 feet, multimodal
	66-259	E5, E6	17.3 miles, 3,500 feet, multimodal
	68-116	E7	20.1 miles, 3,500 feet, multimodal
Washington	102-105	B2	8.6 miles, 1,950 to 3,200 feet, electric upgrade only; 1.0 miles, 3,500 feet, multimodal; 39.3 miles, 500 feet, electric upgrade only
	244-245	B2	4.67 miles, 3,500 feet, multimodal
Wyoming	121-220	F5	6.7 miles, 3,500 feet, electric only
	121-221	F5	35.6 miles, 3,500 feet, multimodal
	121-240	F5	17.1 miles, 3,500 feet, multimodal
	126-218	F5	27.6 miles, 3,500 feet, underground only; 6.2 miles, 3,500 feet, multimodal
	129-218	F5	21.5 miles, 3,500 feet, multimodal
	129-221	F5	8.4 miles, 3,500 feet, multimodal
	138-143	G5	22.7 miles, 3,500 feet, multimodal
	218-240	F5	1.5 miles, 1,500 feet, underground only; 14.0 miles, 3,500 feet, multimodal
	219-220	F5	3.0 miles, 3,500 feet, electric only
	220-221	F5	14.7 miles, 3,500 feet, electric only
	55-240	F5	24.7 miles, 3,500 feet, multimodal
	73-129	F5	6.8 miles, 3,500 feet, multimodal
	73-133	F5, G5	37.5 miles, 3,500 feet, underground only
	73-138	F5, G5	6.7 miles, 3,500 feet, multimodal
	78-138	G5	24.5 miles, 3,500 feet, multimodal
	78-255	G4	28.4 miles, 3,500 feet, multimodal
	78-85	G5	10.0 miles, 3,500 feet, multimodal
	79-216	F3, G3, G4	120.6 miles, 3,500 feet, multimodal

APPENDIX G:

SENSITIVE RESOURCE AREAS THAT WOULD BE INTERSECTED BY PROPOSED WEST-WIDE ENERGY CORRIDORS

APPENDIX G:

SENSITIVE RESOURCE AREAS THAT WOULD BE INTERSECTED BY PROPOSED WEST-WIDE ENERGY CORRIDORS

TABLE G Intersections[a] of Proposed Section 368 Energy Corridors with Sensitive Resource Areas under the Proposed Action

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Arizona	National Monument	Agua Fria National Monument	61-207	E8	Corridor buffer impinges on the monument in an area with existing 250 and 500 kV transmission lines.
	National Recreation Area	Glen Canyon National Recreation Area	68-116	E7	The intersection follows existing 500 kV transmission lines from Glen Canyon Dam and Navajo generating facilities.
	National Recreation Area	Lake Mead National Recreation Area	47-231	D8	The intersection follows an existing 500 kV transmission line in a locally designated corridor.
	National Wildlife Refuge	Havasu National Wildlife Refuge	41-46	D8	The intersection follows along the existing I-40 ROW.
	National Historic Trail	Juan Bautista de Anza National Historic Trail	115-208	E9	Corridor buffer impinges on the trail in an area where the trail is crossed by two 500 kV transmission lines.
	National Historic Trail	Juan Bautista de Anza National Historic Trail	115-238	D9	Small federal parcels completely crossed by the trail. There are no options to crossing these lands while avoiding the trail. The intersection occurs within about 1,600 feet of I-5 and a 10-inch pipeline ROW.
	National Historic Trail	Old Spanish National Historic Trail	113-116	E7	The intersection follows an existing 500 kV transmission line within a locally designated corridor.
California	National Recreation Area	Whiskeytown-Shasta-Trinity National Recreation Area	261-262	B5	The intersection follows an existing 138 kV transmission line.
	Other NPS Service Areas	Mojave National Preserve	27-41	D8	Corridor buffer impinges on the preserve.
	National Wild and Scenic River	Trinity Wild and Scenic River	101-263	A5	The intersection follows an existing 138 kV transmission line, near the Rt. 36 river crossing.
	National Scenic Trail	Pacific Crest National Scenic Trail	115-238	D9	The trail is a long, linear north-south feature that runs the entire length of California that must be crossed by any proposed east-west corridor.
	National Scenic Trail	Pacific Crest National Scenic Trail	264-265	C8	The intersection follows existing 800 kV and 230 kV transmission lines within a locally designated corridor.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
California (Cont.)	National Scenic Trail	Pacific Crest National Scenic Trail	3-8	B5	Corridor buffer impinges on the trail at a location currently crossed by three 500 kV transmission lines.
	National Scenic Trail	Pacific Crest National Scenic Trail	6-15	B6	The intersection occurs within a locally designated corridor in an area where the trail is currently crossed by two 69 kV and two 138 kV transmission lines.
	National Scenic Trail	Pacific Crest National Scenic Trail	107-268	C8	The intersection follows an existing 500 kV transmission line within a locally designated corridor.
	National Scenic Trail	Pacific Crest National Scenic Trail	108-267	C8	The intersection occurs within a locally designated corridor at a location that includes existing 14-inch and 36-inch pipelines and 230 kV and 500 kV transmission lines.
	National Historic Trail	California National Historic Trail	15-104	B5	The intersection occurs in an area where the trail crossed by an existing 20-inch pipeline, a rail line, and U.S. Rt. 395.
	National Historic Trail	California National Historic Trail	3-8	B5	The intersection occurs within a locally designated corridor and in an area where the trail is currently crossed by three 500 kV transmission lines.
	National Historic Trail	California National Historic Trail	6-15	B6	The intersection occurs within a locally designated corridor in an area where the trail is currently crossed by two 69 kV and two 138 kV transmission lines.
	National Historic Trail	California National Historic Trail	7-8	B5	Corridor buffer impinges on the trail.
	National Historic Trail	Old Spanish National Historic Trail	108-267	C8	The intersection occurs within a locally designated corridor at a location that includes existing 14-inch and 36-inch pipelines and 230 kV and 500 kV transmission lines.
	National Historic Trail	Old Spanish National Historic Trail	27-225	D8	The intersections occur in areas where the trail is also crossed by 14-inch and 36-inch pipelines, 230 kV and 500 kV transmission lines, and I-15.
	National Historic Trail	Old Spanish National Historic Trail	27-266	C8	The intersection occurs at a location that includes existing 10-inch and 30-inch pipelines, a 230 kV transmission line, and two 500 kV transmission lines.
	National Historic Trail	Juan Bautista de Anza National Historic Trail	115-238	D9	Small federal parcels completely crossed by the trail. There are no options to crossing these lands while avoiding the trail.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
California (Cont.)	Roadless Area	Coldwater Roadless Area	236-237	C9	Intersection occurs within a locally designated corridor currently containing a 500 kV transmission line.
	Roadless Area	Excelsior Roadless Area	18-23	C7	Corridor buffer impinges on the roadless area; proposed corridor follows existing 230 kV transmission line.
	Roadless Area	Ladd Roadless Area	236-237	C9	Intersection occurs within a locally designated corridor currently containing a 500 kV transmission line.
Colorado	National Recreation Area	Curecanti National Recreation Area	87-277	G6	The intersection follows an existing 230 kV transmission line.
	National Scenic Trail	Continental Divide National Scenic Trail	87-277	G6	The intersection occurs at a location that is crossed by existing 115 kV and 230 kV transmission lines.
	National Historic Trail	Old Spanish National Historic Trail	130-274	F7	The intersection occurs within a locally designated corridor and in an area that includes several pipeline ROWs.
	National Historic Trail	Old Spanish National Historic Trail	132-136	F6	The intersection follows an existing 345 kV transmission line.
	National Historic Trail	Old Spanish National Historic Trail	139-277	G6	The intersection follows an existing 115 kV transmission line.
	National Historic Trail	Old Spanish National Historic Trail	87-277	G6	The intersections occur within a locally designated corridor with an existing 230 kV transmission line.
	Roadless Area	Bard Creek	144-275	G6, G5	The corridor buffer impinges on the roadless area.
Idaho	National Monument	Hagerman Fossil Beds National Monument	36-226	D4	The corridor buffer impinges on the monument.
	National Scenic Trail	Continental Divide National Scenic Trail	50-203	E3	The corridor buffer impinges on the trail.
	National Historic Trail	Nez Perce National Historic Trail	50-260	E3	The intersection occurs where the trail is crossed by U.S. Rt. 22 and a 230 kV transmission line.
	National Historic Trail	Oregon National Historic Trail	29-36	D4	The intersections occur within a locally designated corridor and in an area where the trail is crossed by 230 kV and 500 kV transmission lines.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Idaho (Cont.)	National Historic Trail	Oregon National Historic Trail	36-112	D4	The intersection occurs within 2 miles of 230 kV and 500 kV transmission lines.
Montana	National Scenic Trail	Continental Divide National Scenic Trail	50-203	E3	The intersection occurs within a locally designated corridor with an existing 161 kV transmission line.
	National Scenic Trail	Continental Divide National Scenic Trail	50-260	E3	The intersection occurs within a locally designated corridor with an existing 230 kV transmission line.
	National Scenic Trail	Continental Divide National Scenic Trail	51-204	E2	The corridor buffer impinges on the trail in the vicinity of two crossings by 100 kV transmission lines.
	National Scenic Trail	Continental Divide National Scenic Trail	51-205	E3	The intersection occurs within a locally designated corridor in the vicinity of 100 kV and 230 kV transmission lines, a pipeline ROW, a rail ROW, and I-90.
	National Historic Trail	Lewis and Clark National Historic Trail	50-203	E3	The corridor buffer impinges on the trail; at this location the corridor is locally designated, includes a 115 kV transmission line, and follows I-15.
	Roadless Area	Italian Peak	50-260	E3	The intersection occurs within a locally designated corridor and follows an existing 230 kV transmission line.
Nevada	National Recreation Area	Lake Mead National Recreation Area	39-231	D7	Corridor buffer impinges on the recreation area.
	National Recreation Area	Lake Mead National Recreation Area	47-231	D8	The intersection follows two existing 500 kV transmission lines.
	National Wildlife Refuge	Desert National Wildlife Refuge	37-232	D7	The intersection occurs within a locally designated energy corridor and follows U.S. Rt. 93.
	National Wildlife Refuge	Desert National Wildlife Refuge	232-233(W)	D7	The intersection occurs within a locally designated energy corridors and follows U.S. Rt. 93.
	National Historic Trail	California National Historic Trail	15-104	C6	The buffer impinges on the corridor in the vicinity of the trail crossing by U.S. Rt. 395.
	National Historic Trail	California National Historic Trail	15-17	C6	The intersection occurs within a locally designated corridor.
	National Historic Trail	California National Historic Trail	16-104	C5	The intersections occur at crossings of an existing 800 kV transmission line.
	National Historic Trail	California National Historic Trail	16-17	C5	The corridor buffer impinges on the trail.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Nevada (Cont.)	National Historic Trail	California National Historic Trail	16-24	C5	The intersections occur within a locally designated corridor that follows and in some locations includes a rail ROW.
	National Historic Trail	California National Historic Trail	17-18	C6	The intersections occur within a locally designated corridor at a location containing an 800 kV transmission line.
	National Historic Trail	California National Historic Trail	17-35	C5, D5	The corridor buffer impinges on the trail in the western portion of the corridor near a pipeline ROW and 115 kV and 345 kV transmission lines, and in the eastern portion of the corridor in the vicinity of three <160 kV transmission lines.
	National Historic Trail	California National Historic Trail	35-111	D5	The locally designated corridor buffer impinges on the trail at a location crossed by U.S. Rt. 93 and a rail ROW.
	National Historic Trail	California National Historic Trail	44-110	D5	The intersections occur within a locally designated corridor at locations where the trail is crossed by a rail ROW.
	National Historic Trail	California National Historic Trail	44-239	D5	The intersections occur within a locally designated corridor that includes a 115 kV transmission line.
	National Historic Trail	Old Spanish National Historic Trail	224-225	D8	Southernmost intersection occurs at location where the trail is crossed by a rail ROW, I-15, and several pipeline ROWs; other intersections include buffer impingements.
	National Historic Trail	Old Spanish National Historic Trail	37-39	D7	Intersection occurs within 700 feet of a 500 kV transmission line.
	National Historic Trail	Old Spanish National Historic Trail	39-113	D7	The corridor buffer impinges on the trail near a 500 kV transmission line.
	National Historic Trail	Old Spanish National Historic Trail	39-231	D7	The corridor buffer impinges on the trail near a 500 kV transmission line.
	National Historic Trail	Old Spanish National Historic Trail	47-231	D8	The intersection occurs within a locally designated corridor that includes a 500 kV transmission line; at this location the trail is also crossed by three transmission lines and a pipeline ROW.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Nevada (Cont.)	National Historic Trail	Pony Express National Historic Trail	17-18	C6	The intersection occurs within a locally designated corridor at a location containing an 800 kV transmission line.
	National Historic Trail	Pony Express National Historic Trail	44-110	D6	The intersection occurs within a locally designated corridor at a location where the trail is crossed by a rail ROW.
	Roadless Area	Cave Creek	110-114	D6	The intersection follows two existing 230 kV transmission lines.
	Roadless Area	Larken Lake	18-23	C6	The intersection includes buffer impingements and follows existing 230 kV and 800 kV transmission lines.
	Roadless Area	Aurora Crater	18-23	C6	The intersection includes buffer impingements and follows existing 230 kV and 800 kV transmission lines.
	Roadless Area	South Schell	110-114	D6	The intersection follows two existing 230 kV transmission lines.
	Roadless Area	Cooper	110-114	D6	The corridor buffer impinges on the roadless area in an area where the proposed corridor follows two existing 230 kV transmission lines.
New Mexico	National Scenic Trail	Continental Divide National Scenic Trail	80-273	G8	The intersection occurs within a locally designated corridor in an area where the trail is currently crossed by four pipeline ROWs and 230 kV and 345 kV transmission lines.
	National Historic Trail	El Camino Real de Tierra Adentro National Historic Trail	81-272	G8	The corridor buffer impinges on the trail in an area where the trail is closely paralleled by a 115 kV transmission line.
	National Historic Trail	El Camino Real de Tierra Adentro National Historic Trail	81-272	G9	The impingement follows a 115 kV transmission line and occurs at a location where the trail is crossed by a rail ROW.
	National Wildlife Refuge	Sevilleta National Wildlife Refuge	81-272	G8	Intersections follows the I-25 ROW.
	National Historic Trail	Old Spanish National Historic Trail	80-273	G7	The intersection occurs in an area where the trail is crossed by 8 pipeline ROWs within a distance of about 7,500 feet.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Oregon	National Wild and Scenic River	Clackamas Wild and Scenic River	230-248	B3	Intersection is perpendicular to the river.
	National Wild and Scenic River	Deschutes Wild and Scenic River	11-103	B3	Intersection occurs at a location where the river is currently crossed 1,000 kV, 800 kV, and 230 kV transmission lines and their ROWs.
	National Wild and Scenic River	Sycan Wild and Scenic River	7-11	B4	Intersection follows existing river crossing by two 500 kV transmission lines and ROWs.
	National Scenic Trail	Pacific Crest National Scenic Trail	10-246	B3	The intersection follows three 250 kV and one 500 kV transmission lines.
	National Scenic Trail	Pacific Crest National Scenic Trail	230-248	B3	The proposed corridor crosses the trail at three locations.
	National Historic Trail	California National Historic Trail	4-247	A4	Intersection occurs within a locally designated corridor that includes a 500 kV transmission line; the crossing is also near a location where the trail is crossed by I-5.
	National Historic Trail	Oregon National Historic Trail	10-246	B3	The intersection follows three 250 kV and one 500 kV transmission lines.
	National Historic Trail	Oregon National Historic Trail	250-251	C3	The intersections follow I-84 and a rail ROW.
	Roadless Area	Crane Mountain	7-24	C4	Construction is not prohibited in this roadless area.
	Roadless Area	Walla Walla River	227-249	C3	The intersection in vicinity of existing 230 kV transmission line on the roadless area; construction is not prohibited in this roadless area.
Utah	National Park	Arches National Park	66-212	F6	Corridor buffer impinges on the park in an area that currently includes 69 kV, 138 kV, and 345 kV transmission lines and a 10-inch pipeline.
	National Monument	Grand Staircase-Escalante National Monument	68-116	E7	The intersection follows an existing 500 kV transmission line.
	National Historic Trail	California National Historic Trail	44-239	E5	The corridor buffer impinges on the trail near a location where the trial is crossed by I-80.
	National Historic Trail	Old Spanish National Historic Trail	113-114	E7	The intersection occurs within a locally designated corridor that follows a 36-inch pipeline and 345 kV and 500 kV transmission lines; the intersections occur near a trail crossing by State Rt. 18.
	National Historic Trail	Old Spanish National Historic Trail	113-116	E7	The intersection occurs within a locally designated corridor which includes a 500 kV transmission line.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Utah (Cont.)	National Historic Trail	Old Spanish National Historic Trail	116-206	E7	The intersection occurs near trail crossings by State Rt. 20 and U.S. Rt. 89.
	National Historic Trail	Old Spanish National Historic Trail	66-212	F6	Multiple trail intersections, some occurring in areas where the trail is crossed by I-70, U.S. Rts. 6 and 191, and State Rt. 46, as well as by a rail ROW; in this area the trail is also crossed or paralleled by multiple pipeline ROWs and transmission lines.
	National Historic Trail	Pony Express National Historic Trail	114-241	E5	The intersection occurs near trail crossings by a pipeline ROW and State Rt. 36.
	Roadless Area	418009	66-259	E5	The corridor buffer impinges on the roadless area; construction is not prohibited in this roadless area.
	Roadless Area	418017	66-259	E5	The corridor buffer impinges on the roadless area; construction is not prohibited in this roadless area.
	Roadless Area	Lewis Peak	256-257	E5	The intersection occurs within a locally designated corridor which includes an underground 230 kV transmission line.
	Roadless Area	Mogostu	113-114	E7	Intersections occur within a locally designated corridor that includes a 36-inch pipeline and 345 kV and 500 kV transmission lines.
	Roadless Area	Willard	256-257	E5	The intersection occurs within a locally designated corridor which includes an underground 230 kV transmission line; the corridor buffer impinges on the area in some locations; construction is not prohibited in this roadless area.
Washington	National Scenic Trail	Pacific Crest National Scenic Trail	102-105	B2	The intersection occurs within a locally designated corridor; the intersection occurs at a location where the trail is crossed by U.S. Rt. 2, a rail ROW; and 115 kV, 350 kV, and 500 kV transmission lines.
Wyoming	National Recreation Area	Flaming Gorge National Recreation Area	218-240	F5	Corridor intersection and buffer occurs along a portion of an existing 10-inch gas pipeline ROW.
	National Scenic Trail	Continental Divide National Scenic Trail	78-138	G5	The corridor buffer impinges on the trail; U.S. Rt. 287 overlies the trail, and a transmission line and two pipelines cross the trail near the buffer impingement.

TABLE G (Cont.)

State	Feature Type	Feature Name	Proposed Segment	Map Name[b]	Nature of the Corridor Intersection
Wyoming (Cont.)	National Historic Trail	California National Historic Trail	121-240	F5	The intersections occur in an area with several pipelines and transmission lines where the trail is crossed by a rail ROW and U.S. Rt. 30.
	National Historic Trail	California National Historic Trail	55-240	F5	The intersection follows a 20-inch pipeline and occurs about 1,600 feet north of the trail crossing by I-80.
	National Historic Trail	Mormon Pioneer National Historic Trail	121-240	F5	The intersections occur in an area with several pipelines and transmission lines where the trail is crossed by a rail ROW and U.S. Rt. 30.
	National Historic Trail	Mormon Pioneer National Historic Trail	55-240	F5	The corridor buffer impinges on the trail in an area where the trails are crossed by I-80.
	National Historic Trail	Oregon National Historic Trail	121-240	F5	The intersections occur in an area with several pipelines and transmission lines where the trail is crossed by a rail ROW and U.S. Rt. 30.
	National Historic Trail	Oregon National Historic Trail	55-240	F5	The corridor buffer impinges on the trail in an area where the trails are crossed by I-80.
	National Historic Trail	Pony Express National Historic Trail	55-240	F5	The corridor buffer impinges on the trail in an area where the trails are crossed by I-80.
	Roadless Area	0401036	218-240		The intersection occurs in an area where a 10-inch pipeline crosses the roadless area.

[a] Intersection defined as Section 368 corridor ROW crossing boundary of potentially sensitive resource area.

[b] Maps are presented in the PEIS Vol. III, Map Atlas, Part 3.

APPENDIX H:

GEOGRAPHIC INFORMATION SYSTEM DATA

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GEOGRAPHIC INFORMATION SYSTEM DATA

A geographic information system (GIS) was used to support the mapping and location-specific analyses in the WWEC PEIS. GIS databases contain spatial data including imagery, map graphics, and associated tabular data; and GIS software provides the capabilities to store, process, analyze, model, and visualize the spatial data.

The following are important facets of the GIS used in the project and the maps derived from it:

- **Map scale** is the ratio of the distance on a map to the distance it represents on the ground. Large scale maps depict ground features closer to their actual size and are limited in the extent that can be covered on a page. Linear and point objects depicted on small scale maps typically appear out of proportion to their true sizes. Given the extent of the 11 western states, widths of linear features such as energy corridors usually cannot be shown accurately and remain visible on WWEC maps. The map lines exaggerate the corridor widths. Conversely, it would take a prohibitive number of maps to show corridor widths to scale for the entire project region.

- **Data layer scale** is another scaling consideration when using a GIS database. Each thematic category in the database, such as roads, counties, or pipelines, is usually stored and maintained as a separate layer. Layers are produced at a scale that depends on the source information and the purpose of the layer, and some layers are compilations of data from different source scales. Since a map view in a GIS can be zoomed to any scale, layers can be viewed at scales larger than the scale they were intended to accommodate or combined with layers at different source scales. This can result in a lack of detail on the map and inaccurate locations of features in relation to one another.

- **Data quality and availability** limit some of the information in the GIS, especially a GIS having the diverse set of themes and the large spatial extent needed for the WWEC PEIS. Efforts have been made to gather and use the most complete, current, and comprehensive GIS data available for the project area; nevertheless, in many cases there were limits to the quality, completeness, spatial extent, and temporal currency of available data. As in any product, the quality of GIS data must be evaluated and understood in order to draw appropriate conclusions.

- **Metadata** is information that describes details about data, providing a text description, the purpose of the data, publication date, source material, content, scale, table structure, and many other elements necessary or helpful in understanding a data layer. Not all available GIS data has metadata.

Table H summarizes some of the more important GIS data used in the PEIS, and gives an indication of the diverse sources and levels of quality of the best available data. For the purposes of this summary, quality relates mostly to appropriate data layer scale as described in the metadata. GIS data for which no metadata are available have been assigned a quality description based on experience working with the data in the context of this project. The quality terms used are defined as follows:

- *Small scale*: The data was created to provide a broad overview that could encompass several states (scales smaller than 1:3,000,000).
- *Medium scale*: The data was created to map regional areas such as large parts of individual states (scales between 1:3,000,000 and 1:1,000,000).
- *Large scale*: The data was created to map areas that could encompass several counties or a national forest (scales between 1:1,000,000 and 1:500,000).
- *Local scale*: The data was created to map areas generally smaller than a county or a national forest (scales larger than 1:500,000).

Note the wide range of scales of local-scale maps. Assignment of this quality term does not necessarily denote the highly detailed data created specifically for very large scale maps, such as the 1:24,000 topographic quadrangle maps produced by the USGS.

TABLE H Characteristics of GIS Data Used in the WWEC PEIS

Data Description	Source	Data Quality
1-km Digital Elevation Model	Environmental Systems Research Institute	Medium scale
1-km shaded relief	Environmental Systems Research Institute	Medium scale
30-m Digital Elevation Model	USGS	Local scale
30-m shaded relief	30-m Digital Elevation Model	Local scale
Aquifers	National Atlas of the United States	Medium scale
Areas of Critical Environmental Concern	BLM	Large scale
BLM field office boundaries	BLM	Medium scale
Boundaries of existing BLM land use plans	BLM	Medium scale
Boundaries of future BLM land use plans	BLM	Medium scale
Costly landslide events	National Atlas of the United States	Medium scale
Costly regional landslide events	National Atlas of the United States	Medium scale
Critical habitat for flora and fauna	USFWS	Large scale
DOD installations and ranges	DOD	Local scale
Earthquakes	National Atlas of the United States	Medium scale
Electrical power plants	Licensed through an agreement with the National Geospatial Intelligence Agency	Small scale
Electrical substations	Licensed through an agreement with the National Geospatial Intelligence Agency	Small scale
Electrical transmission lines	Licensed through an agreement with the National Geospatial Intelligence Agency	Small scale
Fault lines	National Atlas of the United States	Local scale
Federal ownership	Compiled from data received by BLM in consultation with the Land Resources Project Office	Medium scale
FEMA Q3 flood data	FEMA	Local scale
Flow characteristics at USGS stream gauges	USGS	Local scale
Generalized geologic regions	USGS	Medium scale
Instrument military training routes	DOD	Local scale
Karst areas	National Atlas of the United States	Small scale
Lakes, dry lakes, and reservoirs	National Atlas of the United States	Medium scale
Landslides	National Atlas of the United States	Small scale
Level III ecoregions	National Atlas of the United States	Small scale
Level IV ecoregions	Environmental Protection Agency	Local scale
Low-level military training routes	DOD	Local scale
Military training routes	DOD	Local scale

TABLE H (Cont.)

Data Description	Source	Data Quality
Military training routes with floors under 1,000 feet above ground level and slow routes under 1,500 feet above ground level	DOD	Local scale
National historic landmarks	Compiled from data received from the National Registration Information System in consultation with the NPS	Local scale
National monuments	Compiled from BLM, USGS, and USFS sources	Medium scale
National natural landmarks	NPS	Local scale
National scenic and historic trails	BLM National Landscape Conservation System	Small scale
Natural gas facilities	Licensed through an agreement with the National Geospatial Intelligence Agency	Small scale
Natural gas pipelines	Licensed through an agreement with the National Geospatial Intelligence Agency	Small scale
Nonattainment areas	State air quality offices	Local scale
NPS areas under Class I EPA air restrictions	NPS	Local scale
Physiographic divisions	USGS	Small scale
Precontact Tribal boundaries	Handbook of North American Indians, Smithsonian Institution	Small scale
Previously proposed energy corridors from other sources	Compiled from various sources	Small scale
Previously proposed energy corridors from scoping comments	Compiled from various sources	Small scale
Previously proposed energy corridors from Western Utility Group	BLM	Small scale
Railroads	Bureau of Transportation Statistics National Transportation Atlas Data	Local scale
Rivers and streams	National Atlas of the United States	Medium scale
Roads	Bureau of Transportation Statistics National Transportation Atlas Data	Local scale
Scenic highways	Utah State University	Local scale
Seismic hazard zones	National Atlas of the United States	Medium scale
Special use airspace	DOD	Local scale
Special use airspace with floors under 1,000 feet above ground level	DOD	Local scale
Surficial geology	United States Geological Survey	Small scale
FS areas under Class I EPA air restrictions	NPS	Local scale
FS region boundaries	FS	Small scale
FS roadless and specially designated areas	FS	Local scale

TABLE H (Cont.)

Data Description	Source	Data Quality
USFWS areas under Class I EPA air restrictions	NPS	Local scale
Visual military training routes	DOD	Local scale
Volcanoes	National Atlas of the United States	Medium scale
Watersheds	National Atlas of the United States	Medium scale
Wild and scenic rivers	USFWS	Medium scale
Wilderness areas	National Atlas of the United States	Medium scale
Wilderness study areas	BLM National Landscape Conservation System	Medium scale

APPENDIX I:

SUMMARY OF WWEC PEIS WEBCASTS FOR CORRIDOR REVIEW AND REVISION, 6/19/06 TO 4/24/07

TABLE I WWEC PEIS Webcasts for Corridor Review and Revision, 6/19/06 to 4/24/07[a]

State	Number of Webcasts	Agencies Represented	Agency Participants	Date
Arizona	8	BLM, FS	BLM, Washington, DC; FS, Washington, DC	7/27/06
		BLM, FS	BLM AZ State Office, FS Region 3	8/10/06
		FS	FS Region 3, Tonto NF, Coconino NF	9/07/06
		BLM	AZ State Office, Phoenix DO, Yuma FO	10/04/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/16/06
		BLM, DOE, FS	BLM AZ State Office, Tucson FO; FS Region 3, Coronado NF; DOE, Washington, DC	11/02/06
		BLM, FS	BLM AZ State Office, Kingman FO, Hassayampa FO, Yuma FO, FS Region 3, Prescott NF, Kaibab NF	11/14/06
		BLM	Safford FO, Tucson FO, Las Cruces FO	3/21/07
California	2	BLM, CEC, DOD, DOE, FS, NPS, USFWS	Many	10/11/06
		DOE	DOE, Washington, DC	3/15/07
Colorado	3	BLM	Little Snake FO, White River FO	6/29/06
		BLM, FS	BLM CO State Office, Royal Gorge FO, Gunnison FO; FS Region 2, Pike-San Isabel NF, Grand Mesa-Uncompahgre-Gunnison NF	8/17/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/12/06
Idaho	5	BLM	WY State Office, Kemmerer FO, UT State Office, Salt Lake FO, ID State Office, Pocatello FO	9/06/06
		BLM, FS	Elko FO, Jarbidge FO, Humboldt NF	9/27/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/16/06
		BLM	BLM WY State Office, BLM UT State Office, BLM ID State Office, Kemmerer FO, Rock Springs FO, Salt Lake FO, Pocatello FO	11/16/06
		BLM, DOE, FS	BLM, Washington, DC; FS, Washington, DC; DOE, Washington, DC	11/17/06
Montana	2	BLM	Cody FO, Worland FO, Billings FO	6/28/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/17/06

TABLE I (Cont.)

State	Number of Webcasts	Agencies Represented	Agency Participants	Date
Nevada	6	BLM, FS	Elko FO, Jarbidge FO, Humboldt NF	9/27/06
		BLM	BLM, Washington, DC	10/18/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/19/06
		BLM	BLM, Washington, DC	11/08/06
		BLM	BLM, Washington, DC	3/29/07
		BLM	NV State Office, Elko FO, Winnemucca FO	4/02/07
New Mexico	6	BLM, FS	BLM, Washington, DC; FS, Washington, DC	7/27/06
		BLM, FS, USFWS	BLM NM State Office, Soccoro FO; FS Region 3, Cibola NF; USFWS Region 2, Sevilleta NWR	8/30/06
		BLM	NM State Office, Roswell FO	8/30/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/16/06
		BLM	NM State Office, Farmington FO	3/14/07
		BLM	Safford FO, Tucson FO, Las Cruces FO	3/21/07
Oregon	4	BLM	Prineville DO	8/24/06
		DOD, DOE, FS, NPS, USFWS	Many	10/17/06
		BLM, FS	BLM OR State Office, FS Region 6	11/09/06
		BLM	BLM, Washington, DC	3/19/07
Utah	9	BLM	UT State Office, Grand Staircase-Escalante NM, Cedar City FO	6/21/06
		BLM	UT State Office, Salt Lake FO, Fillmore FO	6/26/06
		BLM	UT State Office	8/15/06
		FS	Dixie NF	8/17/06
		BLM, FS	BLM UT State Office, Fillmore FO, Kanab FO; FS Region 4, Fish Lake NF, Dixie NF	8/21/06
		BLM	WY State Office, Kemmerer FO, UT State Office, Salt Lake FO. ID State Office, Pocatello FO	9/06/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/12/06
		BLM	BLM WY State Office, BLM UT State Office, BLM ID State Office, Kemmerer FO, Rock Springs FO, Salt Lake FO, Pocatello FO	11/16/06
		BLM, DOE, FS	BLM, Washington, DC; FS, Washington, DC; DOE, Washington, DC	11/17/06

TABLE I (Cont.)

State	Number of Webcasts	Agencies Represented	Agency Participants	Date
Washington	3	FS	Region 6, Mount Baker-Snoqualmie NF, Wenatchee NF, Gifford Pinchot NF	9/28/06
		DOD, DOE, FS, NPS, USFWS	Many	10/17/06
		BLM, DOE, FS	BLM, Washington, DC; FS, Washington, DC; DOE, Washington, DC	12/05/06
Wyoming	9	BLM	Kemmerer FO	6/19/06
		BLM	Rawlins FO, Rock Springs FO	6/27/06
		BLM	Cody FO, Worland FO, Billings FO	6/28/06
		BLM	WY State Office, Rock Springs FO, Kemmerer FO	8/04/06
		BLM	WY State Office, Rawlins FO, Lander FO	8/04/06
		BLM	WY State Office, Kemmerer FO, UT State Office, Salt Lake FO, ID State Office, Pocatello FO	9/06/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/12/06
		BLM	BLM WY State Office, BLM UT State Office, BLM ID State Office, Kemmerer FO, Rock Springs FO, Salt Lake FO, Pocatello FO	11/16/06
		BLM, DOE, FS	BLM Washington DC, FS Washington DC, DOE Washington DC	11/17/06
West-wide	5	FWS	Washington DC	6/30/06
		BLM, FS	BLM, Washington, DC; FS, Washington, DC	8/23/06
		DOE	DOE, Washington, DC	9/11/06
		BLM, DOD, DOE, FS, NPS, USFWS	Many	10/24/06
		DOD	DOD Washington DC, others?	2/22/07
Total Webcasts[b]	52			

[a] Abbreviations: AZ = Arizona; BLM = Bureau of Land Management; CEC = ?; CO = Colorado; DO = District Office; DOD = Department of Defense; DOE = Department of Energy; FO = Field Office; FS = Forest Service; ID = Idaho; NF = National Forest; NM = New Mexico or National Monument; NPS = National Park Service; NV = Nevada; NWR = National Wildlife Refuge; OR = Oregon; USFWS = U.S. Fish and Wildlife Service; UT = Utah; WY = Wyoming.

[b] Webcasts involving more than one state are listed and counted for each state in which they occurred; however, the grand total number of webcasts counts them only once.

APPENDIX J:

PROPOSED ENERGY CORRIDORS THAT WOULD REQUIRE CONSULTATION WITH THE DEPARTMENT OF DEFENSE DURING PROJECT PLANNING

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PROPOSED ENERGY CORRIDORS THAT WOULD REQUIRE CONSULTATION WITH THE DEPARTMENT OF DEFENSE DURING PROJECT PLANNING

Many of the proposed energy corridors that would be designated under the Proposed Action would intersect or occur near military training routes (MTRs) and special use areas (SUAs) where low-altitude military aircraft flights may regularly occur. In addition, some corridor segments would intersect DOD facilities, such as Yuma Proving Ground, Arizona, or the Nellis Small Arms Range, Nevada. Proposed corridors intersecting or near MTRs, SUAs, or DOD facilities are highlighted in red in Figure J-1. Project applicants proposing to develop an energy transport project within any of these corridors should consult with DOD during project planning to ensure that the project design does not conflict with DOD training activities.

FIGURE J-1 Proposed Energy Corridors That Would Require DOD Coordination during Project Planning

APPENDIX K:

SITES OWNED BY FEDERAL AGENCIES AND FEDERALLY RECOGNIZED TRIBES BY STATE

TABLE K-1 BLM Sites in the 11 Western States[a]

Site	Designation[b]	State	Administrative Unit[c]	Total Miles[d]	Total Acres
Gila Box Riparian	NCA	AZ			22,905
Las Ciengas	NCA	AZ			41,972
San Pedro Riparian	NCA	AZ			56,400
Agua Fria	NM	AZ			71,100
Grand Canyon, Parashant	NM	AZ			808,724
Ironwood Forest	NM	AZ			129,022
Sonoran Desert	NM	AZ			486,603
Vermillion Cliffs	NM	AZ			279,568
Aravaipa Canyon	WA	AZ	Safford Field Office		19,700
Arrastra Mountain	WA	AZ	Kingman Field Office		129,800
Aubrey Park	WA	AZ	Kingman Field Office		15,400
Baboquivari Peak	WA	AZ	Tucson Field Office		2,040
Big Horn Mountains	WA	AZ	Phoenix Field Office		21,000
Cottonwood Point	WA	AZ	Arizona Strip Field Office		6,860
Coyote Mountains	WA	AZ	Tucson Field Office		5,100
Dos Cabezas Mountains	WA	AZ	Safford Field Office		11,700
Eagletail Mountains	WA	AZ	Yuma Field Office		97,880
East Cactus Plain	WA	AZ	Lake Havasu Field Office		14,630
Fishhooks	WA	AZ	Safford Field Office		10,500
Gibralter Mountain	WA	AZ	Lake Havasu Field Office		18,790
Grand Wash Cliffs	WA	AZ	Arizona Strip Field Office		37,030
Harcuvar Mountains	WA	AZ	Lake Havasu Field Office		25,050
Harquahala Mountains	WA	AZ	Phoenix Field Office		22,880
Hassayampa River Canyon	WA	AZ	Phoenix Field Office		12,300
Hells Canyon	WA	AZ	Phoenix Field Office		9,311
Hummingbird Springs	WA	AZ	Phoenix Field Office		31,200
Kanab Creek	WA	AZ	Arizona Strip Field Office		6,700
Mount Logan	WA	AZ	Arizona Strip Field Office		14,650
Mount Nutt	WA	AZ	Kingman Field Office		28,080
Mount Tipton	WA	AZ	Kingman Field Office		31,380
Mount Trumbull	WA	AZ	Arizona Strip Field Office		7,880
Mount Wilson	WA	AZ	Kingman Field Office		23,900
Muggins Mountains	WA	AZ	Yuma Field Office		7,711
Needles Eye	WA	AZ	Tucson Field Office		8,760
New Water Mountains	WA	AZ	Yuma Field Office		24,600
North Maricopa Mountains	WA	AZ	Phoenix Field Office		63,200
North Santa Teresa	WA	AZ	Safford Field Office		5,800
Paiute	WA	AZ	Arizona Strip Field Office		87,900
Peloncillo Mountains	WA	AZ	Safford Field Office		19,440
Rawhide Mountains	WA	AZ	Lake Havasu Field Office		38,470
Redfield Canyon	WA	AZ	Safford Field Office		6,600
Sierra Estrella	WA	AZ	Phoenix Field Office		14,400
Signal Mountain	WA	AZ	Phoenix Field Office		13,350
South Maricopa Mountains	WA	AZ	Phoenix Field Office		60,100
Swansea	WA	AZ	Lake Havasu Field Office		16,400
Table Top	WA	AZ	Phoenix Field Office		34,400
Tres Alamos	WA	AZ	Kingman Field Office		8,300
Trigo Mountains	WA	AZ	Yuma Field Office		30,300

TABLE K-1 (Cont.)

Site	Designation[b]	State	Administrative Unit[c]	Total Miles[d]	Total Acres
Upper Burro Creek	WA	AZ	Kingman Field Office		27,440
Wabayuma Peak	WA	AZ	Kingman Field Office		38,944
Warm Springs	WA	AZ	Kingman Field Office		112,400
White Canyon	WA	AZ	Tucson Field Office		5,790
Woolsey Peak	WA	AZ	Phoenix Field Office		64,000
Totals:				**0**	**3,188,360**
Beaver Dam Mountains (includes 2,600 acres in UT)	WA	AZ-UT	Arizona Strip Field Office		15,000
Paria Canyon-Vermilion Cliffs (includes 20,000 acres in UT)	WA	AZ-UT	Arizona Strip Field Office		89,400
Totals:				**0**	**104,400**
California Desert	NCA	CA			10,671,080
King Range	NCA	CA			58,151
California Coastal	NM	CA			883
Carrizo Plain	NM	CA			204,107
Santa Rosa and San Jacinto Mountains	NM	CA			86,400
Headwaters Forest Reserve	OTH	CA			7,472
Argus Range	WA	CA	California Desert District		61,995
Big Maria Mountains	WA	CA	California Desert District		45,367
Bigelow Cholla Garden	WA	CA	California Desert District		13,548
Bighorn Mountain	WA	CA	California Desert District		26,573
Black Mountain	WA	CA	California Desert District		20,537
Bright Star	WA	CA	California Desert District		8,190
Bristol Mountains	WA	CA	California Desert District		70,026
Cadiz Dunes	WA	CA	California Desert District		19,308
Carrizo Gorge	WA	CA	California Desert District		14,735
Chemehuevi Mountains	WA	CA	California Desert District		85,801
Chimney Peak	WA	CA	California Desert District		13,105
Chuckwalla Mountains	WA	CA	California Desert District		86,527
Cleghorn Lakes	WA	CA	California Desert District		33,475
Clipper Mountain	WA	CA	California Desert District		33,905
Coso Range	WA	CA	California Desert District		49,274
Coyote Mountains	WA	CA	California Desert District		18,622
Darwin Falls	WA	CA	California Desert District		8,176
Dead Mountains	WA	CA	California Desert District		46,822
Dome Land	WA	CA	California Desert District		39,273
El Paso Mountains	WA	CA	California Desert District		23,659
Fish Creek Mountains	WA	CA	California Desert District		21,425
Funeral Mountains	WA	CA	California Desert District		25,696
Golden Valley	WA	CA	California Desert District		36,464
Grass Valley	WA	CA	California Desert District		30,048
Hollow Hills	WA	CA	California Desert District		22,037
Ibex	WA	CA	California Desert District		28,809
Indian Pass	WA	CA	California Desert District		32,083
Inyo Mountains	WA	CA	California Desert District Ukiah District		124,970

TABLE K-1 (Cont.)

Site	Designation[b]	State	Administrative Unit[c]	Total Miles[d]	Total Acres
Ishi	WA	CA	California Desert District		240
Jacumba	WA	CA	California Desert District		31,237
Kelso Dunes	WA	CA	California Desert District		144,274
Kiavah	WA	CA	California Desert District		40,933
Kingston Range	WA	CA	California Desert District		199,525
Little Chuckwalla Mountains	WA	CA	California Desert District		28,019
Little Picacho	WA	CA	California Desert District		38,182
Machesna Mountains	WA	CA	California Desert District		120
Malpais Mesa	WA	CA	California Desert District		32,008
Manly Peak	WA	CA	California Desert District		12,889
Mecca Hills	WA	CA	California Desert District		26,314
Mesquite	WA	CA	California Desert District		44,877
Newberry Mountains	WA	CA	California Desert District		20,308
Nopah Range	WA	CA	California Desert District		106,579
North Algodones Dunes	WA	CA	California Desert District		25,818
North Mesquite Mountains	WA	CA	California Desert District		28,943
Old Woman Mountains	WA	CA	California Desert District		162,984
Orocopia Mountains	WA	CA	California Desert District		46,093
Otay Mountain	WA	CA	California Desert District		16,885
Owens Peak	WA	CA	California Desert District		73,573
Pahrump Valley	WA	CA	California Desert District		74,378
Palen/McCoy	WA	CA	California Desert District		212,982
Palo Verde Mountains	WA	CA	California Desert District		29,167
Picacho Peak	WA	CA	California Desert District		8,853
Piper Mountain	WA	CA	California Desert District		72,152
Piute Mountains	WA	CA	California Desert District		48,044
Resting Spring Range	WA	CA	California Desert District		76,280
Rice Valley	WA	CA	California Desert District		41,643
Riverside Mountains	WA	CA	California Desert District		24,029
Rodman Mountains	WA	CA	California Desert District		29,793
Sacatar Trail	WA	CA	California Desert District		50,483
Saddle Peak Hills	WA	CA	California Desert District		1,528
San Gorgonio Additions	WA	CA	California Desert District		38,507
Santa Lucia	WA	CA	Bakersfield District		1,812
Santa Rosa Additions	WA	CA	California Desert District		56,671
Sawtooth Mountains	WA	CA	California Desert District		33,598
Sheephole Valley	WA	CA	California Desert District		186,673
South Nopah Range	WA	CA	California Desert District		17,050
Stateline	WA	CA	California Desert District		7,012
Stepladder Mountains	WA	CA	California Desert District		83,527
Surprise Canyon	WA	CA	California Desert District		24,373
Sylvania Mountains	WA	CA	California Desert District		18,677
Trilobite	WA	CA	California Desert District		29,626
Trinity Alps	WA	CA	Ukiah District		4,471
Turtle Mountains	WA	CA	California Desert District		177,174
Ventana Additions	WA	CA	California Desert District		723
Whipple Mountains	WA	CA	California Desert District		76,063
Yolla Bolly-Middle Eel	WA	CA	Ukiah District		7,125
Eel (Middle Fork and South Fork)	WSRR	CA		32	10,240

TABLE K-1 (Cont.)

Site	Designation[b]	State	Administrative Unit[c]	Total Miles[d]	Total Acres
Tuolumne	WSRR	CA		3	960
Merced	WSRR	CA		12	3,840
North Fork American	WSRR	CA		12	3,840
Klamath	WSRR	CA		1.5	480
Trinity	WSRR	CA		17	5,440
Totals:				**78**	**14,605,558**
Gunnison Gorge	NCA	CO			62,844
Canyons of the Ancients	NM	CO			163,892
Gunnison Gorge	WA	CO	Montrose District		17,700
Powderhorn	WA	CO	Montrose District		48,115
Uncompahgre	WA	CO	Montrose District		3,390
Totals:				**0**	**295,941**
Colorado Canyons	NCA	CO-UT			122,929
Black Ridge Canyons (includes 5,120 acres in UT)	WA	CO-UT	Grand Junction Field Office		70,319
Totals:				**0**	**193,248**
Snake River Birds of Prey	NCA	ID			484,034
Craters of the Moon	NM	ID			274,800
Frank Church-River/No Return	WA	ID	Coeur d'Alene District		802
Totals:				**0**	**759,636**
Pompeys Pillar	NM	MT			51
Upper Missouri River Breaks	NM	MT			374,976
Lee Metcalf-Bear Trap Canyon Unit	WA	MT	Dillon Field Office		6,000
Upper Missouri	WSRR	MT		149	89,300
Totals:				**149**	**470,327**
El Malpais	NCA	NM			227,100
Kasha-Katuwe Tent Rocks	NM	NM			4,124
Bisti/De-Na-Zin	WA	NM	Farmington Field Office		38,381
Cebolla	WA	NM	Albuquerque Field Office		61,500
West Malpais	WA	NM	Albuquerque Field Office		39,400
Rio Grande (includes Red River)	WSRR	NM		63.8	20,416
Rio Chama	WSRR	NM		7.2	2,304
Totals:				**71**	**393,225**
Red Rock Canyon	NCA	NV			195,819
Sloan Canyon	NCA	NV			48,438
Arrow Canyon	WA	NV	Las Vegas Field Office		27,530
Big Rocks	WA	NV	Ely Field Office		12,997
Black Rock Desert	WA	NV	Winnemucca Field Office		314,829
Calico Mountains	WA	NV	Winnemucca Field Office		64,984
Clover Mountains	WA	NV	Ely Field Office		85,748
Delamar Mountains	WA	NV	Ely Field Office		111,328
East Fork High Rock	WA	NV	Winnemucca Field Office		52,617
El Dorado	WA	NV	Las Vegas Field Office		5,700

TABLE K-1 (Cont.)

Site	Designation[b]	State	Administrative Unit[c]	Total Miles[d]	Total Acres
Far South Egans	WA	NV	Ely Field Office		36,384
Fortifications Range	WA	NV	Ely Field Office		30,656
High Rock Canyon	WA	NV	Winnemucca Field Office		46,464
High Rock Lake	WA	NV	Winnemucca Field Office		59,094
Ireteba Peaks	WA	NV	Las Vegas Field Office		10,446
Jumbo Springs	WA	NV	Las Vegas Field Office		4,631
LaMadre Mountain	WA	NV	Las Vegas Field Office		27,879
Lime Canyon	WA	NV	Las Vegas Field Office		23,233
Little High Rock Canyon	WA	NV	Winnemucca Field Office		48,353
Meadow Valley Range	WA	NV	Ely Field Office		123,488
Mormon Mountains	WA	NV	Ely Field Office		157,938
Mt. Charleston	WA	NV	Las Vegas Field Office		2,142
Mt. Irish	WA	NV	Ely Field Office		28,334
Muddy Mountains	WA	NV	Las Vegas Field Office		44,498
North Black Rock Range	WA	NV	Winnemucca Field Office		30,647
North Jackson Mountains	WA	NV	Winnemucca Field Office		23,438
North McCullough	WA	NV	Las Vegas Field Office		14,763
Pahute	WA	NV	Winnemucca Field Office		56,890
Parsnip Peak	WA	NV	Ely Field Office		43,693
Rainbow Mountain	WA	NV	Las Vegas Field Office		20,311
South Jackson Mountains	WA	NV	Winnemucca Field Office		54,535
South McCullough	WA	NV	Las Vegas Field Office		44,245
South Pahroc Range	WA	NV	Ely Field Office		25,800
Spirit Mountain	WA	NV	Las Vegas Field Office		605
Mount Moriah	WA	NV	Ely Field Office		6,435
Tunnel Spring	WA	NV	Ely Field Office		5,371
Wee Thump Joshua Tree	WA	NV	Las Vegas Field Office		6,050
Weepah Spring	WA	NV	Ely Field Office		51,480
White Rock Range	WA	NV	Ely Field Office		24,413
Worthington Range	WA	NV	Ely Field Office		30,664
Totals:				**0**	**2,002,870**
Black Rock Desert-High Rock Canyon Emigrant Trails	NCA	NV-CA			799,165
Totals:				**0**	**799,165**
Cascade-Siskiyou	NM	OR			52,947
Steens Mountain Cooperative Management and Protection Area	OTH	OR			428,156
Yaquina Head Outstanding Natural Area	OTH	OR			100
Hells Canyon	WA	OR	Vale District		1,038
Steens Mountain	WA	OR	Burns District		170,025
Table Rock	WA	OR	Salem District		5,500
Wild Rogue	WA	OR	Medford District		10,160
Rogue	WSRR	OR		47	15,040
Owyhee	WSRR	OR		120	38,400
North Fork Owyhee	WSRR	OR		9.6	3,072
West Little Owyhee	WSRR	OR		57.6	18,432

TABLE K-1 (Cont.)

Site	Designation[b]	State	Administrative Unit[c]	Total Miles[d]	Total Acres
North Fork Crooked	WSRR	OR		18.8	6,016
Crooked (Middle and Lower)	WSRR	OR		17.8	5,696
Deschutes (Middle and Lower)	WSRR	OR		120	38,400
Donner and Blitzen	WSRR	OR		78.5	22,886
Grande Ronde	WSRR	OR		24.9	7,968
John Day (Main Stem)	WSRR	OR		147.5	47,200
South Fork John Day	WSRR	OR		47	15,040
North Umpqua	WSRR	OR		8.4	2,688
Powder	WSRR	OR		11.7	3,744
Quartzville Creek	WSRR	OR		9.7	3,104
Salmon	WSRR	OR		8	2,560
Sandy	WSRR	OR		12.5	4,000
White	WSRR	OR		24.7	7,904
Clackamas	WSRR	OR		0.5	160
Klamath	WSRR	OR		11	3,520
Wallowa	WSRR	OR		10	3,200
Elkhorn Creek	WSRR	OR		3	960
Little Wildhorse and Wildhorse Creeks	WSRR	OR		9.6	3,072
Kiger Creek	WSRR	OR		4.25	1,376
Totals:				**802**	**922,364**
Grand Staircase, Escalante	NM	UT			1,870,800
Totals:				**0**	**1,870,800**
Beaver Dam Mountains (includes 15,000 acres in AZ)	WA	UT-AZ	Cedar City District		2,600
Paria Canyon-Vermilion Cliffs (includes 89,400 acres in AZ)	WA	UT-AZ	Kanab Field Office		20,000
Totals:				**0**	**22,600**
Black Ridge Canyons (includes 70,319 acres in CO)	WA	UT-CO	Moab Field Office		5,120
Totals:				**0**	**5,120**
Juniper Dunes	WA	WA	Spokane District		7,140
Totals:				**0**	7,140
Grand Totals for 11 Western States:				**1,100**	**25,640,754**

[a] Includes all National Landscape Conservation System sites but wilderness study areas, of which there are 609 sites covering 13,480,658 acres in the 11 western states.

[b] Designation abbreviations: NCA = National Conservation Area; NM = National Monument; OTH = Other; WA = Wilderness Area; WSRR = Wild, Scenic, and Recreational River.

[c] Administrative unit reported only if available from BLM (2006).

[d] Miles reported only for WSRRs.

Source: BLM (2006).

TABLE K-2 FS Sites in the 11 Western States

Site	Designation[a]	State	Headquarters	Region	NFS Acres	Other Acres	Total Acres
Apache	NF	AZ	Springerville	3	1,198,634	28,038	1,226,672
Coconino	NF	AZ	Flagstaff	3	1,855,805	158,155	2,013,960
Coronado	NF	AZ	Tucson	3	1,717,651	70,615	1,788,266
Kaibab	NF	AZ	Williams	3	1,560,205	40,861	1,601,066
Prescott	NF	AZ	Prescott	3	1,239,279	168,332	1,407,611
Sitgreaves	NF	AZ	Springerville	3	818,835	65,660	884,495
Tonto	NF	AZ	Phoenix	3	2,873,231	96,312	2,969,543
Totals:					**11,263,640**	**627,973**	**11,891,613**
Angeles	NF	CA	Pasadena	5	668,059	25,608	693,667
Cleveland	NF	CA	San Diego	5	437,355	130,555	567,910
Eldorado	NF	CA	Placerville	5	680,945	203,690	884,635
Inyo	NF	CA	Bishop	5	1,840,890	99,872	1,940,762
Klamath	NF	CA	Yreka	5	1,711,360	175,365	1,886,725
Lassen	NF	CA	Susanville	5	1,070,344	304,601	1,374,945
Los Padres	NF	CA	Goleta	5	1,761,278	201,465	1,962,743
Mendocino	NF	CA	Willows	5	911,653	168,318	1,079,971
Modoc	NF	CA	Alturas	5	1,663,401	315,926	1,979,327
Plumas	NF	CA	Quincy	5	1,175,998	224,897	1,400,895
Rogue River	NF	CA	Medford (OR)	6	54,047	6,987	61,034
San Bernardino	NF	CA	San Bernardino	5	671,686	147,313	818,999
Sequoia	NF	CA	Porterville	5	1,143,562	49,118	1,192,680
Shasta	NF	CA	Redding	5	1,166,149	468,747	1,634,896
Sierra	NF	CA	Fresno	5	1,311,913	100,888	1,412,801
Siskiyou	NF	CA	Grants Pass (OR)	6	33,260	6,314	39,574
Six Rivers	NF	CA	Eureka	5	989,038	129,209	1,118,247
Stanislaus	NF	CA	Sonora	5	898,121	191,918	1,090,039
Tahoe	NF	CA	Nevada City	5	870,190	368,235	1,238,425
Toiyabe	NF	CA	Reno (NV)	4	649,080	47,548	696,628
Trinity	NF	CA	Redding	5	1,043,677	135,421	1,179,098
Eldorado	PU	CA	Placerville	5	180	0	180
Guatay Mountain	PU	CA	San Diego	5	522	0	522
Northern Redwood	PU	CA	Eureka	5	1,597	143,693	145,290
Big Sur	PU	CA	Goleta	5	1,697	0	1,697
Butte Valley	NGL	CA	Yreka	5	18,425	0	18,425
Fire Research Laboratory	EA	CA	Riverside	5	9	0	9
Institute of Forest Genetics	EA	CA	Placerville	5	194	0	194
San Joaquin	EA	CA	O Neals	5	4,580	0	4,580
Angeles	OTH	CA	Pasadena	5	0	0	629
Cleveland	OTH	CA	San Diego	5	0	0	16
Eldorado	OTH	CA	Placerville	5	0	0	1,683
Humboldt Nursery Site	OTH	CA	Eureka	5	0	0	223
Inyo	OTH	CA	Bishop	5	0	0	9
Klamath	OTH	CA	Yreka	5	0	0	716
Lassen	OTH	CA	Susanville	5	0	0	267
Los Padres	OTH	CA	Santa Barbara	5	0	0	504
Mendocino	OTH	CA	Willows	5	0	0	12
Modoc	OTH	CA	Alturas	5	0	0	95
Plant Introduction Station	OTH	CA	Willows	5	209	0	209
Plumas	OTH	CA	Quincy	5	521	0	521
San Bernardino	OTH	CA	San Bernardino	5	707	0	707
Sequoia	OTH	CA	Porterville	5	29	0	29
Shasta	OTH	CA	Redding	5	84	0	84
Sierra	OTH	CA	Fresno	5	134	0	134
Stanislaus	OTH	CA	Sonora	5	279	0	279
Tahoe	OTH	CA	Nevada City	5	123	0	123
Trinity	OTH	CA	Redding	5	33	0	33
Totals:					**20,785,483**	**3,645,688**	**24,431,171**

TABLE K-2 (Cont.)

Site	Designation[a]	State	Headquarters	Region	NFS Acres	Other Acres	Total Acres
Arapaho	NF	CO	Fort Collins	2	723,130	47,474	770,604
Grand Mesa	NF	CO	Delta	2	346,555	5,160	351,715
Gunnison	NF	CO	Delta	2	1,671,455	95,486	1,766,941
Manti-La Sal	NF	CO	Price (UT)	4	27,105	40	27,145
Pike	NF	CO	Pueblo	2	1,110,862	177,517	1,288,379
Rio Grande	NF	CO	Monte Vista	2	1,821,579	101,188	1,922,767
Roosevelt	NF	CO	Fort Collins	2	812,398	275,178	1,087,576
Routt	NF	CO	Steamboat Springs	2	1,125,632	121,734	1,247,366
San Isabel	NF	CO	Pueblo	2	1,119,354	126,083	1,245,437
San Juan	NF	CO	Durango	2	1,878,022	229,532	2,107,554
Uncompahgre	NF	CO	Delta	2	950,661	93,814	1,044,475
White River	NF	CO	Glenwood Springs	2	2,281,731	195,921	2,477,652
Comanche	NGL	CO	Pueblo	2	443,081	24,292	467,373
Pawnee	NGL	CO	Fort Collins	2	193,060	21,268	214,328
Totals:					**14,504,625**	**1,514,687**	**16,019,312**
Bitterroot	NF	ID	Hamilton (MT)	1	464,108	52	464,160
Boise	NF	ID	Boise	4	2,653,145	305,520	2,958,665
Cache	NF	ID	Pocatello	4	263,941	500	264,441
Caribou	NF	ID	Pocatello	4	972,435	94,979	1,067,414
Challis	NF	ID	Challis	4	2,463,507	24,598	2,488,105
Clearwater	NF	ID	Orofino	1	1,679,952	42,180	1,722,132
Coeur d’Alene	NF	ID	Coeur d’Alene	1	726,362	75,962	802,324
Kaniksu	NF	ID	Coeur d’Alene	1	905,976	139,541	1,045,517
Kootenai	NF	ID	Libby (MT)	1	46,480	0	46,480
Nezperce	NF	ID	Grangeville	1	2,224,091	34,482	2,258,573
Payette	NF	ID	McCall	4	2,326,989	97,851	2,424,840
Salmon	NF	ID	Salmon	4	1,772,469	22,771	1,795,240
Sawtooth	NF	ID	Twin Falls	4	1,732,106	70,268	1,802,374
St. Joe	NF	ID	Coeur d’Alene	1	868,434	206,286	1,074,720
Targhee	NF	ID	St. Anthony	4	1,312,356	42,719	1,355,075
Wallowa	NF	ID	Baker City (OR)	6	3,962	1,632	5,594
Cougar Bar	PU	ID	Baker City (OR)	6	363	0	363
Curlew	NGL	ID	Pocatello	4	47,790	27,458	75,248
Totals:					**20,464,466**	**1,186,799**	**21,651,265**
Beaverhead	NF	MT	Dillon	1	2,129,209	69,657	2,198,866
Bitterroot	NF	MT	Hamilton	1	1,122,807	68,786	1,191,593
Custer	NF	MT	Billings	1	1,113,510	86,925	1,200,435
Deerlodge	NF	MT	Dillon	1	1,225,580	144,338	1,369,918
Flathead	NF	MT	Kalispell	1	2,359,969	268,751	2,628,720
Gallatin	NF	MT	Bozeman	1	1,808,755	342,559	2,151,314
Helena	NF	MT	Helena	1	975,781	191,323	1,167,104
Kaniksu	NF	MT	Coeur d’Alene (ID)	1	454,553	35,119	489,672
Kootenai	NF	MT	Libby	1	1,765,916	332,872	2,098,788
Lewis and Clark	NF	MT	Great Falls	1	1,862,316	136,941	1,999,257
Lolo	NF	MT	Missoula	1	2,114,051	507,252	2,621,303
Aerial Fire Depot	OTH	MT	Missoula	1	73	0	73
Auto Repair	OTH	MT	Missoula	1	13	0	13
Missoula Equestrian Center	OTH	MT	Missoula	1	71	0	71
Totals:					**16,932,604**	**2,184,523**	**19,117,127**
Eldorado	NF	NV	Placerville	5	78	0	78
Humboldt	NF	NV	Elko (NV)	4	2,482,085	136,080	2,618,165
Inyo	NF	NV	Bishop	5	61,145	1,203	62,348
Inyo Special Mgmt. Area	NF	NV	Bishop	5	45,345	0	45,345
Toiyabe	NF	NV	Reno (NV)	4	2,586,410	82,594	2,669,004
Toiyabe Special Mgmt. Area	NF	NV	Reno (NV)	4	666,146	214,376	880,522
Totals:					**5,841,209**	**434,253**	**6,275,462**

TABLE K-2 (Cont.)

Site	Designation[a]	State	Headquarters	Region	NFS Acres	Other Acres	Total Acres
Apache	NF	NM	Springerville (AZ)	3	614,202	36,017	650,219
Carson	NF	NM	Taos	3	1,391,674	98,794	1,490,468
Cibola	NF	NM	Albuquerque	3	1,631,266	472,262	2,103,528
Coronado	NF	NM	Tucson (AZ)	3	68,936	2,605	71,541
Gila	NF	NM	Silver City	3	2,708,833	88,795	2,797,628
Lincoln	NF	NM	Alamogordo	3	1,103,828	167,236	1,271,064
Santa Fe	NF	NM	Santa Fe	3	1,573,158	161,642	1,734,800
Kiowa	NGL	NM	Albuquerque	3	136,417	7,080	143,497
Cuba-Rio Puerco	LUP	NM	Santa Fe	3	240	0	240
Bruns Hospital Area	OTH	NM	Santa Fe	3	2	0	7
Carson	OTH	NM	Taos	3	550	0	100,000
Continental Divide T.C.	OTH	NM	Albuquerque	3	0	0	66
Fort Bayard Military Reserve	OTH	NM	Silver City	3	40	0	2,078
Ramon Vigil Grant	OTH	NM	Sante Fe	3	6	0	6
U.S. Army Reserve T.C.	OTH	NM	Santa Fe	3	5	0	5
Totals:					**9,420,432**	**1,035,023**	**10,455,455**
Deschutes	NF	OR	Bend	6	1,597,873	255,416	1,853,289
Fremont	NF	OR	Lakeview	6	1,207,039	506,852	1,713,891
Klamath	NF	OR	Yreka (CA)	5	26,334	205	26,539
Malheur	NF	OR	John Day	6	1,465,293	76,437	1,541,730
Mt. Hood	NF	OR	Sandy	6	1,068,929	48,796	1,117,725
Ochoco	NF	OR	Prineville	6	851,095	127,994	979,089
Rogue River	NF	OR	Medford	6	574,403	53,214	627,617
Siskiyou	NF	OR	Grants Pass	6	1,061,485	62,188	1,123,673
Siuslaw	NF	OR	Corvallis	6	633,955	201,800	835,755
Umatilla	NF	OR	Pendleton	6	1,095,810	97,713	1,193,523
Umpqua	NF	OR	Roseburg	6	983,131	44,241	1,027,372
Wallowa	NF	OR	Baker City	6	993,060	77,899	1,070,959
Whitman	NF	OR	Baker City	6	1,266,899	50,075	1,316,974
Willamette	NF	OR	Eugene	6	1,677,994	112,973	1,790,967
Winema	NF	OR	Klamath Falls	6	1,045,551	51,438	1,096,989
Drift Creek	PU	OR	Lincoln County	6	1,047	818	1,865
Fifteenmile Creek	PU	OR	Sandy	6	555	39	594
Leeds Island	PU	OR	Corvallis	6	0	329	329
Mt. Hood	PU	OR	Sandy	6	354	626	980
Ramsey Creek	PU	OR	Sandy	6	2,278	0	2,278
Yachats	PU	OR	Corvallis	6	748	5,090	5,838
Crooked River	NGL	OR	Prineville	6	112,357	61,272	173,629
Western Oregon	LUP	OR	Corvallis	6	856	0	856
McQuinn Strip	Not specified	OR	Sandy	6	3,465	0	59,068
Totals:					**15,726,114**	**1,838,880**	**17,564,994**
Ashley	NF	UT	Vernal	4	1,286,124	11,831	1,297,955
Cache	NF	UT	Pocatello (ID)	4	437,596	514,741	952,337
Caribou	NF	UT	Pocatello (ID)	4	6,955	1,985	8,940
Dixie	NF	UT	Cedar City	4	1,888,509	78,656	1,967,165
Fishlake	NF	UT	Richfield	4	1,461,228	78,509	1,539,737
Manti-La Sal	NF	UT	Price	4	1,243,593	67,328	1,310,921
Sawtooth	NF	UT	Twin Falls (ID)	4	71,983	20,421	92,404
Uinta	NF	UT	Provo	4	880,728	77,979	958,707
Wasatch	NF	UT	Salt Lake City	4	862,080	162,767	1,024,847
Desert Range	EA	UT	Milford	4	55,630	0	55,630
Totals:					**8,194,426**	**1,014,217**	**9,208,643**
Colville	NF	WA	Colville	6	954,403	75,218	1,029,621
Gifford Pinchot	NF	WA	Vancouver	6	1,319,600	89,766	1,409,366
Kaniksu	NF	WA	Coeur d'Alene (ID)	1	267,304	30,816	298,120

TABLE K-2 (Cont.)

Site	Designation[a]	State	Headquarters	Region	NFS Acres	Other Acres	Total Acres
Mt. Baker	NF	WA	Mountlake Terrace	6	1,301,764	28,187	1,329,951
Okanogan	NF	WA	Okanogan	6	1,499,016	36,012	1,535,028
Olympic	NF	WA	Olympia	6	627,695	64,343	692,038
Quinault Special Mgmt. Area	NF	WA	Olympia	6	5,460	0	5,460
Snoqualmie	NF	WA	Mountlake Terrace	6	1,255,690	314,773	1,570,463
Umatilla	NF	WA	Pendleton (OR)	6	311,197	8,152	319,349
Wenatchee	NF	WA	Wenatchee	6	1,734,067	184,823	1,918,890
Bogachiel	PU	WA	Olympia	6	807	144	951
Brazier	PU	WA	Mountlake Terrace	6	320	0	320
Gold Basin	PU	WA	Mountlake Terrace	6	80	0	80
Golden Phoenix	PU	WA	Mountlake Terrace	6	274	0	274
Illabot Creek	PU	WA	Mountlake Terrace	6	140	1,011	1,151
Skagit	PU	WA	Mountlake Terrace	6	579	241	820
Northeast Washington	LUP	WA	Coeur d'Alene	1	240	0	240
Northeast Washington	LUP	WA	Colville	6	498	0	498
Totals:					**9,279,134**	**833,486**	**10,112,620**
Ashley	NF	WY	Vernal (UT)	4	96,223	8,478	104,701
Bighorn	NF	WY	Sheridan	2	1,107,670	7,491	1,115,161
Black Hills	NF	WY	Custer (SD)	2	175,471	25,664	201,135
Bridger	NF	WY	Jackson	4	1,736,076	8,629	1,744,705
Caribou	NF	WY	Pocatello (ID)	4	7,831	1,781	9,612
Medicine Bow	NF	WY	Laramie	2	1,095,384	307,230	1,402,614
Shoshone	NF	WY	Cody	2	2,437,218	29,339	2,466,557
Targhee	NF	WY	St. Anthony (ID)	4	331,157	2,547	333,704
Teton	NF	WY	Jackson	4	1,666,578	27,953	1,694,531
Wasatch	NF	WY	Salt Lake City (UT)	4	37,762	9,942	47,704
Thunder Basin	NGL	WY	Laramie	2	547,802	35,269	583,071
Totals:					**9,239,172**	**464,323**	**9,703,495**
Grand Totals for 11 Western States:					**141,651,305**	**14,779,852**	**156,431,157**

[a] Designation abbreviations: EA = Research and Experimental Area; LUP = Land Utilization Project; NF = National Forest; NGL = National Grassland; PU = Purchase Unit; OTH = Other.

Source: FS (2006).

TABLE K-3 NPS Sites in the 11 Western States

Site	Designation[a]	State	Federal Acres	Nonfederal Acres	Total Acres
Tumacacori	NHP	AZ	358	3	360
Fort Bowie	NHS	AZ	999	0	999
Hubbell Trading Post	NHS	AZ	160	0	160
Canyon de Chelly	NM	AZ	0	83,840	83,840
Casa Grande Ruins	NM	AZ	473	0	473
Chiricahua	NM	AZ	11,982	2	11,985
Hohokam Pima	NM	AZ	0	1,690	1,690
Montezuma Castle	NM	AZ	841	17	858
Navajo	NM	AZ	360	0	360
Organ Pipe Cactus	NM	AZ	329,365	1,324	330,689
Pipe Spring	NM	AZ	40	0	40
Sunset Crater Volcano	NM	AZ	3,040	0	3,040
Tonto	NM	AZ	1,120	0	1,120
Tuzigoott	NM	AZ	58	754	812
Walnut Canyon	NM	AZ	3,289	291	3,579
Wupatki	NM	AZ	35,422	0	35,422
Coronado	NMEM	AZ	4,748	2	4,750
Grand Canyon	NP	AZ	1,180,863	36,541	1,217,403
Petrified Forest	NP	AZ	108,842	112,779	221,621
Saguaro	NP	AZ	87,526	3,914	91,440
Totals:			**1,769,486**	**241,156**	**2,010,641**
Lake Mead	NRA	AZ-NV	1,470,328	25,336	1,495,664
Totals:			**1,470,328**	**25,336**	**1,495,664**
Glen Canyon	NRA	AZ-UT	1,239,764	14,353	1,254,117
Totals:			**1,239,764**	**14,353**	**1,254,117**
Rosie the Riveter	NHP	CA	0	145	145
San Francisco Maritime	NHP	CA	28	22	50
Eugene O'Neill	NHS	CA	13	0	13
Fort Point	NHS	CA	29	0	29
John Muir	NHS	CA	336	9	345
Manzanar	NHS	CA	814	0	814
Cabrillo	NM	CA	160	0	160
Devils Postpile	NM	CA	798	0	798
Lava Beds	NM	CA	46,560	0	46,560
Muir Woods	NM	CA	523	31	554
Pinnacles	NM	CA	26,470	11	26,481
Channel Islands	NP	CA	79,019	170,542	249,561
Joshua Tree	NP	CA	770,516	19,350	789,866
Kings Canyon	NP	CA	461,846	55	461,901
Lassen Volcanic	NP	CA	106,368	4	106,372
Redwood	NP	CA	77,762	34,750	112,512
Sequoia	NP	CA	403,879	173	404,051
Yosemite	NP	CA	759,535	1,731	761,266
Golden Gate	NRA	CA	30,829	48,456	79,285
Santa Monica Mountains	NRA	CA	23,011	131,098	154,109
Whiskeytown	NRA	CA	42,459	44	42,503

TABLE K-3 (Cont.)

Site	Designation[a]	State	Federal Acres	Nonfederal Acres	Total Acres
Point Reyes	NS	CA	65,092	5,978	71,070
Mojave	PRES	CA	1,461,240	70,240	1,531,480
Totals:			**4,357,287**	**482,639**	**4,839,926**
Death Valley	NP	CA-NV	3,323,772	49,270	3,373,042
Totals:			**3,323,772**	**49,270**	**3,373,042**
Bent's Old Fort	NHS	CO	736	63	799
Sand Creek Massacre	NHS	CO	920	11,663	12,583
Colorado	NM	CO	20,534	0	20,534
Florissant Fossil Beds	NM	CO	5,992	6	5,998
Yucca House	NM	CO	34	0	34
Great Sand Dunes	NP	CO	44,246	0	44,246
Mesa Verde	NP	CO	51,891	231	52,122
Rocky Mountain	NP	CO	265,462	367	265,828
Black Canyon of the Gunnison	NP	CO	30,750	0	30,750
Curecanti	NRA	CO	41,972	0	41,972
Great Sands Dunes Natl. Preserve	PRES	CO	41,686	0	41,686
Totals:			**504,223**	**12,330**	**516,553**
Dinosaur	NM	CO-UT	205,686	4,592	210,278
Hovenweep	NM	CO-UT	785	0	785
Totals:			**206,470**	**4,592**	**211,062**
Nez Perce	NHP	ID	2,219	989	3,208
Craters of the Moon	NM	ID	53,571	0	53,571
Minidoka Internment	NM	ID	73	0	73
Hagerman Fossil Beds	NM	ID	4,335	17	4,351
Craters of the Moon Natl. Preserve	PRES	ID	410,733	0	410,733
City of Rocks Natl. Preserve	PRES	ID	9,520	4,587	14,107
Totals:			**480,450**	**5,592**	**486,043**
Yellowstone	NP	ID-MT-WY	2,219,789	2	2,219,791
Totals:			**2,219,789**	**2**	**2,219,791**
Little Bighorn Battlefield	NB	MT	765	0	765
Big Hole	NB	MT	656	355	1,011
Grant-Kohrs Ranch	NHS	MT	1,491	127	1,618
Glacier	NP	MT	1,012,905	418	1,013,322
Totals:			**1,015,817**	**900**	**1,016,717**
Bighorn Canyon	NRA	MT-WY	68,491	51,805	120,296
Totals:			**68,491**	**51,805**	**120,296**
Chaco Culture	NHP	NM	32,840	1,120	33,960
Pecos	NHP	NM	6,355	314	6,669

TABLE K-3 (Cont.)

Site	Designation[a]	State	Federal Acres	Nonfederal Acres	Total Acres
Aztec Ruins	NM	NM	257	60	318
Bandelier	NM	NM	32,831	845	33,677
Capulin Volcano	NM	NM	793	0	793
El Malpais	NM	NM	109,612	4,665	114,277
El Morro	NM	NM	1,040	239	1,279
Fort Union	NM	NM	721	0	721
Gila Cliff Dwellings	NM	NM	533	0	533
Petroglyph	NM	NM	2,929	4,303	7,232
Salinas Pueblo Missions	NM	NM	985	86	1,071
White Sands	NM	NM	143,733	0	143,733
Carlsbad Caverns	NP	NM	46,427	339	46,766
Totals:			**379,057**	**11,972**	**391,029**
Great Basin	NP	NV	77,180	0	77,180
Totals:			**77,180**	**0**	**77,180**
Lewis and Clark	NHP	OR	1,368	206	1,574
John Day Fossil Beds	NM	OR	13,455	490	13,944
Oregon Caves	NM	OR	484	4	488
Crater Lake	NP	OR	183,224	0	183,224
Totals:			**198,531**	**700**	**199,230**
Golden Spike	NHS	UT	2,203	532	2,735
Cedar Breaks	NM	UT	6,155	0	6,155
Natural Bridges	NM	UT	7,636	0	7,636
Rainbow Bridge	NM	UT	160	0	160
Timpanogos Cave	NM	UT	250	0	250
Arches	NP	UT	76,546	133	76,679
Bryce Canyon	NP	UT	35,833	3	35,835
Canyonlands	NP	UT	337,570	27	337,598
Capitol Reef	NP	UT	241,234	670	241,904
Zion	NP	UT	143,073	3,524	146,598
Totals:			**850,661**	**4,889**	**855,550**
Ebey's Landing	NH RES	WA	2,709	16,615	19,324
San Juan Island	NHP	WA	1,725	27	1,752
Ft. Vancouver	NHS	WA	191	3	194
Whitman Mission	NHS	WA	139	0	139
Mt. Rainier	NP	WA	235,664	716	236,381
North Cascades	NP	WA	504,654	127	504,781
Olympic	NP	WA	913,536	9,115	922,651
Lake Chelan	NRA	WA	59,343	2,604	61,947
Ross Lake	NRA	WA	115,960	1,615	117,575
Lake Roosevelt	NRA	WA	100,390	0	100,390
Totals:			**1,934,311**	**30,822**	**1,965,133**
J.D. Rockefeller	MEM PKWY	WY	23,777	0	23,777
Ft. Laramie	NHS	WY	832	1	833
Devils Tower	NM	WY	1,347	0	1,347

TABLE K-3 (Cont.)

Site	Designation[a]	State	Federal Acres	Nonfederal Acres	Total Acres
Fossil Butte	NM	WY	8,198	0	8,198
Grand Teton	NP	WY	307,694	2,301	309,995
Totals:			**341,847**	**2,302**	**344,150**
Grand Totals for 11 Western States:			**20,437,464**	**938,660**	**21,376,124**

[a] Designation abbreviations: MEM PKWY = Memorial Parkway; NB = National Battlefield; NHP = National Historic Park; NH RES = National Historical Reserve; NHS = National Historic Site; NM = National Monument; NMEM = National Memorial; NP = National Park; NRA = National Recreational Area; PRES = Preserve.

Source: NPS (2006).

TABLE K-4 USFWS Sites in the 11 Western States

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
Bill Williams River	NWR	AZ		6,055
Buenos River	NWR	AZ		117,107
Cabeza Prieta	NWR	AZ	803,418	860,041
Cibola	NWR	AZ		8,606
Havasu	NWR	AZ	14,606	30,280
Imperial	NWR	AZ	9,220	17,810
Kofa	NWR	AZ	516,200	666,480
Leslie Canyon	NWR	AZ		9,795
San Bernardino	NWR	AZ		2,369
Gila River	CA	AZ		6,896
Cabeza Prieta	AS	AZ		10
Kofa	AS	AZ		1
Alchesay	NFH	AZ		21
Williams Creek	NFH	AZ		92
Willow Beach	NFH	AZ		48
Totals:			**1,343,444**	**1,725,611**
Antioch Dunes	NWR	CA		55
Bitter Creek	NWR	CA		14,097
Blue Ridge	NWR	CA		897
Butte Sink	NWR	CA		11,044
Castle Rock	NWR	CA		14
Cibola	NWR	CA		4,247
Clear Lake	NWR	CA		24,123
Coachella Valley	NWR	CA		3,578
Colusa	NWR	CA		4,040
Delevan	NWR	CA		5,797
Don Edwards San Francisco Bay	NWR	CA		29,973
Ellicott Slough	NWR	CA		200
Farallon	NWR	CA	141	211
FSA Interest CA	NWR	CA		80
Grasslands	NWR	CA		85,118
Guadalupe-Nipomo Dunes	NWR	CA		2,553
Havasu	NWR	CA	3,195	7,235
Hopper Mountain	NWR	CA		2,471
Humbolt Bay	NWR	CA		3,375
Imperial	NWR	CA	5,836	7,958
Kern	NWR	CA		11,249
Lower Klamath	NWR	CA		44,295
Marin Islands	NWR	CA		131
Merced	NWR	CA		3,806
Modoc	NWR	CA		7,021
North Central Valley	NWR	CA		15,542
Pixley	NWR	CA		6,970
Sacramento	NWR	CA		10,819
Sacramento River	NWR	CA		10,816
Salinas River	NWR	CA		367
San Diego	NWR	CA		10,503

TABLE K-4 (Cont.)

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
San Diego Bay	NWR	CA		415
San Joaquin River	NWR	CA		9,723
San Luis	NWR	CA		22,893
San Pablo Bay	NWR	CA		13,190
Seal Beach	NWR	CA		911
Sonny Bono Salton Sea	NWR	CA		37,659
Stone Lakes	NWR	CA		4,848
Sutter	NWR	CA		2,590
Tijuana Slough	NWR	CA		1,024
Tule Lake	NWR	CA		39,117
Willow Creek-Lurline	NWR	CA		5,567
Honey Lake	CA	CA		1,050
Topaz Lake	CA	CA		200
Coleman	NFH	CA		141
Livingston Stone	NFH	CA		0
Tehama-Colusa	NFH	CA		350
Totals:			**9,172**	**468,263**
Alamosa	NWR	CO		12,026
Arapaho	NWR	CO		23,270
Baca	NWR	CO		78,398
Browns Park	NWR	CO		13,455
Colorado River	NWR	CO		249
FSA Interest Co.	NWR	CO		339
Monte Vista	NWR	CO		14,834
Rocky Mountain Arsenal	NWR	CO		16,083
Two Ponds	NWR	CO		72
Hot Sulphur	CA	CO		1,115
Mack Mesa	CA	CO		38
National Black-Footed Ferret	AS	CO		44
Hotchkiss	NFH	CO		142
Leadville	NFH	CO	2,560	3,066
Totals:			**2,560**	**163,131**
Bear Lake	NWR	ID		18,086
Camas	NWR	ID		10,578
Deer Flat	NWR	ID		10,548
FSA Interest ID	NWR	ID		1,111
Grays Lake	NWR	ID		20,125
Kootenai	NWR	ID		2,774
Minidoka	NWR	ID		20,752
Oxford Slough	WPA	ID		1,878
C.J. Strike	CA	ID		1,545
Carey Lake	CA	ID		320
Hagerman	CA	ID		220
North Lake	CA	ID		2,705
Sand Creek	CA	ID		1,000
Clearwater	NFH	ID		19

TABLE K-4 (Cont.)

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
Dworshak	NFH	ID		24
Eagle Fish	NFH	ID		1
Hagerman	NFH	ID		79
Kooskia	NFH	ID		137
Magic Valley	NFH	ID		42
McCall	NFH	ID		30
Sawtooth	NFH	ID		83
Totals:			**0**	**92,057**
Benton Lake	NWR	MT		12,459
Black Coulee	NWR	MT		1,309
Blackfoot Valley	NWR	MT		19,223
Bowdoin	NWR	MT		15,552
Charles M. Russell	NWR	MT		914,584
Creedman Coulee	NWR	MT		2,728
FSA Interest MT	NWR	MT		511
Hailstone	NWR	MT		920
Halfbreed Lake	NWR	MT		4,318
Hewitt Lake	NWR	MT		1,361
Lake Mason	NWR	MT		16,815
Lake Thibadeau	NWR	MT		3,868
Lamesteer	NWR	MT		800
Lee Metcalf	NWR	MT		2,793
Lost Trail	NWR	MT		8,834
Medicine Lake	NWR	MT	11,366	31,534
National Bison Range	NWR	MT		18,800
Nine-Pipe	NWR	MT		4,028
Pablo	NWR	MT		2,474
Red Rock Lakes	NWR	MT	32,350	62,464
Swan River	NWR	MT		1,569
Ul Bend	NWR	MT	20,819	56,050
War Horse	NWR	MT		3,393
Cascade	WPA	MT		805
Chouteau	WPA	MT		2,637
Glacier	WPA	MT		10,338
Hill	WPA	MT		1,297
Lewis and Clark	WPA	MT		5,990
Liberty	WPA	MT		428
Pondera	WPA	MT		9,127
Powell	WPA	MT		28,823
Teton	WPA	MT		7,782
Toole	WPA	MT		16,777
Bull Mountain	CA	MT		1,599
Dodson	CA	MT		120
Fox Lake	CA	MT		160
Freezeout Lake	CA	MT		435
Judith Lake	CA	MT		234
Sun River	CA	MT		4,145

TABLE K-4 (Cont.)

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
Bozeman	NFH	MT		173
Creston	NFH	MT		74
Ennis	NFH	MT		169
Totals:			**64,535**	**1,277,500**
Anaho Island	NWR	NV		248
Ash Meadow	NWR	NV		13,828
Desert	NWR	NV		1,615,321
Fallon	NWR	NV		17,902
Moapa Valley	NWR	NV		104
Pahranagat	NWR	NV		5,383
Ruby Lake	NWR	NV		39,286
Sheldon	NWR	NV		572,876
Stillwater	NWR	NV		87,598
Stillwater	CA	NV		63,544
Armagosa Pupfish	NFH	NV		159
Lahontan	NFH	NV		36
Marble Bluff	NFH	NV		623
Totals:			**0**	**2,416,908**
Bitter Lake	NWR	NM	9,621	24,609
Bosque del Apache	NWR	NM	30,287	57,191
Grulla	NWR	NM		3,231
Las Vegas	NWR	NM		8,672
Maxwell	NWR	NM		3,699
San Andres	NWR	NM		57,215
Sevilleta	NWR	NM		229,674
Dexter	NFH	NM		641
Mora	NFH	NM		119
Totals:			**39,908**	**385,051**
Ankeny	NWR	OR		2,796
Bandon Marsh	NWR	OR		889
Baskett Slough	NWR	OR		2,492
Bear Valley	NWR	OR		4,200
Cape Meares	NWR	OR		139
Cold Springs	NWR	OR		3,117
Deer Flat	NWR	OR		188
FSA Interest OR	NWR	OR		607
Hart Mountain	NWR	OR		269,924
Julia Butler Hansen	NWR	OR		3,226
Klamath Marsh	NWR	OR		40,885
Lewis and Clark	NWR	OR		12,167
Lower Klamath	NWR	OR		6,618
Malheur	NWR	OR		187,127
McKay Creek	NWR	OR		1,837
Nest Ucca Bay	NWR	OR		807
Oregon Islands	NWR	OR	925	1,080

TABLE K-4 (Cont.)

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
Sheldon	NWR	OR		627
Siletz Bay	NWR	OR		519
Three Arch Rocks	NWR	OR	15	15
Tualatin River	NWR	OR		1,274
Umatilla	NWR	OR		8,907
Upper Klamath	NWR	OR		14,966
William L. Finley	NWR	OR		5,673
Government Island	CA	OR		2
Ochoco Reservoir	CA	OR		40
Summer Lake	CA	OR		7,128
Clark R. Bavin	AS	OR		4
Klamath Marsh	AS	OR		10
Lakeview	AS	OR		0
Eagle Creek	NFH	OR		727
Irrigon Satellites	NFH	OR		19
Lookingglass	NFH	OR		13
Warm Springs	NFH	OR		85
Totals:			**940**	**578,108**
Bear River	NWR	UT		73,765
Colorado River	NWR	UT		1,008
Fish Springs	NWR	UT		17,992
FSA Interest UT	NWR	UT		281
Ouray	NWR	UT		12,138
Desert Lakes	CA	UT		2,621
Rock Island	CA	UT		2
Topaz Lake	CA	UT		4,142
Jones Hole	NFH	UT		532
Ouray	NFH	UT		0
Totals:			**0**	**112,481**
Columbia	NWR	WA		29,596
Conboy Lake	NWR	WA		6,988
Copalis	NWR	WA	61	61
Dungeness	NWR	WA		773
Flattery Rocks	NWR	WA	125	125
Franz Lakes	NWR	WA		552
FSA Interest WA	NWR	WA		966
Grays Harbor	NWR	WA		1,471
Julia Butler Hansen	NWR	WA		3,044
Little Pend Oreille	NWR	WA		42,594
McNary	NWR	WA		15,505
Nisqually	NWR	WA		4,270
Pierce	NWR	WA		329
Protection Island	NWR	WA		659
Quillayute Needles	NWR	WA	300	300
Ridgefield	NWR	WA		5,218
Saddle Mountain	NWR	WA		161,486

TABLE K-4 (Cont.)

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
San Juan Islands	NWR	WA	353	449
Steigerwald Lake	NWR	WA		1,046
Toppenish	NWR	WA		1,979
Turnbull	NWR	WA		16,532
Umatilla	NWR	WA		14,876
Willapa	NWR	WA		16,161
Colockum	CA	WA		4,957
Lenore	CA	WA		5,787
Marrowstone	CA	WA		16
Methow	CA	WA		3,038
Phalon Lake	CA	WA		10
Sherman Creek	CA	WA		560
Sinlahekin	CA	WA		2,834
Sunnyside	CA	WA		320
Moses Lake	AS	WA		1
Abernathy	NFH	WA		102
Carson	NFH	WA		220
Entiat	NFH	WA		34
Leaven Worth	NFH	WA		877
Little White Salmon	NFH	WA		431
Lyons Ferry	NFH	WA		139
Makah	NFH	WA		82
Nisqually	NFH	WA		156
Quilcene	NFH	WA		47
Quinault	NFH	WA		96
Spring Creek	NFH	WA		90
Tucannon	NFH	WA		49
Willard	NFH	WA		84
Winthrop	NFH	WA		54
Totals:			**839**	**344,964**
Bamforth	NWR	WY		1,166
Cokeville Meadows	NWR	WY		9,259
FSA Interest WY	NWR	WY		3,133
Hutton Lake	NWR	WY		1,968
Mortenson Lake	NWR	WY		1,927
National Elk	NWR	WY		24,778
Pathfinder	NWR	WY		16,807
Seed Skadee	NWR	WY		27,230
East Fork	CA	WY		3,432
Greys River	CA	WY		927
Ocean Lake	CA	WY		10,539
Sheridan	CA	WY		160
Sybille	CA	WY		681
Tongue River	CA	WY		551
Jackson	NFH	WY		0
Saratoga	NFH	WY		120
Totals:			**0**	**102,678**

TABLE K-4 (Cont.)

Site	Designation[a]	State	Wilderness Areas within Designation	Total Acres
Grand Totals for 11 Western States:			**1,461,398**	**7,666,753**

[a] Designation abbreviations: AS = Administrative Site; CA = Coordination Area; NFH = National Fish Hatchery; NWR = National Wildlife Refuge; WPA = Waterfowl Protection Area.

Source: USFWS (2006).

TABLE K-5 Military Installations in the 11 Western States

Military Site	Component	State	Nearest City	Acres Owned	Total Acres
Fort Huachuca	Army Active	AZ	Sierra Vista	71,623	73,299
Yuma Proving Ground	Army Active	AZ	Yuma	829,882	1,008,911
Camp Navajo	Army Guard	AZ	Camp Navajo	28,345	28,345
Papago Military Reservation	Army Guard	AZ	Phoenix	451	451
Barnes Hall USARC	Army Reserve	AZ	Phoenix	12	12
Air Force Plant No. 44	AF Active	AZ	Tucson	2,174	2,208
Davis-Monthan AFB	AF Active	AZ	Tucson	6,373	10,953
Fort Huachuca Radar Site (TARS #2)	AF Active	AZ	Sierra Vista	28	28
Gila Bend AF Auxiliary Field	AF Active	AZ	Gila Bend	1,885	1,886
Luke AF Auxiliary Field No. 1	AF Active	AZ	Wittman	400	1,105
Luke AFB	AF Active	AZ	Litchfield Park	2,629	4,359
Luke Waste Annex	AF Active	AZ	Litchfield Park	41	46
The Barry M Goldwater AF Range	AF Active	AZ	Gila Bend	2,671,675	2,671,680
Yuma Radar Site (TARS #1)	AF Active	AZ	Dome	62	62
Sky Harbor IAP	Air Natl. Guard	AZ	Phoenix	0	51
Tucson IAP	Air Natl. Guard	AZ	Tucson	92	94
MCAS Yuma	USMC Active	AZ	Yuma	4,985	6,232
Other sites (24 in total)[a]		AZ		750,247	750,390
Totals:				**4,370,904**	**4,560,112**
Concord-CA-0696A	Army Active	CA	Clyde	6,100	6,100
Def. Distr. Reg. West Sharpe Site	Army Active	CA	Stockton	724	724
Def. Distr. Reg. West Tracy	Army Active	CA	Tracy	908	908
Fort Ord	Army Active	CA	Seaside	12,272	12,272
NTC and Fort Irwin	Army Active	CA	Barstow	636,181	636,331
Ord Military Community	Army Active	CA	Seaside	771	771
Presidio of Monterey	Army Active	CA	Monterey	392	392
Riverbank AAP	Army Active	CA	Riverbank	171	172
Sacramento Army Depot	Army Active	CA	Sacramento	48	48
SAT COM	Army Active	CA	Paso Robles	23	23
Sierra Army Depot	Army Active	CA	Reno	36,984	36,994
Silas B. Hays	Army Active	CA	Seaside	24	24
MTA Camp Roberts	Army Guard	CA	San Miguel	42,814	42,815
NG Hammer Field	Army Guard	CA	Fresno	30	30
Sacramento Depot Activity	Army Guard	CA	Sacramento	22	22
TS AFRC Los Alamitos	Army Guard	CA	Los Alamitos	2,676	2,676
BT Collins USARC/OMS/AMSA (G)	Army Reserve	CA	Sacramento	38	38
El Monte USARC	Army Reserve	CA	El Monte	11	11
Fort Hunter Liggett	Army Reserve	CA	King City	164,099	164,261
Hwd. of Oakland USARC/AMSA 85 (G)	Army Reserve	CA	Oakland	38	38
March USARC	Army Reserve	CA	Moreno Valley	21	21
Mare Is. USARC OMS Marine AMSA	Army Reserve	CA	Vallejo	34	34
Moffett Community Hsg.	Army Reserve	CA	Mountain View	141	141
Parks Reserve Forces Tng. Area	Army Reserve	CA	Richmond	2,478	2,478
Patton Hall USARC	Army Reserve	CA	Bell	21	21
Tustin USARC	Army Reserve	CA	Santa Ana	17	17
Beale AFB	AF Active	CA	Marysville	22,944	22,944
Davis Communications Annex	AF Active	CA	Davis	316	316
Edwards AFB	AF Active	CA	Rosamond	300,723	300,723
Fort MacArthur Family Hsg. Annex	AF Active	CA	San Pedro	155	156
Lincoln Communications Annex	AF Active	CA	Lincoln	231	231
Los Angeles AF Annex No. 3	AF Active	CA	Manhattan Beach	13	13
Los Angeles AFB	AF Active	CA	El Segundo	99	102
Onizuka AFS	AF Active	CA	Sunnyvale	20	23
Ozol Defense Fuel Support Point	AF Active	CA	Martinez	66	76
Pillar Point AFS	AF Active	CA	Half Moon Bay	55	55
Production Flight Test Instl AF Plant 42	AF Active	CA	Palmdale	5,843	6,131
Travis AFB	AF Active	CA	Fairfield	5,130	6,383
Travis Water System Annex No. 2	AF Active	CA	Elmira	206	206

TABLE K-5 (Cont.)

Military Site	Component	State	Nearest City	Acres Owned	Total Acres
Tulelake Radar Site	AF Active	CA	Newell	928	928
Vandenberg AFB	AF Active	CA	Lompoc	98,171	132,184
Channel Islands ANGS	Air Natl. Guard	CA	Oxnard	206	206
Fresno Yosemite Intl.	Air Natl. Guard	CA	Fresno	0	126
Hayward Municipal Airport ANG	Air Natl. Guard	CA	Hayward	0	27
Moffett Fld. ANG	Air Natl. Guard	CA	Sunnyvale	142	142
Sepulveda National Guard Station	Air Natl. Guard	CA	Van Nuys	26	26
March ARB	AF Reserve	CA	Sunnymeade	2,275	2,539
Norwalk Defense Fuel Support Point	AF Reserve	CA	Norwalk	48	55
MCAGCC Twentynine Palms	USMC Active	CA	Twentynine Palms	605,269	605,616
MCAS Camp Pendleton	USMC Active	CA	Camp Pendleton	411	411
MCAS El Toro Santa Ana	USMC Active	CA	Irvine	4,761	4,777
MCAS Miramar	USMC Active	CA	San Diego	22,499	22,941
MCAS Yuma (Choc Mt. Arial Gnry. Rng.)	USMC Active	CA	Niland	459,506	459,506
MCB Camp Pendleton	USMC Active	CA	Camp Pendleton	126,749	126,749
MCB Camp Pendleton (MWTC Bridgeport)	USMC Active	CA	Bridgeport	0	60,513
MCLB Barstow	USMC Active	CA	Barstow	6,177	6,177
MCRD San Diego	USMC Active	CA	San Diego	505	505
MCAS Tustin	Disestab.	CA	Tustin	308	308
NAF El Centro	Navy Active	CA	El Centro	59,864	62,542
NAS Lemoore	Navy Active	CA	Lemoore NAS	15,738	26,777
NAS Lemoore (Stockton)	Navy Active	CA	Stockton	0	28
NAS North Island San Diego	Navy Active	CA	San Diego	2,802	2,803
NAS North Island San Diego (Clev NF Survival Tra.)	Navy Active	CA	Warner Springs	4,960	6,168
NAS North Island San Diego (Former Phibase Coronado)	Navy Active	CA	Coronado	715	975
NAS North Island San Diego (Imperial Beach)	Navy Active	CA	Imperial Beach	1,393	1,402
NAS North Island San Diego (San Clemente)	Navy Active	CA	San Diego	36,200	36,200
NAS North Island San Diego (Silver Strand)	Navy Active	CA	Imperial Beach	549	549
NAVBASE Ventura City	Navy Active	CA	Point Mugu	4,517	4,534
NAVBASE Ventura City (Capehart Hsg. 3 Mugu.)	Navy Active	CA	Camarillo	51	51
NAVBASE Ventura City (Port Hueneme)	Navy Active	CA	Port Hueneme	1,793	1,793
NAVMEDCEN San Diego	Navy Active	CA	San Diego	79	79
NAVPETOFF Alexandria (Estero Bay Branch)	Navy Active	CA	Morro Bay	10	175
NAVPETOFF Alexandria (Fuel Complex Long Beach)	Navy Active	CA	Long Beach	11	11
NAVPETOFF Alexandria (Fuel Farm San Pedro)	Navy Active	CA	Los Angeles	269	272
NAVPETOFF Alexandria (Norwalk Branch)	Navy Active	CA	Norwalk	0	18
NAWS China Lake	Navy Active	CA	China Lake	606,916	606,933
NAWS China Lake (Mojave B. Ranges)	Navy Active	CA	Trona	316,351	316,351
NAWS China Lake (Randsburg Wash. Area)	Navy Active	CA	Trona	187,001	187,117
NAWS China Lake (San Nicolas Island)	Navy Active	CA	San Nicolas Island	13,370	13,370
NAWS China Lake (Santa Cruz Island)	Navy Active	CA	Goleta	0	11
NS San Diego	Navy Active	CA	San Diego	3,056	3,080
NSA Corona	Navy Active	CA	Corona	247	247
NSA Monterey	Navy Active	CA	Monterey	610	621
NSA Monterey (Dixon Transmitter Fac.)	Navy Active	CA	Dixon	1,285	1,285
NSA Monterey (Navpmossp Mtn. View)	Navy Active	CA	Mountain View	339	343
NWS Seal Beach	Navy Active	CA	Seal Beach	4,968	5,002
NWS Seal Beach (Det. Concord)	Navy Active	CA	Concord	6,914	7,701
NWS Seal Beach (Fallbrook)	Navy Active	CA	Fallbrook	8,851	8,851
NWS Seal Beach (Long Beach Golf Course)	Navy Active	CA	Los Alamitos	0	254
SUBASE San Diego	Navy Active	CA	San Diego	1,230	1,272
FISC Oakland CSO	Caretaker	CA	Oakland	527	531
FISC Oakland CSO (Alameda Annex)	Caretaker	CA	Alameda	51	51
FISC Oakland CSO (Alameda Facility)	Caretaker	CA	Alameda	97	97
FISC Oakland CSO (Richmond Pt. Molate)	Caretaker	CA	Richmond	413	413
Hunters Point Annex CSO	Caretaker	CA	San Francisco	922	922

TABLE K-5 (Cont.)

Military Site	Component	State	Nearest City	Acres Owned	Total Acres
NAS Alameda CSO	Caretaker	CA	Alameda	2,480	2,761
NAS Alameda CSO (Marina Village/SF)	Caretaker	CA	San Francisco	0	30
NCEL Port Hueneme CSO	Caretaker	CA	Port Hueneme	33	33
NS Long Beach CSO	Caretaker	CA	Long Beach	613.7	894
NS Treasure Island CSO	Caretaker	CA	San Francisco	560.2	1,064
NSY Long Beach CSO	Caretaker	CA	Long Beach	1,063.10	521
NSY Mare Island CSO	Caretaker	CA	Vallejo	1,188.50	5,136
NTC San Diego CSO	Caretaker	CA	San Diego	338.5	159
PWC San Francisco CSO	Caretaker	CA	San Francisco	379.5	638
NAVFAC Centerville Beach	Disestab	CA	Ferndale	43.3	40
NAVSECGRUACT Skaggs Is.	Disestab	CA	Sonoma	93.4	3,304
NMCRC Alameda	Navy Reserve	CA	Alameda	20.6	15
NMCRC Los Angeles	Navy Reserve	CA	Los Angeles	29	11
NMCRC Los Angeles	Navy Reserve	CA	Los Angeles	26.4	
NMCRC Moreno Valley	Navy Reserve	CA	Moreno Valley	12.8	10
NMCRC Sacramento	Navy Reserve	CA	Sacramento	10.9	20
Other sites (180 in total)[a]		CA		55,419	57,406
Totals:				**3,922,849**	**4,039,560**
Fort Carson	Army Active	CO	Colorado Spring	137,404	137,404
Pinon Canyon	Army Active	CO	Trinidad	235,896	235,896
Pueblo Chemical Depot	Army Active	CO	Pueblo	23,121	23,121
Rocky Mountain Arsenal	Army Active	CO	Commerce City	17,051	17,215
Flatiron	Army Guard	CO	Longmont	11	11
Joe P Martinez USARC/AMSA #100	Army Reserve	CO	Denver	20	20
William T. Fitzsimons USARC	Army Reserve	CO	Aurora	21	21
Buckley AFB	AF Active	CO	Aurora	3,283	3,872
Buckley Annex	AF Active	CO	Denver	72	72
Cheyenne Mountain AFS	AF Active	CO	Colorado Springs	499	567
Peterson AFB	AF Active	CO	Colorado Springs	201	1,295
Schriever AFB	AF Active	CO	Ellicott	3,198	4,172
USAF Academy	AF Active	CO	Colorado Springs	53,127	53,276
Fort Carson Weapons Range	Air Natl. Guard	CO	Pueblo	3,110	3,110
Greely ANGS	Air Natl. Guard	CO	Greely	0	17
NMCRC Denver	Navy Reserve	CO	Lakewood	15	15
Other sites (18 in total)[a]		CO		1,040	2,221
Totals:				**478,069**	**482,305**
Edgemeade TS Mtn. Home	Army Guard	ID	Mountain Home	151	151
Mountain Home AFB	AF Active	ID	Mountain Home	6,442	6,844
Saylor Creek AF Range	AF Active	ID	Bruneau	103,386	109,466
Boise Air Terminal (ANG)	Air Natl. Guard	ID	Boise	0	576
NAVBASE Kitsap (Bayview Idaho)	Navy Active	ID	Bayview	22	22
Other sites (54 in total)[a]		ID		16,326	20,345
Totals:				**126,327**	**137,404**
Fort Missoula	Army Guard	MT	Missoula	14	14
MTA Fort Wm. Henry Harrison	Army Guard	MT	Helena	3,625	6,150
Sgt Ernest Veuve Hall/AMSA #74	Army Reserve	MT	Missoula	16	16
Malmstrom AFB	AF Active	MT	Great Falls	4,771	29,130
Great Falls IAP ANG	Air Natl. Guard	MT	Great Falls	0	141
Other sites (27 in total)[a]		MT		1,545	1,631
Totals:				**9,971**	**37,082**
Hawthorne Army Depot	Army Active	NV	Reno	147,189	147,236
Nellis AFB	Army Reserve	NV	Las Vegas	22	22
Indian Springs AF Auxiliary Field	AF Active	NV	Indian Springs	2,300	2,300
Nellis AF Range	AF Active	NV	Indian Springs	3,092,208	3,092,316
Nellis AFB	AF Active	NV	Las Vegas	14,145	14,161

TABLE K-5 (Cont.)

Military Site	Component	State	Nearest City	Acres Owned	Total Acres
Nellis Water System Annex	AF Active	NV	Las Vegas	80	107
Tonopah Auxiliary Airfield Annex	AF Active	NV	Tonopah	2,157	2,157
Tonopah Auxiliary Airfield Annex #2	AF Active	NV	Tonopah	109	109
Reno Tahoe IAP	Air Natl. Guard	NV	Reno	0	64
NAS Fallon	Navy Active	NV	Fallon	119,335	119,396
NAS Fallon (Hawthorne Nevada)	Navy Active	NV	Hawthorne	15	15
Other sites (30 in total)[a]		NV		26,096	26,123
Totals:				**3,403,655**	**3,404,005**
Fort Bliss AAA Ranges	Army Active	NM	El Paso, TX	995,404	995,404
Fort Wingate Depot Activity	Army Active	NM	Gallup	16,691	16,691
White Sands Missile Range	Army Active	NM	Las Cruces	2,281,558	2,281,659
Jenkins AFRC	Army Reserve	NM	Albuquerque	0	12
Boles Wells Water System Annex	AF Active	NM	Alamogordo	7,347	7,411
Bonito Lake Water System Annex	AF Active	NM	Carrizozo	78	155
Cannon AFB	AF Active	NM	Clovis	3,790	4,543
Cannon Meadows Hsg. Area	AF Active	NM	Portales	0	39
Cannon Place Hsg. Area	AF Active	NM	Clovis	0	40
Holloman AFB	AF Active	NM	Alamogordo	50,411	52,055
Kirtland AFB	AF Active	NM	Albuquerque	43,990	44,072
Melrose AF Range	AF Active	NM	Melrose	66,033	87,929
NAS Corpus Christi TX (White Sands)	Navy Active	NM	White Sands Msl. Rge.	85	85
Other sites (30 in total)[a]		NM		11,930	17,387
Totals:				**3,477,316**	**3,507,481**
Umatilla Chem. Depot	Army Active	OR	Hermiston	17,055	19,729
Bend Cotef	Army Guard	OR	Bend	160	160
Christmas Valley Radar Site	AF Active	OR	Christmas Valley	2,656	2,656
Coos Head ANGS	Air Natl. Guard	OR	Charleston	43	43
Klamath Falls Airport-Kingsley Field	Air Natl. Guard	OR	Klamath Falls	88	1,072
Portland IAP	Air Natl. Guard	OR	Portland	0	246
NAS Whidbey Island (NAVWPNSSYSTRAFAC Brdman)	Navy Active	OR	Boardman	47,432	62,871
NMCRC Portland	Navy Reserve	OR	Portland	14	14
Other sites (13 in total)[a]		OR		32,114	32,172
Totals:				**99,563**	**118,963**
Deseret Chemical Depot	Army Active	UT	Tooele	19,362	19,364
Dugway Proving Ground	Army Active	UT	Salt Lake	798,214	798,214
Green River Test Complex	Army Active	UT	Green River	1,619	3,628
Tooele Army Depot	Army Active	UT	Tooele	23,063	23,611
Fort Douglas AFRC Complex	Army Reserve	UT	Salt Lake City	54	54
Ogden Maintenance Center 269	Army Reserve	UT	Ogden	12	12
Ogden Storage Facility 11-C	Army Reserve	UT	Ogden	28	28
Hill AFB	AF Active	UT	Clearfield	6,795	6,999
Little Mountain Test Annex	AF Active	UT	Ogden	731	740
Utah Test and Training Range North	AF Active	UT	Wendover	351,335	366,539
Utah Test and Training Range (South Utah)	AF Active	UT	Wendover	572,752	572,753
Salt Lake City IAP ANG	Air Natl. Guard	UT	Salt Lake City	0	135
NSA Monterey (Det Magna Utah)	Navy Active	UT	Magna	518	522
Other sites (79 in total)[a]		UT		539	572
Totals:				**1,775,022**	**1,793,171**
Bonneville Camp	Army Active	WA	Vancouver	3,020	3,840
Fort Lewis	Army Active	WA	Tacoma	84,358	86,041
Yakima Training Center	Army Active	WA	Yakima	323,249	323,426
Kent	Army Guard	WA	Kent	15	15
AMSA 137 (Marine)	Army Reserve	WA	Tacoma	0	11

TABLE K-5 (Cont.)

Military Site	Component	State	Nearest City	Acres Owned	Total Acres
Fort Lawton USAR Complex	Army Reserve	WA	Seattle	58	58
SSG Joe R Hooper USARC	Army Reserve	WA	Bothell	42	42
Vancouver Barracks	Army Reserve	WA	Vancouver	53	53
Fairchild AFB	AF Active	WA	Airway Heights	4,502	5,823
McChord AFB	AF Active	WA	Tacoma	4,537	4,639
Mukilteo Defense Fuel Support Point	AF Active	WA	Everett	21	21
Spokane Family Hsg. Annex	AF Active	WA	Spokane	81	89
Camp Murray ANGS	Air Natl. Guard	WA	Tacoma	0	43
Four Lakes Communications Station (ANG)	Air Natl. Guard	WA	Cheney	63	156
Paine Field ANGS	Air Natl. Guard	WA	Everett	15	15
Spokane IAP ANG	Air Natl. Guard	WA	Spokane	44	79
NAS Whidbey Island	Navy Active	WA	Oak Harbor	4,210	4,362
NAS Whidbey Island (OLF Coupeville)	Navy Active	WA	Coupeville	664	1,014
NAS Whidbey Island (Sea Plane Base)	Navy Active	WA	Oak Harbor	2,772	2,785
NAVBASE Kitsap (Bremerton RR)	Navy Active	WA	Bremerton	654	655
NAVBASE Kitsap (Bremerton)	Navy Active	WA	Bremerton	133	136
NAVBASE Kitsap (Jackson Park Hsg.)	Navy Active	WA	Bremerton	158	160
NAVBASE Kitsap (Keyport NUWC)	Navy Active	WA	Keyport	336	338
NAVBASE Kitsap (Manchester WA)	Navy Active	WA	Bremerton	234	234
NAVBASE Kitsap (Shipyard Puget Sound)	Navy Active	WA	Bremerton	570	570
NAVMAG Indian Island	Navy Active	WA	Port Townsend	2,716	2,716
NH Bremerton	Navy Active	WA	Bremerton	49	49
NS Everett	Navy Active	WA	Everett	213	213
NS Everett (Fort Lawton Magnolia)	Navy Active	WA	Seattle	33	33
NS Everett (Jim Creek)	Navy Active	WA	Oso	4,797	4,901
NS Everett (Marysville)	Navy Active	WA	Marysville	52	52
NS Everett (Pacific Beach)	Navy Active	WA	Pacific Beach	53	53
SUBASE Bangor	Navy Active	WA	Bangor	7,189	7,206
NS Puget Sound CSO	Caretaker	WA	Seattle	152	157
NMCRC Spokane	Navy Reserve	WA	Spokane	23	23
Other sites (69 in total)[a]		WA		507,518	756,232
Totals:				**952,584**	**1,206,239**
Francis E Warren AFB	AF Active	WY	Cheyenne	7,879	37,042
Cheyenne Municipal Airport ANG	Air Natl. Guard	WY	Cheyenne	0	719
Other sites (13 in total)[a]				9,483	10,466
Totals:				**17,362**	**48,277**
Grand Totals for 11 Western States:				**18,633,622**	**19,334,599**

[a] Other sites are those that do not meet the criteria of being at least 10 acres in size and having a plant replacement value of at least $10 million.

Source: DOD (2006).

TABLE K-6 Indian Reservations and Land Trusts in the 11 Western States as Identified by the U.S. Census Bureau[a]

Indian Reservations and Trust Lands	State	Area (sq mi)	Total Acres
Camp Verde Reservation	AZ	1.0	640
Cocopah Reservation	AZ	10.0	6,400
Fort Apache Reservation	AZ	2,627.7	1,681,728
Fort McDowell Reservation	AZ	38.6	24,704
Gila Bend Reservation	AZ	0.7	448
Gila Bend Trust Lands	AZ	0.1	64
Gila River Reservation	AZ	583.9	373,696
Havasupai Reservation	AZ	273.9	175,296
Hopi Reservation	AZ	2,435.7	1,558,848
Hopi Trust Lands	AZ	0.4	256
Hualapai Reservation	AZ	1,590.8	1,018,112
Hualapai Trust Lands	AZ	10.2	6,528
Kaibab Reservation	AZ	188.8	120,832
Maricopa (Ak-Chin) Reservation	AZ	32.9	21,056
Papago Reservation	AZ	4,342.0	2,778,880
Pascua Yaqui Reservation	AZ	1.4	896
Payson (Yavapai-Apache) Community	AZ	0.1	64
Salt River Reservation	AZ	80.0	51,200
San Carlos Reservation	AZ	2,910.6	1,862,784
San Xavier Reservation	AZ	111.4	71,296
Yavapai Reservation	AZ	2.2	1,408
Totals:		**15,242.4**	**9,755,136**
Colorado River Reservation	AZ-CA	432.7	276,928
Fort Yuma (Quechan) Reservation	AZ-CA	68.4	43,776
Totals:		**501.1**	**320,704**
Fort Mojave Reservation	AZ-CA-NV	51.2	32,768
Totals:		**51.2**	**32,768**
Navajo Trust Lands	AZ-NM	2,548.3	1,630,912
Zuni Pueblo	AZ-NM	654.3	418,752
Totals:		**3,202.6**	**2,049,664**
Navajo Reservation	AZ-NM-UT	21,877.8	14,001,792
Totals:		**21,877.8**	**14,001,792**
Agua Caliente Reservation	CA	49.6	31,744
Alturas Rancheria	CA	0.0	0
Augustine Reservation	CA	1.0	640
Barona Rancheria	CA	9.2	5,888
Benton Paiute Reservation	CA	0.2	128
Berry Creek Rancheria	CA	0.1	64
Big Bend Rancheria	CA	0.1	64
Big Cypress Reservation	CA	81.9	52,416
Big Lagoon Rancheria	CA	0.0	0
Big Pine Reservation	CA	0.4	256
Big Sandy Rancheria	CA	0.4	256
Big Valley Rancheria	CA	0.2	128

TABLE K-6 (Cont.)

Indian Reservations and Trust Lands	State	Area (sq mi)	Total Acres
Bishop Rancheria	CA	1.1	704
Blue Lake Rancheria	CA	0.0	0
Bridgeport Colony	CA	0.1	64
Cabazon Reservation	CA	3.4	2,176
Cahuilla Reservation	CA	28.6	18,304
Campo Reservation	CA	25.8	16,512
Capitan Grande Reservation	CA	20.5	13,120
Cedarville Rancheria	CA	0.0	0
Chemehuevi Reservation	CA	49.5	31,680
Chicken Ranch Rancheria	CA	0.1	64
Cold Springs Rancheria	CA	0.2	128
Colusa (Cachil Dehe) Rancheria	CA	0.3	192
Cortina Rancheria	CA	1.2	768
Coyote Valley Reservation	CA	0.1	64
Cuyapaipe Reservation	CA	7.9	5,056
Dry Creek Rancheria	CA	0.1	64
Elk Valley Rancheria	CA	0.1	64
Enterprise Rancheria	CA	0.1	64
Fort Bidwell Reservation	CA	5.1	3,264
Fort Independence Reservation	CA	0.6	384
Fort Mojave Trust Lands	CA	0.1	64
Greenville Rancheria	CA	0.1	64
Grindstone Creek Rancheria	CA	0.1	64
Hoopa Valley Reservation	CA	136.9	87,616
Hopland Rancheria	CA	0.1	64
Inaja-Cosmit Reservation	CA	1.3	832
Jackson Rancheria	CA	0.5	320
Jamul Village	CA	0.0	0
Karok Reservation and Trust Lands	CA	0.7	448
La Jolla Reservation	CA	13.5	8,640
La Posta Reservation	CA	6.4	4,096
Laytonville Rancheria	CA	0.3	192
Likely Rancheria	CA	0.0	0
Lone Pine Reservation	CA	0.4	256
Lookout Rancheria	CA	0.1	64
Los Coyotes Reservation	CA	39.2	25,088
Manchester (Point Arena) Rancheria	CA	0.6	384
Manzanita Reservation	CA	5.6	3,584
Mesa Grande Reservation	CA	11.9	7,616
Middletown Rancheria	CA	0.2	128
Montgomery Creek Rancheria	CA	0.1	64
Morongo Reservation	CA	49.2	31,488
North Fork Rancheria	CA	0.1	64
Pala Reservation	CA	25.4	16,256
Pauma Reservation	CA	9.4	6,016
Pechanga Reservation	CA	7.0	4,480
Picayune Rancheria	CA	0.1	64
Pinoleville Reservation	CA	0.2	128
Pit River Trust Lands	CA	0.4	256
Quartz Valley Reservation	CA	1.0	640

TABLE K-6 (Cont.)

Indian Reservations and Trust Lands	State	Area (sq mi)	Total Acres
Ramona Reservation	CA	0.9	576
Redding Rancheria	CA	0.0	0
Redwood Valley Rancheria	CA	0.1	64
Resighini Rancheria	CA	0.4	256
Rincon Reservation	CA	6.1	3,904
Roaring Creek Rancheria	CA	0.1	64
Robinson Rancheria	CA	0.4	256
Rohnerville Rancheria	CA	0.0	0
Round Valley Reservation	CA	78.2	50,048
Round Valley Trust Lands	CA	16.6	10,624
Rumsey Rancheria	CA	0.1	64
San Manuel Reservation	CA	1.0	640
San Pasqual Reservation	CA	2.2	1,408
Santa Rosa Rancheria	CA	0.3	192
Santa Rosa Reservation	CA	17.1	10,944
Santa Ynez Reservation	CA	0.2	128
Santa Ysabel Reservation	CA	14.4	9,216
Sheep Ranch Rancheria	CA	0.0	0
Sherwood Valley Rancheria	CA	0.5	320
Shingle Springs Rancheria	CA	0.3	192
Smith River Rancheria	CA	0.2	128
Soboba Reservation	CA	9.1	5,824
Stewarts Point Rancheria	CA	0.1	64
Sulphur Bank (El-Em) Rancheria	CA	0.1	64
Susanville Reservation	CA	0.2	128
Sycuan Reservation	CA	0.0	0
Table Bluff Rancheria	CA	0.0	0
Table Mountain Rancheria	CA	0.2	128
Torres-Martinez Reservation	CA	34.5	22,080
Trinidad Rancheria	CA	0.1	64
Tule River Reservation	CA	84.4	54,016
Tuolumne Rancheria	CA	0.5	320
Twenty-Nine Palms Reservation	CA	0.2	128
Upper Lake Rancheria	CA	0.7	448
Viejas Rancheria	CA	2.5	1,600
Woodfords Community	CA	0.6	384
XL Ranch Reservation	CA	14.4	9,216
Yurok Reservation	CA	84.7	54,208
Totals:		**970.2**	**620,928**
Southern Ute Reservation	CO	1,058.6	677,504
Totals:		**1,058.6**	**677,504**
Ute Mountain Reservation	CO-NM-UT	888.9	568,896
Totals:		**888.9**	**568,896**
Coeur d’Alene Reservation and Trust Lands	ID	598.1	382,784
Fort Hall Reservation	ID	814.5	521,280
Fort Hall Trust Lands	ID	0.4	256
Kootenai Reservation	ID	0.0	0

TABLE K-6 (Cont.)

Indian Reservations and Trust Lands	State	Area (sq mi)	Total Acres
Nez Perce Reservation	ID	1,195.1	764,864
Totals:		**2,608.1**	**1,669,184**
Blackfeet Reservation	MT	2,371.1	1,517,504
Crow Reservation	MT	3,543.1	2,267,584
Crow Trust Lands	MT	30.6	19,584
Crow/Northern Cheyenne Area	MT	18.6	11,904
Flathead Reservation	MT	1,938.2	1,240,448
Fort Belknap Reservation	MT	969.0	620,160
Fort Belknap Trust Lands	MT	44.8	28,672
Fort Peck Reservation	MT	3,289.1	2,105,024
Rocky Boy's Reservation	MT	88.5	56,640
Rocky Boy's Trust Lands	MT	79.8	51,072
Northern Cheyenne Reservation	MT	697.1	446,144
Totals:		**13,069.9**	**8,364,736**
Northern Cheyenne Trust Lands	MT-SD	3.2	2,048
Totals:		**3.2**	**2,048**
Acoma Pueblo	NM	411.3	263,232
Acoma Trust Lands	NM	5.4	3,456
Alamo Navajo Reservation	NM	99.0	63,360
Canoncito Reservation	NM	121.6	77,824
Cochiti Pueblo	NM	80.4	51,456
Isleta Pueblo	NM	328.0	209,920
Jemez Pueblo	NM	139.7	89,408
Jicarilla Apache Reservation	NM	1,286.4	823,296
Laguna Pueblo	NM	758.1	485,184
Laguna Pueblo and Trust Lands	NM	760.9	486,976
Laguna Trust Lands	NM	2.8	1,792
Mescalero Apache Reservation	NM	719.1	460,224
Nambe Pueblo	NM	32.0	20,480
Nambe Pueblo and Trust Lands	NM	32.3	20,672
Nambe Trust Lands	NM	0.3	192
Picuris Pueblo	NM	27.4	17,536
Pojoaque Pueblo	NM	21.1	13,504
Ramah Navajo Community	NM	27.7	17,728
San Felipe Pueblo	NM	78.6	50,304
San Felipe/Santa Ana joint area	NM	1.1	704
San Felipe/Santo Domingo joint area	NM	1.2	768
San Ildefonso Pueblo	NM	43.7	27,968
San Juan Pueblo	NM	26.7	17,088
Sandia Pueblo	NM	39.0	24,960
Santa Ana Pueblo	NM	101.2	64,768
Santa Clara Pueblo	NM	76.8	49,152
Santo Domingo Pueblo	NM	107.2	68,608
Taos Pueblo	NM	154.9	99,136
Taos Trust Lands	NM	1.2	768
Tesuque Pueblo	NM	26.5	16,960
Tesuque Trust Lands	NM	0.5	320

TABLE K-6 (Cont.)

Indian Reservations and Trust Lands	State	Area (sq mi)	Total Acres
Zia Pueblo	NM	186.6	119,424
Zia Trust Lands	NM	3.3	2,112
Totals:		**5,702.0**	**3,649,280**
Carson Colony	NV	0.2	128
Dresslerville Colony	NV	0.1	64
Duck Valley Reservation	NV	505.8	323,712
Duckwater Reservation	NV	6.2	3,968
Ely Colony	NV	0.2	128
Fallon Colony	NV	0.1	64
Fallon Reservation	NV	12.8	8,192
Las Vegas Colony	NV	6.2	3,968
Lovelock Colony	NV	0.0	0
Moapa River Reservation	NV	112.0	71,680
Pyramid Lake Reservation	NV	553.9	354,496
Reno-Sparks Colony	NV	3.2	2,048
Summit Lake Reservation	NV	17.4	11,136
Te-Moak Reservation	NV	16.6	10,624
Te-Moak Trust Lands	NV	11.2	7,168
Walker River Reservation	NV	534.4	342,016
Washoe Reservation	NV	4.5	2,880
Winnemucca Colony	NV	0.6	384
Yerington Reservation and Trust Lands	NV	2.6	1,664
Yomba Reservation	NV	7.3	4,672
Totals:		**1,795.3**	**1,148,992**
Fort McDermitt Reservation	NV-OR	54.6	34,944
Totals:		**54.6**	**34,944**
Goshute Reservation	NV-UT	177.4	113,536
Totals:		**177.4**	**113,536**
Burns Paiute Reservation	OR	1.3	832
Burns Paiute Trust Lands	OR	17.6	11,264
Coos, Lower Umpqua, and Siuslaw Reservation	OR	0.0	0
Cow Creek Reservation	OR	0.1	64
Grand Ronde Reservation	OR	15.4	9,856
Siletz Reservation	OR	5.8	3,712
Umatilla Reservation	OR	271.1	173,504
Warm Springs Reservation	OR	1,010.5	646,720
Warm Springs Trust Lands	OR	8.8	5,632
Totals:		**1,330.6**	**851,584**
Northwestern Shoshoni Reservation	UT	0.3	192
Paiute of Utah Reservation	UT	51.0	32,640
Skull Valley Reservation	UT	28.2	18,048
Uintah and Ouray Reservation	UT	6,768.2	4,331,648
Ute Mountain Trust Lands	UT	11.6	7,424
Totals:		**6,859.3**	**4,389,952**

TABLE K-6 (Cont.)

Indian Reservations and Trust Lands	State	Area (sq mi)	Total Acres
Chehalis Reservation	WA	7.0	4,480
Colville Reservation	WA	2,116.6	1,354,624
Hoh Reservation	WA	0.7	448
Jamestown Klallam Reservation and Trust Lands	WA	0.0	0
Kalispel Reservation	WA	7.3	4,672
Lower Elwha Reservation and Trust Lands	WA	0.7	448
Lummi Reservation	WA	21.0	13,440
Makah Reservation	WA	42.7	27,328
Muckleshoot Reservation and Trust Lands	WA	6.1	3,904
Nisqually Reservation	WA	7.9	5,056
Nooksack Reservation	WA	0.7	448
Nooksack Trust Lands	WA	3.5	2,240
Ozette Reservation	WA	1.2	768
Port Gamble Reservation	WA	1.9	1,216
Port Madison Reservation	WA	11.7	7,488
Puyallup Reservation and Trust Lands	WA	28.5	18,240
Quileute Reservation	WA	1.6	1,024
Quinault Reservation	WA	325.2	208,128
Sauk-Suiattle Reservation	WA	0.1	64
Shoalwater Reservation	WA	1.2	768
Skokomish Reservation	WA	8.2	5,248
Spokane Reservation	WA	237.5	152,000
Squaxin Island Reservation	WA	2.2	1,408
Squaxin Island Trust Lands	WA	0.3	192
Stillaguamish Reservation	WA	0.0	0
Swinomish Reservation	WA	11.4	7,296
Tulalip Reservation	WA	35.2	22,528
Upper Skagit Reservation	WA	0.2	128
Yakima Reservation	WA	2,104.3	1,346,752
Yakima Reservation and Trust Lands	WA	2,137.6	1,368,064
Yakima Trust Lands	WA	33.3	21,312
Totals:		**7,155.8**	**4,579,712**
Wind River Reservation	WY	3,471.4	2,221,696
Totals:		**3,471.4**	**2,221,696**
Grand Totals for 11 Western States:		**86,020.4**	**55,053,056**

[a] This table presents a list of reservations and trust lands based on U.S. Census Bureau records. It may not coincide with the list of Tribes presented in Appendix C, since single reservations may have more than one Tribe and some federally recognized Tribes do not have reservations. Reservations and trust lands crossing state boundaries are tallied separately from state totals (e.g., the Navajo Reservation which occupies area in Arizona, New Mexico, and Utah).

Source: U.S. Bureau of the Census (2006).

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APPENDIX L:

POTENTIAL FOSSIL YIELD CLASSIFICATIONS (PFYC) FOR GEOLOGIC FORMATIONS INTERSECTING PROPOSED CORRIDORS UNDER THE PROPOSED ACTION BY STATE

APPENDIX L:

POTENTIAL FOSSIL YIELD CLASSIFICATIONS (PFYC) FOR GEOLOGIC FORMATIONS INTERSECTING PROPOSED CORRIDORS UNDER THE PROPOSED ACTION BY STATE

Tables L-1 through L-11 of this appendix summarize the PFYC classes and general locations of geologic units intersecting the proposed corridors under the Proposed Action as identified on state geologic maps (usually at the 1:500,000 scale). The PFYC classes (1 through 5) are discussed in Section 3.4 and defined in Table 3.4-2. For this analysis, all Quaternary sediments, summarized in Table L-12, were given a PFYC Class 3 designation because they are of unknown fossil yield potential. Due to the variability in source material for these sediments, the actual determination of fossil yielding potential would be made on the basis of more detailed information (maps and literature) and field surveys during a project-specific assessment.

TABLE L-1 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Arizona[a]

Formation/Rock Type	Age	Class	General Location
Basaltic lava flows	Pliocene to Middle Miocene	1	Colorado Plateau (near northern border); Sonoran Basin and Range (southwest)
Bright Angel Shale	Cambrian	2	Central Mountains (north of Phoenix)
Chinle Formation	Upper Triassic	5	Colorado Plateau (near northern border)
Coconino Sandstone	Permian	3	Colorado Plateau (near northern border)
Conglomerate, Sandstone and Limestone	Pliocene to Oligocene	3	Sonoran Basin and Range (southwest of Tucson); Central Mountains (north of Phoenix)
Glen Canyon Group	Jurassic	5	Colorado Plateau (near northern border)
Granitic rocks	Paleocene to Jurassic	1	Sonoran Basin and Range (southwest)
Granitic rocks	Proterozoic	1	Mojave Basin and Range (northwest); Sonoran Basin and Range (southwest)
Hermit Shale	Permian to Pennsylvanian	2	Colorado Plateau (near northern border); Central Mountains (north of Phoenix)
Kaibab Formation	Permian	3	Colorado Plateau (near northern border)
Kayenta Formation	Lower Jurassic	5	Colorado Plateau (near northern border)
Moenkopi Formation	Middle to Lower Triassic	3	Colorado Plateau (near northern border)
Metamorphic rocks	Cretaceous to Jurassic	1	Sonoran Basin and Range (southwest)
Metamorphic rocks	Proterozoic	1	Mojave Basin and Range (northwest); Sonoran Basin and Range (southwest); Central Mountains (north of Phoenix)
Moenave Formation	Lower Jurassic	5	Colorado Plateau (near northern border)
Morrison Formation	Upper Jurassic	5	Colorado Plateau (near northern border)
Muav Limestone	Cambrian	2	Central Mountains (north of Phoenix)
Navajo Sandstone	Upper Jurassic	5	Colorado Plateau (near northern border)
Redwall Limestone	Mississippian	2	Central Mountains (north of Phoenix)
San Rafael Group	Upper to Middle Jurassic	5	Colorado Plateau (near northern border)
Supai Group	Permian to Pennsylvanian	2	Colorado Plateau (near northern border); Central Mountains (north of Phoenix)
Tapeats Sandstone	Cambrian	2	Central Mountains (north of Phoenix)
Temple Butte Formation	Devonian	2	Central Mountains (north of Phoenix)
Toroweap Formation	Permian	3	Colorado Plateau (near northern border)

TABLE L-1 (Cont.)

Formation/Rock Type	Age	Class	General Location
Volcanic rocks	Middle Miocene to Oligocene	1	Mojave Basin and Range (northwest); Sonoran Basin and Range (southwest); south of Tucson
Wingate Sandstone	Lower Jurassic	5	Colorado Plateau (near northern border)

[a] Designations based on geologic map by Kamilli and Richard (1998) and information in Nations and Stump (1996).

TABLE L-2 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, California[a]

Rock Types[b]	Age	Class	General Location
Conglomerate, shale, sandstone, limestone, dolomite, marble, gneiss, hornfels, quartzite	Precambrian	1	Southern California Mountains (northeast of Los Angeles)
Franciscan Complex	Cretaceous and Jurassic	1, 3	Cascade Mountains
Gabbroic rocks	Triassic-Jurassic	1	Cascade Mountains; Sierra Nevada Range; Mojave Basin and Range; Southern California Mountains (northeast of Los Angeles)
Granitic rocks	Cretaceous	1	Cascade Mountains; Sierra Nevada Range
Metasedimentary and metavolcanics	Permian	1	Cascade Mountains
Metasedimentary and metavolcanics	Devonian	1	Cascade Mountains; Sierra Nevada Range
Sandstone, shale, conglomerate	Pleistocene and Pliocene	3	Sierra Nevada Range; Mojave Basin and Range; Southern California Mountains (northeast of Los Angeles); and Sonoran Basin and Range (east of San Diego)
Sandstone, shale, conglomerate	Oligocene	3	Cascade Mountains
Sandstone, shale, conglomerate	Upper and Lower Cretaceous	3	Cascade Mountains
Sandstone, shale, limestone, dolomite, chert, quartzite, and phyllite	Cambrian	1	Southern California Mountains (northeast of Los Angeles)
Ultramafic rocks (intrusives)	Cretaceous to Jurassic	1	Cascade Mountains
Volcanics and metavolcanics	Cretaceous	1	Sierra Nevada Range; Southern California Mountains (northeast of Los Angeles)
Volcanics and metavolcanics	Devonian	1	Cascade Mountains; Mojave Basin and Range
Volcanic flow rocks	Holocene	1	Cascade Mountains; Mojave Basin and Range
Volcanic flow rocks	Oligocene	1	Cascade Mountains; Sierra Nevada Range; Central Basin and Range; Mojave Basin and Range; Southern California Mountains (northeast of Los Angeles)

[a] Designations based on the geologic map by Jennings et al. (1977).

[b] Rock units were not identified at the formation level on the Jennings et al. (1977) map; therefore, only rock types and their ages are provided. Classifications of sedimentary units (e.g., sandstone, shale, and limestone) should be considered tentative.

TABLE L-3 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Colorado[a]

Formation/Rock Type	Age	Class	General Location
Beldon Formation	Pennsylvanian	2	West of Colorado Springs
Browns Park Formation	Upper to Middle Miocene	5	Uinta Mountains; Sand Wash Basin
Dakota Sandstone or Group	Cretaceous	5	Middle Park Basin; San Juan Mountains
Dolores Formation	Triassic	3	San Juan Mountains
Fort Union Formation	Paleocene	3	Sand Wash Basin
Granitic rocks	Proterozoic	1	Middle Park Basin; west of Colorado Springs
Green River Formation	Middle to Lower Eocene	5	Piceance Basin; Middle Park Basin
Anvil Points Member			
Douglas Creek Member			
Garden Gulch Member			
Parachute Creek Member			
Igneous Intrusives	Tertiary	1	San Juan Mountains
Iles Formation	Upper Cretaceous	5	Piceance Basin
Trout Creek Sandstone Member			
Lodore Formation	Mississippian to Cambrian	2	Uinta Mountains
Madison Formation	Mississippian to Upper Devonian	3	Uinta Mountains
Mancos Shale	Lower Cretaceous	2	Piceance Basin; San Juan Mountains
Juan Lopez Member			
Mesaverde Formation or Group	Upper Cretaceous	5	Piceance Basin; San Juan Mountains
Metamorphic rocks	Proterozoic	1	Middle Park Basin; west of Colorado Springs
Middle Park Formation	Paleocene	3	Middle Park Basin; west of Colorado Springs
Minturn Formation	Pennsylvanian	2	West of Colorado Springs
Morgan Formation	Pennsylvanian	2	Uinta Mountains
Morrison Formation	Upper Jurassic	5	Middle Park Basin; San Juan Mountains
Ohio Creek Formation	Upper Cretaceous	3	Piceance Basin
Sego Sandstone	Upper Cretaceous	3	Piceance Basin
Troublesome Formation	Miocene	3	Middle Park Basin
Uinta Formation	Eocene	5	Piceance Basin
Wasatch Formation	Lower Eocene	5	Sand Wash Basin; Piceance Basin
Williams Fork Formation	Upper Cretaceous	5	Piceance Basin

[a] Designations based on geologic map by Tweto (1979) and information in Table F-1 (of Appendix F) in BLM (2005).

TABLE L-4 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Idaho[a]

Formation/Rock Type	Age	Class	General Location
Amsden Formation	Pennsylvanian to Upper Mississippian	3	Snake River Plain (east); south[b]
Aspen Shale or Formation	Lower Cretaceous	3	Snake River Plain (west)
Basalt Flows and associated tuffs	Lower Pleistocene to Pliocene	1	South
Bear River Formation	Lower Cretaceous	3	Snake River Plain (west)
Frontier Formation	Upper Cretaceous	3	Snake River Plain (west)
Gannet Group	Lower Cretaceous	3	Snake River Plain (west)
Smoot Formation			
Drainey Limestone			
Bechler Shale			
Peterson Limestone			
Fehraim Conglomerate			
Great Blue Limestone	Mississippian	2	Snake River Plain (east); south
Idaho Group	Pliocene	3	Snake River Plain (west and east)
Igneous Intrusive rocks (Idaho Batholith)	Lower Cretaceous	1	Snake River Plain (west)
Madison Group	Mississippian to Upper Devonian	3	Snake River Plain (east); south
Deep Creek Formation			
Lodgepole Limestone			
Manning Canyon Shale	Mississippian	2	Snake River Plain (east); south
Park City Formation	Lower Permian to Lower Pennsylvanian	2	Snake River Plain (east); south
Preuss Sandstone or Formation	Upper to Middle Jurassic	3	South
Silicic flows and associated tuffs	Pliocene, Miocene	1, 2	Snake River Plain (west and east); south
Stream and lake deposits	Pliocene	3	Snake River Plain (west and east); south
Metasediments: siltite, argillite, and quartzite	Precambrian	1	North (north of St. Joe River)
Wayan Formation	Lower Cretaceous	3	Snake River Plain (west)
Welded tuff	Pliocene, Miocene	2	South
Wells Formation	Permian to Pennsylvanian	2	Snake River Plain (east); south
Grandeur Tongue			
Tensleep Sandstone			

[a] Designations based on geologic map by Bond and Wood (1978).

[b] South refers to the Northern and Central Basin and Range areas to the south of the Snake River Plain.

TABLE L-5 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Montana[a]

Formation/Rock Type	Age	Class	General Location
Argillites, quartzite, and limestone	Proterozoic	2	Northwest
Belle Fourche Shale	Upper Cretaceous	3	South, along I-15; north, along I-15
Big Snowy Group	Mississippian through Upper Devonian	2	South, along I-15
Boulder Batholith	Cretaceous	1	South, along I-15
Colorado Shale	Cretaceous	3	North, along I-15
Flathead Sandstone	Middle Cambrian	2	South, along I-15
Fort Union Formation	Paleocene	3	Powder River Basin; Bighorn Basin
Jefferson Limestone	Devonian	2	South, along I-15
Madison Limestone	Mississippian through Upper Devonian	3	South, along I-15
Metamorphic rocks	Archean (Basement Complex)	1	South, along I-15
Mowry Shale	Lower Cretaceous	3	South, along I-15; north, along I-15
Morrison Formation	Upper Jurasic	5	Northwest
Niobrara Formation	Upper Cretaceous	5	South, along I-15; north, along I-15
Meagher Limestone	Middle Cambrian	2	South, along I-15
Park Shale	Middle Cambrian	2	South, along I-15
Pilgrim Limestone	Cambrian	2	South, along I-15
Prichard Formation	Proterozoic	1	North, along I-15
Quadrant Formation	Pennsylvanian	2	South, along I-15
Ravalli Formation	Proterozoic	1	North, along I-15
Spokane Shale	Cambrian	2	North, along I-15
Thermopolis Shale	Lower Cretaceous	3	South, along I-15; north, along I-15
Three Forks Formation	Upper Devonian	2	South, along I-15
Two Medicine Formation	Cretaceous	2	North, along I-15
Wallace Formation	Proterozoic	1	Northwest
Willow Creek Formation	Paleocene to Upper Cretaceous	3	Powder River Basin; Bighorn Basin; south, along I-15
Wolsey Shale	Middle Cambrian	2	South, along I-15
Volcanic rocks	Tertiary	1	North, along I-15
Volcanic rocks	Cretaceous	1	North, along I-15

[a] Designations based on geologic map by Ross et al. (1955).

TABLE L-6 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Nevada[a]

Formation/Rock Type	Age	Class	General Location
Andesite and basalt flows	Upper Miocene to Lower Miocene	1	South, west of McCollough Range; southeast of Las Vegas; southwest border, along I-95; east of Reno
Andesite flows and breccias	Upper Miocene to Lower Miocene	1	Southwest border, along I-95; east of Reno; northeast corner of Nevada
Basalt flows	Holocene to Upper Miocene	1	Southwest border, along I-95; north of Reno; north-south line
Basalt flows	Upper Miocene to Lower Miocene	1	Northeast of Las Vegas; north of Reno
Dolomite and limestone Sevy Dolomite Simonson Dolomite Guilmette Formation Nevada Formation Devils Gate Limestone	Devonian	2	Las Vegas Valley; northeast corner of Nevada
Dolomite and limestone	Cambrian and Ordovician	2	South, crossing Pahrump Valley; northeast of Las Vegas
Dolomite and limestone Carrrara Formation Bonanza King Formation Nopah Formation	Upper and Middle Cambrian	2	Las Vegas Valley
Granitic rocks	Cretaceous	1	Southwest border, along I-95; north of Reno; northeast corner of Nevada
Havallah Sequence	Permian to Mississippian	2	East-west line
Limestone and sparse dolomite, siltsone, and sandstone Bird Spring Formation Callville Limestone	Lower Pennsylvanian to Lower Permian	2	South, crossing Pahrump Valley; north-south line
Limestone and dolomite	Upper and Middle Cambrian	2	North-south line
Intrusive rocks of mafic and intermediate composition	Upper Miocene to Middle Oligocene	1	East of Reno
Metamorphic rocks (gneiss and schist)	Precambrian	1	South, west of McCollough Range; southeast of Las Vegas
Phyllitic siltstone, quartzite, and lesser amounts of limestone and dolomite	Lower Cambrian to Precambrian	1	Southwest border, along I-95
Rhylolites	Upper Miocene to Middle Oligocene	1	East of Reno; east-west line; north-south line

TABLE L-6 (Cont.)

Formation/Rock Type	Age	Class	General Location
Rhyolitic flows and shallow intrusive rocks	Upper Miocene to Lower Miocene	1	Southeast of Las Vegas; southwest border, along I-95
Shale, chert, and minor amounts of quartzite, greenstone, and limestone	Ordovician	1	East-west line
Shale, siltstone, sandstone, conglomerate, and limestone	Mississippian to Devonian	2	East-west line
Tuffaceous sedimentary rocks	Upper Miocene to Lower Miocene	2	Southeast of Las Vegas; northeast of Las Vegas; southwest border, along I-95; east of Reno; east-west line; northeast corner of Nevada
Welded and unwelded tuffs, silicic ash flow tuffs	Upper Miocene to Middle Oligocene	2	Southwest border, along I-95; northeast corner of Nevada; north-south line

[a] Designations based on geologic map by Stewart and Carlson (1978).

TABLE L-7 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, New Mexico[a]

Formation/Rock Type	Age	Class	General Location
Animas Formation	Paleocene to Upper Cretaceous	3	Northwest, south/southwest of San Juan Basin
Artesia Group	Permian	5	Southeast, along Mescalero Ridge
Tansil Formation			
Yates Formation			
Seven Rivers Formation			
Queen Formation			
Grayburg Formation			
Moenkopi (locally)			
Basaltic and andesitic lava flow	Middle to Lower Pleistocene	1	Southwest, along I-10
Cliff House Sandstone	Upper Cretaceous	5	Northwest, south/southwest of San Juan Basin
Kirtland and Fruitland Formations	Upper Cretaceous	5	Northwest, south/southwest of San Juan Basin
Lewis Shale	Upper Cretaceous	5	Northwest, south/southwest of San Juan Basin
Lower Santa Fe Group	Upper Miocene to Upper Oligocene	5	Southwest, along I-25 and Rio Grand River
Hayner Formation			
Ranch Formation			
Rincon Valley Formation			
Popotosa Formation			
Cochiti Formation			
Tesuque Formation			
Chamita Formation			
Abiquiu Formation			
Zia Formation			
Mancos Shale	Upper Cretaceous	3	Northwest, south/southwest of San Juan Basin
Menefee Formation	Upper Cretaceous	5	Northwest, south/southwest of San Juan Basin
Nacimiento Formation	Paleocene	5	Northwest, south/southwest of San Juan Basin
Ojo Alamo Formation	Paleocene	5	Northwest, south/southwest of San Juan Basin
Ogallala Formation	Lower Pliocene to Middle Miocene	5	Southeast, along Mescalero Ridge
Pictured Cliffs Formation	Upper Cretaceous	5	Northwest, south/southwest of San Juan Basin
Point Lookout Sandstone	Upper Cretaceous	5	Northwest, south/southwest of San Juan Basin
San Andres Formation	Permian	5	Southeast, along Mescalero Ridge

TABLE L-7 (Cont.)

Formation/Rock Type	Age	Class	General Location
Upper Santa Fe Group Camp Rice Formation Fort Hancock Formation Palomas Formation Sierra Ladrones Formation Arroyo Formation Ojito Formation Ancha Formation Puye Formation Alamosa Formation	Middle Pleistocene to Upper Miocene	5	Southwest, along I-10; southwest, along I-25 and Rio Grande River

[a] Designations based on geologic map by Scholle (2003) and information in Lucas and Williamson (1993), Berman (1993), and Williamson and Lucas (1993).

TABLE L-8 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Oregon[a]

Formation/Rock Type	Age	Class	General Location
Andesite	Holocene and Pleistocene	1	Southeast of Portland
Basalt	Pleistocene and Pliocene	1	Southeast corner of Oregon; central east-west line; central north-south line
Basalt	Upper and Middle Miocene	1	Southwest of Catlow Valley; southeast corner of Oregon; central east-west line; central north-south line
Basalt and andesite	Miocene	1	Southwest of Catlow Valley; eastern border, just west of Snake River; southeast corner of Oregon; central east-west line; central north-south line
Basaltic andesite and basalt	Holocene and Pleistocene	1	Southeast of Portland
Basaltic and andesitic ejecta	Tertiary	1	Southwest of Catlow Valley; central north-south line
Basalt and basaltic andesite	Holocene and Pleistocene	1	Southeast corner of Oregon; central east-west line; central north-south line
Basalt and basaltic andesite	Pliocene and Upper Miocene	1	Southeast of Portland
Basaltic lava flows	Miocene	1	Southeast of Salem; South of Medford
Clastic sedimentary rocks	Upper and Lower Cretaceous	3	South of Medford
Columbia River basalt group and related flows	Miocene	1	Northwest of Portland; southwest of Portland; southeast of Portland; southeast of Salem; eastern border, just west of Snake River; central north-south line
Dothan Formation	Lower Cretaceous and Upper Jurassic	2	South of Medford
Gabbroic rocks	Triassic and Permian	1	Eastern border, just west of Snake River
Grande Ronde basalt	Middle and Lower Miocene	1	Northeast, just west of Wallowa National Forest
Granitic rocks	Cretaceous and Jurassic	1	North of Medford; south of Medford
Lacustrine and fluvial deposits	Miocene	3	Northeast, just west of Wallowa National Forest; central east-west line
Mafic and intermediate intrusives	Micoene	1	Central east-west line
Mafic and intermediate vent rocks	Pliocene and Miocene	1	Southwest of Catlow Valley; eastern border, just west of Snake River; south of Medford; southeast corner of Oregon; central east-west line; central north-south line
Mafic vent deposits	Pleistocene, Pliocene, Miocene	1	Southeast corner of Oregon; central north-south line
Marine sedimentary and tuffaceous rocks	Middle Miocene to Upper Eocene	2	Northwest of Portland
Marine sedimentary rocks	Lower Miocene and Oliocene	3	Southeast of Salem
May Creek Schist	Paleozoic	1	South of Medford

TABLE L-8 (Cont.)

Formation/Rock Type	Age	Class	General Location
Myrtle Group Riddle Formation Days Creek Formation	Lower Cretaceous and Upper Jurassic	3	South of Medford
Nonmarine sedimentary rocks	Eocene	3	South of Medford; north of Medford
Olivine basalt	Pliocene and Miocene	1	Southwest of Catlow Valley; eastern border, just west of Snake River; central east-west line; central north-south line
Pyroclastic rocks	Holocene, Pleistocene, Pliocene, Miocene	1	Southeast corner of Oregon; central east-west line; central north-south line
Rhyolite and dacite	Pliocene and Miocene	1	Southeast corner of Oregon; central east-west line; central north-south line
Rhyolite and dacite domes and flos with small intrusive bodies	Miocene to Upper Eocene	1	Southeast corner of Oregon; central east-west line; central north-south line
Saddle Mountain Basalt	Upper and Middle Miocene	1	Northeast, just west of Wallowa National Forest
Sedimentary rocks Walters Hill Formation Springwater Formation	Pleistocene and Pliocene	2	Central north-south line
Sedimentary rocks	Jurassic	2	South of Medford
Sedimentary rocks, partly metamorphosed	Triassic and Paleozoic	2	Eastern border, just west of Snake River
Sedimentary and volcanic rocks	Jurassic and Upper Triassic	1	Eastern border, just west of Snake River
Silicic ash-flow tuff	Lower Pliocene and Upper Miocene	2	Eastern border, just west of Snake River; southeast corner of Oregon; central east-west line; central north-south line
Silicic vent rocks	Pliocene, Miocene, Oligocene, and Eocene	1	Central north-south line
Subaqueous pyroclastic rocks of basaltic cinder cones	Tertiary	1	Central north-south line
Tuffs and basalt	Miocene and Oligocene	2	Southeast of Salem
Tuffaceous sedimentary rocks and tuff	Pliocene and Miocene	2	Southwest of Catlow Valley; northern border; eastern border, just west of Snake River; southeast corner of Oregon; central east-west line; central north-south line
Tuffaceous sedimentary rocks, tuffs, pumicites, and silicic flows	Miocene	2	Southwest of Catlow Valley; southeast corner of Oregon; central east-west line; central north-south line
Ultramafic and related rocks of ophiolite sequences	Jurassic	1	South of Medford

TABLE L-8 (Cont.)

Formation/Rock Type	Age	Class	General Location
Undifferentiated flows and clastic rocks	Miocene	1	Southeast of Portland
Undifferentiated tuffaceous sedimentary rocks, tuffs, and basalt	Miocene and Oligocene	2	South of Medford
Volcanic rocks	Triassic and Permian	1	Eastern border, just west of Snake River
Volcanic rocks	Jurassic	1	South of Medford
Volcanic and metavolcanic rocks	Upper Triassic	1	South of Medford
Wanapum Basalt	Middle Miocene	1	Northern border; eastern border, just west of Snake River
Welded tuffs and tuffaceous sedimentary rocks	Upper and Middle Miocene	2	Southeast corner of Oregon

[a] Designations based on geologic map by Walker and MacLeod (1991).

TABLE L-9 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Utah[a]

Formation/Rock Type	Age	Class	General Location
Basalt and rhyolite	Pliocene	1	Southwest
Bishop Conglomerate	Oligocene	3	Uinta Basin
Bluff Sandstone	Jurassic	3	Southeast
Browns Park Formation	Pliocene to Miocene	3	Uinta Mountains
Burro Canyon Formation	Lower Cretaceous	3	Southeast
Callville Limestone	Pennsylvanian	2	Southwest
Carmel Formation	Jurassic	3	Southeast; southwest
Cedar Mountain Formation	Lower Cretaceous	5	Southeast
Claron Formation	Paleocene	5	Southwest
Coconino Sandstone	Permian	3	Southwest
Currant Creek Formation	Paleocene	5	Uinta Basin
Curtis Formation	Lower Jurassic	3	Southeast
Dakota Sandstone	Lower Cretaceous	3	Southeast
Deseret Limestone	Mississippian	2	North of Salt Lake City
Duchesne River Formation	Oligocene to Eocene	5	Uinta Basin
Entrada Sandstone	Jurassic	3	Southeast; southwest
Farmington Canyon Schist and Gneiss	Archean	1	North of Salt Lake City
Flagstaff (Limestone) Formation	Paleocene	5	Southeast; Uinta Basin
Glen Canyon Group	Lower Jurassic to Upper Triassic	5	Southeast
Navajo Sandstone			
Kayenta Formation			
Wingate Sandstone			
Green River Formation	Eocene	5	Uinta Basin
Evacuation Creek Member			
Parachute Creek Member			
Garden Gulch Member			
Douglas Creek Member			
Humbug Formation	Mississippian	2	North of Salt Lake City
Kaibab Limestone	Upper Permian	3	Southwest
Kayenta Formation	Triassic	5	Southeast; southwest
Little Willow Schist and Gneiss	Archean	1	North of Salt Lake City

TABLE L-9 (Cont.)

Formation/Rock Type	Age	Class	General Location
Mancos Shale	Lower Cretaceous	3	Southeast; Uinta Mountains; Uinta Basin
Masuk Shale Member			
Emery Sandstone Member			
Blue Gate Shale Member			
Ferron Sandstone Member			
Tununk Shale Member			
Mesaverde Group	Upper Cretaceous	3	Southeast; Uinta Basin
Price River Formation			
Castlegate Sandstone			
Blackhawk Formation (coal)			
Start Point Sandstone			
Moenave Formation	Triassic	5	Southwest
Moenkopi Formation	Lower Triassic	3	Southwest
Morrison Formation	Upper Jurassic	5	Southeast
Brushy Basin Member			
Salt Wash Member			
Muddy Creek Formation	Miocene	3	Southwest
Navajo Sandstone	Lower Jurassic to Upper Triassic	3	Southeast; southwest
North Horn Formation	Paleocene	5	Uinta Basin
Nugget (Navajo) Formation	Lower Jurassic to Upper Triassic	3	Uinta Mountains; Uinta Basin
Oquirrh Group	Permian to Upper Pennsylvanian	2	Great Salt Lake Desert (Cedar Mountains)
Pakoon Formation	Permian	2	Southwest
Rhyolites	Tertiary	1	Southwest
Salt Lake Formation	Miocene to Pliocene	3	Central
Summerville Formation	Jurassic	5	Southeast
Supai Group	Permian	2	Southwest
Toroweap Formation	Permian	3	Southwest
Uinta Mountain Group	Proterozoic	1	Uinta Mountains
Uinta Formation	Eocene	5	Uinta Basin; central
Volcanic rocks (undivided)	Tertiary	1	Southwest; north of Salt Lake City; central
Wasatch/Colton Formation	Lower Eocene to Paleocene	5	Uinta Basin
Webber Sandstone	Lower Permian to Pennsylvanian	2	Uinta Basin

[a] Designations based on geologic map by Hintze (1980) and information in Hintze (1993).

TABLE L-10 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Washington[a]

Formation/Rock Type	Age	Class	General Location
Columbia River Basalt Group	Lower Pliocene to Upper Miocene	1	Cascade Mountains
Continental Sedimentary rocks	Tertiary	3	Cascade Mountains
Metamorphic rocks (gneiss)	Mesozoic	1	Cascade Mountains
Intrusive rocks	Tertiary, Cretaceous	1	Cascade Mountains
Volcanic rocks	Tertiary	1	Cascade Mountains

[a] Designations based on geologic map by Schuster (2005).

TABLE L-11 PFYC Classes by Formation for Corridors and Corridor Segments under the Proposed Action, Wyoming[a]

Formation	Age	Class[b]	General Location
Amsden Formation	Pennsylvanian to Upper Mississippian	3	Wind River Basin; Great Divide Basin
Battle Spring Formation	Eocene to Upper Paleocene	3	Great Divide Basin; Green River Basin
Baxter Shale	Upper Cretaceous	3	Green River Basin
Bighorn Dolomite	Upper Ordovician	2	Bighorn Basin; Wind River Basin
Bridger Formation	Middle Eocene	5	Green River Basin
Casper Formation	Permian to Pennsylvanian	3	South of Casper
Chugwater Group or Formation	Triassic	3	Bighorn Basin; Wind River Basin; south of Casper; Great Divide Basin
Cloverly Formation	Lower Cretaceous	5	Bighorn Basin; Wind River Basin; south of Casper; Hanna Basin; Great Divide Basin
Coalmont Formation	Eocene and Paleocene	3	Hanna Basin
Cody Shale	Upper Cretaceous	3	Bighorn Basin; Wind River Basin
Darby Formation	Mississippian to Devonian	2	Bighorn Basin; Wind River Basin
Dinwoody Formation	Lower Triassic	3	Wind River Basin
Ellis Group	Upper to Middle Jurassic	3	Bighorn Basin
Ferris Formation	Paleocene to Upper Cretaceous	5	Hanna Basin
Flathead Sandstone	Middle Cambrian	2	Bighorn Basin; Wind River Basin
Forelle Limestone	Permian	2	South of Casper
Fort Union Formation	Paleocene	3	Bighorn Basin; Wind River Basin; Great Divide Basin; Green River Basin
Fountain Formation	Upper to Middle Pennsylvanian	2	South of Casper
Fox Hills Formation	Upper Cretaceous	3	Great Divide Basin
Frontier Formation	Upper Cretaceous	3	Bighorn Basin; Wind River Basin; south of Casper; Hanna Basin; Great Divide Basin
Gallatin Group or Limestone	Upper Cretaceous	2	Bighorn Basin; Wind River Basin
Goose Egg Formation	Lower Triassic to Permian	2	Bighorn Basin; south of Casper; Great Divide Basin
Green River Formation	Middle to Lower Eocene	5	Great Divide Basin; Green River Basin
Gros Ventre Formation	Upper and Middle Cambrian	2	Bighorn Basin; Wind River Basin
Gypsum Springs Formation	Middle Jurassic	3	Bighorn Basin; Wind River Basin; Hanna Basin
Hartville Formation	Permian to Mississippian (?)	3	South of Casper
Hoback Formation	Paleocene	5	Great Divide Basin; Green River Basin
Indian Meadows Formation	Lower Eocene	5	Wind River Basin
Lance Formation	Upper Cretaceous	5	Bighorn Basin; Wind River Basin; Great Divide Basin
Lewis Shale	Upper Cretaceous	3	Bighorn Basin; Hanna Basin; Great Divide Basin

TABLE L-11 (Cont.)

Formation	Age	Class[b]	General Location
Madison Limestone	Mississippian to Upper Devonian	3	Bighorn Basin; Wind River Basin; Hanna Basin
Medicine Bow Formation	Upper Cretaceous	3	Hanna Basin
Meeteetse Formation	Upper Cretaceous	3	Bighorn Basin; Wind River Basin
Mesaverde Group or Formation	Upper Cretaceous	3	Bighorn Basin; Wind River Basin; Hanna Basin; Great Divide Basin
Morrison Formation	Upper Jurassic	5	Bighorn Basin; Wind River Basin; south of Casper; Great Divide Basin
Mowry Shale	Lower Cretaceous	3	Bighorn Basin; Wind River Basin; south of Casper; Hanna Basin; Great Divide Basin
Niobrara Formation	Upper Cretaceous	5	South of Casper; Hanna Basin; Great Divide Basin
Nugget Sandstone	Jurassic (?) and Triassic (?)	3	Wind River Basin
Pass Peak Formation	Lower Eocene	3	Green River Basin
Phosphoria Formation	Permian	3	Wind River Basin
Satanka Shale	Permian	2	South of Casper
Steele Shale	Upper Cretaceous	3	South of Casper; Hanna Basin; Great Divide Basin
Sundance Formation	Upper Jurassic	5	Bighorn Basin; Wind River Basin; south of Casper; Great Divide Basin
Tatman Formation	Lower Eocene	5	Bighorn Basin
Tensleep Sandstone	Permian to Pennsylvanian	2	Wind River Basin; Great Divide Basin
Thermopolis Shale	Lower Cretaceous	3	Bighorn Basin; Wind River Basin; south of Casper; Hanna Basin; Great Divide Basin
Wagon Bed Formation	Middle Eocene	5	Wind River Basin
Wasatch Formation	Lower Eocene	5	Great Divide Basin; Green River Basin
Washakie Formation	Upper Eocene	5	Great Divide Basin
White River Group	Oligocene and Eocene	5	South of Casper
Willwood Formation	Lower Eocene	5	Bighorn Basin
Wind River Formation	Lower Eocene	5	Wind River Basin; south of Casper; Hanna Basin

[a] Designations based on geologic map by Christiansen (1986).

[b] Class assignments taken from Table A30-1 (of Appendix 30) in BLM (2004).

TABLE L-12 Types and General Locations of Quaternary Sediments Located in the Vicinity of the Corridors and Corridor Segments under the Proposed Action, by State

Map Unit Descriptions	Age	General Location
Arizona		
Surficial deposits in valleys and wind-blown sand on floodplains and playas	Holocene to Middle Pleistocene	Colorado Plateau (near northern border); Mojave Basin and Range (northwest); Sonoran Basin and Range (southwest); Central Mountains; south of Tucson; southern border
Young alluvium	Holocene to Upper Pleistocene	Mojave Basin and Range (northwest); Sonoran Basin and Range (southwest); Central Mountains
Older surficial deposits, including wind-blown sand	Middle Pleistocene to Upper Pliocene	Central Mountains
California		
Alluvium, lake, playa, and terrace deposits (nonmarine)	Quaternary[a]	North of San Francisco; Mojave Basin and Range; Southern California Mountains (northeast of Los Angeles); southeast of Los Angeles; Sonoran Basin and Range (east of San Diego)
Marine and nonmarine sand deposits	Quaternary	North of San Francisco; Southern California Mountains (northeast of Los Angeles); southeast of Los Angeles; Sonoran Basin and Range (east of San Diego)
Loosely consolidated sandstone, shale, and gravel deposits	Pleistocene and/or Pliocene	Southern California Mountains (northeast of Los Angeles); southeast of Los Angeles
Colorado		
Alluvium	Quaternary	Sand Wash Basin; Piceance Basin; west of Colorado Springs
Gravel and alluvium	Quaternary	Sand Wash Basin; Piceance Basin; San Juan Mountains; west of Colorado Springs
Eolian deposits	Quaternary	Sand Wash Basin
Older gravel and alluvium	Quaternary	Sand Wash Basin; Piceance Basin; San Juan Mountains
Landslide deposits	Quaternary	Middle Park Basin
Glacial drift deposits	Pleistocene	West of Colorado Springs

TABLE L-12 (Cont.)

Map Unit Descriptions	Age	General Location
Idaho		
Alluvium, with glacial deposits and colluvium	Quaternary	North (north of St. Joe River); Snake River Plain (west and east); south
Surficial cover, including stream, lake, and wind deposits	Quaternary	Snake River Plain (east)
Detritus, basin-fill	Quaternary	Snake River Plain (west and east); south
Waterlaid detritus	Pleistocene	
Outwash, fanglomerate, flood and terrace gravels	Pleistocene	North (north of St. Joe River); Snake River Plain (west and east)
Stream and lake deposits	Pleistocene and Pliocene	Snake River Plain (west)
Wind-blown loess	Pleistocene	North (north of St. Joe River)
Glacial lake and shoreline sediments	Pleistocene	Snake River Plain (west); south
Fanglomerate, colluvium, and gravel deposits	Pleistocene	Snake River Plain (west and east)
Montana		
Stream, glacial and lake deposits	Quaternary	Southwest corner of Montana
Nevada		
Alluvial deposits	Holocene to Upper Miocene	South, crossing Pahrump Valley; south, west of McCollough Range; southeast of Las Vegas; Las Vegas Valley; southwest border, along I-95; east of Reno; north of Reno; east-west line; northeast corner of Nevada; north-south line
Playa, marsh, and alluvial-flat deposits	Holocene to Upper Miocene	Northeast of Las Vegas; Las Vegas Valley; southwest border, along I-95; north of Reno; north-south line
Older alluvial deposits	Holocene to Upper Miocene	East-west line
Landslide deposits	Holocene to Upper Miocene	East-west line

TABLE L-12 (Cont.)

Map Unit Descriptions	Age	General Location
New Mexico		
Eolian and piedmont deposits	Holocene to Middle Pleistocene	Southeast, along Mescalero Ridge
Alluvium	Holocene to Upper Pleistocene	Southwest, along I-10; southwest, along I-25 and Rio Grande River; northwest, west/southwest of San Juan Basin
Piedmont alluvial deposits	Holocene to Lower Pleistocene	Southeast, along Mescalero Ridge; Southwest, along I-10; southwest, along I-25 and Rio Grande River
Older alluvial deposits	Middle to Lower Pleistocene	Southeast, along Mescalero Ridge
Lacustrine and playa deposits	Holocene	Southwest, along I-10
Oregon		
Lacustrine and fluvial sedimentary rocks	Pleistocene	Northwest of Portland; southwest of Portland; southeast of Salem; southwest of Catlow Valley; southeast corner of Oregon; northern border; central east-west line; central north-south line
Sedimentary rocks	Pleistocene and Pliocene	Northwest of Portland; southwest of Portland; southeast of Salem
Terrace and pediment gravels	Pleistocene and Pliocene	Southeast corner of Oregon; central north-south line
Glacial deposits	Pleistocene	Southeast of Portland
Alluvial deposits	Holocene	Southwest of Catlow Valley; southeast corner of Oregon; northern border; eastern border, just west of Snake River; central north-south line
Playa deposits	Holocene	Southwest of Catlow Valley; southeast Oregon
Terrace, pediment, and lag deposits	Holocene and Pleistocene	Southeast Oregon
Landslide and debris-flow deposits	Holocene and Pleistocene	Eastern border, just west of Snake River; south of Medford
Dune sand	Holocene	Southeast corner of Oregon; central east-west line
Loess	Holocene and Pleistocene	Northern border
Glaciofluvial, lacustrine, and pediment sedimentary deposits	Pleistocene	Northern border
Fanglomerate (alluvial fan debris, slope wash, colluvium, and talis with fragments of basalt and andesite)		South of Medford; north of Medford; central east-west line; central north-south line

TABLE L-12 (Cont.)

Map Unit Descriptions	Age	General Location
Utah		
Alluvium	Quaternary	Uinta Mountains; Uinta Basin; central; southwest
Glacial deposits	Quaternary	Uinta Mountains; Uinta Basin
Older alluvial deposits	Quaternary	Uinta Basin; southeast
Mud and salt flats	Quaternary	Great Salt Lake Desert
Eolian deposits		Great Salt Lake Desert; southwest; southeast
Lake Bonneville deposits		Great Salt Lake Desert; central; north of Salt Lake City
Marshes		Great Salt Lake Desert
Alluvial deposits, gravel	Quaternary to Tertiary	Central
Washington		
Mass wasting deposits		Cascade Mountains
Alluvium		Cascade Mountains
Alpine glacial drift	Pleistocene	Cascade Mountains
Wyoming		
Alluvium, colluvium, pediments, fan deposits, and lacustrine deposits	Quaternary	Bighorn basin; Hanna Basin
Dunes and loess deposits	Quaternary	Wind River Basin
Landslide deposits	Quaternary	Great Divide Basin

[a] The Quaternary period includes the Pleistocene (1.8 million to 10,000 years ago) and the Holocene (10,000 years ago to the present) epochs. For units listing “Quaternary” as the unit age, the specific epochs were not differentiated on the state geologic map.

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APPENDIX M:

WATER RESOURCES

APPENDIX M:

WATER RESOURCES

TABLE M-1 Wild and Scenic Rivers by State

State	Wild and Scenic River	Designated Location and Length
Arizona	Verde	The northern boundary of the Scenic River area from the section line between Sections 26 and 27, the Gila-Salt River meridian, to the southern boundary, the Mazatzal Wilderness. The northern boundary of the Wild River Area from the boundary of the Mazatzal Wilderness to the southern boundary at the confluence of Red Creek with the Verde River. A total of 40.5 miles.
California	American (Lower)	From the confluence with the Sacramento River to the Nimbus Dam. A total of 23 miles.
	American (North Fork)	From a point 0.3 miles above Health Springs downstream to a point 1,000 feet upstream of Colfax-Iona Hill Bridge. A total of 38.3 miles.
	Big Sur	From the confluence of the South and North Forks downstream to the boundary of the Ventana Wilderness. The South Fork and the North Fork from their headwaters to their confluence. A total of 19.5 miles.
	Eel	From the mouth of the river to 100 yards below Van Ardsdale Dam. The Middle Fork from its confluence with the main stem to the southern boundary of the Yolla Bolly Wilderness Area. The South Fork from its confluence with the main stem to the Section Four Creek confluence. The North Fork from its confluence with the main stem to Old Gilman Ranch. The Van Duzen River from its confluence with the Eel River to Dinsmure Bridge. A total of 398 miles.
	Feather	The entire Middle Fork downstream from the confluence of its tributary streams 1 km south of Beckwourth, California. A total of 77.6 miles.
	Kern	The North Fork from the Tulare-Kern County line to its headwaters in Sequoia National Park. The South Fork from its headwaters in the Inyo National Forest to the southern boundary of the Domelands Wilderness in the Sequoia National Forest. A total of 151 miles.
	Kings	From the confluence of the Middle Fork and the South Fork to the point at elevation 1,595 feet above mean sea level. The Middle Fork from its headwaters at Lake Helen to its confluence with the main stem. The South Fork from its headwaters at Lake 11599 to its confluence with the main stem. A total of 81 miles.

TABLE M-1 (Cont.)

State	Wild and Scenic River	Designated Location and Length
California (Cont.)	Klamath	From the mouth to 3,600 feet below Iron Gate Dam. The Salmon River from its confluence with the Klamath to the confluence of the North and South Forks of the Salmon River. The North Fork of the Salmon River from the Salmon River confluence to the southern boundary of the Marble Mountain Wilderness Area. The South Fork of the Salmon River from the Salmon River confluence to the Cecilville Bridge. The Scott River from its confluence with the Klamath to its confluence with Schackleford Creek. All of Wooley Creek. A total of 286.0 miles.
	Merced	From its source (including Red Peak Fork, Merced Peak Fork, Triple Peak Fork, and Lyle Fork) in Yosemite National Park to a point 300 feet upstream of the confluence with Bear Creek. The South Fork from its source in Yosemite National Park to the confluence with the main stem. A total of 122.5 miles.
	Sespe	The main stem from its confluence with Rock Creek and Howard Creek downstream to where it leaves Section 26, T5N, R20W. A total of 31.5 miles.
	Sisquoc	From its origin downstream to the Los Padres National Forest boundary. A total of 33 miles.
	Smith	The segment from the confluence of the Middle Fork Smith River and the North Fork Smith River to its mouth at the Pacific Ocean. The Middle Fork from its the headwaters to its confluence with the North Fork Smith River, including Myrtle Creek, Shelly Creek, Kelly Creek, Packsaddle Creek, the East Fork of Patrick Creek, the West Fork of Patrick Creek, Little Jones Creek, Griffin Creek, Knopki Creek, Monkey Creek, Patrick Creek, and Hardscrabble Creek. The Siskiyou from its headwaters to its confluence with the Middle Fork, including the South Siskyou Fork of the Smith River. The South Fork from its headwaters to its confluence with the main stem, including Williams Creek, Eightmile Creek, Harrington Creek, Prescott Fork, Quartz Creek, Jones Creek, Hurdygurdy Creek, Gordon Creek, Coon Creek, Craigs Creek, Goose Creek, the East Fork of Goose Creek, Buch Creek, Muzzleloader Creek, Canthook Creek, Rock Creek, and Blackhawk Creek. The North Fork from the California-Oregon border to its confluence with the Middle Fork of the Smith River, including Diamond Creek, Bear Creek, Still Creek, the North Fork of Diamond Creek, High Plateau Creek, Stony Creek, and Peridotite Creek. A total of 325.4 miles.

TABLE M-1 (Cont.)

State	Wild and Scenic River	Designated Location and Length
California (Cont.)	Trinity	From the confluence with the Klamath River to 100 yards below Lewiston Dam. The North Fork from the Trinity River confluence to the southern boundary of the Salmon-Trinity Primitive Area. The South Fork from the Trinity River confluence to the California State Highway 36 bridge crossing. The New River from the Trinity River confluence to the Salmon-Trinity Primitive Area. A total of 203 miles.
	Toulomne	The main stem from its source to the Don Pedro Reservoir. A total length of 83 miles.
Colorado	Cache La Poudre	From Poudre Lake downstream to where the river intersects the easterly north-south line of the west half of the southwest quarter of Section 1, T8N, R71W of the sixth principal meridian. The South Fork from its source to Section 1, T7N, R73W of the sixth principal meridian; from its intersection with the easterly section line of Section 30 of the sixth principal meridian to the confluence with the main stem. A total of 76 miles.
Idaho	Clearwater (Middle Fork)	The Middle Fork from the town of Kooskia upstream to the town of Lowell. The Lochsa River from its confluence with the Selway River at Lowell (forming the Middle Fork) upstream to the Powell Ranger Station. The Selway River from Lowell upstream to its origin. A total of 185 miles.
	Rapid	The segment from the headwaters of the main stem to the national forest boundary. The segment of the West Fork from the wilderness boundary downstream to the confluence with the main stem. A total of 26.8 miles.
	Saint Joe	The segment above the confluence of the North Fork of the St. Joe River to St. Joe Lake. A total of 66.3 miles.
	Salmon	The segment of the main stem from the mouth of the North Fork of the Salmon River downstream to Long Tom Bar. A total of 125 miles.
	Salmon (Middle Fork)	From its origin to its confluence with the Main Salmon River. A total of 104 miles.
Montana	Flathead	The North Fork from the Canadian border downstream to its confluence with the Middle Fork. The Middle Fork from its headwaters to its confluence with the South Fork. The South Fork from its origin to the Hungry Horse Reservoir. A total of 219 miles.
	Missouri	From Fort Benton downstream to Robinson Bridge. A total of 149 miles.
Nevada	None	–

TABLE M-1 (Cont.)

State	Wild and Scenic River	Designated Location and Length
New Mexico	Jemez (East Fork)	From the Santa Fe National Forest boundary to its confluence with the Rio San Antonio. A total of 11 miles.
	Pecos	From its headwaters to the town of Terrerro. A total of 20.5 miles.
	Rio Chama	From El Vado Ranch launch site (immediately south of El Vado Dam) downstream for 24.7 miles.
	Rio Grande	The segment extending from the Colorado state line downstream approximately 68 miles to the west section line of Section 15, T23N, R10E. The lower 4 miles of the Red River. A total of 68.2 miles.
Oregon	Big Marsh Creek	From the northeast quarter of Section 15, T26S, R6E to the confluence with Crescent Creek. A total of 15 miles.
	Chetco	From its headwaters in the Kalmiopsis Wilderness to the Siskiyou National Forest boundary. A total of 44.5 miles.
	Clackamas	From Big Springs to Big Cliff. A total of 47 miles.
	Crescent Creek	From Big Springs to Big Cliff. A total of 10 miles.
	Crooked	From the National Grassland boundary to Dry Creek. A total of 15 miles.
	Crooked (North Fork)	From its source at Williams Prairie to 1 mile from its confluence. A total of 32.3 miles.
	Deschutes	From Wikiup Dam to the Bend Urban Growth boundary at the southwest corner of Section 13, T18S, R11E. From Odin Falls to the upper end of Lake Billy Chinook. From the Pelton Reregulating Dam to the confluence with the Columbia River. A total of 173.4 miles.
	Donner and Blitzen	From Wikiup Dam to the Bend Urban Growth boundary at the southwest corner of Section 13, T18S, R11E. From Odin Falls to the upper end of Lake Billy Chinook. From the Pelton Reregulating Dam to the confluence with the Columbia River. A total of 14.8 miles.
	Eagle Creek	From its headwaters below Eagle Lake to the Wallowa-Whitman National Forest boundary at Skull Creek. A total of 27 miles.
	Elk	The main stem from the confluence of the North and South Forks of the Elk River to Anvil Creek. The North Fork from the falls to the confluence with the South Fork. A total of 19 miles.

TABLE M-1 (Cont.)

State	Wild and Scenic River	Designated Location and Length
Oregon (Cont.)	Elkhorn Creek	The main stem from the confluence of the North and South Forks of the Elk River to Anvil Creek. The North Fork from the falls to the confluence with the South Fork. A total of 6.4 miles.
	Grande Ronde	The main stem from the confluence of the North and South Forks of the Elk River to Anvil Creek. The North Fork from the falls to the confluence with the South Fork. A total of 43.8 miles.
	Illinois	From the boundary of the Siskiyou National Forest downstream to its confluence with the Rogue River. A total of 50.4 miles.
	Imnaha	The main stem from the confluence of the North and South Forks of the Imnaha River to its mouth. The South Fork from its headwaters to the confluence with the main stem. A total of 77 miles.
	John Day	From Service Creek to Tumwater Falls. A total of 147.5 miles.
	John Day (North Fork)	From its headwaters in the North Fork of the John Day Wilderness Area to its confluence with Camas Creek. A total of 54.1 miles.
	John Day (South Fork)	From the Malheur National Forest boundary to the confluence with Smoky Creek. A total of 47 miles.
	Joseph Creek	From Joseph Creek Ranch, 1 mile downstream from Cougar Creek to the Wallowa-Whitman National Forest boundary. A total of 8.6 miles.
	Klamath	From the J.C. Boyle Powerhouse to the California-Oregon border. The Klamath River is in Klamath County 25 miles to the southwest of Klamath Falls in south-central Oregon. A total of 11 miles.
	Little Deschutes	From its source in the northwest quarter of Section 15, T26S, R6E to the north section line of Section 12, T26S, R7E. A total of 12 miles.
	Lostine	From its headwaters in the Eagle Cap Wilderness to the Wallowa-Whitman National Forest boundary. A total of 16 miles.
	Malheur	From Bosenberg Creek to the Malheur National Forest boundary. A total of 13.7 miles.
	Malheur (North Fork)	From its headwaters to the Malheur National Forest boundary. A total of 25.5 miles.
	McKenzie	From Clear Creek to Scott Creek, not including Carmen and Trail Bridge Reservoir Dams. A total of 12.7 miles.
	Metolius	From the Deschutes National Forest boundary to Lake Billy Chinook. A total of 28.6 miles.

TABLE M-1 (Cont.)

State	Wild and Scenic River	Designated Location and Length
Oregon (Cont.)	Minam	From its headwaters at the south end of Minam Lake to the Eagle Cap Wilderness boundary, 0.5 miles downstream from Cougar Creek. A total of 39 miles.
	North Powder	From its headwaters in the Elkhorn Mountains to the Wallowa-Whitman National Forest boundary. A total of 6 miles.
	North Umpqua	From Soda Springs powerhouse to the confluence with Rock Creek. A total of 33.8 miles.
	Owyhee	From Three Forks downstream to China Gulch. Crooked Creek to the Owyhee Reservoir. The South Fork from the Idaho-Oregon border downstream to Three Forks. A total of 120 miles.
	Owyhee (North Fork)	From the Oregon-Idaho state line to its confluence with the Owyhee River. A total of 9.6 miles.
	Powder	From Thief Valley Dam to the Highway 203 bridge. A total of 11.7 miles.
	Quartzville Creek	From the Willamette National Forest boundary to the slack water of Green Peter Reservoir. A total of 12 miles.
	Roaring	From its headwaters to the confluence with the Clackamas River. A total of 13.7 miles.
	Rogue	From the mouth of the Applegate River downstream to the Lobster Creek Bridge. A total of 84.5 miles.
	Rogue (Upper)	From the Crater Lake National Park boundary downstream to the Rogue River National Forest boundary at Prospect. A total of 40.3 miles.
	Salmon	From its headwaters to its confluence with the Sandy River. A total of 33.5 miles.
	Sandy	From the headwaters to the Mt. Hood National Forest boundary. From the east boundary of Sections 25 and 36, T1S, R4E downstream to the west line of the eastern half of the northeast quarter of Section 6, T1S, R4E. A total of 24.9 miles.
	Smith (North Fork)	From its headwaters to the Oregon-California state line. A total of 13 miles.
	Spargue (North Fork)	From the head of River Spring in the southwest quarter of Section 15, T35S, R16E to the northwest quarter of southwest Section 11, T35S, R15E. A total of 15 miles.
	Squaw Creek	From its source to the gauging station 800 feet upstream from the intake of McAllister Ditch. A total of 15.4 miles.

TABLE M-1 (Cont.)

State	Wild and Scenic River	Designated Location and Length
Oregon (Cont.)	Sycan	From the northeast quarter of Section 5, T34S, R17E to Coyote Bucket at the Fremont National Forest boundary. A total of 59 miles.
	Wallowa	The segment of the Wallowa River from the confluence of the Wallowa and Minam Rivers in the hamlet of Minam downstream to the confluence of the Wallowa and the Grande Ronde Rivers. A total of 10 miles.
	Wenaha	From the confluence of the North and South Forks to its confluence with the Grande Ronde River. A total of 21.6 miles.
	West Little Owyhee	From its headwaters to its confluence with the Owyhee River. A total of 57.6 miles.
	White	From Mount Hood National Forest to the confluence with the Deschutes River. A total of 46.8 miles.
	Wildhorse and Kiger Creek	Kiger Creek from its headwaters at the top of Kiger Gorge to the boundary of the Steens Mountain Wilderness Area. Wildhorse Creek from its headwaters to the private property line at the mouth of Wildhorse Canyon, into Section 34, township 34 south, range 33 east. Little Wildhorse Creek from its headwaters to its confluence with Wildhorse Creek. A total of 13.9 miles.
	Willamette (North Fork of the Middle Fork)	From Waldo Lake to the Willamette National Forest boundary. A total of 42.3 miles.
Utah	None	–
Washington	Klickitat	From the confluence with Wheeler Creek, near the town of Pitt, to the confluence with the Columbia River. A total of 10 miles.
	Skagit	The segment from the pipeline crossing at Sedro-Wooley upstream to and including the mouth of Bacon Creek. The Cascade River from its mouth to the junction of its North and South Forks; the South Fork to the boundary of the Glacier Peak Wilderness Area. The Suiattle River from its mouth to the boundary of the Glacier Peak Wilderness Area at Milk Creek. The Sauk River from its mouth to its junction with Elliott Creek. The North Fork of the Sauk River from its junction with the South Fork of the Sauk to the boundary of the Glacier Peak Wilderness Area. A total of 157.5 miles.
	White Salmon	From its confluence with Gilmer Creek, near the town of BZ Corner, to its confluence with Buck Creek. A total of 9 miles.
Wyoming	Yellowstone (Clarks Fork)	From Crandall Creek Bridge downstream to the north boundary of Section 13, T56N, R104W at Clarks Fork Canyon. A total of 20.5 miles.

Source: NPS (2006b).

TABLE M-2 Designation Classification and Administration Authority for Wild and Scenic Rivers in the 11 Western States

State	Wild and Scenic River	Administering Agency	Designation Classification and Length (miles)			Total Designated Miles
			Wild	Scenic	Recreational	
Arizona	Verde	FS	22.2	18.3	–	40.5
California	American (Lower)	State of California	–	–	23.0	23.0
	American (North Fork)	FS	26.3	–	–	26.3
		BLM	12.0	–	–	12.0
	Big Sur	FS	19.5	–	–	19.5
	Eel	State of California	36.0	22.5	250.5	309.0
		FS	35.0	–	–	35.0
		BLM	21.0	4.5	6.5	32.0
		Round Valley Reservation	5.0	1.0	16.0	22.0
	Feather	FS	32.9	9.7	35.0	77.6
	Kern	FS	96.1	20.9	7.0	124.0
		NPS	27.0	–	–	27.0
	Kings	FS	16.5	–	9.0	25.5
		NPS	49.0	–	6.5	55.5
	Klamath	State of California	–	3.0	41.0	44.0
		FS	12.0	21.0	177.5	210.5
		BLM	–	–	1.5	1.5
		Hoopa Valley Reservation	–	–	29.0	29.0
		NPS	–	–	1.0	1.0
	Merced	FS	15.0	2.0	12.5	29.5
		NPS	53.0	14.0	14.0	81.0
		BLM	3.0	–	9.0	12.0
	Sespe Creek	FS	27.5	4.0	–	31.5
	Sisquoc	FS	33.0	–	–	33.0
	Smith	State of California	–	0.5	28.5	29.0
		FS	78.0	30.5	187.9	296.4
	Trinity	State of California	2.0	11.0	24.0	37.0
		FS	42.0	22.0	71.0	135.0
		BLM	–	–	17.0	17.0
		Hoopa Valley Reservation	–	6.0	8.0	14.0
	Tuolomne	FS	7.0	6.0	13.0	26.0
		NPS	37.0	17.0	–	54.0
		BLM	3.0	–	–	3.0

TABLE M-2 (Cont.)

State	Wild and Scenic River	Administering Agency	Designation Classification and Length (miles): Wild	Scenic	Recreational	Total Designated Miles
Colorado	Cache La Poudre	FS	18.0	–	46.0	64.0
		NPS	12.0	–	–	12.0
Idaho	Clearwater (Middle Fork)	FS	54.0	–	131.0	185.0
	Rapid	FS	26.8	–	–	26.8
	Saint Joe	FS	26.6	–	39.7	66.3
	Salmon	FS	79.0	–	46.0	125.0
	Salmon (Middle Fork)	FS	103.0	–	1.0	104.0
Montana	Flathead	FS and NPS	97.9	49.5	71.6	219.0
	Missouri	BLM	64.0	26.0	59.0	149.0
Nevada	None					
New Mexico	Jemez (East Fork)	FS	4.0	5.0	2.0	11.0
	Pecos	FS	13.5	–	7.0	20.5
	Rio Chama	FS and BLM	19.8	4.9	–	24.7
	Rio Grande	FS and BLM	53.2	–	2.5	55.7
Oregon	Big Marsh Creek	FS	–	–	15.0	15.0
	Chetco	FS	25.5	8.0	11.0	44.5
	Clackamas	FS	–	20.0	27.0	47.0
	Crescent Creek	FS	–	–	10.0	10.0
	Crooked	BLM	–	–	15.0	15.0
	Crooked (North Fork)	FS	–	6.3	9.1	15.4
		BLM	11.9	2.2	4.7	18.8
	Deschutes	FS	–	11.0	43.4	54.4
		BLM	–	19.0	100.0	119.0
	Donner and Blitzen	BLM	14.8	–	–	14.8
	Eagle Creek	FS	4.0	6.0	17.0	27.0
	Elk	FS	2.0	–	17.0	19.0
	Elkhorn Creek	FS	5.8	–	–	5.8
		BLM	–	0.6	–	0.6

TABLE M-2 (Cont.)

State	Wild and Scenic River	Administering Agency	Designation Classification and Length (miles) Wild	Scenic	Recreational	Total Designated Miles
Oregon (Cont.)	Grande Ronde	FS	17.4	–	1.5	18.9
		BLM	9.0	–	15.9	24.9
	Illinois	FS	28.7	17.9	3.8	50.4
	Imnaha	FS	15.0	4.0	58.0	77.0
	John Day	BLM	–	–	147.5	147.5
	John Day (North Fork)	FS	27.8	10.5	15.8	54.1
	John Day (South Fork)	BLM	–	–	47.0	47.0
	Joseph Creek	FS	8.6	–	–	8.6
	Klamath	State of Oregon and BLM	–	11.0	–	11.0
	Little Deschutes	FS	–	–	12.0	12.0
	Lostine	FS	5.0	–	11.0	16.0
	Malheur	FS	–	7.0	6.7	13.7
	Malheur (North Fork)	FS	–	25.5	–	25.5
	McKenzie	FS	–	–	12.7	12.7
	Metolius	FS	–	17.1	11.5	28.6
	Minam	FS	39.0	–	–	39.0
	North Powder	FS	–	6.0	–	6.0
	North Umpqua	FS	–	–	25.4	25.4
		BLM	–	–	8.4	8.4
	Owyhee	BLM	120.0	–	–	120.0
	Owyhee (North Fork)	BLM	9.6	–	–	9.6
	Powder	BLM	–	11.7	–	11.7
	Quartzville Creek	BLM	–	–	12.0	12.0
	Roaring	FS	13.5	–	0.2	13.7
	Rogue	FS	13.0	7.5	17.0	37.5
		BLM	20.6	–	26.4	47.0
	Rogue (Upper)	FS	6.1	34.2	–	40.3

TABLE M-2 (Cont.)

State	Wild and Scenic River	Administering Agency	Designation Classification and Length (miles): Wild	Scenic	Recreational	Total Designated Miles
Oregon (Cont.)	Salmon	FS	15.0	–	10.5	25.5
		BLM	–	4.8	3.2	8.0
	Sandy	FS	4.5	–	7.9	12.4
		BLM	–	3.8	8.7	12.5
	Smith (North Fork)	FS	8.5	4.5	–	13.0
	Spargue (North Fork)	FS	–	15.0	–	15.0
	Squaw Creek	FS	6.6	8.8	–	15.4
	Sycan	FS	–	50.4	8.6	59.0
	Wallowa	State of Oregon and BLM	–	–	10.0	10.0
	Wenaha	FS	18.7	2.7	0.2	21.6
	West Little Owyhee	BLM	57.6	–	–	57.6
	White	FS	–	6.5	15.6	22.1
		BLM	–	17.8	6.9	24.7
	Wildhorse and Kiger Creeks	BLM	13.9	–	–	13.9
	Willamette (North Fork of the Middle Fork)	FS	8.8	6.5	27.0	42.3
Utah	None					
Washington	Klickitat	FS	–	–	10.0	10.0
	Skagit	FS	–	99.0	58.5	157.5
	White Salmon	FS	–	9.0	–	9.0
Wyoming	Yellowstone (Clarks Fork)	FS	20.5	–	–	20.5

Source: National Wild and Scenic River System (2006).

TABLE M-3 Length of Rivers Crossing Section 368 Corridors under the Proposed Action and Their Associated HLRs

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
Arizona	Dam	Bartlett Dam	2,764	12
Arizona	Stream	Chevelon Canyon	24,621	12, 13, 17
Arizona	Stream	Colorado River	4,318	5
Arizona	Stream	Kanab Creek	6,603	13
Arizona	Stream	Sacramento Wash	11,488	14
Arizona	Stream	Verde River	8,245	10, 12, 18
Arizona	Stream, intermittent	Agua Fria River	5,203	12, 14
Arizona	Stream, intermittent	Beaver Dam Wash	4,199	14
Arizona	Stream Intermittent	Big Bug Creek	3,152	18
Arizona	Stream, intermittent	Big Sandy River	3,749	12
Arizona	Stream, intermittent	Boulder Creek	5,679	17
Arizona	Stream, intermittent	Buck Mountain Wash	37,549	14
Arizona	Stream, intermittent	Burro Creek	754	17
Arizona	Stream, intermittent	Castanada Wash	3,631	14
Arizona	Stream, intermittent	Castle Dome Wash	280	14
Arizona	Stream, intermittent	Centennial Wash	15,871	14
Arizona	Stream, intermittent	Clayhole Wash	6,092	12
Arizona	Stream, intermittent	Copper Wash	2,180	14
Arizona	Stream, intermittent	Crozier Wash	755	14
Arizona	Stream, intermittent	Detrital Wash	4,540	14
Arizona	Stream, intermittent	Dutchman Draw	7,858	12
Arizona	Stream, intermittent	Fourth of July Wash	4,164	12
Arizona	Stream, intermittent	Hassayampa River	9,772	14
Arizona	Stream, intermittent	Hualapai Wash	4,079	14
Arizona	Stream, intermittent	Hurricane Wash	5,460	17
Arizona	Stream, intermittent	Jackrabbit Wash	30,455	14
Arizona	Stream, intermittent	Johnson Wash	7,805	17
Arizona	Stream, intermittent	Miller Wash	3,615	17
Arizona	Stream, intermittent	NONE GIVEN	423	14
Arizona	Stream, intermittent	Red Horse Wash	30,105	17
Arizona	Stream, intermittent	Sycamore Creek	4,701	14
Arizona	Stream, intermittent	Tonto Creek	3,163	12
Arizona	Stream, intermittent	Tyson Wash	1,281	14
Arizona	Stream, intermittent	Vekol Wash	5,946	14
Arizona	Stream, intermittent	Waterman Wash	5,366	14
Arizona	Stream, intermittent	West Chevelon Canyon	7,741	12
Arizona	Stream, intermittent	White Sage Wash	3,554	17
Arizona	Stream, intermittent	Willow Creek	3,984	17
California	Aqueduct	Los Angeles Aqueduct	26,217	14
California	Canal	All American Canal	91,861	14
California	Canal	Coachella Canal	31	14
California	Dam	Stampede Dam	964	12, 18

TABLE M-3 (Cont.)

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
California	Stream	Bear River	4,198	16
California	Stream	Jenny Creek	2,519	15
California	Stream	Long Valley Creek	1,010	14
California	Stream	Mad River	4,265	16
California	Stream	Owens River	4,983	14
California	Stream	Sacramento River	8,807	16, 18, 20
California	Stream	South Fork Trinity River	10,937	18
California	Stream, intermittent	Cottonwood Creek	457	12
California	Stream, intermittent	Coyote Wash	5,320	5
California	Stream, intermittent	Deep Creek	3,766	17
California	Stream, intermittent	Homer Wash	3,823	14
California	Stream, intermittent	La Posta Creek	551	12
California	Stream, intermittent	Little Dixie Wash	3,478	14
California	Stream, intermittent	Mojave River	2,609	14
California	Stream, intermittent	Piute Wash	2,405	12
California	Stream, intermittent	Secret Creek	7,071	17
California	Stream, intermittent	Woods Wash	4,456	14
Colorado	Stream	Arkansas River	812	18
Colorado	Stream	Badger Creek	2,390	18
Colorado	Stream	Beaver Creek	4,675	17
Colorado	Stream	Big Blue Creek	4,352	18
Colorado	Stream	Blue River	1,635	18
Colorado	Stream	Cebolla Creek	4,324	8
Colorado	Stream	Cedar Creek	9,857	17
Colorado	Stream	Clear Creek	2,383	17
Colorado	Stream	Colorado River	58,417	12, 17, 18
Colorado	Stream	Cottonwood Creek	2,867	18
Colorado	Stream	Currant Creek	545	18
Colorado	Stream	Dolores River	1,477	17
Colorado	Stream	Dry Creek	8,142	17, 18
Colorado	Stream	Dry Fork Piceance Creek	2,482	17
Colorado	Stream	East Fork Dry Creek	1,708	18
Colorado	Stream	Fourmile Creek	589	18
Colorado	Stream	Gunnison River	2,269	18
Colorado	Stream	Little Snake River	187	8
Colorado	Stream	Lost Canyon Creek	5,531	18
Colorado	Stream	Morapos Creek	827	18
Colorado	Stream	Naturita Creek	2,223	18
Colorado	Stream	Piceance Creek	9,217	17
Colorado	Stream	Plateau Creek	13,218	17
Colorado	Stream	Roan Creek	1,701	17
Colorado	Stream	Rock Creek	4,944	12

TABLE M-3 (Cont.)

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
Colorado	Stream	Roubideau Creek	2,825	13, 17
Colorado	Stream	San Miguel River	3,780	17, 18
Colorado	Stream	South Arkansas Creek	1,587	18
Colorado	Stream	Spring Creek	10,819	5, 12
Colorado	Stream	West Mancos River	3,253	18
Colorado	Stream	White River	5,069	17
Colorado	Stream	Williams Fork	30,479	18
Colorado	Stream	Willow Creek	10,640	13, 17
Colorado	Stream, intermittent	Crooked Wash	23,023	17
Colorado	Stream, intermittent	Deception Creek	5,689	12
Colorado	Stream, intermittent	Deep Channel Creek	2,837	17
Colorado	Stream, intermittent	Dripping Rock Creek	1,969	17
Colorado	Stream, intermittent	Hamilton Creek	5,692	18
Colorado	Stream, intermittent	Red Wash	11,241	17
Colorado	Stream, intermittent	Stinking Water Creek	4,907	17
Colorado	Stream, intermittent	Wolf Creek	5,669	17
Idaho	Canal	Milner Gooding Canal	2,547	5
Idaho	Canal	X Canal	4,077	5
Idaho	Stream	Beaver Creek	6,827	12, 15, 17
Idaho	Stream	Bennett Creek	4,170	14
Idaho	Stream	Catherine Creek	119	10
Idaho	Stream	Coeur d’Alene River	343	18
Idaho	Stream	Little Canyon Creek	4,137	10, 14
Idaho	Stream	Medicine Lodge Creek	534	18
Idaho	Stream	North Cottonwood Creek	541	15
Idaho	Stream	Picket Creek	459	14
Idaho	Stream	Rabbit Creek	2,680	15
Idaho	Stream	Salmon Falls Creek	492	10, 15
Idaho	Stream	Snake River	6,453	5, 10, 14
Idaho	Stream	South Fork Coeur d’Alene River	6,762	18
Idaho	Stream	Squaw Creek	14,573	5, 10
Idaho	Stream, intermittent	Birch Creek	3,774	14
Idaho	Stream, intermittent	Canyon Creek	3,501	15
Idaho	Stream, intermittent	Deep Creek	4,458	10
Idaho	Stream, intermittent	Pot Hole Creek	4,049	10
Idaho	Stream, intermittent	Sailor Creek	6,365	10
Idaho	Stream, intermittent	Sinker Creek	1,008	14
Montana	Dam	Clark Canyon Dam	1,523	12
Montana	Stream	Big Beaver Creek	2,217	17
Montana	Stream	Big Hole River	2,063	12
Montana	Stream	Big Pipestone Creek	3,539	18
Montana	Stream	Boulder River	9,981	12

TABLE M-3 (Cont.)

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
Montana	Stream	Cabin Creek	371	17
Montana	Stream	Clark Fork	28,460	12, 15, 17, 18
Montana	Stream	Deadman Creek	4,602	17
Montana	Stream	Frying Pan Gulch	1,401	14
Montana	Stream	Grasshopper Creek	1,482	17
Montana	Stream	Medicine Lodge Creek	2,950	12
Montana	Stream	Moose Creek	407	18
Montana	Stream	Ninemile Creek	1,537	15
Montana	Stream	Prickly Pear Creek	7,250	18
Montana	Stream	Saint Regis River	98,019	18
Montana	Stream	Willow Creek	1,493	18
Nevada	Stream	Carson River	8	5
Nevada	Stream	Coal Mine Creek	339	15
Nevada	Stream	Cottonwood Creek	13,140	15
Nevada	Stream	Coyote Creek	463	14
Nevada	Stream	Duck Creek	9,543	14
Nevada	Stream	Ellison Creek	1,917	15
Nevada	Stream	Humboldt River	55,738	5, 10, 14, 15, 17
Nevada	Stream	Marys River	8,825	15
Nevada	Stream	McDermitt Creek	3,582	15
Nevada	Stream	Muddy River	5,157	5
Nevada	Stream	Nelson Creek	45,578	15
Nevada	Stream	NONE GIVEN	13,604	5, 14
Nevada	Stream	Pahranagat Wash	25,331	14
Nevada	Stream	Quinn River	4,539	10, 14
Nevada	Stream	Rock Creek	1,023	17
Nevada	Stream	Salmon Falls Creek	30,811	10, 14, 15, 17
Nevada	Stream	Secret Creek	508	10, 14
Nevada	Stream	Steptoe Creek	1,406	15
Nevada	Stream	Susie Creek	8,177	15
Nevada	Stream	Tabor Creek	181	5
Nevada	Stream	Town Creek	26,483	14
Nevada	Stream	Truckee Canal	30,752	5
Nevada	Stream	Truckee River	4,575	17
Nevada	Stream	White River	2,103	14
Nevada	Stream, intermittent	Amargosa River	21,321	14
Nevada	Stream, intermittent	Big Spring Wash	14,487	14
Nevada	Stream, intermittent	Boulder Creek	900	14
Nevada	Stream, intermittent	California Wash	7,755	14
Nevada	Stream, intermittent	Coyote Wash	3,646	14
Nevada	Stream, intermittent	Deer Creek	5,016	14
Nevada	Stream, intermittent	Fortymile Wash	3,739	14

TABLE M-3 (Cont.)

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
Nevada	Stream, intermittent	Granite Spring Wash	3,848	10
Nevada	Stream, intermittent	Gypsum Wash	3,147	14
Nevada	Stream, intermittent	Jackson Wash	7,963	10, 14
Nevada	Stream, intermittent	Jumbo Wash	14,533	12, 15
Nevada	Stream, intermittent	Kane Springs Wash	29,829	14
Nevada	Stream, intermittent	Lava Beds Creek	3,754	10
Nevada	Stream, intermittent	NONE GIVEN	78,928	5, 12, 14, 15
Nevada	Stream, intermittent	Ragan Creek	1,958	14
Nevada	Stream, intermittent	Rock Valley Wash	1,789	14
Nevada	Stream, intermittent	Spring Creek	3,550	14
Nevada	Stream, intermittent	Topopah Wash	3,528	14
Nevada	Stream, intermittent	Toquop Wash	3,752	14
Nevada	Stream, intermittent	Washburn Creek	3,512	15
Nevada	Stream, intermittent	Willow Creek	3,815	14
New Mexico	Stream	Pecos River	328	12
New Mexico	Stream	Rio Puerco	3,592	17
New Mexico	Stream	Rio Salado	13,948	17
New Mexico	Stream, intermittent	Betonnie Tsosie Wash	3,367	12
New Mexico	Stream, intermittent	Burro Cienaga	41	5
New Mexico	Stream, intermittent	Burro Draw	2,126	13
New Mexico	Stream, intermittent	Cow Springs Draw	2,053	5
New Mexico	Stream, intermittent	Escavada Wash	1,836	12
New Mexico	Stream, intermittent	Farmington Glade	341	17
New Mexico	Stream, intermittent	Nogal Canyon	1,150	18
New Mexico	Stream, intermittent	Rio Salado	1,546	14, 15
New Mexico	Stream, intermittent	San Jose Arroyo	3,504	14
Oregon	Stream	Burnt River	14,000	15, 17
Oregon	Stream	Clackamas River	3,861	19
Oregon	Stream	Clear Creek	11,118	9
Oregon	Stream	Cow Creek	685	18
Oregon	Stream	Crooked Creek	5,778	5, 10, 15
Oregon	Stream	Deschutes River	2,565	15
Oregon	Stream	East Fork Dairy Creek	2,023	16
Oregon	Stream	Evans Creek	5,113	12
Oregon	Stream	Grave Creek	3,685	18
Oregon	Stream	Jordan Creek	1,334	10
Oregon	Stream	Malheur River	7,487	15
Oregon	Stream	Oregon Canyon Creek	4,829	5, 15
Oregon	Stream	Owyhee River	1,199	10, 15
Oregon	Stream	South Myrtle Creek	1,486	18
Oregon	Stream	Succor Creek	1,287	15
Oregon	Stream	Sycan River	4,010	12

TABLE M-3 (Cont.)

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
Oregon	Stream	Trout Creek	3,760	14
Utah	Stream	Bear Creek	3,055	12
Utah	Stream	Beaver River	4,037	10
Utah	Stream	Brush Creek	691	17
Utah	Stream	Cliff Creek	4,186	17
Utah	Stream	Grassy Trail Creek	1,579	17
Utah	Stream	Green River	12,602	5, 8, 12, 17
Utah	Stream	Hatch Wash	22,207	18
Utah	Stream	Kaibab Gulch	3,505	17
Utah	Stream	Lost Spring Wash	5,155	12
Utah	Stream	Mill Creek	2,765	12, 18
Utah	Stream	Moody Wash	4,558	12
Utah	Stream	Old Channel Sevier River	5,573	5
Utah	Stream	Pack Creek	6,279	18
Utah	Stream	Paria River	5,217	17
Utah	Stream	Price River	3,411	12, 17
Utah	Stream	Saleratus Wash	1,215	12
Utah	Stream	Sevier River	4,911	3, 17
Utah	Stream	Soldier Creek	6,875	17
Utah	Stream	Spanish Fork	4,602	15
Utah	Stream	Virgin River	6,598	12
Utah	Stream	Willow Creek	15,751	12, 17
Utah	Stream, intermittent	Browns Wash	2,462	12
Utah	Stream, intermittent	Cottonwood Wash	13,037	14
Utah	Stream, intermittent	East Canyon Wash	30,525	18
Utah	Stream, intermittent	Floy Wash	152	12
Utah	Stream, intermittent	Little Grand Wash	13,878	12
Utah	Stream, intermittent	Mud Spring Wash	5,426	14
Utah	Stream, intermittent	NONE GIVEN	16,468	15
Utah	Stream, intermittent	Pine Valley Wash	3,928	14, 15
Utah	Stream, intermittent	The Big Wash	7,488	15
Utah	Stream, intermittent	Thompson Wash	10,746	12
Utah	Stream, intermittent	Wah Wah Wash	3,695	15
Washington	Stream	Beckler River	326	19
Washington	Stream	Deception Creek	280	19
Washington	Stream	Entiat River	45	18
Washington	Stream	Nason Creek	13,216	20
Washington	Stream	South fork Skykomish River	3,145	19
Washington	Stream	Tye River	3,060	19
Washington	Stream	Yakima River	5,994	16
Wyoming	Stream	Bitter Creek	3,742	12, 17
Wyoming	Stream	Black Butte Creek	5,181	12

TABLE M-3 (Cont.)

State	Water Body Type	Name	Total Length (feet)[a]	HLR[b]
Wyoming	Stream	Blacks Fork	4,030	5, 18
Wyoming	Stream	Bridger Creek	2,001	5
Wyoming	Stream	Casper Creek	6,686	5, 12
Wyoming	Stream	Currant Creek	2,140	12
Wyoming	Stream	Deadman Wash	203	12
Wyoming	Stream	Dry Creek	2,321	5
Wyoming	Stream	Fivemile Creek	5,660	5
Wyoming	Stream	Green River	1,202	5
Wyoming	Stream	Greybull River	1,531	5
Wyoming	Stream	Killpecker Creek	11,534	12
Wyoming	Stream	Little Bitter Creek	1,753	12
Wyoming	Stream	Medicine Bow River	837	12
Wyoming	Stream	Muddy Creek	4,995	12, 17
Wyoming	Stream	Nowater Creek	3,572	13
Wyoming	Stream	Saint Marys Creek	4,554	13
Wyoming	Stream	Salt Wells Creek	3,711	12
Wyoming	Stream	Sand Spring Creek	1,180	12
Wyoming	Stream	Smiths Fork	1,338	5
Wyoming	Stream	South Fork Casper Creek	6,824	12
Wyoming	Stream	South Fork Powder River	2,794	12
Wyoming	Stream	Sugar Creek	2,620	12
Wyoming	Stream, intermittent	Alkali Creek	15,075	5
Wyoming	Stream, intermittent	Barrel Springs Draw	144	12
Wyoming	Stream, intermittent	Black Rock Creek	2,809	12
Wyoming	Stream, intermittent	East Fork Nowater Creek	3,503	12
Wyoming	Stream, intermittent	Foster Gulch	29,328	5, 12
Wyoming	Stream, intermittent	Greasewood Wash	7,940	12
Wyoming	Stream, intermittent	Kirby Creek	1,415	17
Wyoming	Stream, intermittent	Muddy Creek	20,528	5, 12, 13, 17
Wyoming	Stream, intermittent	North Barrel Springs Draw	3,547	8
Wyoming	Stream, intermittent	Salt Sage Creek	285	12
Wyoming	Stream, intermittent	Sand Creek	8,673	5, 12
Wyoming	Stream, intermittent	Separation Creek	177	12
Wyoming	Stream, intermittent	Sevenmile Gulch	1,434	5
Wyoming	Stream, intermittent	West Branch Willow Creek	5,670	12

[a] Total length is the length of the river segment intercepted by the corridor footprint.

[b] Multiple HLRs can occur for a given stream because there may be more than one stream intercept.

APPENDIX N:

FLOODPLAIN/WETLAND ASSESSMENT OF THE EFFECTS OF ENERGY CORRIDOR DESIGNATION IN THE 11 WESTERN STATES

APPENDIX N:

FLOODPLAIN/WETLAND ASSESSMENT OF THE EFFECTS OF ENERGY CORRIDOR DESIGNATION IN THE 11 WESTERN STATES

N.1 INTRODUCTION

The DOE, BLM, and cooperating agencies propose to designate energy transport corridors in an 11-state area of the western United States, including Washington, Oregon, California, Idaho, Nevada, Montana, Wyoming, Colorado, Utah, Arizona, and New Mexico. Corridor designation is intended to facilitate the establishment of ROWs in these states, and to minimize the environmental impacts of ROW construction by avoiding sensitive resources.

This floodplain/wetland assessment has been prepared, pursuant to Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), and DOE regulations for implementing these Executive Orders as set forth in 10 CFR 1022 (Compliance with Floodplain and Wetland Environmental Review Requirements), to evaluate potential impacts to floodplains and wetlands from the designation of energy corridors in the 11-state area.

N.2 DESCRIPTION OF THE ALTERNATIVES

Under the No Action Alternative, consolidated energy transport corridors would not be designated in the 11-state area. Future energy transport projects would typically not cross federal lands within common, shared, energy transport corridors, but rather use separate ROWs. Future energy transport projects would continue to be evaluated on an individual, project-by-project basis, and there would be no comprehensive process for implementing energy transport projects and ensuring consistency across federal lands.

Under the Proposed Action, approximately 6,055 miles of energy transport corridors, with a nominal 3,500-foot width, would be designated on federal lands throughout the 11-state area of the western United States (Figure N-1). Many of the corridor segments under the Proposed Action would include locally designated energy corridors that are currently designated in federal land use plans. Energy transport projects proposed for the corridors would incorporate by reference this PEIS for their environmental analyses, and would also be required to do additional project-specific NEPA analyses.

N.3 FLOODPLAINS ALONG THE DESIGNATED CORRIDORS

Executive Order 11988, "Floodplain Management," requires all federal agencies to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Floodplain values include the attenuation of the extent of flooding, which (1) reduces the risk of flood loss; (2) minimizes the impacts of floods on human safety, health, and welfare; and (3) supports wetlands, fish, and wildlife. Title 10 of the *Code of Federal Regulations*, Part 1022 (10 CFR 1022), sets forth DOE guidelines for implementing Executive Order 11988.

Base floodplains are the lowlands adjoining inland and coastal waters where there is a 1.0% chance of flooding in any given year, also referred to as the 100-year floodplain. Under 10 CFR 1022, floodplain boundaries may be determined from Flood Insurance Rate Maps or Flood Hazard Boundary Maps prepared by FEMA.

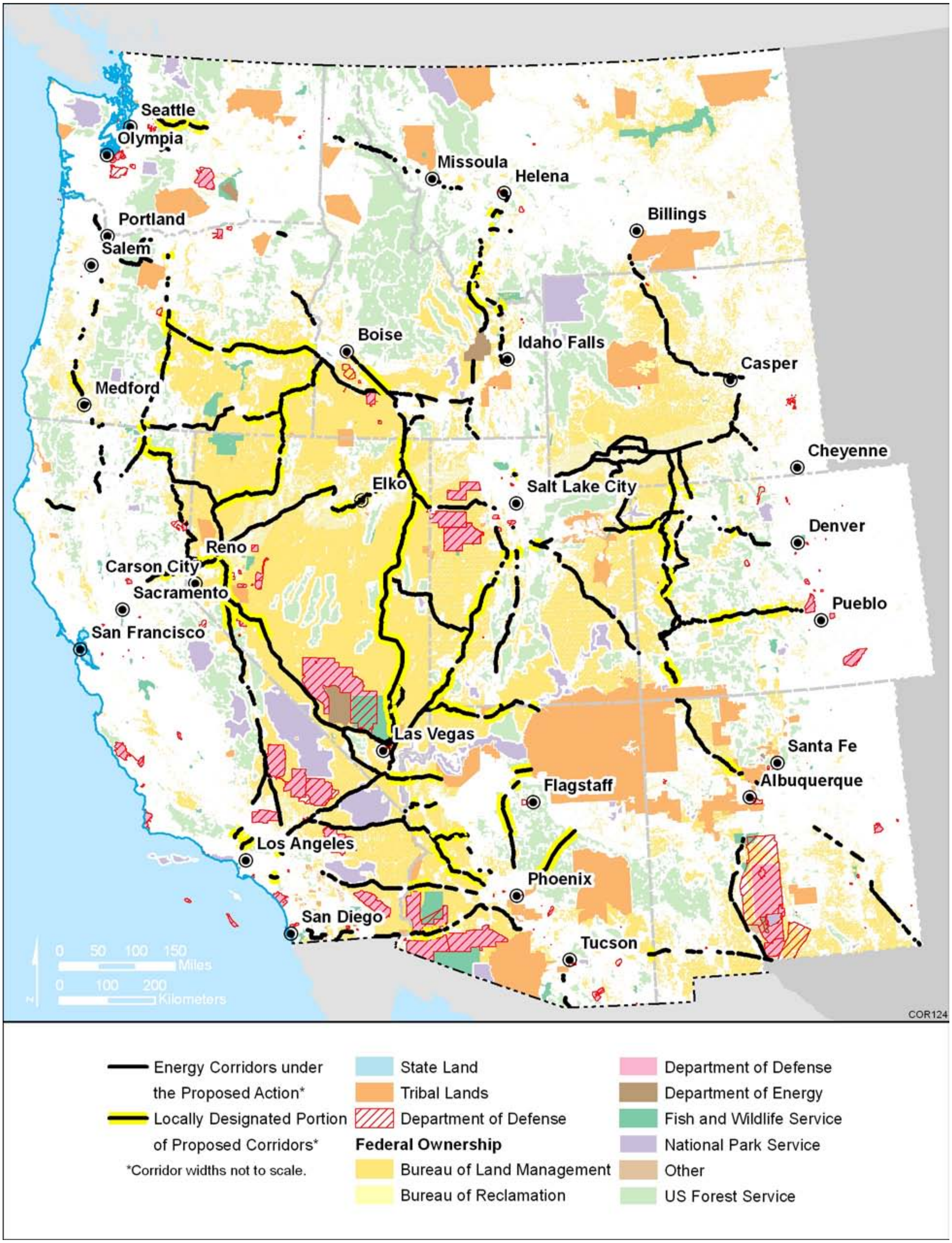

FIGURE N-1 Corridors Proposed for Designation

Critical action floodplains are at a minimum 500-year floodplains (floodplains with a 0.2% chance of flooding in any given year), in which a federal agency action would occur for which even a slight chance of flooding would be too great (such as the storage of highly volatile, toxic, or water reactive materials). The federal agency action for this assessment is the designation of energy corridors; no critical action floodplains occur along the corridors.

The 100-year floodplains in the vicinity of the corridors were determined from FEMA floodplain maps. Although floodplain data is available for many portions of the 11-state area, floodplains are not mapped in many areas remote from human development.

N.4 WETLANDS ALONG THE DESIGNATED CORRIDORS

Executive Order 11990, "Protection of Wetlands," requires all federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Title 10 of the *Code of Federal Regulations*, Part 1022 (10 CFR 1022), sets forth DOE guidelines for implementing Executive Order 11990.

Under 10 CFR 1022, wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas. Wetlands may be identified by the USFWS National Wetlands Inventory.

Wetlands provide a number of valuable functions within the landscape (NRC 1995). Surface water storage in wetlands provides for the absorption of stormwater flows, recharging groundwater as well as reducing downstream flood peaks and subsequent damage from floodwaters. Wetlands help maintain water quality by the retention and removal of dissolved substances, sediments, and contaminants. The transformation and cycling of elements in wetlands maintain nutrient levels that promote wood production. Many fish and wildlife species depend on wetlands for habitat. These species contribute to the recreational and aesthetic values of wetlands.

Wetlands occurring throughout the 11-state area are extremely varied, and include a number of wetland types such as marshes, bogs, vernal pools, and forested wetlands. Wetland types, along with general hydrologic and geologic landscape features, tend to vary by ecoregion. Descriptions of the ecoregions, and many of the wetland types within them, that occur in the 11-state area are presented in Appendix O. Wetland areas are typically inundated or have saturated soils for a portion of the growing season, and support plant communities that are adapted to saturated soil conditions. Streambeds, mudflats, gravel beaches, and rocky shores are wetland areas that may be unvegetated (Cowardin et al. 1979).

Over much of this area, riparian habitats are an important feature on the landscape. Riparian vegetation communities occur along rivers, perennial and intermittent streams, lakes, reservoirs, and at springs. These communities generally form a vegetation zone along the margin, distinct from the adjacent upland area in species composition and density. Riparian communities are dependent on the stream flows or reservoir levels and are strongly influenced by the hydrologic regime, which affects the frequency, depth, and duration of flooding or soil saturation. Riparian communities may include wetlands; however, the upper margins of riparian zones may be only infrequently inundated.

Wetlands are often associated with perennial water sources, such as springs, perennial segments of streams, or lakes and ponds. Riparian areas and wetlands are valued because of the important services they provide within the landscape, such as providing fish and wildlife habitat, maintaining water quality, and flood control. Total wetland area present within each of the 11 states, on the basis of estimates from the 1980s, ranges from about 236,350 acres in Nevada to 1,393,900 acres in Oregon (Table N-1). These estimates represent less than 2.5% of the total surface area of any of the 11 states, and less than 1% of the total state surface area for six of the states.

N.5 EFFECTS OF THE ALTERNATIVES

The relative impacts of potential ROW construction under the two alternatives under consideration, No Action and the Proposed Action (designate new and currently approved corridors), are presented below. The Proposed Action does not specify complete corridors that would represent a fully integrated energy transport network. For this alternative, ROWs that would connect the corridor segments designated by the alternative would need to be constructed to complete the transmission network. These unspecified ROWs could follow a variety of paths across the landscape on other federal and nonfederal land, with varying degrees of resulting impact on ecological resources.

TABLE N-1 Wetland Area in the 11 Western States, 1980s Estimates

State	Wetland Area (acres)	Percent of Surface Area
Arizona	600,000	0.8
California	454,000	0.4
Colorado	1,000,000	1.5
Idaho	385,700	0.7
Montana	840,300	0.9
Nevada	236,350	0.3
New Mexico	481,900	0.6
Oregon	1,393,900	2.2
Utah	558,000	1.0
Washington	938,000	2.1
Wyoming	1,250,000	2.0

Source: Dahl (1990).

Although the proposed corridor designations intersect with floodplain and wetland areas across the 11 states, these designations do not in themselves result in direct effects on floodplains and wetlands. However, it is expected that following corridor designation and land use plan modification, ROWs could be constructed within the corridors and intervening areas connecting corridor segments. The impacts described here are impacts common to ROW construction and would occur if construction occurs, regardless of the alternative chosen.

The construction and placement of some pipelines, electricity transmission line support structures, and access roads, along with the establishment of temporary work areas, could occur within 100-year floodplains. The presence of support structures and excavated soils from footings would result in the displacement of a small amount of floodplain volume and flood storage capacity of 100-year floodplains.

Impacts to wetlands include direct impacts of facility construction, routine operations, and spills, as well as indirect effects. Indirect effects may occur within the corridor or outside the corridor on other federal or nonfederal land, and they may include changes in water quality or hydrologic regime (such as timing, depth, and duration of inundation or soil saturation), changes in soils (such as compaction, sedimentation, or erosion), or changes in vegetation community structure or species composition. These impacts are associated with both the elimination of wetland habitat and the degradation of habitat from activities occurring to a wetland adjacent to or within the watershed of a wetland. The construction of facilities, access roads, and electrical transmission towers, could potentially result in the direct loss of wetlands from the placement of fill material. Construction of pipeline stream crossings, where directional drilling is not used, and access road bridges could also result in losses of wetland habitat. Wetland losses could result in the localized reduction or loss of wetland functions.

Many types of wetlands occur within the 11-state area. However, throughout the region wetlands are frequently associated with perennial streams, including floodplain and riparian wetlands and seeps and springs that feed these streams. Wetlands that are associated with intermittent streams would be expected to occur along the tributaries of these streams and rivers. Springs supporting wetlands may occur along either perennial or intermittent streams. The degree of impacts to wetlands would depend on the degree of wetland development along the perennial streams, lakes, and ponds identified, the presence of associated tributaries with wetland habitats, other wetlands within the corridor segments, and the degree to which wetlands could be avoided during ROW construction.

N.5.1 Effects of the No Action Alternative on Floodplains

Under the No Action Alternative, ROW planning and development would proceed without coordination or expedited systematic planning. Individual project proponents would independently identify preferred routes and project design. More ancillary facilities such as access roads, pumping stations, and electrical substations (with greater amounts of land disturbance) would likely be developed if ROWs were not colocated. Therefore, there is a greater possibility that more energy transport ROW development would occur under the No Action Alternative. Consequently, there is the possibility that there would be more total development under No Action with potentially greater impacts to floodplains. Under No Action, individual project proponents would not benefit from the expedited permitting facilitated by the Proposed Action. Therefore, under this alternative, development may proceed at a slower pace, resulting in less impact to floodplains because of increased time to site projects, obtain permits, and meet multiple permitting requirements.

N.5.2 Effects of the Proposed Action on Floodplains

The designation of corridors under the Proposed Action would not directly affect floodplains. ROW construction under the Proposed Action, if energy transport projects are authorized for the designated corridors, is expected to have less impact than under No Action because there would be a greater likelihood for colocation of energy transport facilities and fewer project-specific ROWs overall. Consequently, it is anticipated that there could be less potential impact to floodplains. Under the Proposed Action, there is a greater likelihood that fewer lands under nonfederal jurisdiction would be crossed than under No Action. Consequently, there is a greater possibility that energy corridors under the Proposed Action would undergo more consistent environmental review. The length and area of floodplain crossings by designated corridors under the Proposed Action are given in Table N-2.

TABLE N-2 Floodplain Areas Crossed by Corridors under the Proposed Action

State	Total Miles	Total Acres
Arizona	10	7,176
California	10	3,667
Idaho	1	263
Nevada	9	3,595
New Mexico	1	323
Oregon	0	248
Washington	1	173
Wyoming	1	510
Total	33	15,955

TABLE N-3 Streams Crossed by Corridors under the Proposed Action

State	Number of Streams	Miles of Stream
Arizona	37	55
California	20	36
Colorado	41	52
Idaho	21	15
Montana	15	31
Nevada	45	98
New Mexico	12	6
Oregon	17	14
Utah	32	44
Washington	7	5
Wyoming	37	34
Total	285[a]	390

[a] Does not equal sum of column due to multiple intersections of some streams.

N.5.3 Effects of the No Action Alternative on Wetlands

Under the No Action Alternative, individual project proponents would independently identify preferred routes and project designs, and it is likely more ancillary facilities would be developed than under the Proposed Action. Consequently, there is the possibility that there would be more total development under No Action, with potentially greater impacts to wetlands. However, under this alternative, impacted habitats would be less likely to be repeatedly affected by additional projects, as could occur under the Proposed Action, and restoration of impacted areas would more likely progress uninterrupted. Under No Action, individual project proponents would not benefit from the expedited permitting facilitated by the Proposed Action. Therefore, under this alternative, development may proceed at a slower pace, resulting in less impact to wetlands, because of increased time to site projects, obtain permits, and meet multiple permitting requirements.

N.5.4 Effects of Corridor Designation on Wetlands

The designation of corridors under the Proposed Action is not expected to directly affect wetlands. Wetlands that are crossed by the proposed corridors may be affected by project development within the designated corridors if energy transport projects are authorized. The wetland types associated with the ecoregions for each state would be potentially affected by corridor development (see Section 3.8 for a discussion of ecoregion impacts under the alternatives). However, avoidance of wetland concentration areas, as well as other sensitive ecological resources, was considered during corridor routing. Across much of the 11-state region, riparian zones along rivers and streams represent important and sensitive habitats. The number of perennial and intermittent named streams crossed by the corridor segments under the Proposed Action in each of the 11 states are presented in Table N-3. The stream length represents the total length of streams lying within the corridor segments. Riparian habitats are also located along many of the unnamed intermittent streams that are tributaries of these water bodies. Under this alternative, 287 streams occur within the corridor segments, with a total stream length of 385 miles. Additional stream crossings would be expected to occur within the ROWs that would be constructed between these corridor segments.

N.6 CONCLUSIONS

Direct impacts to floodplains and wetlands would not occur as a result of the implementation of either of the alternatives. The designation of energy transport corridors and associated amendment of land use plans would not result in direct impacts to wetlands or floodplains. However, if energy transport projects were authorized within designated corridors, their construction (including pipelines, electricity transmission lines, and ancillary facilities) within or outside of designated corridors could result in impacts to wetlands and floodplains, ranging from small indirect effects to losses of wetland or floodplain area or functions. Such impacts would be evaluated in site- and project-specific analyses.

Executive Order 11990, “Protection of Wetlands,” requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial uses of wetlands. Title 10 of the *Code of Federal Regulations*, Part 1022 (10 CFR 1022), sets forth DOE regulations for implementing Executive Order 11990 as well as Executive Order 11988, “Floodplain Management.” Unavoidable impacts to wetlands would require a Clean Water Act (CWA) Section 404 permit from the U.S. Army Corps of Engineers and CWA Section 401 Water Quality Certification from the state. Mitigative measures, possibly including compensatory mitigation, might be stipulated in these permits. A mitigation plan would be required prior to the initiation of construction.

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APPENDIX O:

ECOREGION DESCRIPTIONS

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ECOREGION DESCRIPTIONS

An ecoregion is defined as an area that has a general similarity of ecosystems and is characterized by the spatial pattern and composition of biotic and abiotic features, including vegetation, wildlife, geology, physiography, climate, soils, land use, and hydrology (EPA 2006). Ecoregions of the United States as mapped and described by the U.S. Environmental Protection Agency (EPA) are presented here as the basis for describing visual resources and ecosystems at a general level. The Level III ecoregion classification includes 34 ecoregions covering the 11-state area (Figures O-1 through O-12). Thirty of the ecoregions would contain federally designated energy corridors under the Proposed Action. The ecoregion descriptions presented here are derived primarily from EPA (2002), except where noted.

Coast Range. The Coast Range ecoregion is located along the coasts of Washington, Oregon, and California. The elevation ranges from 0 to 4,000+ feet, and the ecoregion is approximately 20,600 square miles in size. Topography ranges from beaches and low terraces to steeply sloping capes and volcanic slopes. The dominant types of vegetation originally were Sitka spruce and coastal redwood forests along the coast, with a mosaic of western red cedar, western hemlock, and seral Douglas-fir in the inland areas. The low Coast Range mountains support highly productive coniferous forests, and the area is now widely managed for timber production and supports extensive plantations of Douglas-fir. Due to the high precipitation levels, there are numerous streams and rivers. High scenic values attract many recreationists. Logging, wildlife habitat, dairy farming, recreation, and rural residential, residential, and commercial development are important land uses within the ecoregion.

Puget Lowland. The Puget Lowland ecoregion occurs entirely within the state of Washington, and is about 6,300 square miles in size. Located within a continental glacial trough, it includes numerous islands, peninsulas, and bays. The ground moraines, outwash plains, floodplains, and terraces originally supported coniferous forest; however, this ecoregion now supports a mix of pastures, croplands, forests, and urban centers (Pater et al. undated), including Portland and Seattle. Forest composition is influenced by a maritime climate and the rain shadow of the Olympic Mountains.

Willamette Valley. The Willamette Valley ecoregion occurs primarily in Oregon, with a small portion in southwestern Washington. Elevation ranges from 0 to 2,200 feet, and the ecoregion is approximately 5,750 square miles in size. This broad, lowland valley includes terraces, floodplains, and rolling hills. A few buttes and low mountains occur. Originally supporting rolling prairies, deciduous and coniferous forests, and extensive wetlands, the Willamette Valley is now an important agricultural region, supporting pastureland; small grain, timber, fruit, and vegetable production; and vineyards (University of Oregon 1999). The ecoregion includes the Portland urban area. Salem is a smaller urban area within the ecoregion.

Cascades. The Cascades ecoregion occurs primarily in Washington and Oregon, with a small portion in California. Elevation ranges from 600 to 14,400 feet, and the ecoregion is approximately 17,930 square miles in size. This mountainous ecoregion contains steep ridges and river valleys in the west and a high plateau in the east. Landscape includes westerly-trending mountain ridges and steeply sloping mountains and scattered lakes in glacial-rock basins, as

FIGURE O-1 Level III Ecoregions of the 11 Western States

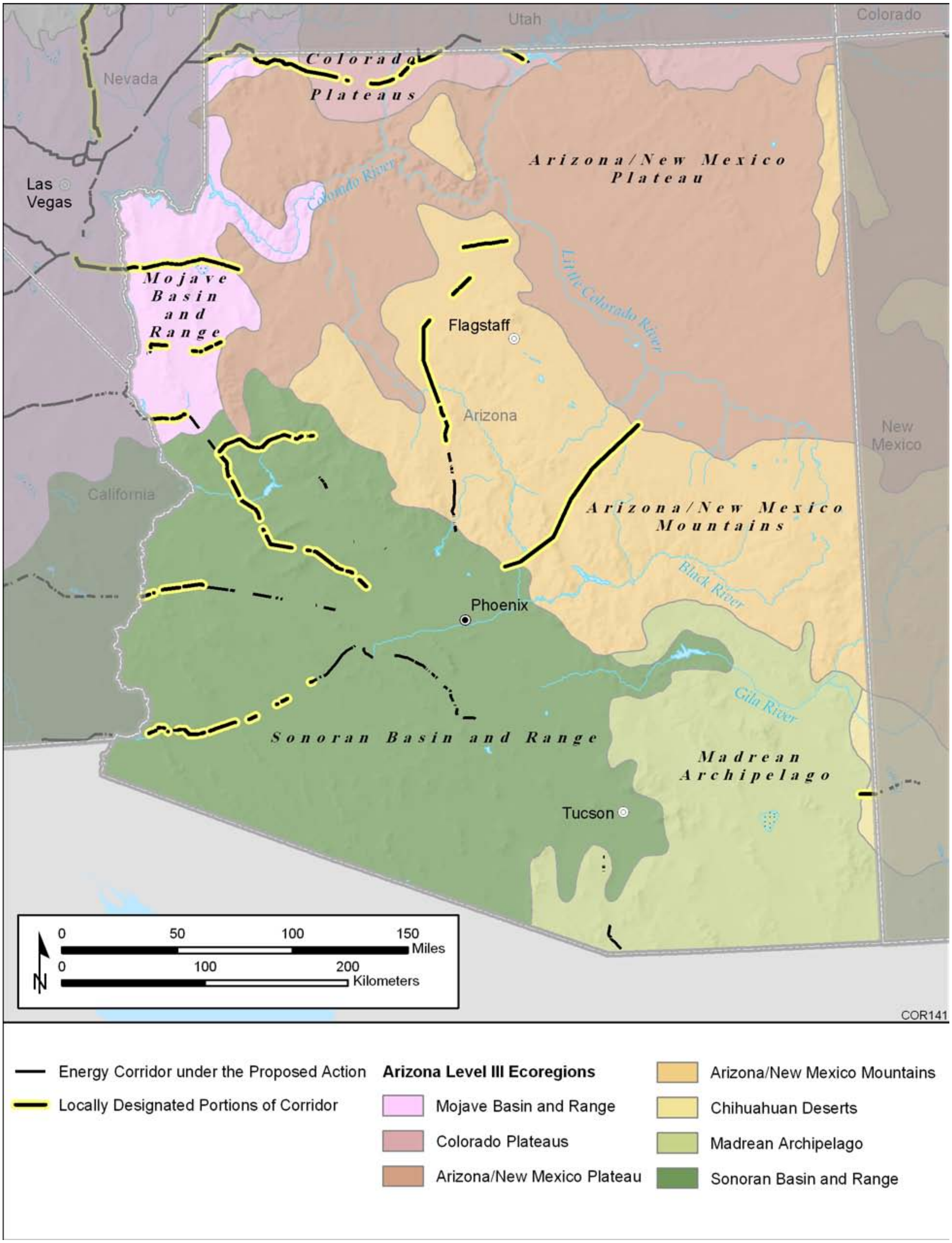

FIGURE O-2 Level III Ecoregions of Arizona and the Proposed Energy Corridors

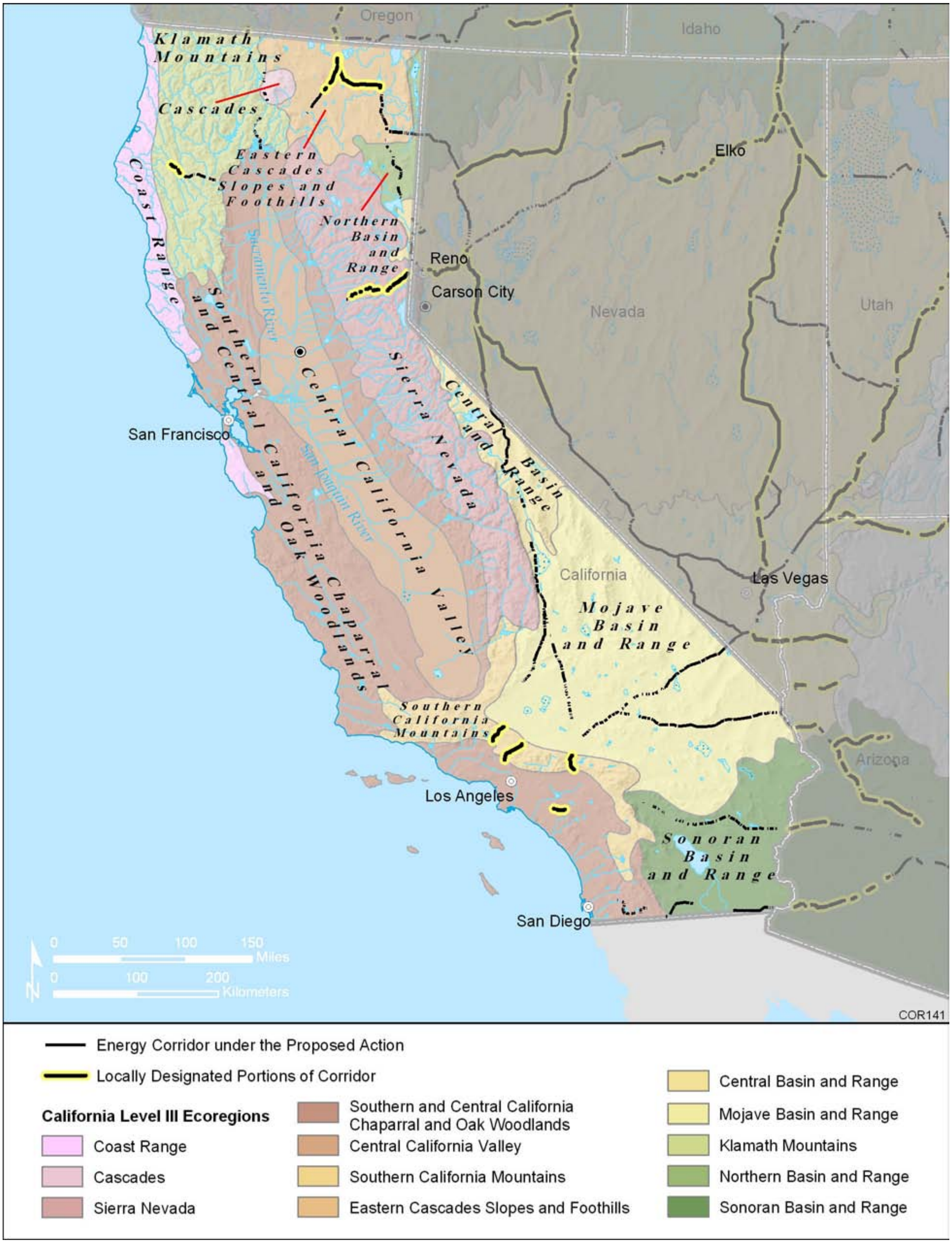

FIGURE O-3 Level III Ecoregions of California and the Proposed Energy Corridors

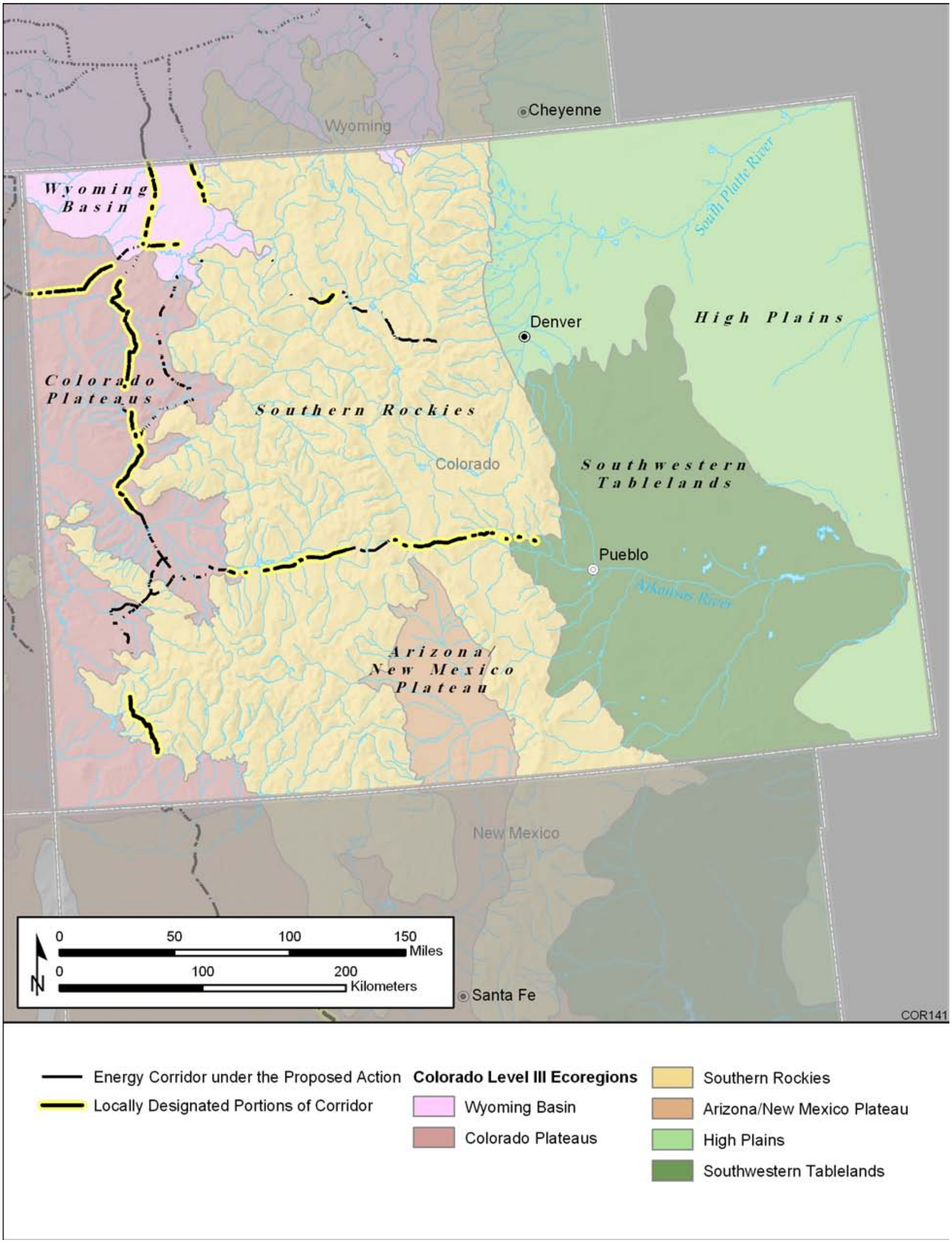

FIGURE O-4 Level III Ecoregions of Colorado and the Proposed Energy Corridors

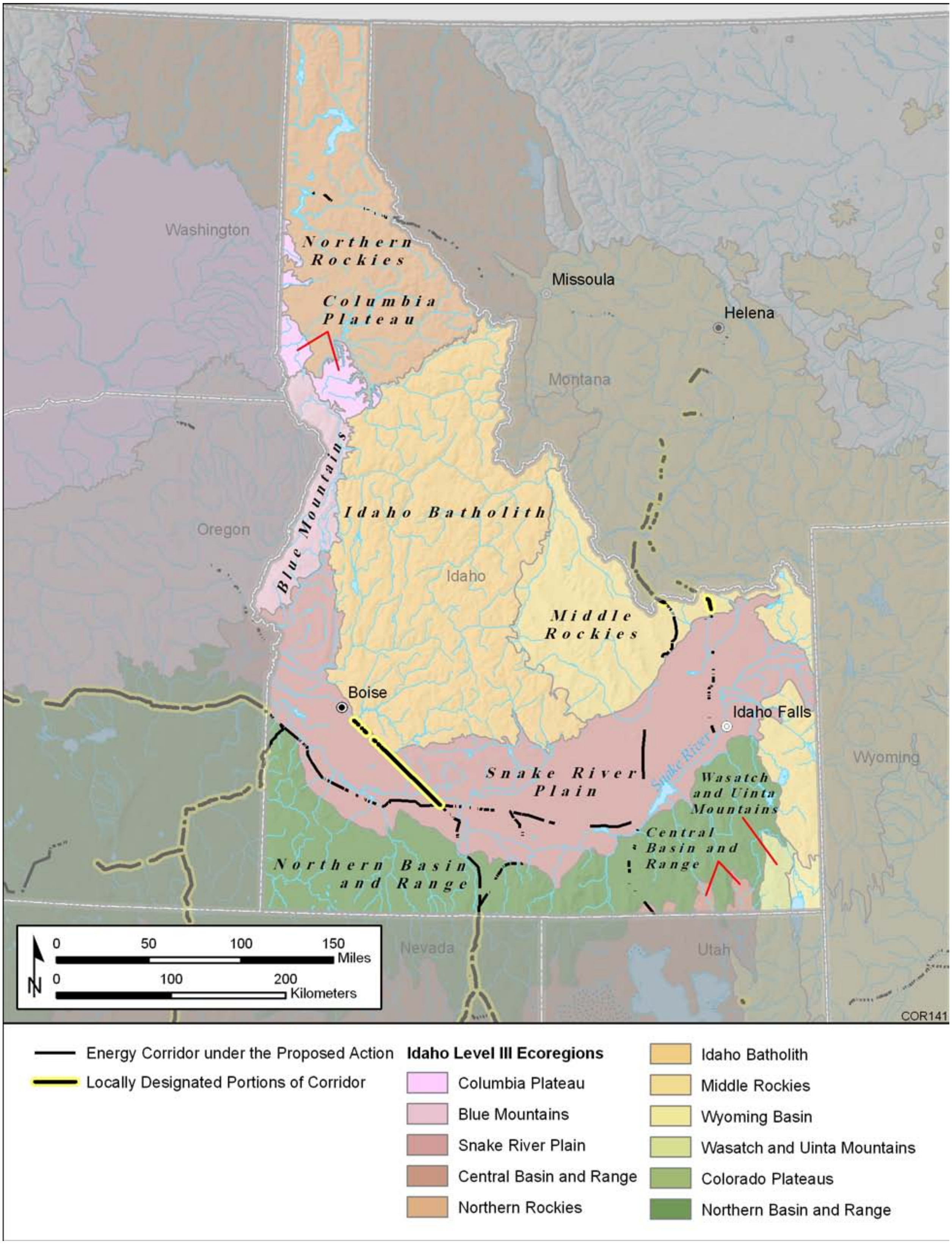

FIGURE O-5 Level III Ecoregions of Idaho and the Proposed Energy Corridors

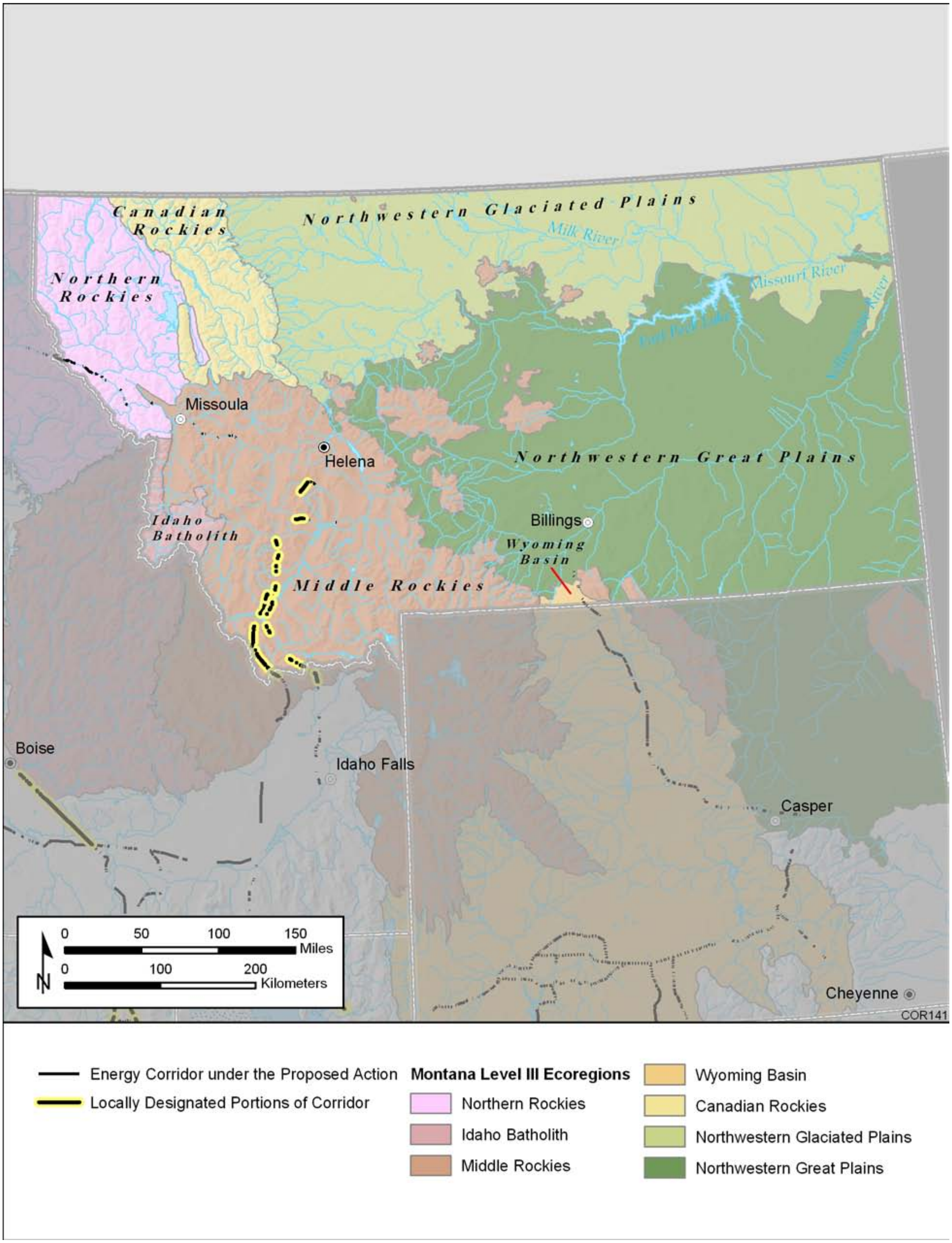

FIGURE O-6 Level III Ecoregions of Montana and the Proposed Energy Corridors

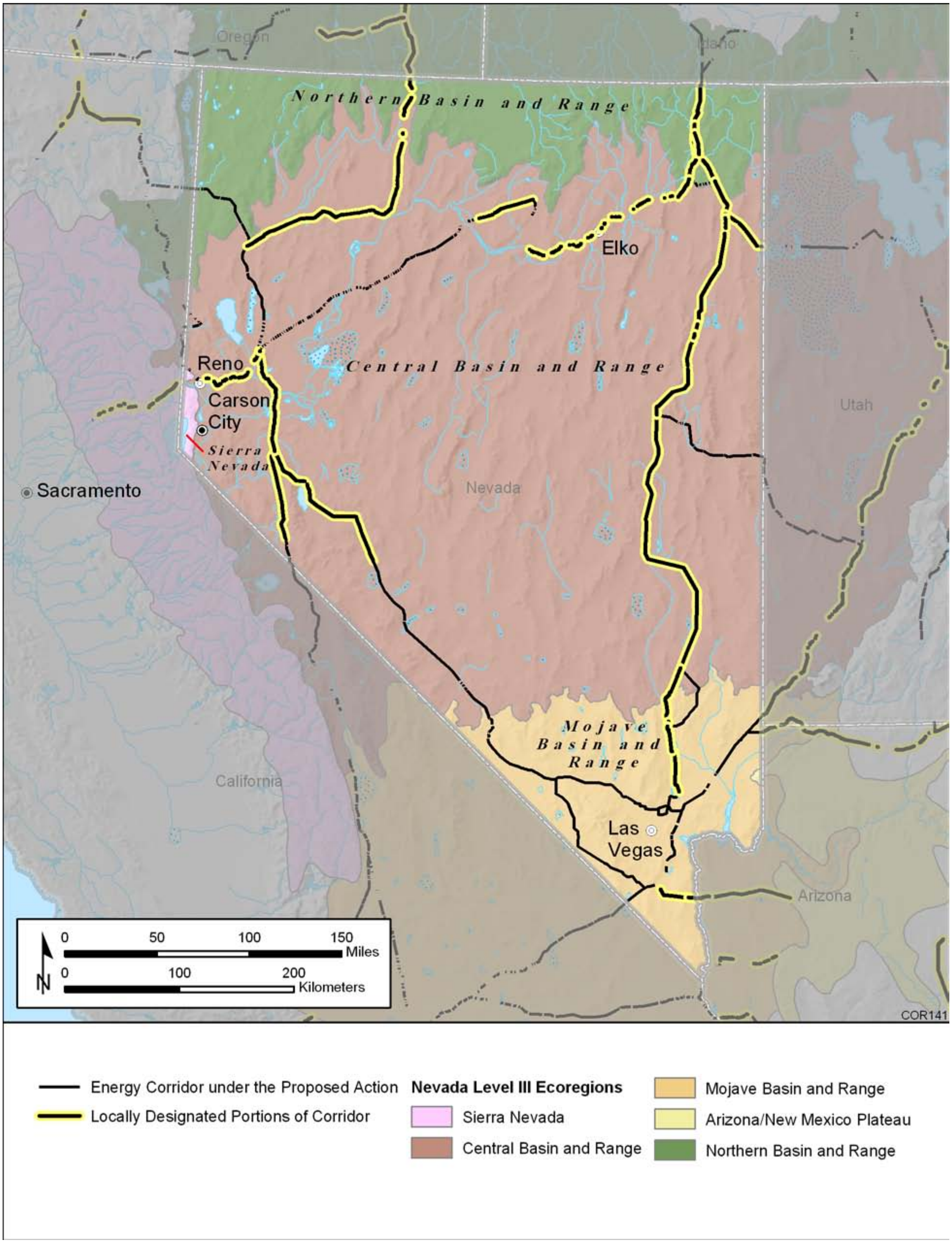

FIGURE O-7 Level III Ecoregions of Nevada and the Proposed Energy Corridors

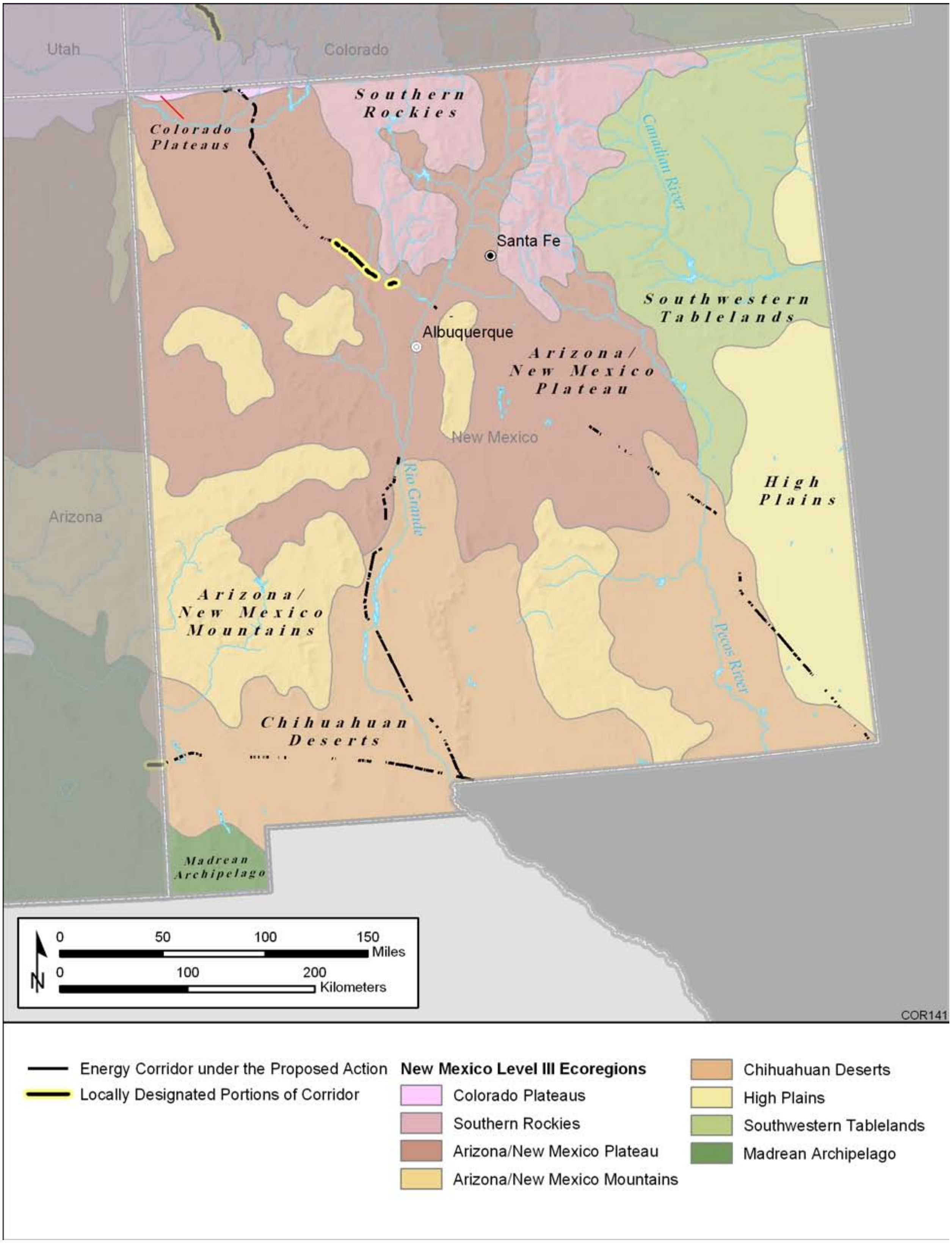

FIGURE O-8 Level III Ecoregions of New Mexico and the Proposed Energy Corridors

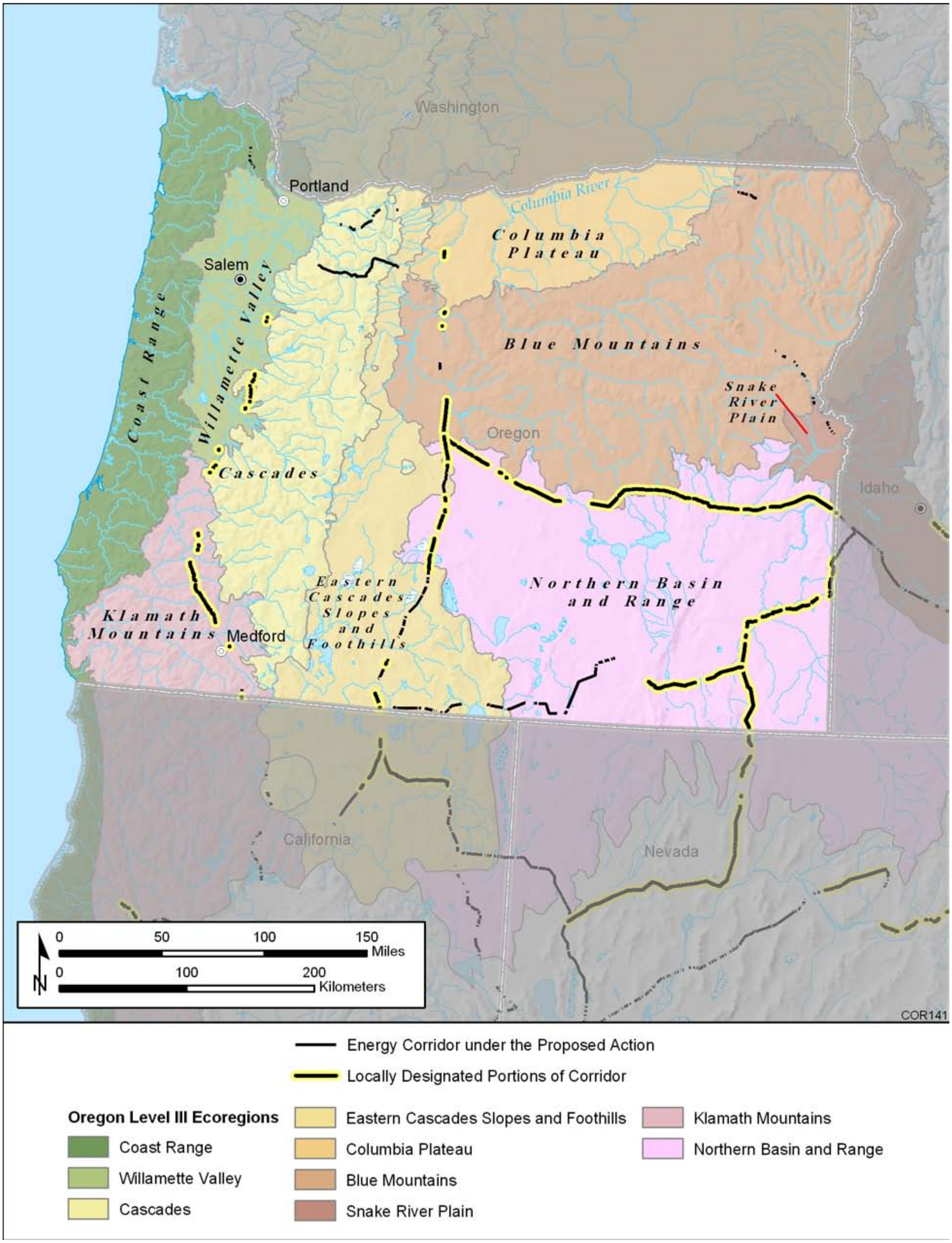

FIGURE O-9 Level III Ecoregions of Oregon and the Proposed Energy Corridors

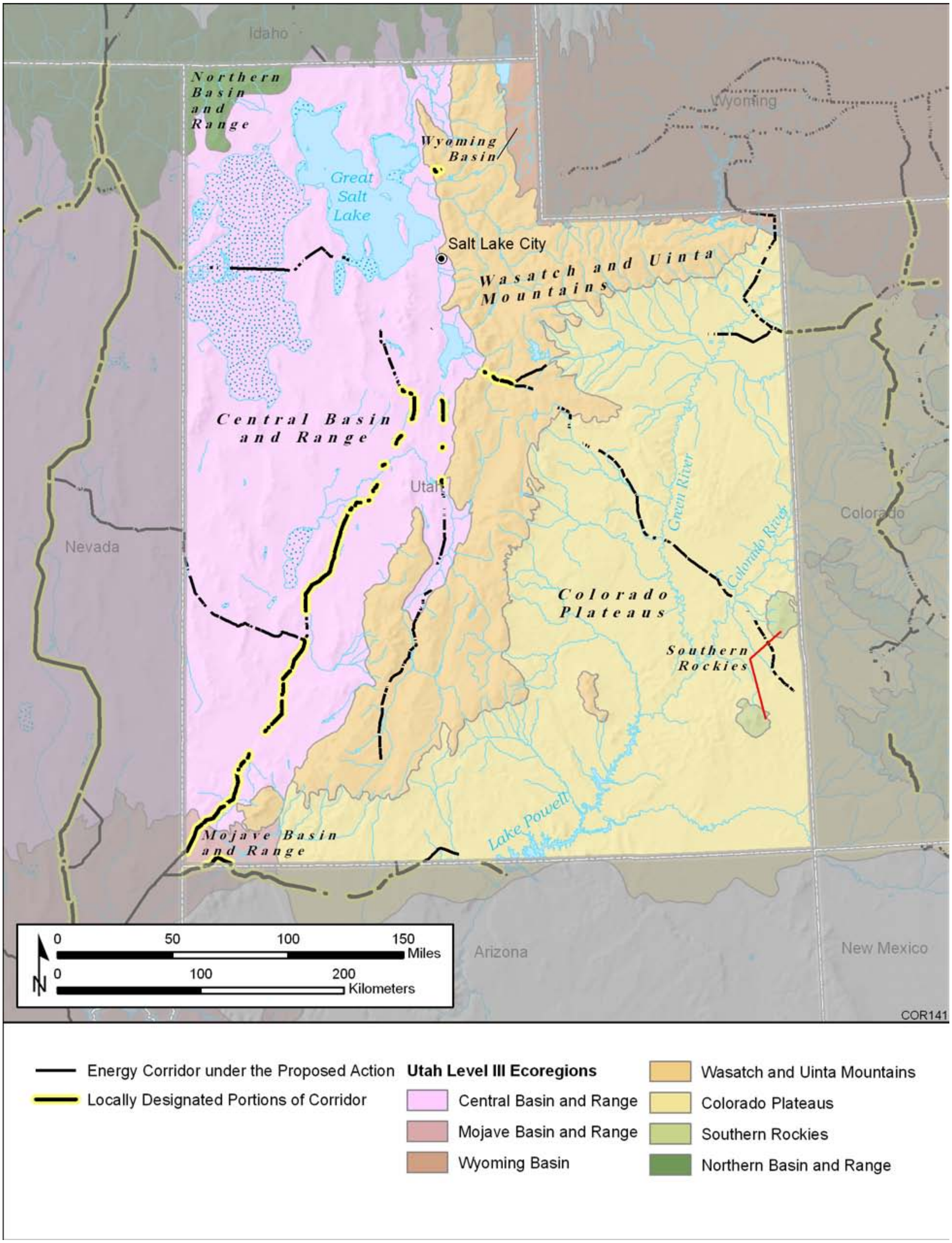

FIGURE O-10 Level III Ecoregions of Utah and the Proposed Energy Corridors

FIGURE O-11 Level III Ecoregions of Washington and the Proposed Energy Corridors

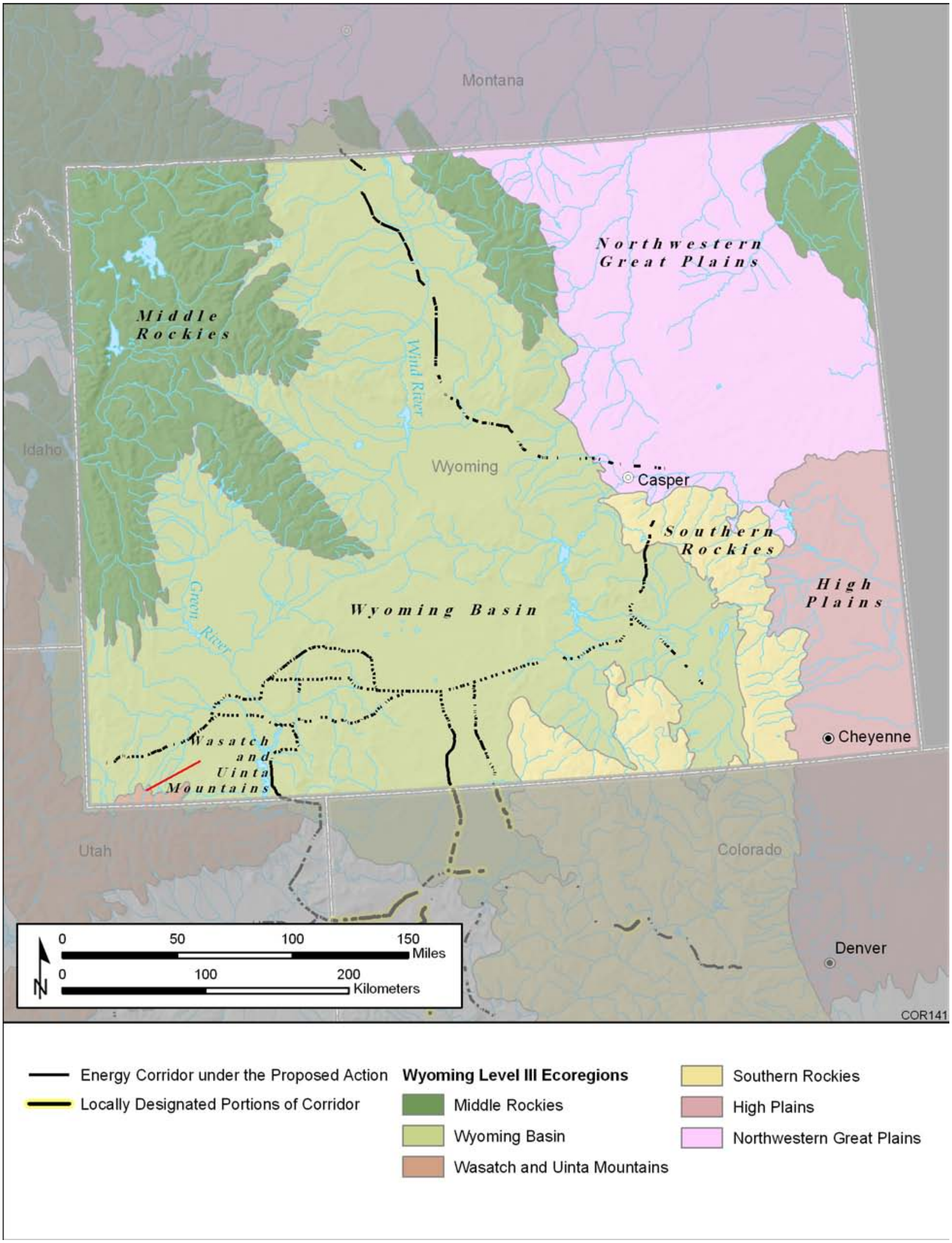

FIGURE O-12 Level III Ecoregions of Wyoming and the Proposed Energy Corridors

well as glaciers and year-round snowfields on the highest peaks. It includes active and dormant volcanoes. Its moist, temperate climate supports extensive coniferous forests, with subalpine meadows occurring at high elevations. Timber management and recreation are major land use activities.

Sierra Nevada. The Sierra Nevada ecoregion is located almost entirely in California, except for a small portion in west-central Nevada. Elevation ranges from 5,000 to 11,000 feet, and the ecoregion is approximately 20,300 square miles in size. This deeply dissected ecoregion slopes gently down to the west and drops sharply on the eastern edge. The eastern portion has been strongly glaciated, and is characterized by high mountain slopes, peaks, ridges, moraines, and lakes. Lower elevations support mostly ponderosa pine in the west and lodgepole pine in the east, with fir and spruce at higher elevations. Alpine conditions exist at the highest elevations. The Sierra Nevada is famed for its scenic resources, and its close proximity to San Francisco and other major urban areas leads to high levels of recreational use. Other land uses include logging, wildlife habitat, rangeland, and woodland grazing.

Southern and Central California Chaparral and Oak Woodlands. The Southern and Central California Chaparral and Oak Woodlands ecoregion is located entirely within California, and covers a sizable portion of the state. This ecoregion is approximately 38,650 square miles in size. Open low mountains or foothills comprise most of the region, with some irregular plains in the south. The ecoregion exhibits a Mediterranean climate of hot, dry summers and moist, cool winters, and supports mainly chaparral and oak woodlands vegetation. Grasslands occur at some lower elevations and small stands of pine at higher elevations. Numerous urban areas are found within the ecoregion, including the urban areas of Los Angeles, San Francisco, and San Diego.

Central California Valley. The Central California Valley ecoregion is located entirely within California. This ecoregion is about 17,750 square miles in size. The ecoregion is a flat, intensively farmed plain that has long, hot, and dry summers and cool winters. Nearly half the region is cropland, most of which is irrigated. The region once supported an array of prairies, oak-grass savannahs, desert grasslands, riparian woodlots, and wetlands. However, human activities have affected most of the native plant communities (Olson and Cox 2001).

Southern California Mountains. This ecoregion covers approximately 6,900 square miles. The Southern California Mountains ecoregion occurs only in California. This ecoregion has a Mediterranean climate of hot, dry summers and moist, cool winters, but because of a higher elevation than adjacent ecoregions, it has slightly cooler temperatures and more moisture. Comparatively dense chaparral and oak woodlands are the predominant vegetation types, along with stands of ponderosa pine.

Eastern Cascades Slopes and Foothills. The Eastern Cascades Slopes and Foothills ecoregion is located in California, Oregon, and Washington. Elevations range from 600 to 8,300 feet, and the ecoregion is approximately 21,690 square miles in size. This ecoregion, with a dry continental climate, lies in the rain shadow of the Cascade Mountains and supports open forests of ponderosa pine and some lodgepole pine. Landscapes include marshy basins to steeply sloped low mountains, volcanic plateaus, and canyons. The region also contains Douglas-fir and hemlock forests, oak savannas, and sagebrush and bunchgrass in upland areas (Pater et al. undated). Important land uses include timber management, recreation, grazing, rural residential development, orchards, and cropping in valleys.

Columbia Plateau. The Columbia Plateau ecoregion occurs in Idaho, Oregon, and Washington. Elevations range from 300 to 4,400 feet, and the ecoregion covers approximately 32,100 square miles. Landscapes range from low, nearly level basins to higher plateau and mountain foothills, with steeply dissected canyons, in some areas. This ecoregion supports arid sagebrush steppe and grassland, but formerly supported large expanses of native bluebunch wheatgrass, Idaho fescue, and other grasses. A large portion of this ecoregion has been converted to agriculture (Noss et al. 2001). Much of the ecoregion supports irrigated and nonirrigated cropland, as well as rangeland.

Blue Mountains. The Blue Mountains ecoregion is located primarily in Oregon, with smaller portions in Idaho and Washington. Elevation ranges from 1,000 to 10,000 feet, and the ecoregion covers approximately 27,380 square miles. The landscape is complex, ranging from nearly flat or rolling alluvial valleys to high plateaus and steep mountain slopes, with some deeply dissected canyons. Vegetation includes sagebrush steppe and saltbrush-greasewood communities, as well as deciduous and coniferous forest (McGrath et al. 2002; Idaho Gap Analysis 2002). Extensive areas of old-growth coniferous forest are present (DellaSala et al. 2001) that include large stands of western juniper (Oregon Progress Board 2000). Woodland grazing, logging, and recreation are important land use activities, along with crop raising in basins, valleys, and some uplands.

Snake River Plain. The Snake River Plain ecoregion is located primarily in Idaho, with a small portion in Oregon. Elevation ranges from 2,100 to 3,500 feet, and the ecoregion covers approximately 20,700 square miles. A xeric intermontane basin and range area of plains and low hills characterizes this ecoregion. Topography includes flat to rolling valleys with many canals and rivers, rolling hills, barren lava fields, benches, and alluvial fans. Except for scattered barren lava fields, the natural vegetation of this ecoregion is sagebrush steppe that is now used for cattle grazing. There are few perennial streams. A large proportion of the alluvial valley is used for agriculture. Urban areas include Boise and Idaho Falls. Land uses include irrigated cropland, pasture, and residential and commercial development.

Central Basin and Range. The Central Basin and Range is located in California, Nevada, and Utah. Elevations generally range from 3,400 to 13,000+ feet, but with large portions between 4,000 and 9,000 feet, the ecoregion covers approximately 119,672 square miles. This internally drained ecoregion is characterized by a mosaic of xeric basins, scattered mountains, and salt flats. The topography is characterized by alternating basins and mountain ranges, generally running north-northeast to south-southwest. Great Basin sagebrush and saltbush-greasewood shrubland are the dominant vegetation types in the basins, with mountain brush and woodland also occurring in the ecoregion (EPA 2002; McGrath et al. 2002). Some portions of this ecoregion are very sparsely vegetated desert, while other areas support saltbrush-greasewood, shadscale, winterfat, sagebrush, and a variety of perennial grasses and herbaceous plants (Woods et al. 2001). Juniper-pinyon woodlots and coniferous forests occur in areas of higher elevation and precipitation. The region is generally very sparsely populated, but has some large urban areas on its periphery, including Carson City and Reno to the west and Salt Lake City to the northeast. Important land uses include rangeland, wildlife habitat, military reservations, and mining, with some irrigated farming.

Mojave Basin and Range. The Mojave Basin and Range ecoregion is located in Arizona, California, Nevada, and Utah. Elevations range from below sea level in Death Valley (–479 feet) to 5,300 feet, and the ecoregion covers approximately 50,000 square miles. It has a warm, temperate climate with little precipitation and includes the Mojave Desert and scattered mountains (Holland et al. 2001; EPA 2002). The ecoregion is rich in endemic ephemeral plants. Creosote bush shrubland is the predominant natural vegetation. Mesquite, creosote bush, all-scale, brittlebush, desert holly, and sagebrush are dominant species at low elevations (Holland et al. 2001); big sagebrush, blackbrush, Mormon tea, yellowbrush, galleta, Indian ricegrass, cheatgrass, and cholla are dominant at elevations of 3,000 to 5,000 feet; and pinyon, juniper, and oak woodlots dominate at elevations of 4,000 to 7,000 feet (Woods et al. 2001; Bryce et al. 2003). The ecoregion includes the urban area of Las Vegas. Important land uses include rangeland, wildlife habitat, urban development, military bases, recreation, gravel operations, and some pastureland and cropland.

Northern Rockies. The Northern Rockies ecoregion is located in Idaho, Montana, and Washington and is a high, rugged, mountainous region. Elevations range from 2,400 to 10,700 feet, and the ecoregion covers approximately 31,600 square miles. Landscapes include northwest-southeast trending forested mountains, some glaciated and intermountain valleys, and generally treeless foothills. The climate and vegetation have a maritime influence, despite an inland position. Douglas-fir, subalpine fir, Englemann spruce, and ponderosa pine occur in this ecoregion, as well as Pacific Coast indicators, such as western red cedar, western hemlock, and grand fir. Alpine characteristics, including numerous glacial lakes, occur at the highest elevations. Logging, mining, wildlife habitat, and recreation are important land uses, with grazing, cropping, and some residential use in valleys.

Idaho Batholith. The Idaho Batholith ecoregion is located primarily in Idaho, with a small portion in Montana. This dissected, partially glaciated mountainous plateau contains the headwaters of numerous perennial streams. Grand fir and Douglas-fir occur in this ecoregion, with Engelmann spruce and subalpine fir at higher elevations. Sagebrush, bunchgrass, and Ponderosa pine grow in valley floors and deep canyons (McGrath et al. 2002). This ecoregion covers approximately 23,750 square miles.

Middle Rockies. The Middle Rockies ecoregion occurs in Idaho, Montana, and Wyoming. Open forest is present in this ecoregion, and foothills are partly wooded or shrub- and grass-covered (Chapman et al. 2004). Intermontane valleys are grass- and/or shrub-covered. Forests of Douglas-fir, subalpine fir, and Engelmann spruce, as well as alpine areas, occur on mountains. In Idaho, Douglas-fir, subalpine fir, lodgepole pine, Engelmann spruce, aspen, and sagebrush occur in mountain and plateau areas, while shadscale and greasewood occur in areas of low precipitation (McGrath et al. 2002). Many mountain-fed perennial streams are present (Chapman et al. 2004). This ecoregion covers approximately 60,400 square miles.

Wyoming Basin. The Wyoming Basin ecoregion is located primarily in Wyoming, with portions in Colorado, Idaho, Montana, and Utah. Elevation ranges from 3,700 to 7,900 feet, and the ecoregion covers approximately 51,470 square miles. This ecoregion is a broad intermountain basin with terraces, scattered high hills, and low mountains (Chapman et al. 2004). The dominant vegetation types are arid grasslands and shrublands supporting bunchgrasses and sagebrush. Poorly drained floodplains and low terraces support sedges, rushes, cattails, and grasses. Well-drained alluvial fans and foothills support sagebrush grasslands (McGrath et al. 2002). Wetland plants occur in poorly drained floodplains, alluvial fans, and terraces (Woods et al. 2001). Important land uses include intensive oil and gas production, mining, grazing, and some irrigated farming and timber management.

Wasatch and Uinta Mountains. The Wasatch and Uinta Mountains ecoregion occurs primarily in Utah, with smaller portions in Wyoming and Idaho. Elevation ranges from 5,000 to 9,000+ feet, and the ecoregion covers approximately 17,600 square miles. This ecoregion is composed of high mountains with narrow crests and valleys, bordered in some areas by dissected plateaus and open high mountains. Lower elevation semiarid foothills support pinyon-juniper woodlands, mountain mahogany-oak scrub, and maple-oak scrub; middle elevations support Douglas-fir forests, aspen parklands, and ponderosa pine; Engelmann spruce and subalpine fir occur at higher elevations (Woods et al. 2001; McGrath et al. 2002). Alpine meadows are present above 11,000 feet. Land uses include timber production, seasonal range and livestock grazing, recreation, and wildlife habitat, with some irrigated farming in mountain valleys and oil production.

Colorado Plateaus. The Colorado Plateaus ecoregion is located in Arizona, Colorado, and Utah, with a small portion in New Mexico. Elevation ranges from 3,200 to 10,000 feet, and the ecoregion covers approximately 48,790 square miles. This ecoregion is characterized by a rugged tableland topography, with large basins, ridges, spectacular canyons, and colorful geological formations. The ecoregion is heavily visited for recreational purposes. The higher elevations support extensive pinyon-juniper woodlands. Between the trees, the ground is sparsely covered by grama, other grasses, herbs, and various shrubs, such as big sagebrush and alderleaf cercocarpus (Primm 2001). Lower areas contain saltbrush-greasewood shrublands, typical of hotter, drier areas. Land uses include livestock, some irrigated farming, recreation, mining, and oil and gas production.

Southern Rockies. The Southern Rockies ecoregion is located primarily in Colorado, New Mexico, and Wyoming, with a small portion in Utah. Elevation ranges from 7,500 to 14,400 feet, and the ecoregion covers approximately 55,420 square miles. The ecoregion is characterized by high, steep, rugged mountains. Coniferous forest covers much of the region. The lowest elevations are generally grass- or shrub-covered. Low to middle elevations support a variety of vegetation, including Douglas-fir, ponderosa pine, aspen, and juniper-oak woodlands. Middle to high elevations are predominantly coniferous forest. The highest elevations have alpine characteristics. Important land uses include timber management, recreation, hunting, wildlife habitat, grazing, mining, and oil production.

Arizona/New Mexico Plateau. The Arizona/New Mexico Plateau occurs primarily in Arizona, Colorado, and New Mexico, with a small portion in Nevada. Elevation ranges from 7,400 to 9,100 feet, and the ecoregion covers approximately 73,900 square miles. The ecoregion's landscapes include low mountains, hills, mesas, and foothills, irregular plains, alkaline basins, some sand dunes, and wetlands. This ecoregion is a large transitional region between the semiarid grasslands to the east, the drier shrublands and woodlands to the north, and the lower, hotter, less vegetated areas to the west and south. Vegetation communities include shrublands with big sagebrush, rabbitbrush, winterfat, shadscale saltbush, and greasewood, and grasslands of blue grama, western wheatgrass, green needlegrass, and needle-and-thread grass (Chapman et al. 2006). Higher elevations may support pinyon pine and juniper forests. San Luis Lake is fed by regional groundwater and mountain streams. In Colorado, a high water table supports numerous ephemeral lakes, wetlands, springs, and flowing wells (Chapman et al. 2006). The ecoregion includes the urban areas of Santa Fe and Albuquerque. Important land uses include irrigated farming, recreation, rangeland, and wildlife habitat.

Arizona/New Mexico Mountains. The Arizona/New Mexico Mountains ecoregion occurs in Arizona and New Mexico, and covers approximately 41,870 square miles. It is characterized by low-elevation mountains that support vegetation indicative of dry, warm environments. Chaparral is common on lower elevations, while pinyon-juniper and oak woodlands are found on the lower and middle elevations. Open-to-dense ponderosa pine forests predominate at higher elevations, with forests of spruce, fir, and Douglas-fir in a few high-elevation areas.

Chihuahuan Deserts. The Chihuahuan Deserts ecoregion occurs in Arizona and New Mexico. This ecoregion covers approximately 29,300 square miles. The broad basins and valleys of this ecoregion are bordered by sloping alluvial fans and terraces. The central and western parts of the region contain isolated mesas and mountains. Arid grassland and shrubland are the predominant vegetation types. The higher mountains, however, support oak-juniper woodlands. The ecoregion includes the urban area of Flagstaff, Arizona.

High Plains. The High Plains ecoregion occurs in Wyoming, Colorado, and New Mexico, and covers approximately 40,953 square miles. This ecoregion consists of smooth to slightly irregular plains. Blue grama-buffalo grass prairies dominate the natural vegetation in this region, which also includes sandsage prairie with sand sagebrush, rabbitbrush, sand bluestem, prairie sandreed, and Indian ricegrass (Chapman et al. 2006). Also occurring are bluestem-grama prairie and wheatgrass-bluestem-needlegrass prairie (Cook et al. 2001). Much of this ecoregion is in cropland. The ecoregion includes the Denver, Colorado, and Cheyenne, Wyoming, urban areas. Other important land uses include grazing and oil and gas production.

Southwestern Tablelands. The Southwestern Tablelands ecoregion is located in Colorado and New Mexico, and covers approximately 35,660 square miles. This ecoregion is an elevated tableland that supports subhumid grassland and semiarid rangeland. The natural vegetation in this ecoregion is grama-buffalo grass, with mesquite-buffalo grass also occurring in the southeast portion. Midgrass prairie and open low shrubs occur along the Canadian River. Juniper-scrub oak-grass savanna occurs on escarpment bluffs (Chapman et al. 2006). This ecoregion includes the urban area of Pueblo, Colorado. Land uses include grazing, dry and irrigated farming, and wildlife habitat, with increasing urban and residential development in some areas.

Canadian Rockies. A portion of the Canadian Rockies ecoregion occurs in Montana, and covers approximately 7,270 square miles. Lower elevation areas primarily support Douglas-fir, spruce, and lodgepole pine; alpine fir is predominant at middle elevations. Higher elevations are treeless alpine habitats.

Northwestern Glaciated Plains. The Northwestern Glaciated Plains ecoregion occurs in Montana, and covers approximately 37,000 square miles. Elevation generally ranges from 1,900 to 5,500 feet, but with isolated buttes up to 8,200 feet. The landscape bears strong evidence of glaciation, with treeless rolling plains, moraines, and hummocks, and includes a moderately high concentration of prairie potholes, which are semipermanent and seasonal wetlands. Some canyons occur, with tree and shrub vegetation. The ecoregion is a transitional region between the generally more level, moister, more agricultural areas to the east and the generally more irregular and drier areas to the west and southwest. Vegetation of this ecoregion is primarily composed of grasses, such as grama, wheatgrass, and needlegrass, with areas of shortgrass prairie and sagebrush steppe. Land uses include grain farming, grazing, and oil production.

Northwestern Great Plains. The Northwestern Great Plains ecoregion occurs in Montana and Wyoming, and covers approximately 77,900 square miles. Elevation ranges from 1,900 to 7,800 feet. This ecoregion is a semiarid, rolling plain, sometimes dissected, with isolated buttes and canyons. Much of the ecoregion is treeless, except in draws and canyons, which may contain scrub and trees. It is part of the largest grassland area in North America (Primm et al. 2001). Native grasslands persist in rangeland areas of broken topography, but on level ground are mostly replaced by agriculture. The dominant grass communities include grama-needlegrass, wheatgrass, and wheatgrass-needlegrass (Primm et al. 2001). Many species of shrubs and herbs also occur, with sagebrush predominating. This ecoregion includes the urban areas of Billings, Montana, and Casper, Wyoming. The major land use is grazing, with some farming, mining, timber production, and recreation.

North Cascades. The North Cascades ecoregion occurs in Washington, and covers approximately 11,700 square miles. This ecoregion is composed of high, rugged mountains with many active alpine glaciers. The climate varies from a mild, maritime rain forest climate in the west to a dry continental climate in the east. Higher elevation areas support forests with Engelmann spruce, subalpine fir, lodgepole pine, white spruce, Douglas-fir, and quaking aspen (Kavanagh and Sims 2001). The lowest elevation areas, on the eastern side, contain parkland of bluebunch wheatgrass and sagebrush with scattered ponderosa pine.

Klamath Mountains. The Klamath Mountains ecoregion occurs in California and Oregon, and covers approximately 18,700 square miles. This ecoregion is physically and biologically diverse, with highly dissected, folded mountains; foothills; terraces; and floodplains. The vegetation is a mosaic of conifers and hardwoods. The valleys and foothills support grassland-savanna and grasslands with bunchgrass and wheatgrass, oak woodlands, oak savanna, Douglas-fir, Ponderosa pine, madrone, incense cedar, and an understory chaparral community (Thorson et al. 2003). Forests composed of tanoak, Douglas-fir, port orford cedar, and madrone occur on mountain areas. Seasonal ponds occur on mesa tops. This ecoregion includes the Medford, Oregon, urban area. Land uses include logging, grazing, crop and tree fruit production, recreation, rural residential development, mining, and some commercial development.

Madrean Archipelago. The Madrean Archipelago ecoregion occurs in Arizona and New Mexico, and covers approximately 16,100 square miles. It consists of basins and ranges with medium to high local relief. Native vegetation in the basins is mostly grama-tobosa shrubsteppe. Oak-juniper woodland is the dominant vegetation type on the ranges; however, ponderosa pine is predominant at higher elevations.

Northern Basin and Range. The Northern Basin and Range ecoregion occurs in California, Idaho, Nevada, Oregon, and Utah, and covers approximately 54,905 square miles. Elevation ranges from 2,500 to 9,700 feet. Landscapes include arid tablelands, intermountain basins, dissected lava plains, and scattered mountains. Elevation ranges from 2,500 to 9,700 feet. Arid tablelands, intermontane basins, dissected lava plains, and scattered mountains characterize this region. Nonmountainous areas, where cool-season grasses are common, support sagebrush grassland and saltbrush-greasewood steppe (McGrath et al. 2002). The dominant species on ranges are mountain sagebrush, mountain brush, and Idaho fescue at lower and middle elevations. Douglas-fir and aspen are common at higher elevations. Valleys within the ecoregion support sagebrush steppe or saltbush vegetation; and juniper woodlands occur on rugged, stony uplands. Livestock grazing, recreation, and wildlife habitat are important land uses, with some farming.

Sonoran Basin and Range. The Sonoran Basin and Range ecoregion occurs in Arizona, California, and New Mexico, and covers approximately 45,100 square miles. This ecoregion contains scattered low mountains and supports large areas of palo verde-cactus shrub and giant saguaro cactus. The ecoregion includes the urban areas of Phoenix and Tucson, Arizona.

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APPENDIX P:

SELECTED POTENTIALLY SENSITIVE VISUAL RESOURCE AREAS INTERSECTED BY OR IN CLOSE PROXIMITY TO PROPOSED WEST-WIDE ENERGY CORRIDORS DESIGNATED UNDER THE PROPOSED ACTION

APPENDIX P:

SELECTED POTENTIALLY SENSITIVE VISUAL RESOURCE AREAS INTERSECTED BY OR IN CLOSE PROXIMITY TO PROPOSED WEST-WIDE ENERGY CORRIDORS DESIGNATED UNDER THE PROPOSED ACTION

TABLE P-1 Intersections[a] of West-wide Energy Corridors with Selected Sensitive Visual Resource Areas under the Proposed Action

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Arizona	National Monument	Agua Fria National Monument	61-207	E8
	National Recreation Area	Glen Canyon National Recreation Area	68-116	E7
	National Recreation Area	Lake Mead National Recreation Area	47-231	D8
	National Historic Trail	Juan Bautista de Anza Trail	115-208	E9
	National Historic Trail	Juan Bautista de Anza Trail	115-238	D9
	National Historic Trail	Old Spanish Trail	113-116	E7
	National Scenic Highway	Historic Route 66	41-46	D8
	National Scenic Highway	Historic Route 66	41-47	D8
	National Scenic Highway	Historic Route 66	61-207	E8
	National Wildlife Refuge	Havasu National Wildlife Refuge	41-46	D8
California	National Recreation Area	Whiskeytown-Shasta-Trinity National Recreation Area	261-262	B5
	Other NPS Resources	Mojave National Preserve	27-41	D8
	National Scenic Trail	Pacific Crest Trail	107-268	C8
	National Scenic Trail	Pacific Crest Trail	108-267	C8
	National Scenic Trail	Pacific Crest Trail	115-238	D9
	National Scenic Trail	Pacific Crest Trail	264-265	C8
	National Scenic Trail	Pacific Crest Trail	3-8	B5
	National Scenic Trail	Pacific Crest Trail	6-15	B6
	National Historic Trail	California Trail	15-104	B5
	National Historic Trail	California Trail	3-8	B5
	National Historic Trail	California Trail	6-15	B6
	National Historic Trail	California Trail	7-8	B5
	National Historic Trail	Juan Bautista de Anza Trail	115-238	D9
	National Historic Trail	Old Spanish Trail	108-267	C8
	National Historic Trail	Old Spanish Trail	27-225	D8
	National Historic Trail	Old Spanish Trail	27-266	C8
	National Scenic Highway	Historic Route 66	41-46	D8
	National Scenic Highway	Volcanic Legacy	261-262	B5
	Wild and Scenic River	Trinity Wild and Scenic River	101-263	A5
	National Wildlife Refuge	Havasu National Wildlife Refuge	41-46	D8
Colorado	National Recreation Area	Curecanti National Recreation Area	87-277	G6
	National Scenic Trail	Continental Divide Trail	87-277	G6
	National Historic Trail	Old Spanish Trail	130-274	F7

TABLE P-1 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Colorado (Cont.)	National Historic Trail	Old Spanish Trail	132-136	F6
	National Historic Trail	Old Spanish Trail	139-277	G6
	National Historic Trail	Old Spanish Trail	87-277	G6
	National Scenic Highway	Colorado River Headwaters	144-275	G5
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-133	F5
	National Scenic Highway	Gold Belt Tour	87-277	G6
	National Scenic Highway	Grand Mesa	132-136	F6
	National Scenic Highway	San Juan Skyway	130-274	F7
Idaho	National Monument	Hagerman Fossil Beds National Monument	36-226	D4
	National Scenic Trail	Continental Divide Trail	50-203	E3
	National Historic Trail	Nez Perce Trail	50-260	E3
	National Historic Trail	Oregon Trail	29-36	D4
	National Historic Trail	Oregon Trail	36-112	D4
Montana	National Scenic Trail	Continental Divide Trail	50-203	E3
	National Scenic Trail	Continental Divide Trail	50-260	E3
	National Scenic Trail	Continental Divide Trail	51-204	E2
	National Scenic Trail	Continental Divide Trail	51-205	E3
	National Historic Trail	Lewis and Clark Trail	50-203	E3
Nevada	National Recreation Area	Lake Mead National Recreation Area	39-231	D7
	National Recreation Area	Lake Mead National Recreation Area	47-231	D8
	National Historic Trail	California Trail	15-104	C6
	National Historic Trail	California Trail	15-17	C6
	National Historic Trail	California Trail	16-104	C5
	National Historic Trail	California Trail	16-17	C5
	National Historic Trail	California Trail	16-24	C5
	National Historic Trail	California Trail	17-18	C6
	National Historic Trail	California Trail	17-35	C5
	National Historic Trail	California Trail	17-35	D5
	National Historic Trail	California Trail	35-111	D5
	National Historic Trail	California Trail	44-110	D5
	National Historic Trail	California Trail	44-239	D5
	National Historic Trail	Old Spanish Trail	224-225	D8
	National Historic Trail	Old Spanish Trail	37-39	D7
	National Historic Trail	Old Spanish Trail	39-113	D7
	National Historic Trail	Old Spanish Trail	39-231	D7
	National Historic Trail	Old Spanish Trail	47-231	D8
	National Historic Trail	Pony Express Trail	17-18	C6
	National Historic Trail	Pony Express Trail	44-110	D6
New Mexico	National Scenic Trail	Continental Divide Trail	80-273	G8
	National Historic Trail	El Camino Real de Tierra Adentro Trail	81-272	G8
	National Historic Trail	El Camino Real de Tierra Adentro Trail	81-272	G9

TABLE P-1 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
New Mexico (Cont.)	National Historic Trail	Old Spanish Trail	80-273	G7
	National Scenic Highway	El Camino Real	81-272	G9
	National Scenic Highway	Geronimo Trail	81-272	G9
	National Wildlife Refuge	Sevilleta National Wildlife Refuge	81-272	G8
Oregon	National Scenic Trail	Pacific Crest Trail	10-246	B3
	National Scenic Trail	Pacific Crest Trail	230-248	B3
	National Historic Trail	California Trail	4-247	A4
	National Historic Trail	Oregon Trail	10-246	B3
	National Historic Trail	Oregon Trail	250-251	C3
	National Scenic Highway	West Cascades	230-248	B3
	Wild and Scenic River	Clackamas Wild and Scenic River	230-248	B3
	Wild and Scenic River	Deschutes Wild and Scenic River	11-103	B3
	Wild and Scenic River	Sycan Wild and Scenic River	7-11	B4
Utah	National Monument	Grand Staircase-Escalante National Monument	68-116	E7
	National Historic Trail	California Trail	44-239	E5
	National Historic Trail	Old Spanish Trail	113-114	E7
	National Historic Trail	Old Spanish Trail	113-116	E7
	National Historic Trail	Old Spanish Trail	116-206	E7
	National Historic Trail	Old Spanish Trail	66-212	F6
	National Historic Trail	Pony Express Trail	114-241	E5
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-218	F5
	National Scenic Highway	Dinosaur Diamond Prehistoric	66-212	F6
Washington	National Scenic Trail	Pacific Crest Trail	102-105	B2
	National Scenic Highway	Stevens Pass Greenway	102-105	B2
Wyoming	National Recreation Area	Flaming Gorge National Recreation Area	218-240	F5
	National Scenic Trail	Continental Divide Trail	78-138	G5
	National Historic Trail	California Trail	121-240	F5
	National Historic Trail	California Trail	55-240	F5
	National Historic Trail	Mormon Pioneer Trail	121-240	F5
	National Historic Trail	Mormon Pioneer Trail	55-240	F5
	National Historic Trail	Oregon Trail	121-240	F5
	National Historic Trail	Oregon Trail	55-240	F5
	National Historic Trail	Pony Express Trail	55-240	F5

[a] Intersection defined as WWEC ROW crossing boundary of potentially sensitive visual resource area.

[b] Maps are presented in the PEIS Vol. III, Map Atlas, Part 3.

TABLE P-2 Proximity Events[a] Involving West-wide Energy Corridors and Selected Sensitive Visual Resource Areas under the Proposed Action

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Arizona	National Monument	Agua Fria National Monument	61-207	E8
	National Monument	Pipe Spring National Monument	113-116	E7
	National Monument	Sonoran Desert National Monument	115-208	E9
	National Monument	Vermilion Cliffs National Monument	68-116	E7
	National Monument	Grand Staircase-Escalante National Monument	68-116	E7
	National Monument	Grand Staircase-Escalante National Monument	113-116	E7
	National Recreation Area	Glen Canyon National Recreation Area	68-116	E7
	National Recreation Area	Lake Mead National Recreation Area	41-47	D8
	National Recreation Area	Lake Mead National Recreation Area	47-231	D8
	Other NPS Resources	Tumacacori National Historical Park	234-235	E10
	Other NPS Resources	Tumacacori National Historical Park	234-235	F10
	National Historic Landmark	Tumacacori Museum	234-235	E10
	National Historic Trail	Juan Bautista de Anza Trail	115-208	E9
	National Historic Trail	Juan Bautista de Anza Trail	115-238	D9
	National Historic Trail	Juan Bautista de Anza Trail	115-238	E9
	National Historic Trail	Juan Bautista de Anza Trail	234-235	E10
	National Historic Trail	Juan Bautista de Anza Trail	234-235	F10
	National Historic Trail	Old Spanish Trail	113-116	E7
	National Scenic Highway	Historic Route 66	27-41	D8
	National Scenic Highway	Historic Route 66	41-46	D8
	National Scenic Highway	Historic Route 66	41-47	D8
	National Scenic Highway	Historic Route 66	41-47	E8
	National Scenic Highway	Historic Route 66	61-207	E8
	National Wildlife Refuge	Havasu National Wildlife Refuge	27-41	D8
	National Wildlife Refuge	Havasu National Wildlife Refuge	41-46	D8
California	National Park	Joshua Tree National Park	30-52	D9
	National Monument	Cascade-Siskiyou National Monument	4-247	B4
	National Monument	Lava Beds National Monument	8-104	B5
	National Monument	Santa Rosa/San Jacinto Mountains National Monument	30-52	D9
	National Recreation Area	Whiskeytown-Shasta-Trinity National Recreation Area	261-262	B5
	Other NPS Resources	Manzanar National Historic Site	18-23	C7
	Other NPS Resources	Mojave National Preserve	27-225	D8
	Other NPS Resources	Mojave National Preserve	27-41	D8
	National Historic Landmark	Modjeska House	236-237	C9
	National Scenic Trail	Pacific Crest Trail	107-268	C8
	National Scenic Trail	Pacific Crest Trail	108-267	C8
	National Scenic Trail	Pacific Crest Trail	115-238	D9

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
California (Cont.)	National Scenic Trail	Pacific Crest Trail	18-23	C7
	National Scenic Trail	Pacific Crest Trail	23-106	C8
	National Scenic Trail	Pacific Crest Trail	261-262	B5
	National Scenic Trail	Pacific Crest Trail	264-265	C8
	National Scenic Trail	Pacific Crest Trail	3-8	B5
	National Scenic Trail	Pacific Crest Trail	6-15	B6
	National Historic Trail	California Trail	15-104	B5
	National Historic Trail	California Trail	15-104	B6
	National Historic Trail	California Trail	261-262	B5
	National Historic Trail	California Trail	6-15	B6
	National Historic Trail	California Trail	7-11	B5
	National Historic Trail	California Trail	8-104	B5
	National Historic Trail	Juan Bautista de Anza Trail	115-238	D9
	National Historic Trail	Old Spanish Trail	108-267	C8
	National Historic Trail	Old Spanish Trail	224-225	D8
	National Historic Trail	Old Spanish Trail	27-225	D8
	National Historic Trail	Old Spanish Trail	27-266	C8
	National Historic Trail	Old Spanish Trail	27-41	D8
	National Scenic Highway	Historic Route 66	27-41	D8
	National Scenic Highway	Historic Route 66	41-46	D8
	National Scenic Highway	Volcanic Legacy	261-262	B5
	National Scenic Highway	Volcanic Legacy	3-8	B5
	National Wild and Scenic River	Kern Wild and Scenic River	18-23	C7
	National Wild and Scenic River	Klamath Wild and Scenic River	4-247	B5
	National Wild and Scenic River	North Fork American Wild and Scenic River	6-15	B6
	National Wild and Scenic River	Trinity Wild and Scenic River	101-263	A5
	National Wildlife Refuge	Clear Lake National Wildlife Refuge	7-11	B5
	National Wildlife Refuge	Clear Lake National Wildlife Refuge	8-104	B5
	National Wildlife Refuge	Coachella Valley National Wildlife Refuge	30-52	D9
	National Wildlife Refuge	Havasu National Wildlife Refuge	27-41	D8
	National Wildlife Refuge	Havasu National Wildlife Refuge	41-46	D8
	National Wildlife Refuge	Modoc National Wildlife Refuge	8-104	B5
	National Wildlife Refuge	San Diego National Wildlife Refuge	115-238	D9
	National Wildlife Refuge	Tule Lake National Wildlife Refuge	7-11	B5
	National Wildlife Refuge	Tule Lake National Wildlife Refuge	8-104	B5
Colorado	National Park	Black Canyon of the Gunnison National Park	136-277	G6
	National Park	Black Canyon of the Gunnison National Park	87-277	G6

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Colorado (Cont.)	National Recreation Area	Curecanti National Recreation Area	136-277	G6
	National Recreation Area	Curecanti National Recreation Area	87-277	G6
	National Monument	Dinosaur National Monument	126-133	F5
	National Monument	Dinosaur National Monument	126-218	F5
	National Monument	Dinosaur National Monument	73-133	F5
	National Natural Landmark	Garden Park Fossil Area	87-277	G6
	National Natural Landmark	Indian Springs Trace Fossil Area	87-277	G6
	National Scenic Trail	Continental Divide Trail	144-275	G6
	National Scenic Trail	Continental Divide Trail	87-277	G6
	National Historic Trail	Old Spanish Trail	130-274	F7
	National Historic Trail	Old Spanish Trail	132-136	F6
	National Historic Trail	Old Spanish Trail	132-136	G6
	National Historic Trail	Old Spanish Trail	134-139	G6
	National Historic Trail	Old Spanish Trail	136-139	G6
	National Historic Trail	Old Spanish Trail	136-277	G6
	National Historic Trail	Old Spanish Trail	139-277	G6
	National Historic Trail	Old Spanish Trail	66-212	F7
	National Historic Trail	Old Spanish Trail	87-277	G6
	National Scenic Highway	Colorado River Headwaters	144-275	G5
	National Scenic Highway	Colorado River Headwaters	144-275	G6
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-133	F5
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-218	F5
	National Scenic Highway	Gold Belt Tour	87-277	G6
	National Scenic Highway	Grand Mesa	132-136	F6
	National Scenic Highway	San Juan Skyway	130-274	F7
	National Wildlife Refuge	Browns Park National Wildlife Refuge	126-218	F5
Idaho	National Monument	Craters of the Moon National Monument	36-112	E4
	National Monument	Craters of the Moon National Monument	49-112	E4
	National Monument	Hagerman Fossil Beds National Monument	36-112	D4
	National Monument	Minidoka Internment National Monument	112-226	D4
	National Monument	Minidoka Internment National Monument	36-112	D4
	National Recreation Area	Sawtooth National Recreation Area	49-202	E4
	National Natural Landmark	Big Southern Butte	252-253	E4
	National Natural Landmark	Hagerman Fauna Sites	36-112	D4
	National Scenic Trail	Continental Divide Trail	50-203	E3
	National Scenic Trail	Continental Divide Trail	50-260	E3
	National Historic Trail	California Trail	49-112	E4
	National Historic Trail	California Trail	49-202	E4
	National Historic Trail	Nez Perce Trail	50-203	E3

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Idaho (Cont.)	National Historic Trail	Nez Perce Trail	50-260	E3
	National Historic Trail	Nez Perce Trail	50-260	E4
	National Historic Trail	Oregon Trail	112-226	D4
	National Historic Trail	Oregon Trail	29-36	D4
	National Historic Trail	Oregon Trail	36-112	D4
	National Historic Trail	Oregon Trail	36-228	D4
	National Historic Trail	Oregon Trail	49-112	E4
	National Historic Trail	Oregon Trail	49-202	E4
	National Wildlife Refuge	Camas National Wildlife Refuge	50-203	E4
	National Wildlife Refuge	Deer Flat National Wildlife Refuge	250-251	C3
	National Wildlife Refuge	Deer Flat National Wildlife Refuge	36-228	D4
	National Wildlife Refuge	Minidoka National Wildlife Refuge	36-112	E4
	National Wildlife Refuge	Minidoka National Wildlife Refuge	49-202	E4
	National Wildlife Refuge	Red Rocks Lakes National Wildlife Refuge	50-203	E3
Montana	National Recreation Area	Rattlesnake National Recreation Area	229-254	E2
	National Natural Landmark	Bridger Fossil Area	79-216	F3
	National Historic Landmark	Wheeler, Burton K., House	51-204	E3
	National Historic Landmark	Wheeler, Burton K., House	51-205	E3
	National Scenic Trail	Continental Divide Trail	50-203	E3
	National Scenic Trail	Continental Divide Trail	50-260	E3
	National Scenic Trail	Continental Divide Trail	51-204	E2
	National Scenic Trail	Continental Divide Trail	51-204	E3
	National Scenic Trail	Continental Divide Trail	51-205	E2
	National Scenic Trail	Continental Divide Trail	51-205	E3
	National Historic Trail	Lewis and Clark Trail	229-254	D2
	National Historic Trail	Lewis and Clark Trail	229-254	E2
	National Historic Trail	Lewis and Clark Trail	50-203	E3
	National Historic Trail	Lewis and Clark Trail	51-205	E3
	National Historic Trail	Nez Perce Trail	79-216	F3
	National Wildlife Refuge	Red Rocks Lakes National Wildlife Refuge	50-203	E3
Nevada	National Park	Great Basin National Park	110-114	D6
	National Recreation Area	Lake Mead National Recreation Area	37-39	D7
	National Recreation Area	Lake Mead National Recreation Area	37-39	D8
	National Recreation Area	Lake Mead National Recreation Area	39-231	D7
	National Recreation Area	Lake Mead National Recreation Area	39-231	D8
	National Recreation Area	Lake Mead National Recreation Area	41-47	D8
	National Recreation Area	Lake Mead National Recreation Area	47-231	D8
	National Recreation Area	Spring Mountains National Recreation Area	224-225	D7
	National Recreation Area	Spring Mountains National Recreation Area	224-225	D8

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Nevada (Cont.)	National Natural Landmark	Hot Creek Springs & Marsh	110-233	D6
	National Historic Landmark	Newlands, Senator Francis G., House	15-17	C6
	National Historic Trail	California Trail	111-226	D5
	National Historic Trail	California Trail	15-104	B6
	National Historic Trail	California Trail	15-104	C6
	National Historic Trail	California Trail	15-17	C6
	National Historic Trail	California Trail	16-17	C5
	National Historic Trail	California Trail	16-24	C5
	National Historic Trail	California Trail	17-18	C6
	National Historic Trail	California Trail	17-35	C5
	National Historic Trail	California Trail	17-35	D5
	National Historic Trail	California Trail	35-111	D5
	National Historic Trail	California Trail	35-43	D5
	National Historic Trail	California Trail	43-111	D5
	National Historic Trail	California Trail	43-44	D5
	National Historic Trail	California Trail	44-110	D5
	National Historic Trail	California Trail	44-239	D5
	National Historic Trail	California Trail	6-15	B6
	National Historic Trail	California Trail	6-15	C6
	National Historic Trail	Old Spanish Trail	113-116	D7
	National Historic Trail	Old Spanish Trail	224-225	D7
	National Historic Trail	Old Spanish Trail	224-225	D8
	National Historic Trail	Old Spanish Trail	37-39	D7
	National Historic Trail	Old Spanish Trail	37-39	D8
	National Historic Trail	Old Spanish Trail	39-231	D7
	National Historic Trail	Old Spanish Trail	39-231	D8
	National Historic Trail	Old Spanish Trail	47-231	D8
	National Historic Trail	Pony Express Trail	110-114	D6
	National Historic Trail	Pony Express Trail	17-18	C6
	National Scenic Highway	Pyramid Lake	15-17	C6
	National Scenic Highway	Pyramid Lake	17-18	C6
	National Wildlife Refuge	Pahranagat National Wildlife Refuge	37-232	D7
	National Wildlife Refuge	Sheldon National Wildlife Refuge	7-24	C5
New Mexico	National Monument	Aztec Ruins National Monument	80-273	F7
	National Monument	Aztec Ruins National Monument	80-273	G7
	Other NPS Resources	Chaco Culture National Historic Park	80-273	G8
	National Scenic Trail	Continental Divide Trail	80-273	G8
	National Scenic Trail	Continental Divide Trail	81-213	F9
	National Historic Trail	El Camino Real de Tierra Adentro Trail	80-273	G8
	National Historic Trail	El Camino Real de Tierra Adentro Trail	81-213	G10
	National Historic Trail	El Camino Real de Tierra Adentro Trail	81-213	G9

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
New Mexico (Cont.)	National Historic Trail	El Camino Real de Tierra Adentro Trail	81-272	G8
	National Historic Trail	El Camino Real de Tierra Adentro Trail	81-272	G9
	National Historic Trail	Old Spanish Trail	80-273	F7
	National Historic Trail	Old Spanish Trail	80-273	G7
	National Scenic Highway	El Camino Real	80-273	G8
	National Scenic Highway	El Camino Real	81-213	G10
	National Scenic Highway	El Camino Real	81-213	G9
	National Scenic Highway	El Camino Real	81-272	G8
	National Scenic Highway	El Camino Real	81-272	G9
	National Scenic Highway	Geronimo Trail	81-272	G9
	National Scenic Highway	Historic Route 66	80-273	G8
	National Scenic Highway	Jemez Mountain Trail	80-273	G8
	National Scenic Highway	Turquoise Trail	80-273	G8
	National Wildlife Refuge	San Andres National Wildlife Refuge	81-272	G9
	National Wildlife Refuge	Sevilleta National Wildlife Refuge	81-272	G8
Oregon	National Monument	Cascade-Siskiyou National Monument	4-247	B4
	National Scenic Trail	Pacific Crest Trail	10-246	B3
	National Scenic Trail	Pacific Crest Trail	230-248	B3
	National Scenic Trail	Pacific Crest Trail	4-247	B4
	National Historic Trail	California Trail	4-247	A4
	National Historic Trail	California Trail	4-247	B4
	National Historic Trail	Oregon Trail	10-246	B3
	National Historic Trail	Oregon Trail	11-103	C4
	National Historic Trail	Oregon Trail	11-228	C4
	National Historic Trail	Oregon Trail	230-248	B3
	National Historic Trail	Oregon Trail	250-251	C3
	National Scenic Highway	Hells Canyon	250-251	C3
	National Scenic Highway	Mt Hood	10-246	B3
	National Scenic Highway	Outback Scenic	7-11	B4
	National Scenic Highway	Outback Scenic	7-24	B4
	National Scenic Highway	Rogue Umpqua	4-247	A4
	National Scenic Highway	Rogue Umpqua	4-247	B4
	National Scenic Highway	West Cascades	230-248	B3
	National Wild and Scenic River	Clackamas Wild and Scenic River	230-248	B3
	National Wild and Scenic River	Crooked Wild and Scenic River	11-103	B3
	National Wild and Scenic River	Deschutes Wild and Scenic River	11-103	B3
	National Wild and Scenic River	Owyhee Wild and Scenic River	24-228	C4
	National Wild and Scenic River	Powder Wild and Scenic River	250-251	C3

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Oregon (Cont.)	National Wild and Scenic River	Salmon Wild and Scenic River	10-246	B3
	National Wild and Scenic River	Salmon Wild and Scenic River	230-248	B3
	National Wild and Scenic River	Sandy Wild and Scenic River	10-246	B3
	National Wild and Scenic River	Sycan Wild and Scenic River	7-11	B4
	National Wild and Scenic River	White Wild and Scenic River	11-103	B3
	National Wild and Scenic River	White Wild and Scenic River	230-248	B3
	National Wildlife Refuge	Deer Flat National Wildlife Refuge	250-251	C3
	National Wildlife Refuge	Hart Mountain National Antelope Refuge	7-24	C4
	National Wildlife Refuge	Sheldon National Wildlife Refuge	7-24	C4
	National Wildlife Refuge	Sheldon National Wildlife Refuge	7-24	C5
Utah	National Park	Arches National Park	66-212	F6
	National Monument	Dinosaur National Monument	126-218	F5
	National Monument	Grand Staircase-Escalante National Monument	113-116	E7
	National Monument	Grand Staircase-Escalante National Monument	116-206	E7
	National Monument	Grand Staircase-Escalante National Monument	68-116	E7
	National Monument	Vermilion Cliffs National Monument	68-116	E7
	National Recreation Area	Flaming Gorge National Recreation Area	126-218	F5
	National Recreation Area	Glen Canyon National Recreation Area	68-116	E7
	National Natural Landmark	Joshua Tree Natural Area	113-116	E7
	National Historic Trail	California Trail	256-257	E5
	National Historic Trail	California Trail	44-239	E5
	National Historic Trail	California Trail	49-202	E5
	National Historic Trail	Old Spanish Trail	113-114	E7
	National Historic Trail	Old Spanish Trail	113-116	E7
	National Historic Trail	Old Spanish Trail	116-206	E6
	National Historic Trail	Old Spanish Trail	116-206	E7
	National Historic Trail	Old Spanish Trail	66-212	F6
	National Historic Trail	Old Spanish Trail	66-212	F7
	National Historic Trail	Old Spanish Trail	68-116	E7
	National Historic Trail	Pony Express Trail	114-241	E5
	National Historic Trail	Pony Express Trail	116-206	E5
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-133	F5
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-218	F5
	National Scenic Highway	Dinosaur Diamond Prehistoric	126-258	F5

TABLE P-2 (Cont.)

State	Feature Type	Feature Name	WWEC Segment	Map Name[b]
Utah (Cont.)	National Scenic Highway	Dinosaur Diamond Prehistoric	66-212	F6
	National Scenic Highway	Energy Loop	66-212	E6
	National Scenic Highway	Flaming Gorge Uintas	126-218	F5
	National Scenic Highway	Highway 12 Utah	116-206	E7
	National Wildlife Refuge	Browns Park National Wildlife Refuge	126-218	F5
	National Wildlife Refuge	Ouray National Wildlife Refuge	126-218	F5
	National Wildlife Refuge	Ouray National Wildlife Refuge	126-258	F5
Washington	National Scenic Trail	Pacific Crest Trail	102-105	B2
	National Scenic Trail	Pacific Crest Trail	244-245	B2
	National Scenic Highway	Mountainto Sound Greenway	244-245	B2
	National Scenic Highway	Stevens Pass Greenway	102-105	B2
Wyoming	National Recreation Area	Flaming Gorge National Recreation Area	126-218	F5
	National Recreation Area	Flaming Gorge National Recreation Area	218-240	F5
	National Scenic Trail	Continental Divide Trail	78-138	G5
	National Historic Trail	California Trail	121-240	F5
	National Historic Trail	California Trail	55-240	F5
	National Historic Trail	California Trail	79-216	G4
	National Historic Trail	Mormon Pioneer Trail	121-240	F5
	National Historic Trail	Mormon Pioneer Trail	55-240	F5
	National Historic Trail	Mormon Pioneer Trail	79-216	G4
	National Historic Trail	Oregon Trail	121-240	F5
	National Historic Trail	Oregon Trail	55-240	F5
	National Historic Trail	Oregon Trail	79-216	G4
	National Historic Trail	Pony Express Trail	121-240	F5
	National Historic Trail	Pony Express Trail	55-240	F5
	National Historic Trail	Pony Express Trail	79-216	G4
	National Wildlife Refuge	Seedskadee National Wildlife Refuge	121-240	F5

[a] Proximity event defined as a WWEC passing within 5 miles of the boundary of a potentially sensitive visual resource area.

[b] Maps are presented in the PEIS Vol. III, Map Atlas, Part 3.

APPENDIX Q:

ARCHAEOLOGICAL, HISTORIC, AND ETHNOGRAPHIC CONTEXT

APPENDIX Q:

ARCHAEOLOGICAL, HISTORIC, AND ETHNOGRAPHIC CONTEXT

The following are regional overviews for the Great Basin, Southwest, Plains, Plateau, California, and Northwest Coast cultural areas, which generally correspond to the major physiographic regions of the American West. The Native groups in each of these cultural areas had to adapt to the regional climate and environment in order to survive. As a result, there is a certain level of homogeneity within each region. Culture areas are based on the distribution of Native American Tribal groups at the time of Euro-American contact. They do not always correspond completely with prehistoric cultural areas. For example, the Colorado Plateau is considered with the Great Basin, because of linguistic and cultural ties between the Utes and Great Basin groups. However, in some prehistoric periods it was part of the greater Southwest. These overviews are intended to provide a basic historical chronology for each region and an understanding of the known types of cultural sites.

Q.1 THE GREAT BASIN

America's Great Basin is a region of arid intermontane valleys and plateaus stretching from the Sierra Nevada and Cascade Range on the west to the Wasatch Mountains on the east, and from the edge of the Columbia River Drainage on the north to the Colorado River Drainage on the south (Figure Q-1). It is an area of internal drainage. All streams and rivers arising in the basin empty into lakes or sink into the ground, never reaching the ocean as surface water. The basin is characterized by long, narrow generally north-south valleys nestled between steep mountain ranges. Thirty-three of its ranges have peaks over 10,000 feet with valley floors often over 4,000 feet in elevation. Mountain slopes and higher elevations support pinyon and juniper woodlands, while lower elevations are characterized by sagebrush and shadscale vegetation communities (Grayson 1993). Game animals include pronghorn, deer, mountain sheep, and formerly bison, and there is a periodic abundance of smaller game, such as jack rabbits. Streams and marshes in valley bottoms yield fish and migratory birds. The pinions provide an abundant if irregular crop of pine nuts. The Great Basin becomes less mountainous to the south where elevations are lower. There are areas of low desert, such as the Mojave Desert and Death Valley. Over time, the amount of precipitation within the Basin has varied significantly. In wet periods, large lakes form on valley floors; in drier times, they disappear, leaving behind only dry lakebeds, or playas.

The physiographic Great Basin forms the heart of the Great Basin cultural area. However, the Great Basin culture extends beyond the physiographic Great Basin and includes parts of the Columbia Plateau on the north, the Snake and Salmon River areas in Idaho, parts of western Wyoming, the Colorado Plateau of eastern Utah and western Colorado, and the northwestern corner of Arizona (d'Azevedo 1986; Jennings 1986). In general, these areas are not as arid as the heart of the Great Basin and include more elaborate river systems, mountainous regions, and high plateaus carved by deep canyons.

Q.1.1 Settlement Pattern

With some notable exceptions, the ways of life of Great Basin groups have remained remarkably similar for thousands of years. Small bands not much larger than a single nuclear family followed a seasonal round, making use of

FIGURE Q-1 Traditional Tribal Ranges in the Great Basin Cultural Area (Source: d'Azevedo 1986)

a variety of resources, each in its season. During those times of the year when resources were plentiful, bands joined together to gather pine nuts, hunt rabbits or pronghorn, socialize, and arrange marriages (Grayson 1993). During those times of the year when resources were scarce and dispersed, the bands likewise dispersed in small units.

The locations of temporary campsites and winter villages were constrained by access to water, food, and wood. Winter villages tended to cluster along the lower edges of pinyon and juniper woodlands. Pine nuts from an earlier harvest were stored here to provide food for the winter (Drews et al. 2004). Frequent winter temperature inversions in the intermontane valleys meant that these locations were often 15°F warmer than valley bottoms. They thus provided food, warmth, and shelter. Spring was the time for communal hunts that included jack rabbits and pronghorn.

Settlement patterns at other times of the year were determined by the presence and location of food resources. Streams and lakes provided fishing opportunities. Shallow lakes and marshes were particularly attractive to migrating birds and provided opportunities for communal hunting. Stream and lake shores were preferred locations for hunting camps or seasonal villages. Since these varied over time, evidence of past occupation is often associated with fossil lake shores. Human settlement shifted with these shifting resources; however, canyon mouths near fishing streams seem to have been favored (Grayson 1993). In some times and places, Great Basin peoples in contact with Southwestern groups have relied at least partly on horticulture for their subsistence. Year-round settlements developed in areas with sufficient water and irrigable fertile soil chiefly on the Colorado Plateau and the Lower Colorado River (Fowler and Madsen 1986).

The mountains and canyons of the Great Basin provided natural shelter in the form of caves and rockshelters. These dry, sheltered locations were attractive camping or dwelling spots over long periods of time when situated in proximity to subsistence resources, and have yielded long sequences of archeological data.

While Great Basin archaeological resources reflect broadly similar patterns, there are regional variations, and many local chronological sequences have been devised. The basin-wide correlating sequence followed here is based on that provided by Jesse Jennings in the *Handbook of North American Indians* (Jennings 1986). While broadly applicable, not all areas of the Great Basin followed the same developmental path, and the transition between these broad periods does not occur at the same time throughout the Basin.

Q.1.2 Prehistoric Context

Pleistocene/Holocene Transition or Paleo-Archaic (12,000 BC–8000 BC). During the last Ice Age, the Great Basin was much cooler and wetter. Large freshwater lakes formed, and now-extinct animals roamed its basins. The earliest suggestion of human presence appears as the climate warmed and the lakes shrank (Mehringer 1986). Most artifacts attributed to this period are surface finds associated with lake terraces. Typical sites include scatters of chipped stone artifacts, such as crescents and gravers, in association with large, bifacially flaked spear points. The remains of large extinct animals, such as mammoths, camels, and giant bison, have been found in similar locations, although their association with the artifacts is not always clear. The earliest inhabitants of the Great Basin seem to have followed a seasonal round, exploiting the plant and animal resources found near these shallow lakes, possibly hunting big game and probably exploiting upland resources as well (Bryan and Touhy 1999).

Early Archaic (8000 BC–2000 BC). Archaic peoples continued to follow a seasonal round of hunting and gathering, but subsisted on a wider variety of plants and animals. Their campsites often included dry caves and rockshelters where many perishable artifacts, including basketry and cordage nets, have been preserved (Cressman 1977). The atlatl, or spear thrower, came into use. Atlatl darts were tipped with side-notched, stemmed chipped-stone points. The increasing appearance of grinding stones reflects an increasing dependence on seed resources (Aikens and Madsen 1986). The beginning of this period was cooler and wetter than today; there were shallow lakes and marshes in areas that are now dry (Grayson 1993). These lacustrine areas were favored seasonal campsites. By 6000 BC, pinyon pine began to expand into the southern Great Basin, eventually providing an important upland food source. In the western Great Basin, the Western Pluvial Tradition emerged. Increasingly intense hunting included small mammals, rabbits, mountain sheep, deer, and occasional bison. The shift to an Archaic way of life did not occur until about 5800 BC in southern Idaho (Butler 1986) and around 5000 BC in the southwestern Great Basin (Warren and Crabtree 1986).

From about 5500/5000 BC to 2000 BC, conditions were warmer than they are today. As lakes and marshes decreased, the Great Basin appears to have been less densely populated. The eruption of Mount Mazama (now Crater Lake) in 5050 BC had significant effects on the population of the northern Great Basin (Cressman 1986).

Middle Archaic (2000 BC–AD 500/750). During the Middle Archaic, climatic conditions in the area approximated current conditions. By 1500 BC, the lakes had returned and the population again increased. Lake margins were favored locations for open sites. Caves and rockshelters continued to be used for storage. Pinyon pine continued to spread northward and reached the Reno area by AD 400. The fundamental Archaic way of life was retained, but with an increased dependence on seeds for food. Family groups maintained a seasonal round. Artifacts include Elko series atlatl points, fishhooks, leisters, knives, scrapers, and bone awls, with fewer milling stones. There appears to have been an active trading network in sea shells and obsidian. A wide variety of resources continued to be exploited. Favored camping locations were used repeatedly. Clay-lined semisubterranean pithouses appeared in winter camps with facilities for storage and access to favored resources.

Late Archaic (AD 750–Contact). The Late Archaic begins between AD 500 and 750. It is marked by the introduction of the bow and arrow, which replaces the spear thrower, or atlatl. More elaborate plant processing tools indicate a continuing shift toward vegetal resources, although the basic Archaic way of life was retained. There was an increasing influence from surrounding cultural areas. Horticulture appeared for a time in some areas, but for the most part did not last, giving way to a return to Archaic foraging. Desert side-notched arrow points are period markers, along with brownware pottery.

In some areas of the Great Basin culture, irrigation-based horticulture, permanent house structures, and pottery production were added to the Archaic tradition. The Fremont cultures spread over most of Utah north of the Colorado, Escalante, and Virgin Rivers and into adjacent portions of southern Idaho, eastern Nevada, and western Colorado from AD 400 to 1300 (Marwit 1986). The extent to which the Fremont groups depended on agriculture varied, with southern groups tending to be more dependent. Northern groups appear to have been less sedentary, and horticulture was only one segment of an Archaic seasonal round. Sites include semisubterranean dwellings and above-ground storage structures. Sites vary in size from individual farmsteads to hamlets and villages that include slab-lined pithouses and stone-and-adobe surface structures, some of which are multiroomed. Pottery includes a variety of gray wares — plain, corrugated, and painted — along with red-and-white wares.

To the south of the Fremont, puebloid cultures based on horticulture developed, particularly along the Virgin and Muddy Rivers. Ceramic parallels with the Kayenta Anasazi suggest dates of AD 400 to 1150. Initial small-scale sites, not unlike the Fremont sites, expanded during the Pueblo I phase and declined during Pueblo II. The largest sites appear to have been destroyed by 19th century Euro-American settlements, which were also dependent on permanent water. These sites may well have been way stations on the Old Mojave Trail, which linked the Kayenta Anasazi to turquoise mines in Nevada and coastal California (Fowler and Madsen 1986).

By 1300, the Fremont and the Virgin Anasazi had disappeared and were replaced by mobile Shoshonean groups who continued to practice an essentially Archaic way of life until contact with European groups.

Q.1.3 Protohistoric Context

Spain was the first European power to lay claim to the Great Basin, in part of the province of Alta California in New Spain. Spanish claims had little effect early on. However, horses did filter into the Great Basin through Ute escapees from Spanish New Mexico reaching the Utes and High Plains Shoshone, Bannock, and Northern Shoshone. Equestrian societies developed by the mid-1700s. They adopted Plains characteristics and hunted bison on the Plains (Shimkin 1986). These eastern groups developed more complex sociopolitical structures. Buffalo hunts and interactions with more complex Plains and Southwestern groups required the establishment of chiefs. These mounted groups preyed on the unmounted groups of the central Basin, taking captives and selling them as slaves to Europeans (Malouf and Findlay 1986).

The Basin remained largely unexplored by Europeans until 1776 and 1777, when Fathers Dominguez and Escalante traversed much of Utah and the Colorado Plateau. The area between Santa Fe and Utah Lake became well known to Spanish traders who entered the area without official sanction to trade and acquire slaves. Fur trader-trappers from the United States and Canada made their way to the Great Basin in the early 1800s, which gradually became known to Euro-Americans. Competition between fur trappers of different companies and nationalities often led them to attempt to trap out a valley before the competition arrived, leaving it devoid of beaver, with disastrous consequences for species such as beaver (Smith et al. 1983).

Q.1.4 Historic Context

In 1776 and 1777, two expeditions attempted to find a route linking Santa Fe with Monterey. Fathers Dominguez and Escalante crossed Utah and the Colorado Plateau. They did not reach California, but pioneered a stretch of the Old Spanish Trail, leaving most of the Great Basin undocumented. The unsanctioned Spanish traders did not record their journeys. In 1819, the Adams-Onís Treaty defined the boundary between New Spain and the United States and set the northern border of Alta California at the

42nd parallel, leaving the bulk of the Great Basin in New Spain, which became the Republic of Mexico in 1821 (Smith et al. 1983).

The 1840s brought an influx of American emigrants, most of whom were passing through. The Old Spanish Trail to southern California, the many-branched California Trail leading to Sacramento, and the Oregon Trail leading to the Northwest tended to funnel emigrant traffic. During the California Gold Rush of 1849 and 1850, tens of thousands of emigrants followed the California Trail along the Humboldt River through the Great Basin and across the mountains into California (Smith et al. 1983).

With the ratification of the Treaty of Hidalgo in 1848, the remainder of the Great Basin came under American control. In 1887, the first American settlers arrived in the Great Basin, among them Mormon immigrants under the leadership of Brigham Young, who settled in the Valley of the Great Salt Lake. They sought to bring the entire Great Basin under their control, establishing the independent State of Deseret. From its center in Salt Lake City, the church sent out colonizers to establish agricultural communities in surrounding valleys and missions to acquire natural resources such as minerals and timber. Relying on irrigation to support their farms, the Mormons often settled in the same places as the Fremont and Virgin Anasazi centuries before. The result was a scattering of planned agricultural communities from northern Arizona to southern Idaho and parts of Wyoming and Nevada. Much of this area was included in Utah Territory established by Congress in 1850 (Arrington 1958).

The discovery of mineral wealth in the Great Basin resulted in a new influx of settlers. The discovery of the Comstock Load near Virginia City in the late 1850s and silver in the Humboldt Mountains in the 1860s brought miners to Nevada. Nevada territory was separated from Utah in 1861. Mining continued in a boom/bust cycle through the end of the 19th century, and continues to some extent today. Abandoned mining and prospecting equipment remains scattered throughout the Great Basin.

With the incorporation of California into the Union and the development of mineral wealth in the West, new, more efficient communication routes were sought. In 1859, a more direct southern route across the Great Basin was laid out, linking Salt Lake City to Carson City, Nevada. This route was followed by the Pony Express, the Overland Mail and Stage, and eventually Wells Fargo until the turn of the century. This remained the main communication route across the Great Basin until the coming of the railroad. In 1863, the Central Pacific Railroad began laying track eastward from Sacramento, eventually joining with the Union Pacific in 1869. The railroad increased access to the central Great Basin, and ethnic communities developed. Chinese laborers, first attracted by gold in California, found work building the railroad and ranching, establishing relatively short-lived communities.

Ranches, farms, and commercial centers grew up to support the miners, drawing on the region’s limited water resources. The mines usually eventually gave out, but many of the ranches and farms remained. The Preemption Act of 1841 and the Homestead Act of 1861 allowed ranchers and farmers to acquire title to the land they had settled. Ranches and farms were located in close proximity to water. In 1877, the Desert Entry Act allowed claims of 640 acres of irrigable land, permitting homesteaders and ranchers to greatly increase their holdings. In addition, line cabins were built on grazing ranges. Sheep and cattle were raised in the Great Basin. Herding sheep provided a source of revenue for Basque immigrants who established themselves in the Great Basin in the 1880s and 1890s. The Taylor Grazing Act of 1934 favored beef ranchers over sheep raisers, and eventually cattle ranching became dominant.

Much of the Great Basin remains empty and arid. Exactly these qualities attracted the development of military test ranges for aircraft and other weapons, and weapons storage.

A bombing range was established at what is now Edwards Air Force Base (AFB) in 1933; Wendover Army Air Field was established as a bombing range in 1941. It has here that atomic bomb shapes were tested and the Enola Gay was prepared for its flight to Hiroshima. Such functions are continued at the Utah Test and Training Range now administered from Hill AFB. In 1943, the Naval Ordnance Test Station was established at China lake, California, and a biological warfare testing station at Dugway Proving Grounds in Utah. The Army Air Corps Flexible Gunnery School was established at what is now the Nellis Bombing and Gunnery Range, in 1941, and the Nevada Test Site in Nye County, Nevada, was used for atmospheric and underground testing of nuclear weapons from 1951 to 1992.

Q.1.5 Ethnohistoric Context

At the time of Euro-American contact, almost all of the Great Basin was inhabited by Paiute, Ute, and Shoshonean groups sharing a common way of life and speaking closely related languages of the Numic family. Only the Washoe, whose territory is centered on Lake Tahoe and who likely arrived in the Great Basin before the Numic speakers, speak an unrelated Hokan language (Jacobsen 1986). Numic speakers include the Northern Shoshone and Bannock, the Eastern Shoshone, the Western Shoshone, the Northern Paiute, the Southern Paiute, the Owens Valley Paiute, the Kawaiisu, and the Washoe. With the exception of some southern groups who practiced horticulture and some eastern groups that gathered to hunt bison, Great Basin peoples lived a mobile transhumant lifestyle similar to that of their Archaic predecessors. Taking advantage of variations in altitude and topography, small bands, usually no larger than a nuclear family, followed a seasonal pattern of hunting and gathering, sometimes forging beyond the Great Basin. As part of this seasonal round, groups came together for communal hunts or to gather pine nuts. Winter villages were located near permanent water and included storage features for seeds and roots. Plant resources tended to predominate. Basketry, sickles, seed beaters, nets, and weirs were common food procurement tools along with bows and arrows, clubs, and traps.

Native American groups in the Great Basin were among the last indigenous groups to come in contact with Euro-Americans. Although relations were initially friendly, Native American groups soon came into conflict with fur trappers over the scarce resources of the Great Basin. With water at a premium in the arid Basin, emigrant routes of necessity followed its few rivers, such as the Humboldt, disturbing favored Native American hunting, gathering, and fishing grounds. Fertile lands close to water attracted immigrants who displaced Native Americans and deprived them of their most important food resources. American farmers and ranchers displaced native groups from these areas. Livestock consumed seed crops important to Native Americans. The Native response to this loss of resources provoked violent responses from the emigrants (Smith et al. 1983).

Now fully engaged with an expanding United States, Great Basin Tribal groups felt the impact of the American move west, particularly along the main migration routes and in areas of mineral wealth. It was axiomatic to American thinking that the expanse of Euro-American civilization should not be prevented by thinly spread hunting societies (Prucha 1988). Native American populations were to be concentrated on reservations, "civilized," taught to farm, and eventually assimilated into American culture. Reservations began to be established in the Great Basin in 1855. While some groups did adopt agriculture, for the most part these efforts did not achieve their goals. Until 1870, Tribal Nations were treated as sovereign entities to be dealt with by treaty. Agreements in which Tribes ceded land, reserved rights, and were promised annuities were made, but not always ratified and rarely fully respected. Under pressure from Euro-American expansion, Native American populations declined. Beginning in 1870, efforts began to eliminate reservations by allotting lands to individual reservation inhabitants. This effort intensified the passage of the Dawes Severalty Act of 1887. Great Basin populations continued to diminish from 1887 to 1933 under the allotment policy. At the same time, new "Indian lands" were created when the Bureau of Indian Affairs (BIA) recognized "camps" or "colonies" of non-reservation Native Americans on the outskirts of towns and cities (Clemmer and Stewart 1988).

The Tribal Reorganization Act of 1934 began a period when attempts were made to reverse the effects of allotment, allow the expression of traditional Native American culture, and encourage indigenous customs and crafts and elected Tribal councils. At the end of World War II, emphasis returned to ending reservations through the termination program. BIA attempted to relocate Native Americans to the cities to end high rates of unemployment on the reservations. Mineral leasing increased after the war, so that by 1964 the status of Native American groups varied widely, ranging from wealthy income-producing reservations to terminated groups. Under the Indian Self-Determination Act of 1975, Tribal governments were given increased opportunities to administer programs on their own reservations, and Great Basin groups increasingly took advantage of them, beginning with those, such as the Utes (Simmons 2000), that had the most experience in administering large budgets (Clemmer and Stewart 1988). In the 1980s, the U.S. government officially propounded the doctrine of government-to-government dealings with Tribal Nations, a return to the recognition of Tribal sovereignty.

Q.2 THE SOUTHWEST

Although the Southwest cultural area extends well into Mexico (Figure Q-2), only the portions located in the southwestern United States are considered: Arizona, New Mexico, southwestern Colorado, southeastern Utah, and the southern tip of Nevada. The Southwest is arid to semiarid with extreme variation in elevation and topography and with few permanent rivers. As a result, plant and animal resources are often locally diverse.

Q.2.1 Settlement Pattern

The physical landscape of the Southwest includes rugged mountains, mesas incised by deep canyons, and low-lying deserts. While predominantly arid, snows in the high mountains feed significant rivers: the Colorado, the San Juan and the Rio Grande. Indigenous peoples have adapted to the aridity and developed a way of life dependent on farming native American crops: corn, beans, and squash. They developed a variety of means of cultivating the soil and conserving moisture developing farmsteads and villages often dependent on irrigation (Kehoe 1981; Cordell 1997). As in any arid climate, access to water is a limiting factor in settlement patterns. Access to a variety of ecological niches and a broad spectrum of resources is another prime factor in site selection. Protected canyon heads with access to water, a variety of plants and animals at different elevations, and mineral sources were favored by hunting and gathering peoples. Fertile, irrigable soil and access to mountains for hunting and gathering were favored by agriculture peoples, as were in some periods defendable tops of mesas surrounded by vertical cliffs or shelters within the cliffs themselves.

Q.2.2 Prehistoric Context

Cultural traits common to the area at the height of its prehistoric development include permanent villages, agriculture, regionally variable architecture including adobe and stone masonry, patterned settlements, specialized religious structures, pottery, weaving, communal structures, weakly stratified societies, and strong continuity with preagricultural hunting and gathering techniques (Woodbury 1979). Its agriculturally based components may be seen as being derived from the more highly developed cultures of Mesoamerica.

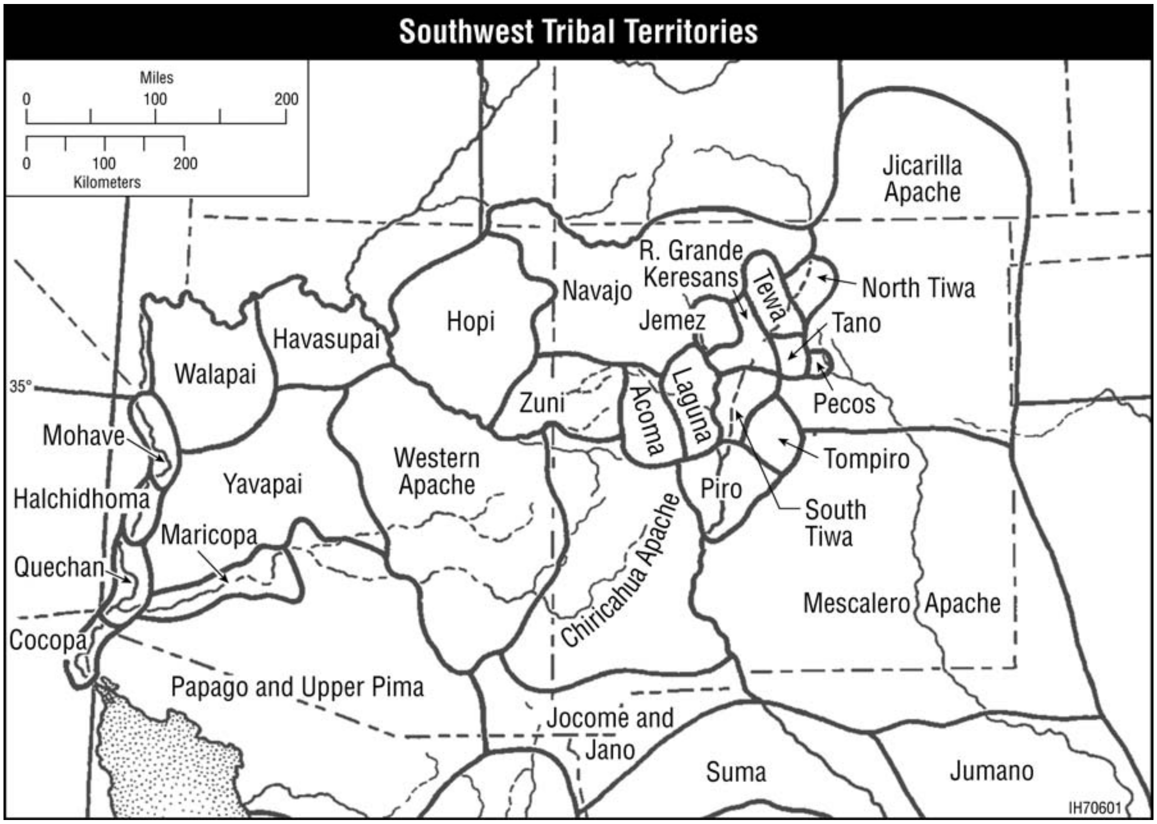

FIGURE Q-2 Tribes of the Southwestern Cultural Area

Paleo-Indian (9500 BC–5500 BC). During Paleoindian times, rainfall was higher than today, and ponds and playas were full, as were rivers and the major arroyos. Grasslands supported herd animals that included now-extinct species, such as the mammoth and *Bison antiquus*, and no longer native species, such as camelids and the horse. The earliest cultural remains are those of small Paleoindian groups of the Clovis tradition (9500 BC–9000 BC), whose subsistence base included hunting or scavenging large herd animals (Judge 1973). The classic diagnostic Clovis artifact is a large lanceolate point with a concave base, bifacially worked and fluted on one or both sides (Cordell 1979b). Paleoindian sites from the succeeding Folsom tradition (9000 BC–8000 BC) are more common. Folsom sites include base camps, "armament" sites, processing sites, and kill sites. All seem to be located with reference to water, hunting grounds, playas, the broad plains that surrounded them, and commanding views (Cordell 1979b).

Paleoindian sites have low visibility, and many may have been buried. Those that have been found tend to be in areas where erosional processes have deflated sites. Those without diagnostic artifacts look like lithic scatters from other periods.

Archaic Period (7000 BC–AD 400). The Archaic Period saw a change in subsistence strategy from big game hunting/scavenging to a more diversified subsistence base. It was characterized by small, mobile groups of hunters and gatherers subsisting to an equal extent on wild plants and relatively small game (deer, pronghorn, rabbits, etc.). In the later part of the period, maize agriculture was incorporated by some groups (Cordell 1979b). The Archaic tradition emerged earliest in the western part of the Southwest and may have radiated from core areas in southern California and northern Mexico. Archaic sites tend to be relatively ephemeral and are affected by geological processes. Archaic peoples often chose dunes or other geologically active surfaces for their campsites. Sites lacking diagnostic artifacts are difficult to distinguish from those of other periods and often yield small lithic assemblages (Cordell 1979a).

Early Archaic. The San Dieguito-Pinto Tradition, in which small groups followed a seasonal round of upland and lowland exploitation, appears in the West as early as 7000 BC. It spreads slowly eastward, filling the niche eventually vacated by Plains-based big game hunters. Archaic peoples preferred spring-fed canyon heads for base camps with access to a broad spectrum of resources. Smaller activity sites were located close to hunting, gathering, or quarrying resources (Irwin-Williams 1979). The south-central Southwest sites, which are characterized by thin flat milling stones and percussion-flaked chipped-stone tools, indicate a mixed hunting-gathering economy (Irwin-Williams 1979).

Middle Archaic. There are indications that the climate of the Southwest entered a moister phase around 3500 BC. It was a period of dune stabilization, soil formation, and increased spring reliability. The number, size, and density of sites increase, indicating a population increase. Camps become less ephemeral with indications of simple temporary structures. A distinctively Southwest cultural area began to develop as cultures across the region interacted at a low level and shared subsistence patterns and stylistic traits (Irwin-Williams 1979).

In the West, surface finds of stone choppers, scrapers, grinding stones, and handstones indicate a mixed foraging economy. Lake-edge sites were preferred. In the north, canyon heads remained popular locations for base camps with extensive fire-cracked cobble-filled earth ovens. Faunal remains suggest that medium and small game animals were being exploited. A picture emerges of increasingly successful systematic, intensive, and inclusive exploitation of microenvironments over the whole annual cycle.

Late Archaic (2000 BC–AD 500). During this period, cultural influences reaching the Southwest from Mexico resulted in Archaic groups adding horticulture to their subsistence base. At first, raising crops became another element of the seasonal round, but by the end of the period, permanent villages had been established, irrigation had been introduced, and maize, beans, and squash, the staples of Native American agriculture, were being grown (Irwin-Williams 1979). Horticulture gradually became an increasingly important part of the subsistence base as the population of Archaic groups slowly increased. Some sites became more permanent and included cultic artifacts. Narrow canyon-floor floodplains near canyon heads seem to have been exploited for maize agriculture (Woodbury and Zubrow 1979).

The earliest permanent villages in the Southwest appeared along the Gila and Salt Rivers of southern Arizona about 300 BC. These sites were clearly peripheral outposts of Mesoamerican civilization. Large-scale irrigation appeared without local precursors. In the centuries before AD 500, village life became widespread, incorporating permanent architecture, constructed wells, irrigation systems, and storage pits. Pottery, also derived from Mexico, was widespread by the end of the period, and by AD 500, the bow and arrow had replaced the atlatl, or spear thrower. The pattern of agriculturally based permanent settlements was established as a distinctive Southwestern cultural pattern, producing maize, beans, squash, cotton, and possibly tobacco, and having communal ritual areas (Woodbury and Zubrow 1979).

Hohokam. The initial incursion of settlements based on irrigation agriculture on the

Gila and Salt Rivers can be seen as the Pioneer Period of the Hohokam culture (100 BC–AD 500). The Hohokam were likely immigrants from Mexico, bringing with them Mesoamerican practices and technology. They occupied sites along perennial streams with access to mountain resources. Although they constructed elaborate irrigation systems, they also relied heavily on gathering such resources as saguaro fruit and mesquite beans. Pioneer settlements consisted of wood and brush structures built in shallow depressions clustered haphazardly near irrigation canals. Cremation was the typical mortuary practice. Typical artifacts include thin plain and redware pottery made using the paddle-and-anvil technique, ceramic figurines, worked shells, finely chipped stone artifacts, stone bowls, trough milling stones, and stone palettes. Shells were obtained primarily from the Gulf of California, either by trade or expedition.

In the succeeding Colonial Period (AD 550–900), the same patterns became elaborated and expanded as Hohokam culture spread to the north, west, and east. There were more and larger settlements. Irrigation systems expanded, suggesting inter-village cooperation. Ball courts and platform mounds showed increasing Mesoamerican connections as well as social, religious, and economic integration within the communities. There arose a new flamboyance in the arts, shown in ceramic decorations, ceramic figurines, more elaborate stone work, and worked shells.

Hohokam territory shifted slightly in the following Sedentary Period (AD 900–1100). In many areas, village locations shifted to the floodplain or first terrace, while other dwellings shifted away from the rivers, although they were still connected by irrigation channels. Mesoamerican connections continue. By the end of the period, the roofs and walls of dwellings were being constructed of wattle and daub, or *jacal*.

In the following Classic Period (AD 1100–1450), the basic way of life remained the same, but there was a shift in settlement pattern and a contraction from frontier areas. Many Sedentary Period sites did not continue into the Classic Period. Sites became larger and moved farther from water. There is evidence for terrace farming, dry farming, and flood irrigation, as well as canal irrigation. Multistory buildings appear. The Hohokam culture comes to an end around AD 1450, perhaps under pressure from Athapaskan (Apache/Navajo) expansion or because of a loss of trade ties with Mesoamerica (Gumerman and Haury 1979).

Mogollon. A distinct agriculturally based culture also developed in the more mountainous regions east of the Hohokam. While broadly parallel to other Southwestern cultures, a distinct ecological context resulted in a distinct culture. The occupied area is dissected by high mountains and well-watered valleys. These narrow valleys were less than ideal for agriculture because of their narrowness, altitude, and short growing seasons. Early Mogollon (500 BC–AD 1000) settlements, which were often at least partially walled, tended to be located in easily defensible positions on high mesas, bluffs, or ridges well back from well-traveled routes. By AD 900–1000, sites were located on floodplains near irrigable land. Settlements consisted of from four or five to fifty pithouses. Each settlement had one or more large pithouses, or kivas, presumably for communal and/or ritual use.

Early Mogollon pottery were coiled, polished, uniformly shaped, plain brown and red wares, while painted wares appeared about AD 400 when red-on-brown and red-on-white wares appeared. The chipped stone industry continued earlier Archaic forms and techniques, but there was a well-developed pecked and ground stone technology including functional forms such mortars, pestles, milling stones, and axes along with carved decorative pieces.

The Later Mogollon (AD 1000–1400) culture appears to have been influenced by the Anasazi to the north. The dominant site type is a surface pueblo of from four or five to

500 rooms. The tightly packed cells included living, storage, and work rooms. Each pueblo had one to six semisubterranean kivas. By the end of the period, much larger great kivas had appeared. Around AD 1250, there is a precipitous drop in the number of sites in some areas, while others increase in population. Later Mogollon pottery predominantly consisted of black-on-white wares decorated with exuberant geometric and figural designs. Over time, red-on-black wares and polished black wares increased. Metates, or milling stones, changed in form from basin to trough to tubular associated with milling bins (Martin 1979).

Ancient Puebloan (Anasazi[1]). The term Anasazi refers to the archaeologically known Puebloan cultures occupying the area north of the Mogollon and the Hohokam in an area stretching from southeastern Nevada to north-central New Mexico, but centered on the Four Corners area of the Colorado Plateau. This is an arid area of diverse topography including forested mountains, wooded mesa tops, broad and narrow canyons, and river valleys. Ecological diversity associated with variations in altitude, rainfall, and local topography made the area attractive to Archaic peoples. As in other cultural areas, there is considerable variability, particularly between the eastern and western reaches of the area (Cordell 1979a; Plog 1979).

Basketmaker II[2] (100 BC–AD 400). Sites first identified as Basketmaker were found in dry caves and rockshelters where basketry and woven fibers were preserved. Sites identified as Basketmaker II tend to be located in places that had access to diverse vegetal resources, such as rockshelters, on promontories or bluffs with good views, rims of deep canyons, and benches far from river bottoms. They consist of one or more pithouses and seem to have been occupied seasonally. The people used spear throwers to bring down game and processed plants with grinding stones. They planted and harvested maize, but only as part of their subsistence base. Rice grass and pinyon nuts provided important subsistence as well. Western Basketmaker II sites tend to have no pottery (Cordell 1997).

Basketmaker III (AD 400–700). The following period saw territorial expansion, population growth, increased trade, and increased dependence on agriculture, but hunting and gathering remained important. The fundamental Native American triad of beans, corn (maize), and squash appeared. New narrower, side-notched projectile points suggest that the bow and arrow replaced the spear thrower. Villages typically consisted of three to four structures, with one larger pithouse serving communal and ritual purposes. Villages included an increased number of storage pits, and grayware pottery appeared in the west. Village sites tended to be located on alluvial terraces and benches. The archaeological sites have low visibility. Alluvium conceals some, while pithouses often do not leave surface depressions and are discovered only in road cuts (Stewart and Gauthier 1981).

Pueblo I (AD 700–900). Pueblo I sites are located much as the Basketmaker III sites had been, but show an increasing reliance on agriculture. Rectilinear surface storage structures appear. There is evidence of terracing and irrigation. Most sites appear to have been occupied by a single family for a single generation (Plog 1979). An increase in local varieties of widely traded painted pottery reflects the need to store and probably to exchange food in a somewhat drier environment

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1 The term Anasazi is derived from a Navajo word meaning “ancient enemy” or “ancient stranger” and is not preferred by modem Puebloan groups. However, since there seems to be no universally accepted alternative, it is retained here to distinguish the prehistoric Pueblo cultures of the northern Southwest from other prehistoric Pueblo cultures, such as the Hohokam and the Mogollon.

2 Basketmaker I was a theoretical construct that has never been isolated archaeologically.

where harvests were irregular and unpredictable (Cordell 1979a).

Pueblo II (AD 900–1100). By AD 1000, agriculture had become the dominant food source for the Anasazi. Marked by characteristic black-on-while or red-on-white pottery, village sites increased in size and were often associated with outliers. Canals, terraces, check dams, reservoirs, and grid systems developed. There were shifting patterns of abandonment and aggregation. Chaco Canyon emerged as a redistribution hub for the turquoise trade. Surface structures included living, storage, and work rooms, while kivas remained semisubterranean.

Pueblo III (AD 1100–1300). This period saw the abandonment of most of the northern tier of the Anasazi range and the aggregation of population in the southern areas. Dependence on agriculture became well established. Sites near water courses and arable land were favored. Cliff dwellings suggest a need for defense. Large pueblos developed, composed of rectangular cells and semisubterranean kivas grouped around courtyards. Chaco Canyon was the dominant center, at the nexus of a system of constructed roads and trails. Finds there include copper bells and macaw bones from Mexico.

Pueblo IV (AD 1300–1600). During Pueblo IV, the trend toward population concentration continued. The center of Anasazi development shifted from the San Juan Basin to the Middle and Upper Rio Grande. Most historically known pueblos were founded at this time (Cordell 1979a). Large villages with hundreds of rooms built of stone or adobe were typical. Some were multistory with a central plaza and large kivas. Large sites developed in the Hopi and Zuni areas, and large pueblos appeared on the fertile alluvium along the Rio Grande. A long-distance trade network linked the Middle Rio Grande with the Hopi on the west and with Plains groups on the east (Cordell and Gumerman 1989).

Patayan. The Patayan were a pottery-making culture centered on the Lower Colorado River distinct from their Hohokam, Mogollon, and Anasazi neighbors. They occupied the mostly Basin and Range area between the coastal ranges of the Californias on the west, the Mogollon Rim of Arizona on the east, the southern tip of Nevada on the north, and the Gila River on the south (Schroeder 1979). They built small villages or pueblos associated with small farm plots. Sites are characterized by rock-lined *jacal* structures, rock and gravel alignments, and rock-filled and roasting pits. Their pottery was plain brownware related to Hohokam wares. Chipped-stone choppers characterized their stone toolkit.

The Patayan likely developed from the Archaic cultures of the Mojave Desert and had a way of life similar to the Yuman groups that inhabited the Lower Colorado at the time of European contact. A reliance of river floodwater farming, wild plant gathering, and hunting small game has been postulated, with exploitation of upland resources in times of crop failure. The Patayan appear to have been in the area by AD 700. Archaeological evidence is scant. Riverside sites were likely eroded, covered by alluvium, or drowned by modern reservoirs. Typical Patayan site types include artifact scatters (seasonal base camps, temporary camps, resource areas, lithic manufacturing, trade routes, rock rings, earth figures, and petroglyphs) (Stone 1991; Cordell 1997).

Apacheans. Five of the seven Southern Athapaskan societies currently reside in the Southwest: the Western Apache, Chiricahua, Mescalero, Jicarilla, and Navajo. From an original homeland in Canada’s Mackenzie Basin, these groups are thought to have followed the Rocky Mountains south, arriving in the Southwest between AD 1000 and 1400. Primarily hunters and gatherers exploiting a wide range of resources in small mobile bands, they had practically surrounded the Pueblos by the time of the Spanish arrival in the 16th century, and had selectively adopted Puebloan cultural traits such as pottery production and limited agriculture. The interaction between Apacheans and Pueblos intensified under the pressure of Spanish expansion, particularly during the Pueblo Revolt of 1680, when the two groups made common cause against the Spanish and when Apacheans harbored Pueblo refuges from the Spanish reconquest (Brugge 1983; Opler 1983a).

Q.2.3 Protohistoric Context

Spanish explorers entered the Southwest in 1540 following the Rio Grande to the Pueblos of what is now New Mexico. Disappointed at their failure to find the treasures of the Seven Cities of Cibola they returned without gold. At first, few followed in their footsteps. The reports of the few explorers and missionaries that made the trek indicate that the Pueblo culture was thriving. They described impressive mesa-top pueblo villages with plenty of food and enough cotton blankets to share with the Spaniards (Johansen 2005). All this would change with the onset of Spanish colonization, although Yuman and other western groups remained isolated from Hispanic populations.

Q.2.4 Historic Context

Spanish Colonial and Mexican Period. Spanish colonization began in earnest in 1598, and in 1609 a capital of the now royal colony of Nuevo Mexico was established, which nominally included Arizona, and a new capital at Santa Fe was founded. Pueblo villages came under the encomienda system and were required to provide tributes of grain, wood, and labor (Simmons 1979a). The arrival of the Spanish initiated a period of demographic crisis for indigenous Native Americans. New diseases reduced their numbers and perhaps their social complexity. Livestock changed the ecology of the area, competing for resources with the native fauna and consuming native grasses. The establishment of Spanish settlements and haciendas restricted the resources available to Pueblo groups and further complicated Pueblo relationships with the nonsedentary Native American groups that surrounded them (Cordell and Gumerman 1989). In 1680, the burden of the encomienda system and Spanish attempts to suppress native religious practices resulted in an explosion of violence. The usually independent Pueblos united and in alliance with the Navajo threw off Spanish rule. The Spanish reconquered the Rio Grande and Zuni pueblos in 1692. The Hopis were able to defeat the Spanish and remained independent throughout the 18th century. Refugees from the Rio Grande and Zuni pueblos sought refuge with the Hopi and in Navajo lands. At this time, elements of Pueblo and Apachean cultures merged into contemporary Navajo culture, with the Navajo adopting more permanent residences, agriculture, and sheep husbandry.

Spanish colonial law dictated that new towns, or villas, be laid out in a grid pattern around a central plaza (Simmons 1982). Grants for new settlements included a tract of communal land for grazing and the gathering of firewood, lumber, and other raw materials.

Archaeologically, domestic Spanish colonial sites have been little studied. Sites dating to before the Pueblo Revolt yield few manufactured goods, and ceramics are mostly the same as at Native American sites. At the smaller, more dispersed land holdings that characterize the 18th century, a similar pattern continues. Apart from the grid-plan plazas, sites consist of plazuelas and single structures of herders with corrals and ramadas (Cordell 1979b). Spanish artifacts are rare and distinctive, including gun flints, chain mail, and Majolica ware pottery (Cordell 1979b).

Mexican independence in 1821 marked the beginning of a new era in the history of New Mexico. Government was now primarily a local affair, with little interference from Mexico City. With independence came more commercial freedom. Trade with its burgeoning northern neighbor, the United States, increased over the Santa Fe Trail, and New Mexico became increasingly dependent on American manufactured goods. While locally produced pottery did not disappear, an increasing amount of American cloth, crockery, milled lumber, and iron hardware made its way into the area after 1821 (Simmons 1979b).

U.S. Period. The U.S. Army entered New Mexico in August of 1846, during the Mexican War, and in a virtually bloodless action seized the territory for the United States. In 1848, under the terms of the Treaty of Guadeloupe Hidalgo, New Mexico was ceded to the United States, and military posts and stage routes were established (Simmons 1982). New Mexico, accustomed to considerable local autonomy, convened a constitutional convention and applied for statehood in 1850, an action that was ignored by the U.S. Congress, which established New Mexico as a territory in the same year (Simmons 1979b). The Gadsden Purchase was ratified in 1854, adding 30,000 square miles to the Territory of New Mexico for the development of a transcontinental railroad. The establishment of the Territory of Nevada in 1861 removed all land west of the Colorado River from New Mexico. Arizona Territory was formed in 1864. In the same year, the United States began forcibly moving the Navajo from their traditional lands to Fort Sumner on the Pecos River. They were allowed to return to a reduced reservation in 1868.

The Southwest experienced many of the same kinds of economic development as the rest of the American West. Ranching, mining, lumbering, and railroad development were all important themes. Raising livestock had long been important to the local economy. The new domestic animals introduced by the Spanish — sheep, goat, cattle, and horses — were of economic importance to colonists and Native Americans alike. The Homestead Act of 1862 opened to homesteading public lands surveyed by the General Land Office. Lands near reliable surface water were among the first to be homesteaded. The presence and accessibility of water seem to have been important factors contributing to the establishment of homesteads. Improved roads and automobiles, along with better well-drilling technology, made many areas much more attractive to homesteaders after World War I.

Mining. Native Americans had been mining turquoise and coal before the arrival of the Spanish, and it was the lure of mineral wealth that first brought Spanish explorers up the Rio Grande. Spanish colonists using Native American labor began mining gold and perhaps copper ores before the Pueblo Revolt. These operations resumed after the revolt and continued through the Mexican period (Cordell 1979b). American settlers were not immune to the lure of bright metal. Although the lack of capital and transportation were initial hindrances, with the arrival of the railroad in 1880, both became available and mining activity increased.

Transportation. Mineral development in Colorado and the San Juan drainage of New Mexico attracted railroads to the Southwest, beginning in the 1870s. Phoenix and Albuquerque continued to develop as transportation hubs. East-west national highways, U.S. Route 66 and later Interstate 40, crossed the north-south routes following the Rio Grande Valley.

As in the Great Basin, the arid stretches of the Southwest were found suitable for the development and testing of weapons. The New Mexico Proving Ground was established south of Albuquerque in 1942, while the Manhattan Engineer District established a facility for developing atomic weapons at Los Alamos, New Mexico, resulting in the first successful test of an atomic weapon at Alamagordo in 1945. White Sands began testing missiles in 1945, Yuma Proving Ground opened in 1942, and the Goldwater Air Force Range opened in 1941.

Q.2.5 Ethnohistoric Context

At contact, the Southwest was inhabited by a variety of Native American groups (Figure I-2), including Puebloans (Hopi, Zuni, Acoma, Laguna, Piro, Tiwa, Tewa, Jemez, Tompiro, Tano, Pecos, and Keresans), Apacheans (Western Apache, Chiricahua Apache, Mescalero Apache, Jicarilla Apace, and Navajo), the Pima-Papago, and the Yuman cultures (Cocopa, Quechan, Hsalichdohoma, Mohave, Maricopa, Walapai, and Havasupai). Yuman cultures vary between upland and river types. Those along the river practiced floodwater irrigation from earth-covered farmsteads, growing corn, beans, and squash; they also collected mesquite beans, hunted, and fished. Upland Yumans lived a hunting and gathering way of life that was similar to that of Great Basin groups. Some, such as the Havasupai, practiced irrigation agriculture part of the year. The Pima-Pago appear to be descendants of the Hohokam, and practiced irrigation agriculture in small villages.

Contemporary Pueblo groups speak a number of distinct languages, but share similar cultures. At the time of European contact, they included the Hopi, the Zuni, the Acoma, and numerous Rio Grande Puebloan groups who live in agriculturally based communities known for their distinctive architecture. Traditional pueblos consisted of one or more multistoried stone or adobe room blocks surrounding a central plaza, sometimes open on the south where ritual structures or kivas were located. Because the pueblos were subject to frequent raids, there traditionally were no ground-level entrances; instead, access was through roof openings by retractable ladders. After contact, beehive ovens, along with metal tools and containers, were adopted from the Spanish (Schroeder 1979). However, Puebloan groups were not the only groups to inhabit the Southwest. The Pueblos and their Hispanic neighbors were involved in a trading and raiding relationship with the Navajo, Apache, and Comanche. This interaction resulted in the sharing of both trade goods and cultural traits among the communities.

Pueblo subsistence was based on irrigation agriculture, including traditional crops and stock: maize, beans, squash, turkeys, and crops and livestock introduced by the Spanish. Winter wheat was adopted, thus extending the growing season. Fruit trees and new vegetables were also adopted, along with horses, sheep, goats, and cattle. In addition, hunting and the gathering of traditional plant resources remained important for the Pueblos.

Active Spanish suppression of indigenous religious practices drove them underground, resulting in the secrecy that now surrounds them. Spanish missionaries succeeded in applying a Catholic overlay to Puebloan traditions, which the Pueblos have assimilated into their traditional beliefs.

Archaeologically, post-contact Pueblo sites show both Plains and European influences. Plains influences include striated culinary wares and bone talon points and gouges (Wendorf and Reed 1955). European influences on Puebloan material culture include the introduction of metal tools, new grains, and domestic animals. The introduction of the horse increased the Puebloan hunting range and allowed hunting parties to range onto the Plains in quest of bison (Wendorf and Reed 1955).

When United States officials arrived in the Southwest after the Mexican War, the Native American groups they encountered varied widely in the extent of their previous exposure to Euro-Americans. Most of the agriculturally based Pueblos had been incorporated into the Spanish and Mexican legal systems and had received land grants (Egan and Padney 1979). More mobile Apachean groups had had mostly adversarial contact, raiding both Native American and colonial communities. Interior Yuman groups were isolated and had had almost no contact with people of European descent, while those on the Lower Colorado had been missionized by Spanish and Mexican clergy (Stewart 1983a). Initial contacts with American authorities were based on the pattern of negotiating treaties with sovereign entities; however, this pattern gave way in the 1870s.

Already compact, the pueblos and the agricultural Pima villages were not as susceptible to the American desire to concentrate and "civilize" indigenous groups and retained their own lands. They were not greatly affected by attempts at allotment under the Dawes Act of 1887 (Dockstander 1979). The Navajo and Apaches, on the other hand, although themselves subject to raids and slaving by settled populations, were seen as threatening groups blocking access to agricultural and mineral resources. It was felt that they needed to be controlled and pacified. These groups were subject to removal — the Navajo and Mescalera Apache to Fort Sumner in 1864 (Roessel 1983) and Chiricahua Apache to Florida in 1886 (Opler 1983b) — before eventually returning to the Southwest. Conflicts between historical enemies such as the Navajo and Hopi continued as the returning Navajo population grew and settlement expanded. The process of establishing reservations began in 1859 with the Pima and continued through the end of the nineteenth century and the beginning of the twentieth. The influx of Americans brought on by the construction of railroads and the development of agricultural and mineral resources brought Native American groups into increased contact with outsiders. Efforts to "civilize" and Americanize the Natives increased. However, attempts at forced schooling met with only limited success. During the 1920s, the Metalliferous Minerals Act and the Indian Oil Act clarified Native American ownership of subsurface minerals. This brought a new source of wealth to some Tribes and encouraged the development of Tribal councils that could legally negotiate development rights (Shepardson 1883). This process continued with the establishment of Tribal councils and constitutions under the Indian Reorganization Act of 1934. Most Southwestern Tribes were able to retain a strong ethnic identity during this process and through their councils resisted attempts at reservation termination in the 1950s. This left them well positioned to take advantage of the Indian Self-determination Act of 1975 and the return to government-to-government relations with the federal government beginning in the 1980s (Clemmer 1979; Egan and Padney 1979; Ezell 1983; Fontana 1983; Harwell and Kelly 1983; Iverson 1983; Khera and Mariella 1983; McGuire 1983; Schwartz 1983; Stewart 1983b).

Q.3 THE GREAT PLAINS

Montana, Wyoming, Colorado, and New Mexico straddle the western periphery of the Plains cultural area that extends from the Rocky Mountains to the Mississippi River and from the Saskatchewan River in southern Canada to the Rio Grande in Texas (Figure Q-3). Grasslands dominate the landscape, with short-grass prairie toward the west, tall-grass prairie toward the east, and a mixed zone extending through portions of the Dakotas, Nebraska, Kansas, and Oklahoma. The Great Plains roughly includes the short-grass and mixed zones. Less than 1% of pre-European tall-grass prairie remains, and the mixed zone is greatly reduced. Declines in the short-grass prairie are less, but significant (USGS 2003). Time frames in the following are approximate and subject to regional differences and overlaps.

Q.3.1 Settlement Pattern

Climatic changes throughout prehistory required constant modification of the subsistence strategies of the Plains. Early strategies involved nomadic hunting of large game; however, as the climate warmed and dried, a focus solely on large game was no longer possible. Exploitation of floral resources increased during the Archaic Period. This resulted in a semi-nomadic population that would engage in seasonal

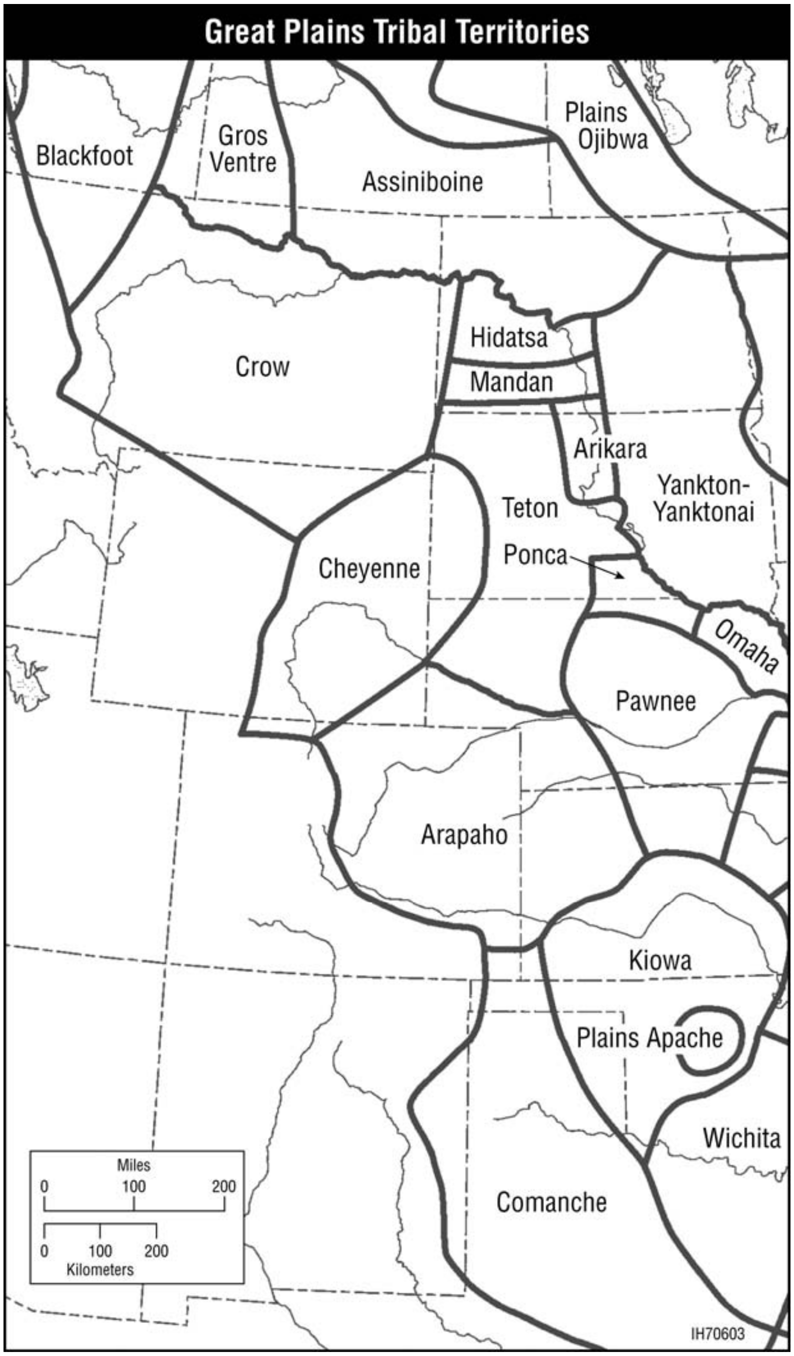

FIGURE Q-3 Native Americans of the Great Plains (Source: DeMallie 2001)

movements to exploit available resources. This pattern was followed by an increasing reliance on horticulture. Concurrently, habitat for the modern bison continued to improve, which allowed herds to swell to millions. The increases in game and plant resources allowed human populations to also expand. Villages become common by the end of the first millennium AD in some areas. The introduction of the horse significantly modified life on the Plains, with some groups becoming fully nomadic. These patterns continued until Euro-American populations began settling on the Plains.

Q.3.2 Prehistoric Context

Paleo-Indian (10,000 BC–8000 BC). Though earlier dates have been proposed, the Plains were occupied by 12,000 years ago. Wetter and cooler than today, the climate supported a number of species that are now extinct. Three broad and successive complexes of large lanceolate projectile points, used with thrusting or throwing spears, were employed in taking large game. Fluted Clovis points are associated with mammoth and other Pleistocene and modern species. Folsom and later Plano points are associated with the hunting of *Bison antiquus*. This species was larger than, and ancestral to, modern bison (buffalo) and was extinct by 8000 BC. Remains representing the Paleo-Indian Tradition include kill sites, processing sites, special activity areas, and campsites. A Folsom campsite in Colorado contained scrapers, knives, engraved bone, bone needles, and remains of antelope, rabbit, fox, wolf, coyote, turtle, and bison. The importance of big game relative to other sources is a subject of debate. Paleo sites frequently appear in mountains, foothills, and plains along the western periphery (Cassells 1983; COAHP 2003).

Archaic (8000 BC–AD 1). The grazing capacity of short-grass prairie diminished with the warming and drying that marked the end of the Pleistocene. Modern bison, replacing *B. antiquus*, were pursued when available. With climatic uncertainty came a shift toward smaller game and plant resources, a trend that started in the mountains and foothills on the western edge of the Plains. Material markers include better grinding tools (manos and slabs), basin-shaped fire pits with heating stones, and the appearance of notched points, which indicates atlatl use. Remains include cordage, fishhooks, sinkers, nets, and baskets. Early Archaic people sheltered in circular wattle-and-daub huts and rockshelters, probably making seasonal rounds of local resources. Early Archaic pit houses in the mountains in Colorado suggest semipermanence. Late Archaic stone circles occur on butte tops, rises, and river terraces in the northwestern Plains and adjacent mountains. These may represent tepees or other structures. Lines of cairns up to several kilometers long, of unknown function, may date to the late Archaic (Frison 2001).

Plains Woodland (500 BC–AD 900). By 500 BC, characteristics of the Eastern Woodlands Tradition began spreading up river systems along the eastern edge of the Plains. Traits defining the Plains Woodland Tradition initially included distinctive cord-marked pottery, mound burials, and limited horticulture. The bow and arrow appeared later. Crops including maize, beans, squash, and indigenous plants supplemented wild plant resources that were collected and processed. In most areas, people hunted bison, but focused on smaller game. Dogs, pulling and carrying loads, made long-distance seasonal hunts possible. The tradition is poorly represented on the western periphery. People living a basically Archaic lifestyle in Colorado, for example, grew a little maize in the summer and wintered in rockshelters or open camps in the mountains. Though Hopewellian-influenced populations in eastern Kansas lived in semipermanent settlements in AD 1–500, evidence suggests that horticulture was unimportant (Johnson 2001).

Plains Village (AD 900–1450). By AD 1000, population was growing and a less transient lifestyle, termed the Plains Village Tradition, was developing. Large semipermanent houses were clustered into villages above floodplains, often along major streams. Sizable cache pits became common. Bottomlands were more intensively gardened using stone, bone, and wooden tools. Improved maize was grown. Horticulture supplemented wild riverine, bottomland, and grassland resources. The balance between grown, gathered, and hunted foods, and between bison and other game, varied by region and through time. The same was true of house styles and settlement patterns. Climatic shifts influenced the subsistence mix and settlement pattern.

Fortified villages of up to 25 multifamily, rectangular lodges appeared on the periphery of the Plains along north drainage tributaries of the Missouri River in what are now northwestern Iowa and the corners of adjacent states (Henning 2001). These were followed by related settlements along the Middle Missouri River in South Dakota, and later upriver in the plains of North Dakota. Settlements in this regional expression, called the Middle Missouri Tradition, were located on high terrace rims along major streams with substantial bottomlands (Wood 2001). Rectangular pit houses with large storage pits were built in smaller, unfortified, and more dispersed villages on terraces and bluffs overlooking streams in the central Plains (Wedel 2001). Village Tradition sites along tributary streams in western Nebraska and Kansas, southeastern Colorado, and the Texas panhandle were situated on canyon rims or stream benches. The Apishapa in Colorado grew maize on canyon floors as a supplement to hunting and gathering, and built dirt-covered circular houses with stone-slab walls (Gunnerson 2001). There were also Pueblo horticultural villages at the mouths of canyons where permanent streams exited the mountains in New Mexico and Colorado (Bell and Brooks 2001). These villages were abandoned by the mid-15th century following centuries of frequent migrations and displacements. Central Plains migrants to the abandoned Middle Missouri area later became culturally mixed with returning Middle Missouri Tribes. This population was ancestral to the historic Mandan and Hidatsa villagers (Krause 2001).

Q.3.3 Protohistoric Context (AD 1500–1800)

The periphery of the western Plains is in the rain shadow of the Rocky Mountains and depends heavily upon moisture from the Gulf. Precipitation is low and unpredictable. A major drought in the 1400s depopulated the high Plains. A return to cooler and moister conditions in the 1500s improved the grass, and the bison herds multiplied. Villagers hunted there seasonally. Nomadic Apacheans traversed the southern Plains with large dog trains and traded prairie animal products to villagers for horticultural products and objects suitable for a settled life.

Trade networks were long established, as is known from the movements of exotic goods such as Gulf Coast shell, Yellowstone obsidian, Great Lakes copper, and Montana steatite. European wares, importantly including guns and more efficient tools, began moving through traditional trade networks when they became available. Spanish traded for skins and captives. Beaver-felt hats became popular in Europe around 1600, leading to the extinction of beaver there. The English and French competed for beaver and other pelts obtained initially through trade with Native Americans. Horses were acquired from the Spanish in the mid-17th century and spread throughout the Plains. Bison became easier to follow and kill and became increasingly important. With horses, many Tribes concentrated almost exclusively on bison. Some foot nomads became mounted nomads, and some groups abandoned horticulture to start following the herds. A fully mobile Plains lifestyle quickly evolved within many Tribes, featuring new social institutions, toolkits, and settlement patterns. Tribes typifying the new Plains culture included Blackfoot, Atsina, Assiniboin, Teton Dakota, Crow, Arapaho Cheyenne, Kiowa, and Comanche (Turner 1979). Trade was often through Native intermediaries and many villages participated. In the 18th century, Mandan, Hidatsa, and Arikara formed a trading hub that warehoused merchandise and brokered the exchange of western Plains horses for European goods brought by eastern and northern Tribes. There was a ready market for furs and hides and, through time, greater access to European goods brought increased dependence upon them. Trade-related epidemics weakened populations (Swagerty 2001).

Q.3.4 Historic Context

The earliest Spaniards on the Plains entered with Coronado (1540–1542) from the south and traversed what are now Arkansas, New Mexico, Colorado, Kansas, and Nebraska. Entering from the north, the French Verendres brothers (1742–1743) passed through North Dakota, Montana, and Wyoming. Following the purchase of the Louisiana Territory from France in 1803, Euro-Americans started exploring the potential of the Plains. The route of Lewis and Clark (1804–1806) included present-day Missouri, South Dakota, North Dakota, Montana, and points west. Other early American explorers and trailblazers included Pike (1806; Missouri, Kansas, Colorado, New Mexico), Hunt (1811; Missouri, Iowa, South Dakota, Colorado, and points west), Long (1819; Arkansas, Oklahoma, Kansas, Colorado, New Mexico), Becknell (1822; Kansas, Oklahoma, New Mexico), Bonneville (1832; Missouri, Nebraska, Wyoming, and points west), and Fremont (1843–1844; Kansas, Colorado, Utah, Wyoming, and points west) (Scott 1952; p. 362). Negative reporting by Pike and Long contributed to an early disinterest in the West. Overly optimistic reporting by Fremont would later fuel enthusiasm. Trappers meanwhile ranged throughout the plains and mountains as individuals or as company men, and trading posts were established. A Euro-American fur trade prospered for the first several decades of the 19th century, before demand for and supply of beaver diminished coincidentally to kill the enterprise.

The modern boundaries of the contiguous United States west of the Mississippi were attained through acquisition of additional lands in the period 1845 to 1853. The Homestead Act of 1862 offered free land to applicants meeting minimal registration requirements. Areas where public land was made available included all of the newly acquired territories except Texas, which retained its public lands under the terms of annexation. Applicants did need to be United States citizens or document their intent to become citizens. Especially after the Civil War, large numbers of homesteaders filed for land in the western Plains. Many of these were recent European immigrants. One result of the Act was that farming was attempted on marginal lands, often resulting in failure, especially during drought (NPS 2006).

The availability of windmills and improved drilling techniques expanded the areas suitable for farming. Barbed wire became available in the 1870s. Lumber and markets became available through the railroads. More suitable crop varieties, notably winter wheat, were introduced. Wheat remains the most important crop in the Great Plains and is grown mostly without irrigation. Sorghum is important in the southern Plains, as are barley and oats in the north. Irrigated crops include sugar beets and alfalfa. Mechanized farming has resulted in large farms (USDS 2006).

Seventy thousand members of the Church of Jesus Christ of Latter-day Saints moved along the Mormon Trail between 1846 and 1869. The trail connected Nauvoo, Illinois, with Salt Lake City, Utah. Mexico achieved independence in 1821 and became open to trade with the United States. The Santa Fe Trail opened in 1821 and accommodated merchants moving between Independence, Missouri, and Santa Fe in what was then Mexico. The trail was later linked to routes to the California gold fields. Passing through Nebraska and Wyoming, the Oregon Trail carried emigrant farmers to Oregon Country in large numbers beginning about 1843. After 1848, California-bound miners used the trail as far as Fort Hall in Idaho (TNGen 2000).

The Union Pacific and Central Pacific lines met in 1869, linking Omaha to the Pacific Coast. By 1883, the Northern Pacific (St. Paul–Portland), Santa Fe (Chicago–Los Angeles), and the Southern Pacific (San Francisco–Los Angeles) were operating (Scott 1952; pp. 382–383). Railroad routes were a dominant factor in determining the course of Euro-American settlement.

Beef cattle were brought to Colonial Spain. At the close of the Civil War, the price of beef was high in the northern states as the Kansas Pacific completed a line to Abilene. Texans began making spring drives of free-range cattle to the railhead for live shipment east to slaughterhouses and to Midwestern stock raisers. The cattle industry prospered and spread rapidly north while constantly shifting west to stay ahead of homesteaders. Following a major loss of livestock to blizzards (1886–1887), an already stressed open-range system transitioned to fenced ranching (USDS 2006). Sheep and cattle ranching prospered, and ranching presently dominates land use in the western Plains.

Gold, silver, and copper mining were important through the Rocky Mountain states during the 19th century. Energy resources now dominate. Petroleum has been important in the southern Plains through most of the industry's history. The Panhandle Field presently leads the world in natural gas production. Wyoming today produces a quarter of the nation's coal output (USDS 2006).

Q.3.5 Ethnohistoric Context

Bison-based nomadic or semi-nomadic and horse-mobile lifestyles dominated the Plains by the 1800s. Hunting styles varied. The Arapaho, for example, lived in large tipi villages that were moved in order to follow the herd movements through the birthing, grazing, and rutting seasons. During winter, they split up into small camps in sheltered areas. In contrast, the Blackfoot would begin the year hunting in bands, come together as a Tribe in mid-summer for religious ceremonies and communal hunting, and return to smaller hunting units using jumps and pounds to take buffalo in the fall. Cheyenne bands were politically unified, with a formal system of delegates and advisors to regulate society, plan wars, conduct ceremonies, and enforce rules. This was not the general case, however, and most Tribes consisted of autonomous bands linked by kinship, religion, and language. The Sun Dance religions were widespread.

The Plains was largely avoided by Euro-Americans until the mid-19th century when the U.S. government entered into numerous treaties with Native Americans in the east. Most treaties resulted in a loss of territory for Natives. The Indian Removal Act (1830) resulted in the forced resettlement of a number of Tribes from the Northeast, Southeast, and Great Lakes regions into Indian Territory, now Oklahoma. Wagon trains started crossing the Great Plains in the 1840s taking settlers and miners to California. Traffic increased when gold was discovered in Colorado and the Montana Rockies in the 1850s.

The U.S. government purchased Fort Laramie from the American Fur Company in 1849, and a number of important treaties were later signed there. Fort Laramie Treaty of 1851, intended to insure peace on the Plains, was signed by representatives of the Lakota, Cheyenne, Arapaho, Crow, Arikara, Assiniboin, Mandan, Gros Ventres, and others. Land north of the Platte, south of the Missouri, and east of the Yellowstone Rivers were divided into tracts and assigned to Tribes who agreed to stop fighting each other and Euro-American migrants. The U.S. government would be allowed to build roads and outposts within their territories. For these and other considerations, the Tribes were granted possession forever (Mattes 1980).

Seeking California gold, about 50,000 miners passed Fort Laramie from 1850 to 1854 (Mattes 1980). The end of the Civil War brought increased numbers of miners, wagon trains, and settlers through the Plains, along with a military freed for activities in the West. Increases in population and settlement brought increased tensions between settlers and Tribes that resulted in treaty-breaking and punitive military actions. In 1865, the Southern Cheyenne ceded most of Colorado Territory to the United States by treaty. The Great Sioux Reservation was created in 1868.

The Union Pacific/Central Pacific railway linking Missouri to California was completed in 1869. Construction of a rapidly expanding rail system consumed land and local resources. Completed lines increased the flow of outsiders and provided easy transport of buffalo hides to distant markets. A new tanning method increased demand for hides. The Plains was flooded with hide hunters, and the remaining herds were destroyed.

The Indian Appropriation Act of March 3, 1871, contained an insert stating that Indian Nations and Tribes would no longer be recognized as independent powers with whom the United States could contract by treaty. Existing treaties were honored, though they proved subject to modification by congressional measures that encouraged settlement and exploitation of resources. A half-century of disease, treaties, military actions, and relocations ended with Tribes in reservations under United States supervision (Swagerty 2001). The Desert Land Act of February 28, 1877, effectively abrogated terms of earlier Ft. Laramie treaties and legitimized the movement of settlers into the Black Hills. (Keppler 1927). In 1889, the Great Sioux Reservation was broken into 6 small reservations and most of the original reservation was opened to settlement.

The Dawes Severalty Act (General Allotment Act) of 1887 reduced landholdings on reservations by allotting families 160 acres, individuals 80 acres, and opening the remainder to settlement. Moreover, the sale of allotments was allowed. Nationally, Native holdings were reduced from 241 million acres in 1880 to 50 million in 1934 (Powers 1973). Government policy concerning Native Americans during most of the subsequent century either targeted or resulted in loss of Native culture. Recent years have seen policy shifts and a resurgence in interest in their heritage on the part of Native Americans (Fowler 2001).

Concerning states included in the western energy corridor that were part of the Plains Culture Area, all but one of the present-day reservations is in Montana. Light manufacturing, ranching, and farming contribute to the economy of the Blackfeet Reservation, which occupies 1.5 million acres in northwestern Montana on the eastern slopes of the Rockies. About half of the 15,560 enrolled Blackfoot Tribal members live on or near the reservation. Seventy-five percent of the Crow Tribe’s 10,000 enrolled members live on or near the Crow Reservation bordering south-central Montana. The Tribe maintains a buffalo herd and operates a coal mine. 4,500 of about 7,000 enrolled members of the Confederated Salish and Kootenai Tribes live on or near the Flathead Indian Reservation in the mountains of western Montana. Timber, hydroelectric revenues, a resort and casino, and a Tribal enterprise corporation contribute to the economy. About 6,800 Assiniboine and Sioux live on the 2 million acre Fort Peck Reservation. The Fort Belknap Reservation belongs to the Assiniboine and Gros Ventre Tribes with a combined enrollment of about 4,000. Reservation and other Tribal lands together total 650,000 acres of plains and grassland in north-central Montana. The Tribes maintain a bison herd, and meat packing and tourism contribute to the economy. About 5,000 Northern Cheyenne and members of other Tribes and non-Native Americans live on the 445,000 acre Northern Cheyenne Reservation, which borders the Crow Reservation in southeastern Montana. Farming, ranching, and small businesses contribute to the reservation economy (State of Montana 2007).

The Wind River Reservation is comprised of Tribal, federal trust, and other lands totaling 2.2 million acres in west-central Wyoming. Reservation population includes 4,700 Arapaho and 2,650 Shoshone. Reservation economy includes ranching, construction, and gaming (U.S. Chamber of Commerce 2007).

Q.4 THE PLATEAU

The Plateau region is a rugged area comprised of high mountains and intervening valleys (Figure Q-4). The region is generally divided into three main areas: Northern Plateau, Southern Plateau, and Eastern Plateau. The Northern Plateau is largely in Canada and is not discussed below. The Southern Plateau is bordered on the west by the Cascade Range, on the east by the Bitterroot Range, and on the north by the Okanagon Highlands near the Canadian border. The southern boundary is less well defined and follows the drainages for the Deschutes and John Day Rivers. The Eastern Plateau focuses on the Bitterroot Range of the Rocky Mountains and is largely within Montana. The southwestern portion of the Eastern Plateau is comprised of the Salmon and Clearwater drainages, and the northern boundary includes the Kootenai and Pend Orielle drainages. All of the Plateau cultures were influenced by their access to salmon and anadromous river systems,

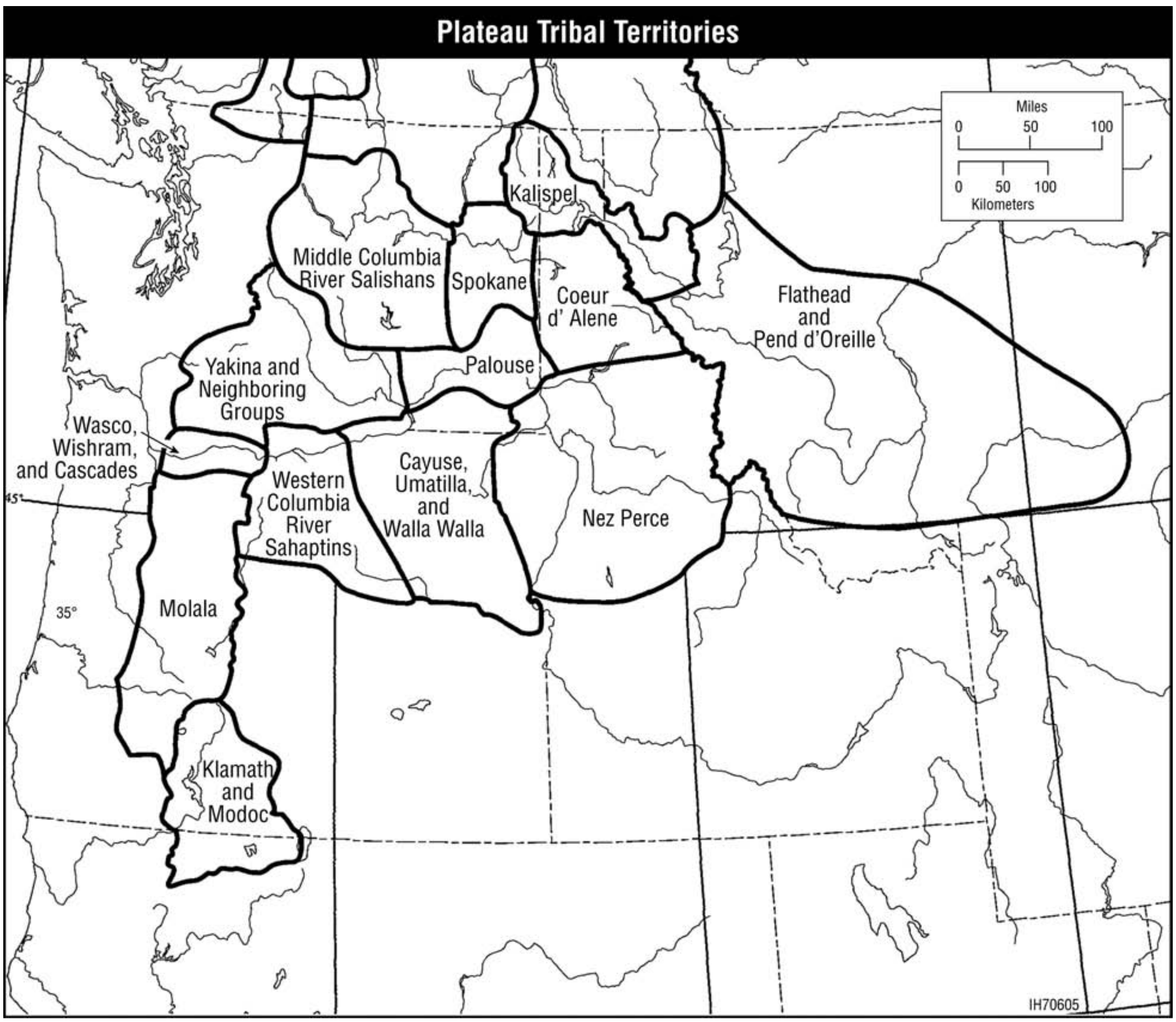

FIGURE Q-4 Tribes of the Plateau Cultural Area (Walker 1998)

roots, and large ungulates. The various cultural time periods applied to this region and the changes in material culture reflect the changes in access to the three main food sources. The later reintroduction of the horse in the contact period greatly altered the cultures of the Plateau region.

Q.4.1 Settlement Pattern

The plateau is characterized by linear riverine settlement patterns reflecting reliance on a diverse subsistence base of anadromous fish and extensive game and root resources. The later reintroduction of the horse in the contact period greatly altered the cultures of the Plateau region. A village settlement pattern comprised of semipermanent long houses associated with temporary subsistence camps at higher elevations emerged about 2,000 years ago and remained basically intact until the adoption of the horse around 1700. Thereafter villages grew and locations where access to rivers combined with access to grasslands were favored, particularly in the southern portion of the region. Permanent winter villages had semisubterranean earth lodges located along the main rivers, while summer lodges were temporary mat-covered affairs located in higher elevations (Walker 1998)

Q.4.2 Prehistoric Context

The cultural time periods for the Plateau are called the Early Paleo-Indian (9000 BC–6000 BC), the Middle Period (6000 BC–2000 BC), and the Late Period (2000 BC–AD 1000). These time periods are further subdivided according to the exact location within the Plateau region. As mentioned above, a general pattern depended primary on food sources such as salmon fisheries or ungulates such as bison that could provide relatively easy food sources. These primary food sources were augmented with seasonal plant resources such as the camas root, which can be crushed and baked.

Paleo-Indian (9000 BC–6000 BC). The earliest known evidence for human beings in the Plateau date to the Paleo-Indian Period. This time period is very poorly represented in the archaeological record with only a few isolated sites. There is almost no evidence from this time period in the northern and eastern regions. The evidence in the southern region indicates that salmon were already present (Chatters and Pokotylo 1997). There is some evidence, such as fish net weights, that fish including possibly salmon were already a part of the diet. The tools found in this period consist primarily of microblades made of sharpened stone. These stones would be set in a wood shaft to form serrations. The scant evidence from this period suggests that people of this time lived in covered dwellings something like tepees.

Middle Period (6000 BC–2000 BC). The Middle Period was a time of climatic change from cold and dry to a more moderate and wet period. This period is divided into Early-Middle (6000 BC–3300 BC) and Late-Middle (3300 BC–2000 BC) halves at the regional scale. Some of the major changes that occur in the Middle Period include an expansion of salmon fisheries, the beginnings of reliance on bison in the Eastern Plateau, and the development of trade networks. During the Early-Middle Period, the microblade traditions of the northern areas continued along with the hunting and gathering strategies that persisted in the Paleo-Indian Period. The southern portions of the Plateau region show evidence of increased salmon habitat and increased reliance on salmon, resulting in larger more stable human populations. As the salmon habitat spread into the Plateau region, the cultures that had developed around salmon fisheries on the Pacific Coast also spread into the interior. The first mortars and pestles are found in the Early-Middle Period, implying a new reliance on roots for food. A defining difference between the Early- and Late-Middle Periods is the first evidence of food storage, which allowed larger populations to exist and started the transition away from nomadic to more sedentary lifestyles. It is during the Late-Middle Period that the first semisubterranean houses were found in the Plateau, along with the first villages. The new adaptations were largely confined to the lowlands in the Southern Plateau during this period.

Late Period (2000 BC–AD 1720). The Late Period is subdivided into Early, Middle, and Late Periods. The Late Period was a time of continuous climatic changes and population growth. During the Early-Late Period (2000 BC–500 BC), the climate became much colder. Due to the new resources being exploited, populations continued to rise. The trade networks that had been developing since the Middle Periods went into decline, and overall tool quality decreased. There was greater exploitation of locally available lower quality raw materials. Field camps were near key resources. While semisubterranean dwellings continued to be used, they were dug deeper during this period. In the Eastern Plateau, there was an intensification of plant use for food. Also in the Eastern Plateau, there was the first widespread use of floodplain resources.

The climate improved considerably in the Middle-Late Period (500 BC–AD 500 to 1000). Warmer and wetter weather resulted in an expansion of food resources across the Plateau region during this time period. The first large villages appeared on the lower sections of rivers. These villages generally contained smaller and shallower semisubterranean houses than were seen previously. The trade networks that had been diminishing were revitalized. Evidence of the bow and arrow appeared in the Southern Plateau by 400 BC; it was not found in the Northern and Eastern Plateaus until AD 500. With the growth of populations, there was an apparent increase in social stratification. This is most clearly seen through the funerary items found from this period. They range from simple burials with no materials at all to lavish burials with materials showing great artistic ability. It was during the Middle-Late Period that widespread social conflict first appeared.

The Late-Late Period (AD 500–1000 to 1720) is marked by a dramatic drop in population after AD 1000 in the Northern and Southern Plateau subregions (Chatters and Pokotylo 1997). Populations along the Columbia River increased at this time. The social stratification that developed in the Middle-Late Period seemed to stop. Other than these changes, many of the adaptive strategies from the Middle-Late Period continued.

Q.4.3 Protohistoric Period (AD 1600–1750)

The Protohistoric Period was between the first exposure to European technology and actual contact with Europeans. The Tribes present during this period included the Flathead, Nez Perce, Coeur d’Alene, Cayuse, Umatilla, Walla Walla, Palouose, Spokane, Yakima, Middle Columbia River Salishans, Molala, Klamath, and Modoc. It is possible that some material goods from Russian and Spanish explorers reached the Plateau region early in this period, but the first large-scale impact was from epidemic illness. The first epidemics likely came from fur trappers moving up the Pacific Coast (Walker and Sprague 1997). It is difficult to get solid dates for these early epidemics. The first documented epidemic is in 1780. During the Protohistoric Period, it is possible that as much as half of the Plateau population died. Introduction of the horse was the second major change to affect the Plateau peoples’ way of life. Horses were first evident in this region after the 1680 Pueblo uprising when large numbers of horses were released into the wild. The horse allowed for greater distances to be covered during seasonal rounds, which allowed populations to grow. While the horse did not change subsistence patterns, it greatly altered the social and political situation in the Plateau. Raiding and warfare grew in this period due to the greater access to the peoples surrounding the Plateau, especially to the east and south. New large composite groups were formed to aid defense.

Q.4.4 Historic Context

The Historic Period began when the British and Spanish started regularly visiting the northwest Pacific Coast. The first confirmed contact with United States representatives was in 1805 when the Lewis and Clark expedition stayed with the Nez Perce in what would become Idaho. After 1805, a steady stream of explorers and fur traders began to impact the lives of the Plateau cultures. The fur trade killed off most of the fur bearing animals in the region. Numerous epidemics reduced Native populations during this period. The period ended with the establishment of Oregon Territory in 1848. The Oregon Trail had been in use for over a decade by 1848, with the number of people using this route west growing steadily.

The American Period (1848 to Present) continued a process of native removal begun in the Historic Period. The U.S. military started constructing outposts shortly after creation of the territory. The new states of California, in 1850, and Oregon, in 1859, formalized American hold on the region. Natives were placed on reservations beginning in the 1850s. A large influx of miners began after gold deposits were discovered in 1854 near the Clark's Fork River. The bulk of the Plateau region was open to Euro-American settlement after 1859 treaties opened the area east of the Cascade Mountains. Once the settlers moved into the region, several gold strikes brought ever greater numbers into the Plateau. The salmon resources began dwindling in the 1860s when the first commercial canneries were constructed on the Columbia and Fraser Rivers that fed the region. The Northern Pacific Railroad was completed in 1883, opening the area to extensive logging. Montana and Washington became states in 1889, with Idaho becoming the last state in the region in 1890.

In the twentieth century, resource use in the region was dominated by logging, mining, farming, and ranching. The construction of the Grand Coulee and Bonneville Dams in the 1930s irrevocably altered the salmon fisheries on the Columbia River and opened new areas to irrigation farming, mainly for livestock feed.

Q.4.5 Ethnohistoric Context

Plateau cultures have traditionally relied on a complex fishing technology similar to that found along the Northwest Coast. They depended on mutual cross-utilization of subsistence resources among the various groups in the area and the extension of kinship ties through extensive intermarriage throughout the area. There was limited political integration, primarily at the village and band levels, but trading relationships were extended throughout the area by means institutionalized trading partnerships and regional trade fairs. Mythology and religious beliefs were widely shared, focusing mainly on the vision quest, shamanism, life-cycle observances, and seasonal celebrations in the subsistence cycle. Close relations were maintained with the Northwest Coast. After the introduction of the horse, there was greater contact with the Plains Tribes whom they supplied with horses (Walker 1998).

From the beginning of the nineteenth century, the Nez Perce, Cayuse, Walla Walla, and Flathead embraced equestrian culture, while the northwestern Salishan groups retained more of the pre-horse culture. Conditions changed in 1846 when Oregon Territory was partitioned between the United States and Canada. The Organic Act that established Oregon Territory in the United States affirmed the "rights of person or property" of Native Americans until they were extinguished by treaty (Beckham 1998). Washington Territory was created in 1853. The process of negotiating treaties with the United States began in 1855. Large reservations were negotiated, and the Plateau peoples reserved rights to hunting and fishing areas beyond their reservations primarily in the southern portions of the Plateau.

Conflict with immigrants and miners resulted in the outbreak of violence during the mid-1850s that was brutally repressed. The end of hostilities began a period of removal and concentration on reservations, which were continually reduced. Tribes were financially impoverished, yet wealthy in horses. When Indian agents tried to Christianize Native populations, they responded with revitalization movements that stressed Native beliefs. Violence again erupted in the 1870s. During this time, the United States ceased negotiating treaties with Native American groups and encouraged more intense attempts at acculturation by the BIA. The passage of the Dawes Severalty Act of 1887 resulted in further reductions of reservation territory as Tribes sold "surplus" land to the government.

By the early twentieth century, most Plateau Native Americans resided on allotments often lacking sufficient water rights. The Indian Reorganization Act of 1934 curtailed allotments. In the 1950s, the Colville and Klamath Tribes, possessors of rich timber and range resources, were targets of termination legislation. The results of terminating trust responsibilities for the Klamath were devastating and partially led to the Indian Self-Determination Act of 1975. Thereafter Tribes began to assert more control over their own territories. Courts confirmed treaty rights to hunt and fish in usual and accustomed places. Tribes began to exploit the tourist potential of their lands, developing parks and casinos under the Indian Gaming Regulatory Act of 1988. In the 1980s, the affirmation of government-to-government consultation brought Native Americans on the Plateau full circle to a return of recognized sovereignty.

Q.5 CALIFORNIA

The California cultural area does not correspond exactly with the boundaries of the modern state of California. The western edges of the Plateau, Great Basin, and Southwestern cultural areas extend into eastern California (Figure Q-5). The central portions of the state are considered the most typically "Californian" (Heizer 1978a); however, the central area is mostly private land and is not considered in this PEIS. This section will discuss only those areas of California affected by the designation of energy corridors on federal lands. These are primarily mountainous areas adjoining the Central Valley.

Q.5.1 Settlement Pattern

With the exception of the northwestern and southeastern portions of the area, which have unusually wet and dry climates, respectively, California has a predominantly Mediterranean climate. The hills and mountains that flank the Central Valley and the rivers that cut through them provide considerable variability and rich floral and faunal resources. For the last 4,000 years, the dominant floral staple has been generous acorn crops, which provide a rich supply of storable food. In addition, epos, or yampa root, was a staple in the northeast, as were seed grasses in the Central Valley and foothills. Deer remain plentiful throughout the state, except in the redwood forests; there are elk in the northern coastal range and antelope in the grasslands. The rivers of the Central Valley and northwest coast run with anadromous salmon and trout, and migratory birds use coastal and interior flyways (Baumhoff 1978).

The earliest Californians have left mostly surface remains and seem to have been drawn to the shores of shallow lakes, valleys, passes, and the coast. The pattern that emerges later is one supported by the abundance of resources available to indigenous California groups. A pattern of permanent winter villages associated with seasonal camps is common. In areas of greatest abundance, a settlement hierarchy emerges consisting of principal and secondary villages Principal villages include semisubterranean ritual structures or dance

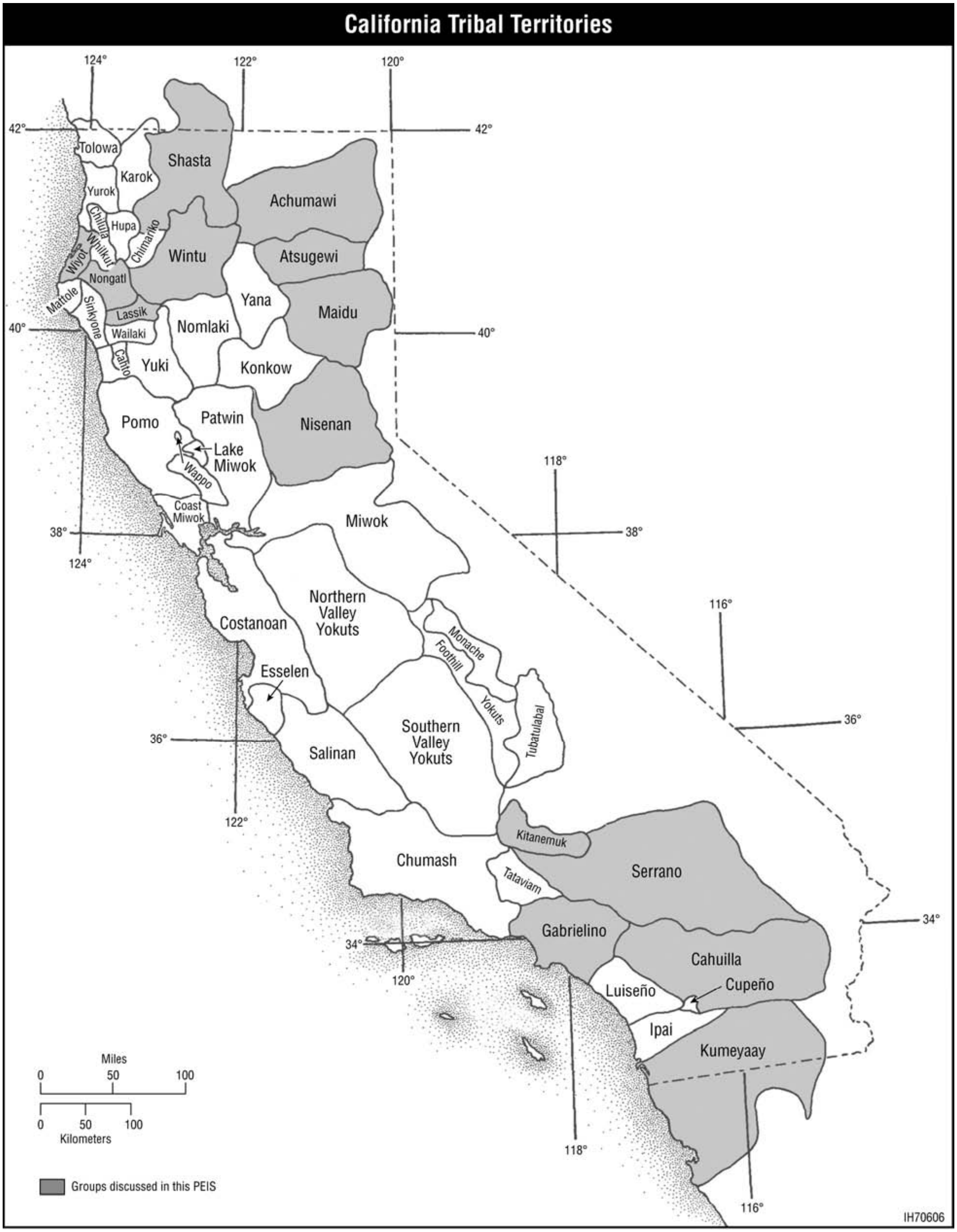

FIGURE Q-5 Tribes of the California Cultural Area (Source: Heizer 1978b)

houses that appear to have been political and ritual centers. Villages tend to be located along rivers and at lower elevations. They include house structures, deep middens, and often bedrock mortars. Seasonal campsites are more ephemeral, but repeated use has resulted in the formation of shallower middens and fewer bedrock mortars. Special activity sites, such as tool reduction sites, are located near the resource being exploited (Moratto 1984).

Q.5.2 Prehistoric Context

Period I: Hunting: (10,000 BC–6000 BC). Moister conditions during this period created expanded lakes and marshes in the Central Valley that attracted game and early human populations. Archaeological finds consist of a scattering of mostly surface sites yielding bifacially flaked and fluted points similar to those associated with Paleoindian big game hunters further inland. There are similarities with Clovis and Folsom points. While no direct association has been found, it has been postulated that these points are associated with hunters of large game, possibly animals that are now extinct. The few known campsites include some grinding tools, supporting the notion that Period I peoples were primarily hunters, although it is likely that they exploited small as well as large game and also included vegetal resources in their subsistence base (Wallace 1978; Moratto 1984).

Period II: Collecting (6000 BC–3000 BC). There is an apparent shift in emphasis from hunting to collecting in Period II. The frequency of food grinding implements from this period resulted in a milling stone horizon across the California cultural area. Sites are characterized by heavy deep-basin milling stones and handstones. Associated projectile points testify that hunting continued. While there is a heavier concentration of these sites in the south, they are represented in the northern and central parts of the area, as well. It is possible that the milling tradition arrived with seed-grinding peoples from the Great Basin where rainfall had become scarce and the intermontane lakes were drying up, causing part of the population to move westward (Wallace 1978).

Period III: Diversified Subsistence (3000 BC–2000 BC). In this period, a wider range of plant and animal species were used with increased efficiency. Specialized and selective exploitation of particular environments developed. Generally, there was dependence on hunting, fishing, and collecting, with one of these activities being emphasized based on local resources. Mortars and pestles were added to milling stones, and chipped-stone artifacts were more diverse and more skillfully made. There is an increase in bone and shell artifacts. Skillfully made biconcial charmstones appear. The Windmiller sites of the Sacramento Valley and Sierra foothills fit into this pattern. Sites include burial knolls. There are few burial sites with habitation debris (Wallace 1978).

Late Prehistoric (2000 BC–AD 1500). The Late Prehistoric Period has been divided into Early (2000 BC–1000 BC), Middle (1000 BC–AD 500), and Late horizons (AD 500–1500), based on central California sequences. Subsistence and settlement patterns remained relatively stable after the turn of the era. During this period, regional cultures developed with climax cultures in the Sacramento-San Joaquin delta and the Santa Barbara coast, with only indirect effects on the areas considered here. The development of hopper mortars, bowl mortars, and bedrock mortars indicate that methods for leaching tannin from acorn meal had been developed and that California’s abundant acorn crop had become fundamental to the food base throughout the area. The bow and arrow replaced the spear thrower sometime before AD 500. There is evidence for the widespread burning of grasslands, chaparrals, and forests to encourage the growth of preferred seed-bearing plants and to provide forage for deer. On California’s northwest coast, societies exploiting sea mammals, mollusks, and fish developed villages concentrated mostly along river banks. Net shuttles, weights, and fishhooks are common artifacts. Oversized obsidian blades, slate animal-form clubs, and shell beads indicate status or wealth. There is evidence of trade with the upper Klamath and as far away as Vancouver Island. Farther inland, the Redding District cultures exhibit many of the same characteristics, including ritual obsidian blades, notched bone pendants, pine nut beads, charmstones, and desert side-notched points. A similar pattern appears in the South Cascades where milling stones and hopper, bowl, and bedrock mortars indicate a mixed dependence on acorns and seed crops. In the northern Sierra Nevada, a high-elevation seasonal hunting and seed gathering culture developed by 1000 BC characterized by manos and metates and basalt drills. By AD 800, a material culture appeared consistent with the ethnographically known Maidu (Elsasser 1978).

Q.5.3 Protohistoric Period (AD 1500–1770)

California had the highest preconquest population density in North America. There were about 300,000 Native Americans living in the California cultural area at the time of Spanish contact, speaking over 300 dialects and mostly living in political units of 50 to 500 members. Spanish explorers reached California in the early 16th century, but missions were not established until 1769. The period between first contact and European settlement is considered protohistoric. During this period, the distribution of beads — some used as a medium of exchange and others as indicators of social status — is among the most important indicators of the organization of social behavior. Beads were traded from manufacturing centers on the Pacific Coast, the Coast Range, the Sierra foothills, and the Central Valley. In areas of abundance, a settlement hierarchy of large and small villages developed composed of pithouses with tule, brush, or wattle and daub superstructures. In some settlements, there were large specialized structures for ritual or social activities. Villages in the north tended to be seasonally occupied, while southern communities tended to be year-round. Large rectangular houses were common in the northwest, and smaller houses were typically found in the northern Coast Range, South Cascades, and the Sierra Nevada (King 1978; Schuyler 1978; Moratto 1984).

Q.5.4 Historic Context

Spanish settlement of Alta California began in 1769 to counter British and Russian expansion from the north and to secure the area for the Manila Galleons trading between Mexico and the Spanish Philippines. Spanish colonists established a series of missions, forts, towns, and ranches stretching along the Pacific littoral from San Diego to north of San Francisco. Due to a relatively dense Native American population, most missions and ranches were built and operated with forced indigenous labor. Mexican independence in 1821 was followed by secularization of the missions in 1834. A pattern of large ranchos developed on former mission lands that spread to the interior. Non-Mexican immigrants from the United States and Europe continued the rancho pattern of enclosed, fortified, communal settlement units and expanded it into the foothills of the Sierra Nevada and northward toward Oregon, but never reached the Northwest Coast. The Mexican War and the Gold Rush of 1849 brought sudden changes. Practically overnight a new society transplanted into California including miners, farmers, merchants, and soldiers (Schuyler 1978).

With statehood in 1850, the process of industrialization began with the construction of railroads within California and across the mountains to the east. As in other western states, mining, lumbering, and ranching were important developments. American immigration continued through the 20th century. The areas considered in this PEIS are mainly in relatively remote mountainous and desert areas. They were mainly affected by logging, mining, ranching, and military development (Schuyler 1978).

Q.5.5 Ethnohistoric Context

The energy corridors considered in this PEIS cross the traditional ranges of the Shasta, Wiyot, Nongatl, and Lassik in the northwest; the Achumawi and Atsugewi in the northeast; the Wintu in the northern Coast Range; the Maidu and the Nisenan in the Cascades and Sierra; and the Kitenamuk, Serrano, Gabrelino, Cahuilla, and Kumeyaay in the south. For the most part, these groups continued the patterns observed in the Late Prehistoric and Protohistoric Periods. Except for the Kumeyaay in the south, who had contact with Southwestern groups, they were nonagricultural. The environment was rich enough that large villages could be maintained, supported by fishing, hunting, and harvesting natural seed and nut crops. In areas of exceptional abundance, such as the Northwestern Coast, villages were occupied year-round. In other areas, there were substantial winter villages, but populations would disperse to take advantage of localized resources in the summer or fall. The vertical variation in climate in most areas allowed groups to summer in the mountains, taking advantage of seasonally available resources there, or to journey to preferred acorn groves. In most years, acorns provided a storable staple that could be used throughout the winter. Noted for their excellent basketry weaving, in most respects the material culture of the California Indians was relatively simple (Heizer 1978b).

Indigenous Californian groups were divided into small kin-based units, usually with a hereditary headman as a leader. Independent villages formed the basis of the society. A main settlement and a few outlying smaller ones made up a triblet. The descendants of many of these groups have been displaced or reduced in number. Some joined with other groups when affiliated with a particular mission. While no longer occupying all of their traditional range, they still have ties to sacred or other culturally important sites in these areas, such as former village sites and specific plant and animal resources of traditional importance.

Change began to occur with the arrival of Spanish settlers moving up the coast from the south and Russian traders down the coast from the north. The establishment of the Franciscan missions and the spread of disease among the local population resulted in the abandonment of the coastal villages as Natives sought refuge in the foothills and highlands of the Sierra Nevada. Native populations were often forcibly assimilated into the missions and ranches, most of which were built and operated with forced indigenous labor. Diseases introduced by the Spanish and Russians spread through the Native population. The epidemic of 1833 substantially reduced the population of Native Americans throughout California. As Euro-American immigration continued, the pattern of large ranches dependent on indigenous labor expanded. For the most part, there was at least a modicum of coexistence between immigrant and indigenous populations until the Mexican War and Gold Rush of 1849 brought in waves of immigrants. There was little accommodation for indigenous populations by this flood of immigrants, which regarded them as a nuisance. Native Americans were enslaved, moved, or exterminated from areas of value to the American newcomers (Schuyler 1978; Moratto 1984). The new State of California permitted the taking and selling of Native Americans as "apprentices" or indentured servants (Johansen 2005).

The residents of the United States felt it was their "manifest destiny" to "civilize" the continent, and had often removed Native American populations, forcing them farther west. In California, indigenous populations could not be displaced westward and in 1850 the Indian agents Redick McKee, George W. Barbour, and O.M. Wozencraft negotiated 18 treaties in which Native Americans ceded lands in return for protected reservations and some compensation. Most Californians felt the treaties too generous, and they were not ratified. A system of much smaller reservations on federal land where Native Americans could be concentrated and acculturated was begun, with little success. A policy of forcible concentration and elimination was followed in subsequent decades. By 1873, the indigenous population was so reduced that Euro-Americans no longer considered Native Americans a threat. The remaining Native populations were influenced by the revitalization movements such as the Ghost Dance. Additional small reserves began to be set aside in the 1870s, and by 1930 there were 36 small communities or "rancherias" in northern California. A quarter of existing Native American reserves were lost to allotments after 1887. The practice of allotment was ended in 1934 by the Indian Reorganization Act. Thereafter the federal government continued to add to Indian lands in California. By 1950, there were 117 mostly small Native American communities. Under changing government priorities, 36 Native American reserves were terminated in the 1950s with their lands divided among their members (Rawls 1984). Much of these lands were lost and most groups have now been reinstated. As the Native American population continues to expand and take control of their own resources, access to the power that could be provided through the proposed corridors will be of increasing importance to them.

Q.6 NORTHWEST COAST

The traditional range of the Northwest Coast cultures is the Pacific Coast of North America from the Gulf of Alaska to northern California, and from the shoreline to the Cascade Mountains (Figure Q-6). Only the southern part of the Northwest Coast cultural area — the portion within the states of Oregon and Washington — would be affected by the actions considered in this PEIS. This region includes the Puget Sound Basin, the mouth of the Columbia River, the Willamette Valley, and the foothills of the Cascade Range. The climate along this coastal region is moderated by the Pacific Ocean, and the area is rich with a diversity of subsistence resources. While cultural differences do occur, basic subsistence patterns are very similar throughout the region. A strong reliance on fish and mammals predominates, complemented with nuts (i.e., hazelnuts), roots (i.e., camas), and berries.

Q.6.1 Settlement Pattern

The cultures of the Northwest Coast are marked by a remarkable continuity of subsistence and settlement. Fishing, hunting, and gathering of shellfish persist throughout most of the area. Sea mammals were used as sources of both food and oil for fuel in much of the area, but to a less extent inland. Villages were concentrated in narrow lowland belts along the rivers, while seasonal sites and camps used for regional hunting and collecting were located at higher elevations. Inhabitants of the Puget Sound Basin exploited the resources of a wide variety of microenvironments found along a network of interconnecting fjords and channels, resulting in more than 1,000 miles of coastline in a relatively restricted area. Inland, open forests also yielded a wide variety of plant and animal resources. Because of the large supply of food, populations were generally large and socially stratified (Suttles 1989).

Q.6.2 Prehistoric Context

Paleo-Indian. The early prehistory of low-lying areas in the Puget Sound Basin and Lower Columbia River is largely submerged. Sea levels began rising around 8000 BC and did not stabilize at their current levels until about 3000 BC. However, evidence from surrounding uplands suggests that there was human occupation in these areas. Four tool traditions appear in the Northwest Coast before 7000 BC. The fluted and stemmed point traditions found throughout much of North America appear to have reached the Northwest Coast from the interior, expanding down the Columbia River between 9000 BC and 8000 BC. These traditions appear to be associated with hunting cultures, and are only weakly expressed on the coast.

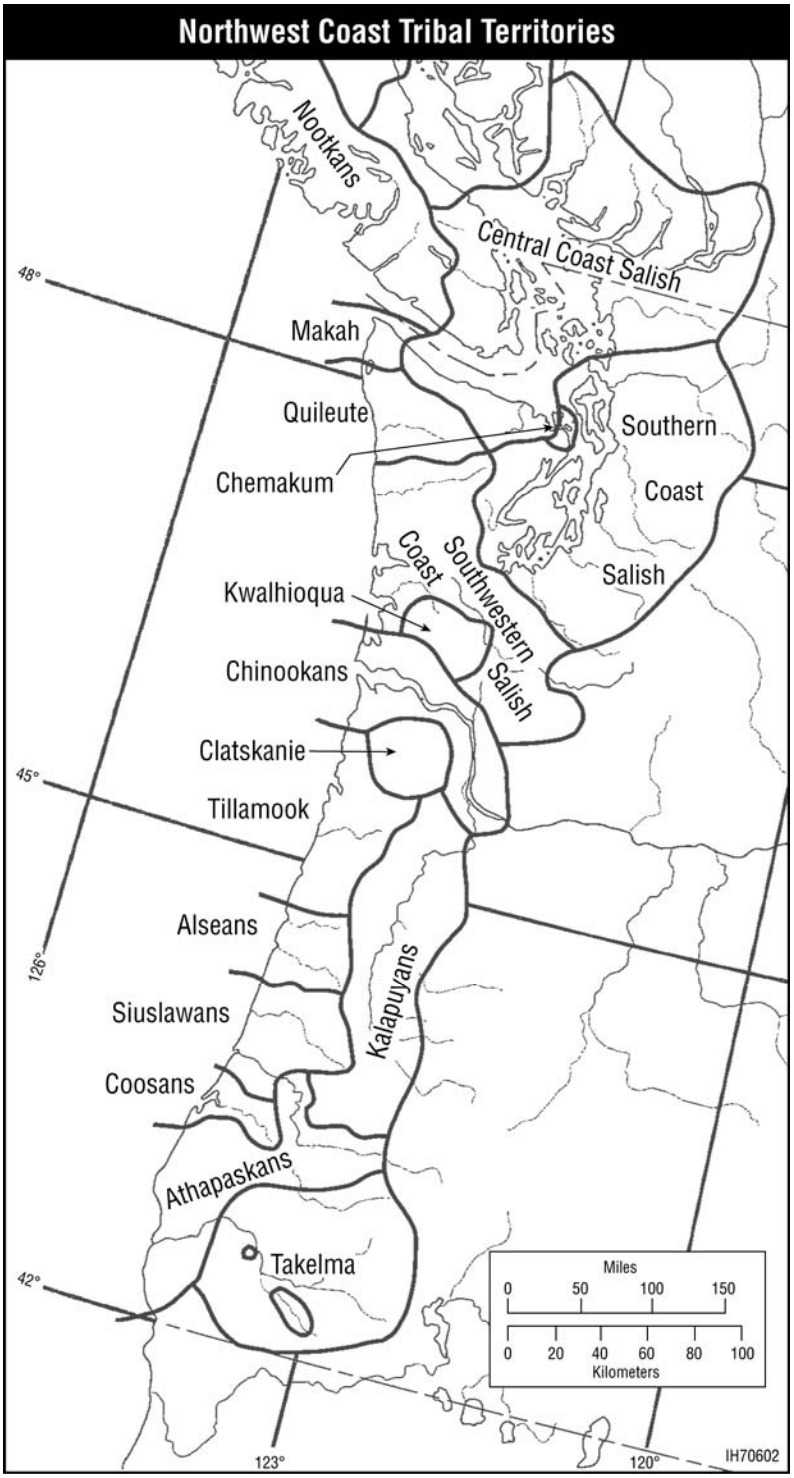

FIGURE Q-6 Native Americans on the Northwest Coast (Source: Suttles 1990)

While the fluted point tradition lacks continuity in the area, the stemmed point tradition appears throughout the traditional range of Chinookan speakers and may have been employed by an ancestral Chinookan population. The pebble tool and microblade traditions appear to have diffused southward along the coast between 8000 BC and 7000 BC. Unifacially flaked pebble tools associated early on with leaf-shaped bifaces are the markers of the pebble tool tradition. This coastal tradition may be of Asian origin. It included the exploitation of both land and sea mammals and the pursuit of anadromous fish, such as salmon. It appears to have spread upstream along the Fraser and Columbia Rivers following the spawning salmon. The bearers of the pebble tool tradition may be the ancestors of the Coast Salish. Small, parallel-sided blades struck from a prepared core are the markers of the microblade tradition. This Asian-derived tradition, although known early on in the north, did not arrive in the southern portion of the Northwest Coast until the Early Archaic phase (Carlson 1989).

Archaic. Early Archaic phase, based on hunting and gathering of a wide array of plant and animal resources, is thought to have commenced by 6000 BC. Upland finds of hunting and plant processing suggest the pattern of lowland villages and specialized upland camps. Many of the upland sites are surface finds from forested areas associated with willow leaf projective points and, in some cases, milling stones, mortars, and pestles. The Middle Archaic (4000 BC–AD 200) exhibits an intensification of this pattern. Around 3000 BC, shell middens begin to appear, as mollusks were added to the Northwestern subsistence base. Sea levels stabilized, and the pattern present at historic contact was established by at least 1300 BC. Large riverside settlements suggest a strong riverine orientation. Net sinkers indicate an increased emphasis on fishing. Arrow points appear between 500 BC and 100 BC, indicating the addition of the bow and arrow to the Northwest Coast toolkit. It gradually supplanted the spear thrower, or atlatl, which did not go out of use until AD 700. Flaked cobbles and cobble celts suggest the beginnings of the Northwest Coast woodworking tradition by at least this time. Earthen ovens found in the Willamette Valley indicate the processing of acorns and camas roots (Nelson 1989; Pettigrew 1989). After 1000 BC, a more dispersed pattern was established in the southern Willamette Valley.

More archaeological sites are known from the Late Archaic (AD 200–1775); however, most of them are dated relatively late. The Lower Columbia Valley was scoured by a cataclysmic flood in the thirteenth century AD. In AD 1250, a major landslide on the Columbia River sealed off the upper river from the salmon runs and created a large lake. When the natural dam broke, it modified landforms, destroying much of the archaeological evidence from the lower portions of the river, at the same time creating the Cascades of the Columbia River, a favorite fishing venue for Native Americans. The riverside village pattern returns after the flood. Larger net sinkers suggest that sturgeon were added to the diet on the lower Columbia River (Pettigrew 1989).

Highly acidic soils in the Puget Sound Basin have resulted in poor preservation of organic materials at archaeological sites, except at some water-logged sites, rendering their interpretation difficult. It appears that the earliest sites were oriented to land resources including those found in the intertidal zone.

Q.6.3 Protohistoric Context

European contact with the Northwest Coast began in 1774. Early explorers soon realized the profitability of trading otter pelts to China, and Spanish, Russian, British, and American fur traders all made their way to the Northwest Coast, as did Chinese and Hawaiian traders. Following the Lewis and Clark expedition, which reached the Pacific overland in 1805, an American trading post was established on the Columbia River in 1811, but the British Hudson's Bay Company dominated trade after

1821. While the introduction of Old World diseases as a result of these contacts had serious negative effects on Native American peoples, their lands and cultures were not compromised for the most part during the fur trading period. Native Americans, many of whom had acquired firearms before the arrival of the Europeans, were skilled traders and were able to hold their own and even dominate the mostly maritime trade. Trade with the outside world did not greatly alter Northwest Coast societies, but was easily accommodated in the existing complex culture (Ames and Maschner 1999). It was only with the establishment of agricultural settlements in the Willamette Valley in the 1830s that Euro-American cultural encroachment began in earnest (Cole and Darling 1990).

Q.6.4 Historic Context

The Northwest Coast was the western edge of what was known to Europeans and Americans as Oregon Country. The northern boundary of New Spain was set in 1819, and in 1818, Great Britain and the Unites States agreed to joint control of the land between New Spain and Russian America (Alaska). Fur traders and trappers from the United States and Canada found new routes to the Pacific Coast, and by the 1840s, immigrant settlers were following the Oregon Trail to the Columbia River and Willamette Valley, or taking the more southerly Applegate Trail, which also served to link the Northwest to California's gold fields. In 1839, the Cowlitz Trail connected the Willamette Valley with the Puget Sound Basin. In 1846, the United States and Great Britain agreed on a partition of Oregon Country, extending the existing border with Canada westward to the coast.

Oregon Territory was created in 1848. Settlers around Puget Sound and in the Willamette Valley filed land claims under the Oregon Donation Act of 1850. Few settlers were established north of the Columbia until 1851, when a saw mill was established near present-day Seattle, and lumbering became one of the area's major industries. Washington was created as a separate territory in 1853. The establishment of territorial governments marked the beginning of the removal of Native American groups from their traditional lands.

In Washington Territory, a series of treaties were negotiated by which Native American groups gave up most of their traditional territories in return for small reservations and the retention of traditional hunting, fishing, sealing, and whaling rights. In Oregon, a policy of removing Native Americans from the Willamette Valley was initiated. The Native Americans were first granted substantial land on the coast and a reservation at Grand Ronde, but then the initial reservation and trust lands were steadily diminished. The Oregon treaties did not include traditional fishing and hunting rights (Beckham 1990; Marino 1990).

Traditionally timber, agriculture, and fishing have been the mainstays of the economy of the American Northwest. The forests of the Northwest Coast attracted lumbermen, and the discovery of gold in the Coast Range of Oregon attracted miners. Commercial fishing of the salmon runs began in the last quarter of the 19th century, and canneries sprang up along the Columbia.

Development of a transportation network in the rugged Northwest was difficult. Water traffic had been common since before European contact. Native American trails were developed into roads. A system of ferries connecting those roads was developed in the 20th century. In 1873, the Northern Pacific Railroad chose Tacoma as a terminus, and in 1883, the Northwest was connected to Minnesota and the rest of the nation, facilitating immigration and the development of railroad communities. The completion of the railroad stimulated the growth of agriculture and the timber industry. Northwestern ports prospered from the discovery of gold in Alaska, and became jumping off points for miners headed north. In the 20th century, the development of the aircraft industry helped spur increased industrial diversification. As trade with the Pacific Rim increased the need for the ports of the Northwest, Portland and Seattle became increasingly important. The subsequent development of computer-related industries continued the growth.

Q.6.5 Ethnohistoric Context

The proposed energy corridors evaluated in this PEIS would pass east of the Coast Range along the Willamette Valley and into the Puget Sound Basin, through the traditional territories of the Takelma, Upper Umqua (Athapaskan), Kalapuyans, Clatsknie, Chinookans, Southwestern Coast Salish, and Southern Coast Salish (Figure Q-6). These names represent linguistic groupings rather than social units, and although the linguistic affinities were recognized by group members themselves, the functional social and political unit was usually the village, not the larger group.

Despite speaking many different languages, Northwest Coast Native American groups had much in common. They all lived in rich environments that allowed for relatively permanent villages based on hunting and gathering. Most of the groups considered here did not live directly on the coast, yet fishing was a major source of food, especially the seasonal spawning runs of anadromous species such as salmon. Villages often had their own fishing territories where they constructed weirs, set fish traps, and speared fish. Land mammals such as deer, elk, and the occasional bear were also important food resources. In the south, acorns were a staple. In the Willamette Valley, hazel nuts and camas roots were important. The open forests around Puget Sound were rich in a variety of berries. All of these resources were consumed fresh or dried and preserved for the winter season.

There was a pattern of regular seasonal movement from substantial winter villages built of rectangular, semisubterranean plank houses to less substantial camps or shelters, to exploit seasonal resources such as ripening plant resources or salmon runs. The northern groups built larger and more elaborate structures than southern ones — some houses sheltered 10 or more related families. Besides dwellings, villages typically included a sweat lodge for the men, and in the north, a potlatch house for the ritual display of wealth. These societies tended toward social stratification, with the northern groups being more stratified than the southern ones. Wealth and status were important virtues in all groups, but were more elaborated in the north. All groups had at least three divisions: headmen or chiefs, commoners, and slaves. The village headman position was often hereditary, but was based on the heritage of wealth, and had to be confirmed by conspicuous displays of wealth and redistribution. In the north, there were additional subdivisions among commoners based on wealth. Slaves were considered property and had no rights, although in the southern groups, they could regain nonslave status. Slave raiding and slave trading were common (Hajda 1989; Kendall 1989; Krauss 1989; Miller and Seaburg 1989; Silverstein 1989; Suttles and Lane 1989; Zenk 1989).

The Chinookans and the Coast Salish had first contact with European traders, and were the first to feel the impact of disease. Their numbers were reduced before the first Euro-American settlers arrived in the Willamette Valley in the 1830s and 1840s. The American administration pursued a policy of concentrating the indigenous population in a few reservations and moving them east of the Cascades if possible. Remnants of once distinct and independent groups were placed together. In these circumstances, one group often came to dominate and the remnants of others were absorbed into the dominant culture, losing their cultural identities in the process. Some Native American groups refused to enter into treaty agreements and did not move to reservations. The descendants of these groups have less official standing when dealing with the government. When gold was found in the Rogue River drainage in 1852, the Takelma and the Upper Umqua were decimated. No living speakers of these languages remain. Kalapuyans in the Willamette Valley occupied lands most desired by American settlers. Remnants of these groups went mostly to the Grand Ronde Reservation. The Chinookan groups went partly to Grand Ronde and were partly absorbed by the Salish. After 1871, the U.S. government ceased negotiating treaties with Native American Tribes, and in 1887 began a policy of eliminating reservations by allotting reservation lands to individual Native Americans. Allotment was ended in 1934, but in the mid-20th century, the U.S. government returned to a policy of termination, whereby reservations and Tribes were ended as official entities and assets were distributed to Tribal members. Some Northwestern groups were terminated, but have since been reinstated as officially recognized groups (Kendall 1989; Miller and Seaburg 1989). In the 1980s, the federal government returned to a policy of government-to-government consultations with Native American Tribes.

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APPENDIX R:

CULTURAL RESOURCES DATA REQUEST

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PURPOSE

As part of the analysis conducted for the West-wide energy corridor (WWEC) Programmatic Environmental Impact Statement (PEIS), information was collected on cultural resources within the proposed corridors. The identification of individual cultural resources was considered too specific, given the wide scope of the PEIS; therefore, more general information was deemed appropriate. Three types of information concerning cultural resources were considered necessary for providing an understanding of what is known about cultural resources in the corridors. The first was the number of acres of land within the proposed corridors that had been previously surveyed for cultural resources; survey information is important because cultural resources are generally found only through surveys. The second was the number of cultural resources that had been identified within the proposed corridors. The third type of information sought was the number of cultural resources within the corridors that had been examined and determined to be eligible for listing on the *National Register of Historic Places* (NRHP). Most known cultural resources have yet to be examined to determine their eligibility for listing on the NRHP. In addition, inquiries were made regarding known important cultural resources that could be avoided during the siting of the corridors (such as World Heritage sites or extensive traditional cultural properties). This inquiry also assisted in the characterization of the site types likely to occur in the analysis area.

THE REQUEST

To determine what is known about cultural resources in the corridors, a data request was made in July 2006 asking agencies throughout the 11 western states with cultural resources management responsibilities for the above-described information for the proposed West-wide energy corridors. The agencies included the BLM, FS, and SHPOs. Each agency was provided a description of the project and a discussion of the types of data desired. Paper and electronic maps (GIS shape files) of the corridor locations were provided to each agency. The analysis area consisted of a 2-mile-wide corridor following the locations of the proposed corridors. This width provided a buffer for the ongoing corridor changes during the siting process. In some instances, corridors have been dropped or added since the inquiry. Given the programmatic nature of this study and the fact that the data received did not roll up easily into a coherent analysis (see below), a second inquiry was not made to the SHPOs subsequent to changes. These changes were, however, coordinated through agency offices, and important known cultural resources continued to be avoided.

Corridor routes were expected to be continuously modified while the PEIS was being prepared. It is acknowledged that the data collected in the summer of 2006 would not exactly correspond with the final corridor locations. To partially mitigate this issue, a 2-mile corridor width was used in the data request rather than the 3,500-foot width of the final corridors. This increased width would compensate for some of the expected alterations of the proposed corridor routes. The information collected was intended to be representative of the current level of knowledge concerning cultural resources in the corridors not being definitive or complete.

CURRENT STATUS OF CULTURAL RESOURCE DATA

It was anticipated that the condition and completeness of cultural resources information would vary among states and agencies. Data management for cultural resources is handled in many different ways across the United States. The primary repository for cultural resources information in every state is the SHPO. However, many federal agencies keep their own records or in some cases data is shared between the SHPO and a federal agency.

Most states and agencies index their information concerning cultural resources locations and survey data on USGS 7.5-minute topographic maps. In the last 25 years, there have been various attempts at the state and federal agency level to transfer this information into an electronic format, as the data requested is more easily accessible when in this format. The task becomes much more difficult and time consuming when the data must be extracted from paper maps. The response to the data request for the PEIS is partially a reflection of the current status of this transfer of information to an electronic format. The success of this transfer of data to an electronic format has been variable. In general, the states and agencies that provided the most information for the PEIS were those with more information available electronically.

THE RESPONSE

Information on cultural resources was received from 10 of the 11 western states. The results are provided in Table 3.10-4 in Section 3.10 of the PEIS. In most states, data was received from multiple agencies. The data ranged from electronic GIS data layers to letters containing summaries for the proposed corridors. The amount of corridor within a state for which information was provided varied widely. In one instance, only a single national forest provided any information for an entire state. Other agencies could only provide data for portions of the corridors that were proposed on land they managed. Often it was unclear how much of the corridor network within a state was covered by the information provided. All respondents provided at least some information on the number of cultural resources within the proposed corridors. Data pertaining to the amount of surveying that had been done was received from half of the states. Many locations chosen for corridors had not been surveyed for cultural resources, but based on past research in an area, a sense of the likelihood for there being cultural resources is known. The sensitivity of some corridor locations for containing cultural resources was provided, when possible. Because the level of detail and the completeness of the information varied so greatly, only a very broad-scale presentation of the data was possible. The information collected, however, is considered representative of our current level of knowledge. While not complete for the 11 western states, the information is deemed useful for illustrating what is known and unknown about cultural resources within the corridors.

APPENDIX S:

SOCIOECONOMIC METHODS AND IMPACTS

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S.1 HOW WERE POTENTIAL IMPACTS EVALUATED?

The economic analysis of project developments (not designation) assesses impacts at the state level for each of the 11 western states in terms of changes in employment, income, population, housing, community service finances and employment, and state income and sales tax revenues. Property values and quality-of-life impacts are assessed qualitatively through a review of the literature. Capturing state-level effects is important to estimating the benefits of WWEC developments, since it is likely that much of the expenditures related to the capital equipment, materials, and services associated with project construction and operation would not take place in the immediate areas hosting each development but would more likely occur elsewhere in the state hosting WWEC developments.

Because of the relative economic importance of WWEC developments in small rural economies and the potential lack of local economic and community infrastructure in some communities, WWEC developments may result in an influx of a temporary population in some locations. Although population increases are likely to be small in most areas of each state, there may be impacts to local community public finances and local government employment in some areas.

S.1.1 Corridor Energy Transport Project Data

WWEC energy transport project data in Appendix E provide an upper bound to potential impacts in any given 3,500-foot corridor segment by assuming that the maximum technically feasible development in each corridor will occur, specifically, three 500-kV electricity transmission lines, two 42-inch gas pipelines, and two 32-inch petroleum products pipelines. Impacts in one year are estimated on the basis of the amount of construction activity that occurs in one year for a typical electricity line and for typical gas and petroleum pipeline segments. It is assumed that a maximum of 150 miles of corridor containing all three transport systems could be developed during the first year of construction. To assess the relative impacts of WWEC development, the analysis assumes — since the specific energy development trajectory for each corridor over the 20-year planning period is not known — that the build-out year occurs in the first year of the planning period, with operations impacts occurring in the second year.

S.1.2 Impacts on Employment and Income

Impacts of WWEC developments on regional employment and income are assessed by using regional economic multipliers together with data available on utility capital expenditures for construction and data on operations. Multipliers capture the (off-site) effects of on-site activities associated with the construction and operation of WWEC developments. The multipliers are derived from IMPLAN (economic impact modeling system) input-output economic accounts for each state, which show the flow of commodities to industries from producers and institutional consumers (Minnesota IMPLAN Group, Inc. 2006). The accounts also show consumption activities by workers, owners of capital, and imports from outside the region. The IMPLAN model contains 528 sectors representing industries in agriculture, mining, construction, manufacturing, wholesale and retail trade, utilities, finance, insurance and real estate, and consumer and business services. The model also includes information for each sector on employee compensation; proprietary and property income; personal consumption expenditures; federal, state, and local expenditures; inventory and capital formation; and imports and exports.

Expenditures data associated with the construction and operation of WWEC developments is derived from numerous sources (Schremp et al. 2002; Buchanan et al. 2005; Parker 2005). These sources provided the relevant construction and operating cost data for labor and materials in various general cost categories on the three main WWEC technologies: electricity transmission, gas pipelines, and petroleum product pipelines. Cost data for each cost category was then mapped into the relevant North American Industry Classification System (NAICS) codes for use with multipliers from an IMPLAN model specified for each state.

Information on the expected pattern of procurement within the state for the various materials and subcontracts in each cost category is used in the calculation of impacts to adjust total procurement expenditures in these two categories. The extent of procurement within the state would be based either on procurement data provided by the engineering and construction contractors or would be estimated using proxy data based on state employment shares by sector and state unemployment rates.

IMPLAN multipliers for each sector in which regional spending occurs are used in association with expenditures data to estimate impacts on state employment and income. Impacts on employment are described in terms of the total number of jobs created in the region in the first build-out year and in the first year of operation. The relative impact of the increase in employment in the state is calculated by comparing total construction employment related to WWEC developments in the first build-out year to baseline state employment forecasts over the same period. Impacts are expressed in terms of percentage point differences in the average annual employment growth rates with and without WWEC project construction. Forecasts are based on data provided by the U.S. Department of Commerce.

IMPLAN data shows the current economic structure of the states in which WWEC developments are projected to occur. The extent to which both local spending to procure materials and services and wage and salary spending occur in the each state's economy will be included in the analysis of economic impacts. However, the extent and likelihood of structural change to the states' economies will not be assessed in the analysis, given the relatively small economic impacts of WWEC developments in each state as well as uncertainty over the development trajectory for each WWEC-designated corridor, the timing of WWEC-related spending on industries in the affected areas, and their impact on the relocation of industries to the 11 states to serve the developments.

S.1.3 Impacts on Population

An important consideration in assessing impacts of the WWEC developments is the number of workers, families, and children that would migrate into each state, either temporarily or permanently, to support construction and/or operation of WWEC developments. The capacity of regional labor markets to produce workers in sufficient numbers in the appropriate occupations required for the developments' construction and operation is closely related to a state's occupational profile and occupational unemployment rates. To estimate the in-migration that would occur to satisfy direct labor requirements, the analysis develops estimates of available labor in each direct labor category on the basis of state unemployment rates applied to each occupational category. In-migration associated with indirect labor requirements is derived from estimates of the labor available in the state economy as a whole that is able to satisfy the demand for labor by industry sectors in which WWEC development-related spending initially occurs. The national average household size is used to calculate the number of additional family members that would accompany direct and indirect in-migrating workers. The analysis also uses additional data from similar linear energy development projects and provided in various publications, technical reports, and EISs.

Impacts on population are described in terms of the total number of in-migrants arriving in the region in the first build-out year. It is assumed that no in-migrating workers would be required during project operations. The relative impact of the increase in population in the state is calculated by comparing total WWEC development in-migration for construction in the first build-out year with baseline state population forecasts over the same period. Impacts are expressed in terms of percentage point differences in average annual population growth rates with and without project construction. Forecasts are based on data provided by the U.S. Bureau of the Census.

S.1.4 Impacts on Housing Markets

The in-migration of workers that will occur during construction has the potential to substantially affect the states' housing markets. The analysis considers these impacts by estimating the increase in demand for rental housing units in the first build-out year that results from the in-migration of both direct and indirect workers into the state. Because it is assumed that in-migrating workers would not be required during project operations, there would be no projected impacts on housing during this phase of each project. The relative impact on the existing housing in the state is estimated by calculating the impact of WWEC-related housing demand on the forecasted number of vacant rental housing units in the first build-out year. Forecasts are based on data provided by the U.S. Bureau of the Census.

S.1.5 Impacts on Community Services

The relative scale of WWEC project development may mean small increases in state population as workers migrate into each state to fill WWEC projects' construction and operation positions, in some cases accompanied by family members. In-migration associated with construction of WWEC developments would translate into increased demand for educational services and for public services (e.g., police, fire protection, health services) in each state. Estimates of the total number of in-migrating workers and their families were used to calculate the impact of WWEC construction on county, city, and school district revenues and expenditures using baseline data provided in annual comprehensive financial reports aggregated to the state-level, forecasted for the build-out year on the basis of per capita revenues and expenditures for each jurisdiction. Because it is assumed that in-migrating workers would not be required during project operations, there would be no projected impacts on community services during this phase of each project. Population forecasts are based on data provided by the U.S. Bureau of the Census.

The impacts of WWEC developments-related in-migration on community service employment are also calculated at the state level. By using the estimates of the number of in-migrating workers and families, the analysis calculates the numbers of new sworn police officers, firefighters, and general government employees that would be required to maintain existing levels of service for each community service. These calculations are based on the numbers of existing employees per 1,000 people for each community service. The analysis of the impact on educational employment estimates the number of teachers in each school district that would be required to maintain existing teacher-student ratios across all student age groups.

Impacts on health care employment are estimated by calculating both the number of physicians in each county required to maintain the existing levels of service on the basis of the numbers of existing physicians per 1,000 population, as well as the number of additional staffed hospital beds that will be required to maintain the existing levels of service based on the existing number of staffed beds per 1,000 population. Impacts are estimated for the first build-out year. No impacts would occur during operations, as it is assumed that in-migrating workers would not be required during this phase of each project. Information on existing employment and levels of service is based on data provided by the U.S. Bureau of the Census.

S.1.6 State Taxes

The analysis estimates direct sales tax revenues by multiplying the value of in-state project capital expenditures plus materials and supplies expenditures in both the first build-out year and the first year of operations by the current sales tax rate in each state. Indirect sales tax revenues are calculated by using the value of the additional indirect output (sales) generated by WWEC wages and salary spending, procurement of materials and supplies, and capital projects by the state sales tax rates.

Then, total state income tax revenues are estimated by multiplying the value of direct and indirect personal income generated by WWEC activities in the first build-out year and in the first year of operations by the average state tax rates for taxpayer income categories.

S.1.7 Property Values and Quality of Life

Energy transmission projects can potentially affect property values in areas designated as energy corridors or in communities located on adjacent land. These aspects of the impact of energy transport facilities may consequently affect quality of life in the rural communities hosting these developments. Impacts on property values and quality of life would occur primarily as a result of the visibility of electricity transmission structures, with other factors (such as health and safety and any noise associated with each of the three transmission systems) likely to be less important. Three approaches have been used to study the impacts of electricity transmission systems on property values: appraisal methods, perception studies, and statistical analyses. The results of assessments of the impact of electricity transmission lines using each of these methods are reviewed.

S.2 WHAT MIGHT BE THE ENVIRONMENTAL CONSEQUENCES OF PROJECT CONSTRUCTION AND OPERATION?

Construction and operation of energy transport projects could produce impacts on state employment and unemployment rates, personal income, and state sales and income tax revenues. Project construction could also likely lead to the temporary in-migration of workers and their family members, which could impact the rental housing market in each state, and could likely also impact state and local government expenditures and employment.

Under the No Action Alternative, energy transport projects would be independently sited and developed in the 11 western states, with the amount of development on federal land being uncertain. Under the Proposed Action, it is assumed that (1) reasonable, technically feasible development would occur in any given 3,500-foot corridor that would include, specifically, three 500-kV electricity transmission lines, two 42-inch gas pipelines, and two 32-inch petroleum products pipelines; and (2) annual construction in each state would occur up to an annual maximum of 150 miles. The specific energy development trajectory for each corridor over the 20-year planning period is not known. Therefore, to assess the relative impacts of developing the hypothetical energy transport projects under either of the alternatives, the analysis assumed that the build-out year would occur in 2007, the first year of the planning period, with operations impacts occurring in 2008, the second year.

Economic and fiscal impacts of energy transport projects construction and operation in each state include direct impacts, which include the construction expenditures and employment associated with building the transmission lines, pipeline systems, and ancillary facilities identified (Appendix E); and indirect effects, which include the subsequent impacts in each state resulting from the spending of project wages and salaries, as well as from expenditures related to the procurement of material and equipment and from the spending of sales and income tax revenues.

S.2.1 No Action Alternative

Under the No Action Alternative, utilities would pursue the independent siting and development of the energy transport projects on federal land, without the benefits of an expedited permitting process and the colocation of auxiliary facilities and other related infrastructure. The construction and operation of energy transport projects under the No Action Alternative would produce employment and generate income and state tax revenues and would likely require the in-migration of workers for certain occupational categories, which in turn would affect rental housing markets and create the need for additional state and local government expenditures and employment. Under this alternative, however, there would be considerable uncertainty regarding the location and timing of energy infrastructure construction on federal land. The absence of a coordinated permitting process may mean less federal land is utilized if energy transport projects can be more easily permitted on private land, or may mean that more federal land is used if facilities cannot take advantage of colocation. Given these considerations, the impacts of the No Action Alternative are not known.

S.2.2 Proposed Action

Construction and operation of the hypothetical energy transport projects in the proposed energy corridors could produce the socioeconomic impacts shown in Table S-1. Under the Proposed Action, construction impacts in 10 of the 11 western states were based on development occurring at an assumed maximum of 150 miles per year, with only impacts in Washington based on total miles. Under the Proposed Action, the largest employment impacts would be in Utah (4,946 jobs created), Idaho (4,933 jobs), and New Mexico (4,800 jobs). Corridor development would produce more than 4,000 jobs in each of the other states in 2007 with the exception of Washington, where 1,816 jobs would be created.

Corridor development would produce larger income impacts in California ($199.7 million), Colorado ($191.7 million), and Oregon ($188 million), with more than $150 million in income produced in each remaining state in the 11-state region except Montana and Washington. Sales taxes associated with development of the energy transport projects in the proposed energy corridors would be the largest in California ($22.6 million) and Colorado and Utah (both with $22.1 million), with the projects producing revenues of more than $20 million in seven of the remaining states. Income taxes would be largest in California ($8.3 million), Colorado ($7.9 million), and Oregon ($7.8 million), with somewhat smaller impacts in seven of the remaining eight states.

Given the scale of construction activities that could occur under energy transport projects, and the projected availability of local workers in the required occupational categories, project construction could require some in-migration of workers and their families from outside each state. Development of energy transport projects on the proposed energy corridors would relocate 700 in-migrants temporarily to each of the 11 states in 2007 except Washington, where

TABLE S-1 Potential Socioeconomic Impacts of Energy Transport Project Development in the Proposed Energy Corridors

	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming
Construction[a]											
Employment											
Direct	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	1,333	559	1,333
Total	3,949	4,347	4,450	4,933	4,678	3,888	4,800	4,755	4,946	1,816	4,494
Income ($m 2005)											
Direct	68.4	68.4	68.4	68.4	68.4	68.4	68.4	68.4	68.4	28.7	68.4
Total	186.5	199.7	191.7	174.2	132.0	175.3	171.1	188.0	185.5	75.8	160.0
Taxes ($m 2005)											
Sales	21.7	22.6	22.1	21.3	20.4	20.5	21.3	20.0	22.1	9.0	20.4
Income	7.7	8.3	7.9	7.2	6.6	7.3	7.0	7.8	7.6	3.1	6.6
In-migrants (number)	700	700	700	700	700	700	700	700	700	294	700
Vacant Rental Housing (number)	508	508	508	508	508	508	508	508	508	213	508
Local Government											
Expenditures ($m 2005)	7.3	10.4	8.6	6.9	7.5	8.3	8.4	8.9	8.0	4.2	11.2
Employment (number)	49	50	55	56	60	43	68	52	54	23	88
Operations[a]											
Employment											
Direct	50	50	50	50	50	50	50	50	50	21	50
Total	148	155	162	185	186	144	183	168	187	68	170
Income ($m 2005)											
Direct	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	1.0	2.3
Total	6.3	6.6	6.4	5.9	5.7	5.8	5.9	6.3	6.3	2.6	5.4

TABLE S-1 (Cont.)

	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	Oregon	Utah	Washington	Wyoming
Taxes ($m 2005)											
Sales	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.2	0.4
Income	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1	0.1

[a] Construction impacts are for 2007; operations impacts are for 2008.

294 in-migrants would arrive. Although in-migration may potentially impact local housing markets, the relatively small number of in-migrants and the availability of temporary accommodation (hotels, motels, and mobile home parks) would mean that the impact of energy transport project construction on the number of vacant rental housing units is not expected to be large. Approximately 500 rental units are expected to be occupied in each of the states (except Washington) during construction, which would represent 7.9% of the vacant rental units expected to be available in Wyoming in 2007, 5.2% in Montana, 4.3% in Idaho, and 3.3% in Utah, with increases of less than 2% of the vacant rental housing stock elsewhere in the remaining six states. In Washington, 213 units would be required, representing less than 1% of the vacant rental stock.

In addition to the potential impact on housing markets, in-migration would also affect state and local government expenditures and employment. Construction of the energy transport projects within the proposed energy corridors would require an additional $8.9 million in expenditures in Wyoming, $8.3 million in California, and $7.1 million in Oregon to meet the existing levels of service in the provision of state and local government services, which would represent an increase of less than 0.2% over expenditures expected in each of these states in 2007. Smaller increases in expenditures would be expected elsewhere in the 11-state region. Increases in local government employment would also be expected with corridor development to maintain levels of service, with 69 new employees likely to be required in Wyoming, 54 in New Mexico, and 48 in Montana, representing less than 0.2% of state and local employment expected in these states in 2007.

Employment impacts associated with operation of the energy transport projects' infrastructure would be small, with the largest impacts in Utah (187 jobs created), Montana (186 jobs), and Idaho (185 jobs). Corridor development would produce more than 140 jobs in each of the other states in 2008 with the exception of Washington, where 68 jobs would be created. Corridor development would produce larger income impacts in California ($6.6 million), Colorado ($6.4 million), Oregon ($6.3), and Utah ($6.3 million). Fiscal impacts of corridor development would be similar in the 11-state region, with sales taxes of $0.6 million in each of the states, with smaller impacts in Montana ($0.5 million), Wyoming ($0.4 million), and Washington ($0.2 million). Income taxes would be similar in most of the states ($0.3 million), with slightly larger impacts in California ($0.4 million) and smaller impacts in Washington and Wyoming ($0.1 million).

Because a relatively small local labor force would be required to maintain and operate the energy transmission projects' infrastructure, in-migrants are not expected, and no impacts are likely in the rental housing market or to local government expenditures or employment.

Federal agencies may collect right-of-way grants, rentals, royalty fees, and other revenues from utilities operating energy transport systems located in designated corridors on federal land. However, as it is not known precisely how existing or new revenue collection mechanisms might be used by federal agencies on corridor land, the magnitude of these revenues cannot be determined at this time.

S.2.3 Impact of Energy Transport Systems on Property Values

Energy transport projects can potentially affect property values in areas designated as energy corridors, or in communities located on adjacent land. These aspects of the impact of energy transport facilities may consequently affect quality of life in the rural communities hosting these developments. Impacts on property values and quality-of-life would occur primarily as a result of the visibility of electricity transmission structures, with other factors (such as health and safety and any noise associated with each of the three transport systems) likely to be less important. Three approaches have been used to study of impacts of electricity transmission systems on property values: appraisal methods, perception studies, and statistical analyses (Kroll and Priestley 1992; Grover Elliot and Company 2005). There are significant data and methodological problems associated with each approach, and the results of studies using each approach are often inconclusive.

Appraisal studies use data on sale prices on similar properties or groups of properties to examine whether land crossed by or close to transport systems have significantly different values compared to properties that are unaffected by these systems. In a review of the evidence from sales data and interviews with real estate professionals, Kroll and Priestley (1992) and Grover Elliot and Company (2005) found that price differentials for residential properties based on sales data in appraisal studies tended to be small, usually 5% or less, with slightly larger price impacts for agricultural, commercial, and industrial land. Impacts tended to taper off rapidly with distance from the transmission line. Although there are a large number of appraisal studies on the impact of transmission lines, most studies used a small sample of properties, and many relied on the informed judgment of appraisers rather than more rigorous statistical analysis, undermining the validity of the findings of many of these studies.

Perception studies attempt to establish how individual property owners and real estate professionals perceive the impact of energy transport developments on property values. Data is collected using mailed questionnaires and personal interviews, and includes data on EMF effects and other health and safety issues, aesthetics, and overall environmental quality (Rhodeside and Harwell Inc. 1988). Kroll and Priestley (1992), the International Electric Transmission Perception Project (1996), and Grover Elliot and Company (2005) noted that in many of the studies the majority of respondents felt that transmission lines had little or no effect on residential property values, with small increases noted only in some studies. Interviews with agricultural land owners found a high level of indifference with respect to property value losses. In general, impacts tended to be smaller at distances from the transmission line site and once the transmission line had been operating for some time. There were large differences between perceptions of property values losses and actual losses where additional statistical analyses were undertaken. Perception-based studies are inconclusive on the impact of transmission lines, with a wide range of questions soliciting attitudes and various approaches to the definition of key aesthetic variables (International Electric Transmission Perception Project 1996; Grover Elliot and Company 2005).

Statistical analyses attempt to establish the relationship between energy transmission lines and the value of property sales on land crossed by or close to energy developments, compared to land located elsewhere. Evidence presented in studies using statistical methods suggests that transmission lines have no discernable impact on residential properties values in the majority of cases, or produce losses of between 2% and 10%. Impacts have been found to be greater for smaller residential properties and immediately following construction of a line (Delaney and Timmons 1992; Kroll and Priestley 1992; Hamilton and Schwann 1995; Cowger, Bottemiller, and Cahill 1996; Bolton and Sick 1999; Bottemiller, Cahill, and Cowger 2000; Des Rosiers 2002; Wolverton and Bottemiller 2003; Grover Elliot and Company 2005). While properties with a direct view of a transmission line may suffer losses in value, property in locations close to transmission line easements might actually experience appreciation in property values resulting from greater local visibility, increased privacy, and greater access to buffer zones alongside each line (Des Rosiers 2002). Although there are numerous statistical analyses of property value impacts, there are few with large sample sizes that incorporate a range of subject property types and sales price and that measure the effects on property value over time.

Moreover, much of the variation in sales prices between properties located next to transmission lines and in otherwise similar locations is likely a reflection of differences in property and neighborhood characteristics not captured by the statistical methodologies chosen (Kroll and Priestley 1992; Grover Elliot and Company 2005).

S.3 MITIGATION MEASURES

Under each of the alternatives, mitigation of socioeconomic impacts is unlikely to be required. Although construction of each energy transport project is likely to require in-migration of workers and family members from outside each state, the number of in-migrants arriving in each state in 2007 is likely to be small and not likely to create impacts to rental housing markets, and only likely to require small increases in local government expenditures and employment.

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