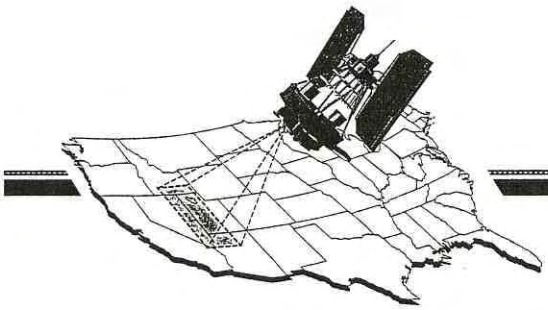

CHAPTER 3
AFFECTED ENVIRONMENT

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INTRODUCTION

This chapter provides a description of the environment potentially affected by the construction, operation, and maintenance of the proposed Southwest Intertie Project (SWIP). The project area is described in terms of three environments:

Natural Environment

- air quality and meteorology
- earth resources (soils, geology, paleontology, minerals, surface hydrology)
- biological resources (vegetation, wildlife, riparian, wetlands, and threatened, endangered, and other special-status species)

Human Environment

- land use resources (land jurisdiction, existing and planned land uses, parks, recreation, and preservation areas, transportation and access, grazing and mining claims and extractive uses)
- visual resources (viewpoints, natural scenery)
- socioeconomics

Cultural Environment

- cultural resources (prehistory, enthnohistory, history, archaeology)

The inventory was conducted to provide a basis to evaluate the impacts of the alternative routes. Methods of inventory varied among the various resources. Therefore, the inventory areas and methods are summarized in each resource section. Detailed inventory results for each resource are contained in the SWIP Technical Reports (Dames & Moore, 1991). These Technical Reports include:

- Volume I — Objectives, Procedures, and Results
- Volume II — Natural Environment
- Volume III — Human Environment
- Volume IV — Cultural Environment

The technical reports are accompanied by data tables. These tables locate and specify resource features and values mile by mile along the assumed centerlines of all the routing alternatives. The resource locations in these tables correspond to the locations illustrated on the maps in the accompanying Map Volume. The technical reports and data tables are available for public review at the agency offices listed in Appendix H.

During the regional environmental study, alternative routes were first identified as broad corridors of varying widths, referred to as preliminary corridors (refer to Chapter 2 for a discussion of the regional studies). Reference, or assumed, centerlines (routes) within each preliminary corridor were identified on maps and in field reviews by representatives from Idaho Power Company (IPCo), Los Angeles Department of Water and Power (LADWP), Dames & Moore, Bureau of Land Management (BLM), National Park Service (NPS), and the Forest Service (FS). The areas covered by each resource investigation along each of the alternative routes are called study corridors. The study corridors varied in width from one to three miles on either side of the assumed centerlines. The study corridors identified during the SWIP studies should not be confused with agency planning or designated utility corridors, used by the BLM, FS, and other federal land management agencies to consolidate utility rights-of-way. In some cases, however, the agency utility corridors and the study corridors do correspond.

The resource discussions that follow are based on the environmental studies described in Chapters 2 and 5. The inventory results presented in this chapter are for each of the final alternatives:

- **Midpoint to Dry Lake** - Route A, Route B, Route C, Route D, Route E, Route F, and Route G

- **Ely to Delta** - Direct Route, Cutoff Route, 230kV Corridor Route, and Southern Route

Comparative data for each of these alternative routes, as well as the Utility and the Agency Preferred Routes are listed in Tables 2-4 and 2-5 in Chapter 2.

The environmental data, impact assessment, mitigation planning, and comparative data for substations and microwave facilities are located in Appendices E and F.

NATURAL ENVIRONMENT

Air Quality and Meteorology

The climate in southern Idaho, eastern Nevada, and western Utah is influenced largely by location, regional weather systems, and topographic orientation. The climate throughout much of this area is characterized by hot, dry summers and cold, dry winters. Surface winds are channeled through valleys between generally north-south trending mountain ranges. Winds flow predominately in northeasterly or southwesterly directions. Annual precipitation depends largely on elevation. Precipitation occurs primarily in the form of snow at higher elevations during the winter months. The snows maintain high water tables and provide groundwater recharge. Some additional precipitation occurs from thunderstorms produced by daytime heating of air masses in valleys.

Temperatures average in the mid 70s during July and in the mid 20s during January on the Snake River Plateau of southern Idaho. In Nevada, average temperatures during July range

between the high 60s at higher elevations (e.g., Ely area) to the low 90s at lower elevations (e.g., Las Vegas area). During January, average temperatures in Nevada range between the high 20s at higher elevations (e.g., Ely area) to the mid 40s at lower elevations (e.g., Las Vegas area). Temperatures in southwestern Utah average in the high 70s during July and the high 20s during January.

The existing air quality conditions along the alternative routes and ancillary facilities of the SWIP are briefly described below. Because of the remoteness of much of the proposed project study area, current data are quite sparse, however some data were available from air and weather monitoring stations in the general vicinity. Characterization of the existing air quality and meteorology is based on data gathered between 1987 and 1989. Existing air quality and meteorology monitoring data compiled are listed in technical Air Quality and Meteorology technical report (refer to Appendix H for the locations where technical reports can be reviewed).

The Jarbidge Wilderness Area, located 30 miles west of the nearest routing alternatives in northern Nevada, was the only Prevention of Serious Deterioration (PSD) Class I area identified within the study corridors. Class I is identified as an area where the cleanest and most stringent degree of protection from future air quality degradation applies. Class I areas include national and international parks, national wilderness areas (exceeding 5,000 acres), and national memorial parks (exceeding 5,000 acres). All other wilderness areas, Wilderness Study Areas (WSAs) and national parks identified in or adjacent to study corridors are classified as PSD Class II. Class II allows a moderate degree of degradation, and Class III a lesser degree of protection from future air quality degradation. No degradation, however, no matter what class, can exceed the National Ambient Air Quality Standards (NAAQS).

Three areas within the study corridors currently do not meet the NAAQS and are classified as nonattainment areas. Two areas in Nevada include Las Vegas in Clark County (which is a nonattainment area for carbon monoxide and total suspended particulates) and the Lower Steptoe Valley (a nonattainment area for sulfur dioxide) near McGill. The third nonattainment area is located at the Intermountain Generating Station north of Delta, Utah.

Standards and regulations for primary and secondary federal air quality allowances, monitoring, and permitting for the pollutants of concern for the proposed project are established under the Clean Air Act of 1970, the 1977 Amendments, and the 1990 Amendments. Air quality standards and regulations for the states of Idaho, Nevada, and Utah follow or are more stringent than federal standards and regulations. Air pollutants expected during the project construction include suspended particulates, carbon dioxide, sulfur oxides, and nitrogen oxides.

Earth and Water Resources

Introduction

The purpose of the earth and water resource study is to identify geological, paleontological, soil, and water features that may be affected by the construction, operation, and maintenance of the a 500kV transmission line.

The National Environmental Protection Act of 1969 (NEPA) is the primary legislation that requires addressing potential impacts to earth and water resources and is the basis for this report. Some federal legislation that addresses protection of the land and water resources includes the Federal Land Policy and Management Act of 1976 (FLPMA), the Antiquities Act of 1906 with amendments, and the Clean Water Act of 1972 (CWA) with amendments.

The issues of concern regarding the location of the proposed transmission line include the loss of soil and soil productivity from increased erosion or soil compaction, conflicts with potential mineral development, the destruction of significant fossils, possible scarring and increased erosion in landslide areas, and the degradation of water quality from soil erosion and sedimentation. Also, areas prone to flooding may be susceptible to construction, maintenance, and tower stability problems.

Methods

Information for the inventory was obtained primarily from publications and discussions with agency specialists of the BLM, FS, Soil Conservation Service (SCS), Geological Survey (USGS), Bureau of Mines, Federal Emergency Management Agency (FEMA), Idaho Bureau of Mines and Geology, Idaho Department of Water Resources (IDWR), Idaho Museum of Natural History, Utah Division of State History, Utah Geological and Mineral Survey, Brigham Young University, University of Nevada (Reno), Nevada Bureau of Mines and Geology, and the University of Utah.

Specific resource features that were identified on maps include

- known potential geologic formations
- areas with potential mineral resources
- known fossil localities
- landslide areas
- soil units
- prime farmland
- intermittent and perennial streams and lakes
- springs
- shallow ground water
- known faults
- flood-prone areas

Recent satellite imagery was also used to inventory data and verify locations of sensitive features. Data were identified within 0.5 mile of the assumed centerline for each routing alternative (study corridor), and were delineated on project maps at 1:100,000 scale. A GIS was used to map the inventory, to assist impact assessment, and document the results of the analysis.

Results

Resource features that have a high sensitivity are:

- soils with either a high wind erosion or high water erosion potential
- areas of high paleontological sensitivity
- areas of active mining
- known potential landslide hazard areas, perennial streams and lakes
- springs
- wetland areas

Only the high sensitive data categories that are issues of concern are described below. Also refer to the technical reports for the location and quantification of the less sensitive features inventoried. The technical report includes narrative and tables that describe the inventory mile by mile along the assumed centerline of the routing alternatives (refer to Appendix H for the locations where technical reports can be reviewed).

Disturbance to the land surface within the alternative study corridors results mainly from agriculture, livestock grazing, and roads. Agricultural activities have disturbed the native condition of the soils to a great extent in Idaho, primarily in the Snake River Valley. Numerous unpaved and two-track roads are present. The soils in the "true" desert in Lincoln, Nye, and Clark counties are sensitive to disturbance because the soils erode easily when the surface is disturbed. There is very little perennial surface water in the study area, but the water quality of perennial lakes and streams is generally considered to be good. A small part of the east side of Goose Lake to the west of Eden, Idaho (Link 30), is the only perennial lake crossed by the routes.

Areas described in the following discussion considered as being **large** are usually crossed by more than 0.5 mile of alternative routes while those described as **small** are typically less than 0.5 mile along the assumed centerline. Numbers of occurrences or number of miles along the assumed centerline are quantified in parentheses. Also refer to the maps in the accompanying Map Volume.

Alternative Routes - Midpoint to Dry Lake

Route A

In summary, there would be a total of approximately 23.8 miles of high sensitivity paleontological area crossed along the entire route. A total of approximately 39.0 miles of soils with a high potential of water erosion and approximately 63.7 miles of soils with a high potential of wind erosion occur along the route. There are 26 perennial streams identified along the route centerline and 42 springs within 0.5 mile of the assumed centerline. Areas with a flood potential are delineated along 6.2 miles of the route.

Between the Midpoint Substation and Jackpot, soils with a high potential of water erosion occur in large areas north and east of Jackpot and in small areas primarily along the foothills north of the Sawtooth National Forest near Rock Creek. Soils with a high potential of wind erosion occur in small areas east of the Salmon Falls Creek Reservoir. There are 18 mapped crossings of streams and canals:

- Milner-Gooding Canal near Midpoint (2)
- the Main Canal (4) northeast of Hansen
- the Twin Falls Main Canal (6) south of the Snake River
- Rock Creek (1), McMullen Creek (1), and Cottonwood Creek (1) along the foothills north of the Sawtooth National Forest
- Green Creek (1) and Deep Creek (1) northeast and east of Rogerson
- Salmon Falls Creek (1) southeast of Jackpot

Route A crosses a small portion of the east side of Goose Lake west of Eden, Idaho. There are no high sensitivity paleontological resources or flood potential areas along this segment of the route.

From Jackpot to Windermere Hills (Links 110, 130, and 160), soils with a high potential of water erosion occur in large areas between Contact and Willow Creek. Salmon Falls Creek east of Contact (Link 102) is the only perennial stream crossed and areas with potential for flooding occur near Salmon Falls Creek (2.4 miles) east of Contact and near Thousand Springs Creek (0.3 mile). Potentially high sensitivity paleontological resources occur in Tertiary sedimentary rocks (Ts1, Ts3) in large areas throughout this route, but in the area primarily south of Contact. Soils with a high potential of wind erosion were not identified along this segment of the route.

From Windermere Hills to north of Interstate 80, soils with a high potential of water erosion occur in a large area west of Toano Draw north of Interstate 80 (Links 152, 200, and 211). High sensitivity paleontological resources may occur in sedimentary rocks (Ts1, Ts3) in large areas northeast of the Windermere Hills and in small areas northeast of the Pequop Mountains. Areas of soils with high wind erosion potential, perennial streams, or areas prone to flooding are not known to occur in this segment.

From Interstate 80 to north of Dolly Varden, soils with a high potential of wind erosion occur in large areas in Goshute Valley from south of Interstate 80 to Dolly Varden (Links 211, 212,

and 230). Soils with a high potential of wind erosion, perennial streams, areas with the potential for flooding, or areas with the potential for high sensitivity paleontological resources do not occur in this area.

From north of Dolly Varden to the North Steptoe substation site, soils with a high potential of wind erosion occur in large areas in Goshute Valley from Dolly Varden to south of Mizpah (Links 230 and 250) and northwest of the North Steptoe substation site. Areas with a potential for flooding occur in large areas of Goshute Valley from Dolly Varden to Nelson Creek (Link 230) and west of the Currie Hills (Link 250). Several springs within 0.5 mile of the assumed centerline are located mainly west and southwest of Goshute Lake. Tertiary sedimentary rocks (Ts3) potentially containing high sensitivity paleontological resources occur in small areas in the Currie Hills. There were no perennial streams or soils with a high potential of water erosion identified along this segment of the route.

From the North Steptoe substation site to the Robinson Summit substation site, soils with a high potential of water erosion occur in large areas near Warm Springs to the east of the Egan Range, and north of Robinson Summit. Soils with a high potential of wind erosion are present in large areas of the Steptoe Valley from Lages Station to Cherry Creek (Links 259, 260, 261, and 270) and from north of Warm Springs to northwest of Steptoe (Links 291, 293, and 310), and in Butte Valley from the west side of the Egan Range to Robinson Summit (Links 293 and 310). Tertiary sedimentary rocks (Tys) with a high paleontological sensitivity are present north of Robinson Summit. No perennial streams or areas prone to flooding were identified in this area.

From the Robinson Summit substation site to the Dry Lake substation site, soils with a high potential of water erosion occur in large areas along the White River Valley west and southwest of the Wayne Kirch Wildlife Management Area and in small areas along the foothills on the east side of Jakes Valley. Soils with a high potential of wind erosion occur in small areas of Jakes Valley from Robinson Summit to Jakes Wash (Links 340, 362 and 363) and in large areas south of Ellison Creek west of Preston (Link 670), along Pahranagat Wash from Maynard Lake to Coyote Spring Valley (Links 690, 700 and 720), and in Dry Lake Valley (Links 700 and 720). Areas with a potential for flooding occur along Ellison Creek (0.7 mile) west of Preston, along the White River west of Preston (0.1 mile) and southwest of the Wayne Kirch Wildlife Management Area (0.3 mile), and in numerous small areas along Pahranagat Wash, Coyote Spring Valley, and in Hidden Valley west of Dry Lake (Links 690, 700, and 720). High sensitivity paleontological resources are present in younger Tertiary sedimentary rocks (Tys) in a few small areas south of Robinson Summit and near Ellison Creek west of Preston (approximately 1.4 miles along the centerline route). No perennial streams were identified along this segment of the route.

Route B

Route B would cross approximately 38.6 miles of high sensitivity paleontological resources. Soils with a high potential of water erosion are present along 53.1 miles, and soils with a high potential of wind erosion are present along 63.8 miles. There are 27 perennial streams

that would be crossed along the assumed centerline, and 20 springs are present within 0.5 mile of the assumed centerline. Areas prone to flooding occur along 1.2 miles of Route B.

Route B is the same as Route A from Midpoint Substation to Jackpot. From Jackpot to north of Interstate 80, soils with a high potential of water erosion occur in large areas including south of Jackpot, along Trout Creek between Texas Spring Canyon and Burnt Creek in the Granite Range (Links 92 and 140) and west of Toano Draw north of Interstate 80 (Links 144, 200, and 221). The perennial streams that are crossed (and the number of times crossed) by this subroute are Salmon Falls Creek (1) south of Jackpot (Links 72 and 91), Trout Creek (2) in the Granite Range, and Thousand Springs Creek (1)(Link 140) southeast of Knoll Mountain. One spring occurs along the assumed centerline near Trout Creek. High sensitivity paleontological resources occur in Tertiary sedimentary rocks (Ts1, Ts3) in large areas along Trout Creek to Five Mile Draw and in small areas west of Toano Draw. No areas were identified as being prone to flooding or having soils with a high potential of wind erosion.

From north of Interstate 80 to Lages Station, soils with a high potential of water erosion occur in large areas in the Toano Range northwest of Wendover, in the Boone Spring Hills, and east of Boone Canyon northeast of Lages Station. Large areas of soils with a high potential of wind erosion occur in Antelope Valley from Boone Spring in the Antelope Range to Lages Station (Link 226). A small area with the potential for flooding is present along the Northern Pacific Railroad line near Oasis. High sensitivity paleontological resources occur in Tertiary sedimentary rocks (Ts1) east of Boone Canyon in the Antelope Range. There were no perennial streams identified along the corridor centerline.

From Lages Station to Cherry Creek Station segment, there are large areas of soils with a high potential of wind erosion. Soils with a high water erosion potential, areas with high sensitivity paleontological resources, perennial streams, or areas prone to flooding were not identified.

From Cherry Creek Station to the Robinson Summit substation site, soils with a high potential of water erosion occur in large areas near Cocomongo Mountain to the southwest of Cherry Creek Station (Link 280), and along White Sage Wash to the north of Robinson Summit (Link 280). Soils with a high potential of wind erosion are present in large areas east of Cocomongo Mountain, in Butte Valley south of the Cherry Creek Range, to the north and west of White Sage Wash, and to the north of Robinson Summit. Telegraph Creek (Link 280) in the Egan Range is the only perennial stream that would be crossed in this segment of the route. High sensitivity paleontological resources occur in younger Tertiary sedimentary rocks (Tys) north of Robinson Summit.

Route B is the same as Route A from Robinson Summit substation site to the Dry Lake substation site, northeast of Las Vegas.

Route C

In summary, 35.3 miles of high sensitivity paleontological resources would be crossed along the assumed centerline of Route C. Approximately 44.4 miles of soils with a high potential of water erosion and 63.7 miles of soils with a high potential of wind erosion are crossed. There are 23 perennial streams and 2.1 miles of land prone to flooding. There are 20 springs identified within 0.5 mile of the assumed centerline of this route.

Route C is the same as Route B from Midpoint Substation to Interstate 80 and the same as Route A from Interstate 80 to Dolly Varden.

In the route segments from north of Dolly Varden to the North Steptoe substation site, there are soils with a high potential of water erosion present near the Currie Hills. Soils with a high wind erosion potential occur in large areas in Goshute Valley from Dolly Varden to east of Mizpah (Links 230 and 250) and in the Steptoe Valley from south of the Currie Hills to Lages Station (Links 250 and 259). Areas prone to flooding occur in large areas of Goshute Valley from Dolly Varden to Nelson Creek (4.2 miles) and south of the Currie Hills (0.6 mile). Tertiary sedimentary rocks (Ts3) contain potentially high sensitivity paleontological resources in small areas of the Currie Hills. No perennial streams were identified.

Route C is the same as Route A from the North Steptoe substation site to Dry Lake substation site.

Route D

High sensitivity paleontological resources are present along approximately 21.9 miles along Route D. Approximately 35.2 miles of soils with a high potential of water erosion and 57.0 miles of soils with a high potential of wind erosion are crossed by this route. There are 22 perennial streams crossed and 45 springs identified within 0.5 mile of the assumed centerline. Approximately 3.1 miles of land prone to flooding are crossed by this alternative.

Route D is the same as Route A from Midpoint Substation to the Windermere Hills. From Windermere Hills to Dolly Varden, soils with a high potential of water erosion occur in large areas on the east side of the corridor near Wells, along the west side of the Wood Hills, and in the Pequop Mountains near Hogan. Soils with a high potential of wind erosion occur in large areas east of Ventosa in the Independence Valley (Link 190) and north of Dolly Varden in the Steptoe Valley (Links 190 and 230). High sensitivity paleontological resources occur in Tertiary sedimentary rocks (Ts2) in a small area northeast of Bishop Creek Reservoir. Perennial streams and areas with the potential for flooding were not identified. The segment from Dolly Varden to the Dry Lake substation site is the same as Route A.

Route E

In summary, there would be approximately 25.5 miles of high sensitivity paleontological resources that are crossed along this route. Approximately 48.6 miles of soils with a high potential of water erosion and 69.2 miles of soils with a high potential of wind erosion are crossed. There are 22 perennial streams crossed and 17 springs identified within 0.5 mile of the assumed centerline. Approximately 4.1 miles of land prone to flooding are also crossed by this route.

Route E is the same as Route A in the segment from Midpoint Substation to Interstate 80 and the same segment as Route B from Interstate 80 to the North Steptoe substation site (refer to discussion above). Route E is the same segment as Route A from the North Steptoe substation site to the Dry Lake substation site.

Route F

Approximately 37.4 miles of high sensitivity paleontological resources and approximately 1.8 miles of areas with known potential landslide hazard would be crossed by the centerline corridor of Route F. Approximately 39.6 miles of soils with a high potential of water erosion and 62.9 miles of soils with a high potential of wind erosion are crossed. There are eight perennial streams along the centerline and 17 springs identified within 0.5 mile of the centerline. Approximately 1.8 miles of land with the potential for flooding are also crossed by the centerline of the corridor.

From Midpoint to Jackpot, soils with a high potential of water erosion occur in large areas along the Snake River near Hagerman (Links 61, 64, and 70) and north of Jackpot, and in small areas west of the Snake River and near Salmon Falls Creek west and south of Hagerman (Link 64). Soils with a high potential of wind erosion are present in large areas between the Midpoint Substation and Hagerman, north of Jackpot, and in small areas east of Salmon Falls Creek Reservoir. The route crosses the following perennial streams one time: Clover Creek Canal (Link 61) southeast of Gooding and the Snake River (Link 61) near Hagerman. The route crosses the Salmon Falls Creek twice northwest of Castleford (Link 64) and again southwest of Jackpot. Areas with the potential for flooding occur along the Snake River (0.1 mile) and along Salmon Falls Creek (0.1 mile) southeast of Jackpot. High sensitivity paleontological resources occur in Quaternary and Tertiary sedimentary rocks (Qbs, Qtg) along and near the Snake River west of Hagerman (Link 61). This route would pass near the Hagerman Fossil Bed National Monument which is known for its paleontological resources such as the Hagerman Horse. Known potential landslide areas occur along the Snake River and Salmon Falls Creek near Hagerman. Route F is the same as Route C in the segment from Jackpot to Dry Lake substation site.

Route G

In summary, 30.6 miles of high sensitivity paleontological areas would be crossed along the entire route. Approximately 34.7 miles of soils with a high potential of water erosion and approximately 51.6 miles of soils with a high potential of wind erosion occur along the centerline of the corridor. There are 27 perennial streams identified along the route centerline and 45 springs within 0.5 mile of the assumed centerline. Areas with a potential flood hazard occur along 3.1 miles along this route.

Route G is the same as Route A in the segment from Midpoint Substation to Jackpot. From Jackpot to Interstate 80, soils with a high potential of water erosion occur in large areas between Contact and Wilkins, and east of the Pequop Mountains. Two perennial streams, Salmon Falls Creek and Thousand Springs Creek, are crossed. Areas with potential for flooding occur near Salmon Falls Creek (2.4 miles) east of Contact and near Thousand Springs Creek (0.3 mile). Numerous springs occur mainly between Contact and Willow Creek (Link 130), and near Thousand Springs Creek (Links 150 and 151). High sensitivity paleontological resources occur in Tertiary sedimentary rocks (Ts1, Ts3) in large areas between Contact and Willow Creek and in small areas west of Toano Draw.

Route G is the same as Route A in the segment from Interstate 80 to North Steptoe substation site. From the North Steptoe substation site to the Robinson Summit substation site, soils with a high potential of water erosion occur in large areas near the Cocomongo Mountain southwest of Cherry Creek Station (Links 270 and 180), and along White Sage Wash north of Robinson Summit (Link 280). Soils with a high potential of wind erosion are present in large areas in the Steptoe Valley and in Butte Valley south of the Cherry Creek Range, north and west of White Sage Wash, and north of Robinson Summit. Telegraph Creek (Link 280) in the Egan Range is the only perennial stream crossed by the subroute. There are 28 springs delineated within 0.5 mile of the centerline of Link 241 in the Steptoe Valley. High sensitivity paleontological resources occur in younger Tertiary sedimentary rocks (Tys) north of Robinson Summit. Flood hazards do not occur along this segment.

Route G is the same as Route A in the segment from the Robinson Summit substation site to the Dry Lake substation site.

Alternative Routes - Ely to Delta

Cutoff Route

In summary, 55.6 miles of high sensitivity paleontological resources would be crossed along the entire route. Soils with a high potential of water erosion are crossed for approximately 22.1 miles, and soils with a high potential of wind erosion are crossed for approximately 12.6 miles. Perennial streams and areas with the potential for flooding were not identified along this route. There are two springs within 0.5 mile of the assumed centerline of this route.

From the North Steptoe substation site to south of the Little Hills, soils with a high potential of water erosion occur in large areas in the Schell Creek Range, near Tippetts Pass (Link 266) south of Stonehouse, and near the Red Hills (Link 266). Soils with a high potential of wind erosion are present in small areas of Steptoe Valley. High sensitivity paleontological resources occur in Tertiary sedimentary rocks (Tys) in the Antelope Range east of Stonehouse and in Upper Cambrian rocks (Cu) in the Schell Creek Range.

In the segment from south of the Little Hills to the Buckskin Hills (Links 267 and 268) soils with a high potential of water erosion are present in a small area near Government Peak and in a large area in the Conger Range to the north of the Buckskin Hills (Link 470). High sensitivity paleontological resources occur in Quaternary colluvium and alluvium on the east and west sides of Snake Valley and east of the Buckskin Hills.

In the segment from the Buckskin Hills to the Intermountain Generating Station there are large areas of soils with a high potential of water erosion in Payson Canyon of the Confusion Range (Link 462), in Marjum Canyon of the House Range (Link 462), and in Swasey Wash of Whirlwind Valley (Link 470). Soils with a high potential of wind erosion are present in large areas between Coyote Knolls and Soap Hollow east of the House Range (Link 470), north and west of the Smelter Hills (Link 571), northeast of Sugarville near the Intermountain Generating Station (Links 581 and 582), and in small areas south of the Little Drum Mountains (Link 470 and 540) and north of the Topaz Lake Wildlife Management Area. High sensitivity paleontological resources are present in Quaternary alluvium and colluvium in large areas east of the Buckskin Hills in Tule Valley, between the House Range and Smelter Hills, and north of Sugarville (Links 581 and 582).

Direct Route

Along the entire route, approximately 55.5 miles of high sensitivity paleontological resources would be crossed. Approximately 14.4 miles of soils with a high potential of water erosion and 8.6 miles of soils with a high potential of wind erosion are present along the route. Two springs were identified within 0.5 mile of the assumed centerline.

The Direct Route is the same as the Cutoff Route from the North Steptoe substation site to south of the Little Hills. From south of the Little Hills to Intermountain Generating Station, soils with a high potential of water erosion occur in large areas north of Tin Springs Mountain (Link 620), at the north end of the Confusion Range, at the south end of the Middle Range (Link 630), and at the north ends of the House Range (Link 630) and the Little Drum Mountains (Links 630 and 650). Soils with a high potential of wind erosion occur in large areas north of the Smelter Hills and northeast of Sugarville near the Intermountain Generating Station. High sensitivity paleontological resources are present in Quaternary colluvium and alluvium in large areas of the Snake Valley, Tule Valley, east and west of the Drum Mountains, and north of Sugarville, and in Cambrian rocks (Marjum Formation) at the north end of the House Range.

230kV Corridor Route

Approximately, 64.9 miles of high sensitivity paleontological resources would be crossed by the centerline along the entire route. Soils with a high potential of water erosion occur for approximately 31.2 miles and soils with a high potential of wind erosion occur for approximately 19.2 miles along the centerline of the route. Four perennial streams are crossed and six springs occur within 0.5 mile of centerline.

In the segment from Robinson Summit to the Buckskin Hills, soils with a high potential of water erosion occur in small areas in the Egan Range east of Robinson Summit and in large areas along the foothills of the Duck Creek Range east of Ely (Link 370), from the west side of the Schell Creek Range through Cooper Canyon, (Link 380) in the Snake Range near Osceola (Link 460), and in the Buckskin Hills (Link 461). Soils with a high potential of wind erosion occur in small areas east of Robinson Summit, and in large areas of the Steptoe Valley from Hercules Gap to the foothills of the Schell Creek Range north and east of Ely, and in Spring Valley east of Osceola. High sensitivity paleontological resources are present in Quaternary alluvium and colluvium in large areas of the Snake Valley and in younger Tertiary sedimentary rocks (Tys) near Weaver Creek east of Osceola in the Snake Range. Perennial streams (and the number of crossings) occur at Steptoe Creek (1)(Link 380) east of Comins Lake, and at Weaver Creek (2)(Link 460) and Silver Creek (1)(Link 460) east of Osceola in the Snake Range. Six springs were identified within 0.5 mile of the centerline. The 230kV Corridor Route is the same as the Cutoff Route in the segment from the Buckskin Hills to the Intermountain Generating Station.

Areas of known potential landslide hazard occur along the 230kV Corridor Route for approximately 0.6 mile in Cooper Canyon to the southeast of Ely. Areas of active mining occur along the 230kV Corridor Route for approximately 1.0 mile on the east side of Spring Valley west of Osceola.

Southern Route

Along the entire route, approximately 84.7 miles of high sensitivity paleontological resources would be crossed. Approximately 17.1 miles of soils with a high potential of water erosion and 40.1 miles of soils with a high potential of wind erosion are present along the route. Twelve springs were identified within 0.5 mile of the assumed centerline. Three perennial streams would be crossed by this route and several areas with the potential for flooding were identified along this route.

From the Robinson Summit substation site to the Buckskin Hills, soils with a high potential of water erosion occur in small areas in the Egan Range east of Robinson Summit (Link 362) and in large areas, in Antelope Valley Wash (Link 451), and in the Tule Valley south of the Barns Hills (Link 451). Soils with a high potential of wind erosion occur in small areas east of Robinson Summit, and in large areas of the Steptoe Valley, along the foothills of the Egan Range at the western edge of the Steptoe Valley (Link 364), and in Swasey Wash southwest of Delta (Link 490). High sensitivity paleontological resources are present in Quaternary alluvium and colluvium in large areas of the Antelope Valley and Ferguson Desert.

Perennial streams occur near Martin Spring in the Egan Range where the route passes through Water Canyon and down Williams Creek to cross the mountains. Twelve springs occur in Water Canyon within 0.5 mile of the assumed centerline.

Biological Resources

Introduction

Federal environmental legislation and regulations applicable to biological resources in the project area include the Endangered Species Act of 1973 as amended, the Sikes Act, Title II as amended, FLPMA, the Migratory Bird Treaty Act of 1986, the Bald Eagle Act of 1940 (amended in 1962 to include the golden eagle), Section 404 of the Clean Water Act (CWA) (and amendments), Executive Orders 11990 (protection of wetlands) and 11988 (floodplain management), and NEPA. NEPA requires federal agencies to prepare environmental impact statements (EIS) on all major federal actions in accordance with CEQ implementing regulations (1978). Additional authority requiring the addressing of biological resources is listed in the technical report.

Biological resource data for the states of Idaho, Nevada, and Utah were obtained from a secondary (existing) data source for the SWIP regional study conducted by Dames & Moore in 1988 (also refer to Chapter 2). The regional inventory focused on the distribution of highly sensitive species of wildlife and plants and similarly sensitive habitat types. Locations of federally listed species and sensitive habitats were used to select a number of preliminary corridors to be studied further.

Methods

A biological inventory was then conducted for the SWIP alternative routes using data from scientific literature, existing Dames & Moore files, satellite imagery at 1:100,000 scale, SPOT black and white satellite imagery at 1:24,000 scale, and agency contacts. Data was collected within the study corridors one mile on either side of the assumed centerlines for each routing alternative. Agency personnel were asked to provide information on potential or known occurrences of sensitive species of wildlife and plants and on habitats of special concern within the study corridors. The following agencies were contacted for information: BLM, Forest Service, Fish and Wildlife Service (FWS), Utah Division of Wildlife Resources (UDWR), Nevada Department of Wildlife (NDOW), Idaho Department of Fish and Game (IDFG), and Idaho, Nevada, and Utah Natural Heritage Programs.

Data were collected and digitized into a GIS at a 1:100,000 scale for:

- vegetation types
- common and characteristic plant species found in each vegetation type
- vertebrate species likely to be found in habitats in the project area

- species listed as federally threatened, endangered or as candidates under review for listing
- species classified as rare, sensitive or otherwise protected by state agencies
- areas of special biological value or interest, including riparian and wetland habitats

The technical reports contains detailed information on the vegetation and wildlife resources inventoried. The results of the biological resources inventory are summarized below.

Results

Vegetative Communities

Eleven vegetative communities have been identified within the SWIP biological study area. Satellite imagery facilitated the identification and distribution of vegetation (refer to Map Volume). The imagery was "classified" using a computer to distinguish various spectral qualities, or light reflectivity from the ground surface digitally recorded by a satellite. Since the spectral qualities of some communities were similar on the satellite images, the eleven communities were mapped as seven vegetation types.

Shadscale, greasewood, samphire-iodine bush, and Great Basin sagebrush are all included under sage scrub. Mojave desert scrub and grassland communities are both uniquely identified. Wetland and riparian areas are listed under riparian. Piñon-juniper and alpine tundra are represented by woodland/mountain shrub/grasses. Limber/bristlecone pine and quaking aspen are represented by the mountain conifer/broadleaf category.

Agriculture - This is most prevalent in the Snake River plain in southern Idaho where native vegetation has been cleared for agricultural purposes (e.g., Links 10, 20, 40, 41, 61, 62, and 63). Also refer to the Land Use section in this chapter and the Landcover maps in the accompanying Map Volume for locations.

Grassland - Grassland communities occur throughout the alternative corridors, largely ecotonal with other plant communities, such as sage scrub (Links 71, 91, 92, 100, 110, 130, 160, 141, 142, 144, 152, 161, 200, 211, 221, 243, 259, 260, 270, 362-63, 420, 430, 450, etc.) and piñon-juniper (Links 263, 264, 280, 350), but are often present as discrete grassland units. Many native species have been replaced historically during land management practices by exotics, such as cheatgrass brome (Bromus tectorum), crested wheatgrass (Agropyron cristatum), filaree (Erodium cicutarium), tumble mustard (Sisymbrium altissimum), and thistle (Salsola iberica). Native species include gramas (Bouteloua spp.), bluegrasses (Poa spp.), needlegrasses (Stipa spp.), galleta (Hilaria jamesii), sand dropseed (Sporobolus cryptandrus), Indian ricegrass (Oryzopsis hymenoides), and squirreltail (Sitanion hystrix).

Sage Scrub - The four distinct communities categorized under sage scrub are described below. The most common is Great Basin sagebrush, the other three have more specialized

habitat requirements. Very few links cross sage scrub exclusively (e.g., Links 70, 300, 310, and 320), most being ecotonal with grasslands (links listed above).

- Shadscale Community - Shadscale (Atriplex confertifolia) occurs in low elevation, often saline basins typified by low precipitation, heavy soils, and a water table too deep to support stands of greasewood. This shrub-dominated community normally has cover values less than 12 to 15 percent, and plants that are often less than one meter in height.

- Greasewood Community - Greasewood (Sarcobatus vermiculatus) occurs in saline soils along the edges of playas where the water table is high. Salts from the soils are drawn in solution into the plant, the leaves drop off and rot causing a highly alkaline habitat in which only specialized, salt tolerant plants can survive. Vegetative cover in greasewood communities is usually less than 10 percent.

- Samphire-Iodine Bush Community - This community occurs where the combination of high water table and high soil salt content is so great that water often stands in pools of low playas and dense crusts of salt crystals form on soil surfaces and on the bases of plants.

- Great Basin Sagebrush Community - On low foothills at somewhat higher elevations, big sagebrush reach down to make contact with playa chenopods, and upward along ridges and in valley bottoms to mingle with piñon-juniper woodlands. In addition, portions of this community extend well above piñon-juniper to cover rocky ridges and valleys at elevations as high as 10,000 feet. At higher elevations, soils are rocky and less dense, the water table is lower, and soils are free of salts. Vegetative cover is between 20 and 50 percent. Within this community, mountain mahogany (Cercocarpus ledifolius) occurs locally on south-facing slopes in dense stands. At higher elevations, quaking aspen (Populus tremuloides), Douglas-fir (Pseudotsuga menziesii), and white fir (Abies concolor) may occur given moister climates. Limber pine (Pinus flexilis) and spruce (Picea spp.) occur in some parts of Nevada.

Mojave Desertscrub Community - This community is found on the basin floors and bajadas below 4000 feet. South of the Pahranagat Mountains and at the north end of Kane Springs Valley in Nevada, a transition to Mojave desertscrub vegetation occurs (e.g., Links 680, 690, and 700). Creosotebush (Larrea tridentata) is the most abundant plant, with white bursage (Franseria dumosa) as a codominant. Blackbrush (Coleogyne ramosissima) is common at higher elevations. Joshua trees (Yucca brevifolia), all-scale (Atriplex hymenclea), desert holly (A. hymenelytra) and brittlebush (Encelia farinosa) occur locally.

Woodland/Mountain Shrubs/Grasses - Piñon-juniper and the alpine-tundra community are two distinct vegetation types represented by this category.

- Piñon-Juniper - In areas of generally higher elevations (5,000 to 8,000 feet) and steeper slopes, piñon-juniper woodlands dominate the upper foothill landscape. These woodlands or "pygmy forests" are limited along alternative links at higher elevations, primarily intermingling with grasslands and sage scrub (e.g., Links

263, 264, 280, 350, 364, and 460). In many areas, this vegetation type runs continuously from mountain range to mountain range. Annual precipitation in these sites varies greatly. Soils are often rocky, shallow, and poorly defined. Plant cover is often less than 15 percent with most of that existing as upper canopy cover. Grasses, forbs, and woody plants are limited. The most common woody plant is singleleaf piñon (Pinus monophylla). Where juniper (Juniperus osteosperma) dominates, neither singleleaf piñon nor piñon pine (P. edulis) occur, within the study corridors in southern Idaho.

- Alpine-Tundra Community - Above timberline, at elevations exceeding 11,000 feet, low-growing, perennial herbs are virtually the only plant types present. Woody plants are rare or non-existent.

Mountain Conifer/Broadleaf - Two distinct high elevation communities, limber pine - bristlecone pine and quaking aspen, are represented by this category.

- Limber Pine-Bristlecone Pine - This high elevation community occurs between 8,000 and 10,000 feet elevation. Common tree species are white fir (Abies concolor var. lowiana), bristlecone pine (Pinus longaeva var. aristata), limber pine (P. flexilis). This vegetative community has not been specifically identified along any of the links.

- Quaking Aspen - Occurring at elevation ranging from 6,000-8,000 feet, quaking aspen are often found growing in pure stands. Understory conifers generally will eventually grow and shade out the aspen.

Riparian - Riparian areas are encountered infrequently within the alternatives, generally occurring in narrow communities along streams and marshes. Streams in the region traversed by the SWIP alternatives originate from perennial headwater spring sources or from snowmelt which creates numerous ephemeral and a few perennial streams. Typical intermountain vegetation along these waterways is comprised of cottonwoods (Populus spp.), willows (Salix spp.), dogwood (Cornus spp.), wild rose (Rosa spp.), birch (Betula spp.), chokecherry (Prunus spp.), and alder (Alnus spp.) (Links 241, 244, 245, 261, 267, 291, 292, and 620). A unique variety of swamp cedar (Juniperus scopulorum) exists in three known locations including the White River Valley (Link 670) and Spring Valley (Link 380). Climate and elevation will determine which species are present.

Wetlands - Wetlands are also present in the form of marshes and wet meadows within portions of the study area, primarily at lower elevations.

Other Natural Land Cover - Other categories of land cover that have been identified by satellite imagery are natural bare soils and playas. Natural bare soils occur along valleys, in dry areas, dunes, and those areas where vegetation is very sparse. Playas are dry lake beds, often with high mineral content. A majority of the playas are located in Utah with a few scattered in Nevada (e.g., Links 190, 223, 230, 490, 500, 510, 520, 572, 290). None of the links are exclusively within a playa.

Wildlife

Approximately 560 species of vertebrates are likely to occur, over the course of a year, in habitats traversed by alternative corridors. These species are listed in Tables BIO-10 - BIO-15 of the technical reports (refer to Appendix H for the locations where technical reports can be reviewed).

Seventy species of fish are known to occur within aquatic habitats in the project area (refer to Tables BIO-10 - BIO-12 of the technical reports). Native and introduced game fish are present in warm and cold water lakes, ponds and reservoirs, and in perennial streams and rivers. Others inhabit hot and cold springs, and marshes. Approximately 31 percent of the fish fauna occupying waters in the project area are introduced.

Fifteen species of amphibians are expected to occur in aquatic, riparian, and wetland habitats in the project area. Sixty-two species of reptiles potentially occur in terrestrial habitats within the study corridors (refer to Table BIO-13 of the technical reports).

The Biological resources technical report (Table BIO-14 of the technical reports) lists 316 species of birds that potentially occur within habitats in the project area. Of these 109 are most likely to occur in lower elevation swamp/slough areas and 109 (some overlap) are riparian species. Grasslands are habitat for approximately 62 different species and the sagebrush community hosts 81 species. Approximately 71 of the 316 bird species are permanent residents of the area and 143 are summer breeding residents. The remainder are likely to occur only during spring and/or fall migration periods, with a few winter residents.

A total of 111 species of mammals are expected to occur within habitats traversed by the alternative routing corridors of the SWIP (refer to Table BIO-15 of the technical reports). Small mammals including rodents, lagomorphs (rabbits and hares), bats, and shrews are the most numerous, although not readily observed. Over one half of the mammals that may occur in the project area are rodents (51 species). Large mammals include 19 species of carnivores and five species of native ungulates.

Approximately 34 species of vertebrates are not native to the region, introduced through accidental or intentional human activities.

Wild Horses and Burros - Free roaming horses (Equus caballus) and burros (E. asinus) occur on public lands in the project area. These animals are descendants of horses and burros that escaped from man or were turned out onto the open range. None occur within the study corridors.

Desert Tortoise - In recent years, dramatic declines in tortoise population numbers have been observed throughout much of its range, including southern Nevada. A number of factors have contributed to the observed decline including disease, loss of habitat to development, degradation of habitat from livestock grazing, predation on juveniles by ravens attracted to areas where human refuse accumulates, illegal collection, and off-road vehicle (ORV) use. The Mojave population of the desert tortoise was formally listed as a federally threatened species by the FWS in April 1990. Concern has been expressed for the maintenance of viable

populations in Clark County, Nevada, and especially the Las Vegas Valley where rapid commercial and residential development is occurring. As a result of these urban developments affecting desert tortoise, a Habitat conservation Plan is being developed to minimize, monitor, and mitigate impacts to tortoises in the larger Clark County region. The plans currently identify the Coyote Spring valley as a priority area for preservation of the species (Regional Environmental Consultants 1991). Desert Tortoise do not occur in Idaho or in the Utah portion of the SWIP.

Sage Grouse - Declines in sage grouse numbers are largely associated with destruction of sagebrush habitat. Conversion of sagebrush to agricultural lands, and attempts to convert sagebrush areas to grassland for livestock grazing are a few of the human developments contributing to the decrease in grouse numbers. There has been concern expressed by state and federal agency biologists for other activities that would further impact the sage grouse populations.

Aquatic/Riparian Habitats

Idaho - Important aquatic/riparian habitats traversed by SWIP alternatives or located in close proximity to project alternatives including the Snake River, Salmon Falls Creek and reservoir, Little Wood River, Deep Creek, Cottonwood Creek, Goose Lake, Wilson Lake Reservoir, and Deep Creek Reservoir.

Nevada - Aquatic/riparian habitats traversed by SWIP alternatives or in close proximity to project alternatives include the Humboldt River and tributaries, Salmon Falls Creek, Trout Creek, Shoshone Creek, Thousand Springs Creek, Bishop Creek and Reservoir, Duck Creek, Steptoe Creek and associated springs, Bassett Lake, Spring Valley Creek, the White River, Ellison Creek, Forest Home Creek, Whipple and Tule Field Reservoirs and Goshute Creek.

Several wetland areas traversed by SWIP alternatives serve as nesting and wintering grounds for waterfowl and bald eagles. These occur in areas of Spring Valley, Steptoe Valley, White River Valley and Bassett Lake. Wetlands associated with Bassett lake are nesting habitat for white-faced ibis, long-billed curlew, and sandhill crane.

Natural springs and streams which are habitat for a number of sensitive fish species include Goshute Creek, Duck Creek, and associated springs of Steptoe Valley, Spring Valley Creek , and associated springs of Spring Valley, the White River, and springs of White River Valley and Town Creek.

Utah - Significant aquatic/riparian habitats that occur within SWIP alternatives in Utah include the Sevier River and tributaries, Sevier Lake, Topaz Slough, Crafts Lake, Baker Creek, Jensen Spring, Rocky Knoll Spring, Coyote Spring, Gandy Salt Marsh lake, Leland-Harris Spring Complex, and Miller Spring.

Leland-Harris Spring Complex and Miller Spring occur within several miles of Link 63 in Snake Valley. These areas are habitat for four sensitive species: the desert dace, least chub,

spotted frog, and Great Basin silver spot butterfly. The latter three are candidates (Category 2) for federal listing as threatened or endangered.

Special Status Species - Plants

Seventy plant species, which occur or potentially occur along proposed corridors, have been identified as sensitive on the state and/or federal level (refer to Tables BIO-16, 17, and 18 in the technical report). There are no known plant species occurring within the SWIP proposed corridors that are presently listed as threatened or endangered on the federal level. Candidate species in the area include two that are Federal Category 1 (C1), 33 are Federal Category 2 (C2), and 35 are recommended for deletion Federal Category (C3). C1 means that substantial information exists to support proposing the species for listing as threatened or endangered, and a listing proposal is being or will be prepared. C2 indicates that listing of a species may be appropriate when additional information is gathered. The C3 category means that species that were once considered for listing are no longer being considered.

The listing used was the Federal Register 50 CFR Part 17, Wednesday, February 21, 1990. Most are found on at least one state list of species of concern. Although many of the species are not legally protected by the Endangered Species Act, they are protected by federal agency policies and regulations.

Known locations of 31 of the 70 plant species occur along, or within one mile, of alternative routes. The low number of known plant locations in the area is more likely a function of the lack of field research and does not preclude the existence of additional species.

Idaho - Sixteen sensitive plant species have been identified as occurring or potentially occurring within the proposed SWIP corridors in Idaho. According to the most recent data available, none of these species are currently listed as threatened or endangered on the federal level. Of the sixteen species, three are federal Category 2 and one is C3. The State of Idaho identifies various levels of sensitivity as discussed below. Table BIO-16 in the Technical Report lists these 16 plants.

Three plants are classified as C2 on the federal level. One species of milk-vetch, Mulford's milk-vetch (Astragalus mulfordiae), is known from several counties, including Owyhee County (Moseley and Groves 1990). It grows on well-drained, deep, sandy soils on south-facing slopes (Rosentreter 1990). Davis' peppergrass (Lepidium davisii) occurs along internally drained, hard-bottomed playas. These playas are often used for stock watering ponds and race tracks. Montane peppergrass (L. montanum var. papilliferum), known from Owyhee County can tolerate harsh conditions where other plants are unable to take root (Rosentreter 1990).

The categories utilized to identify state sensitive species are defined by The Idaho Native Plant Society. One species, wovenspore lichen (Texosporium sancti-jacobi), is considered state priority 1. It is part of an effort to identify rare non-vascular plants in Idaho (Moseley and Groves 1990). Only recently found in Idaho, it grows on decomposed grasses and on the underside of very old rabbit pellets where humidity is high (Rosentreter 1990).

Two-headed onion (Allium anceps), four-wing milk-vetch (Astragalus tetrapterus) and dimersia (Dimersia howellii) are listed as State Priority 2. Two-headed onion requires moist habitat and areas that are inundated in the spring. Four-wing milk-vetch is found in association with piñon-juniper at elevations of 3,500 to 6,500 feet. It is known from one site in Twin Falls County, Idaho and is being threatened by off-road vehicles and trampling. Dimersia is known from a limited number of sites in Owyhee County.

Owyhee morning milk-vetch (Astragalus atratus var. owyheensis) is a state sensitive species. Generally found on steep hillsides and flats over basalt, it is often entangled under sagebrush. Threats include range improvement and agricultural development. Other state sensitive species are Torrey's blazing star (Mentzelia torreyi var. acerosa); Webber's needlegrass (Stipa webberi), which also may be more common than previously known (R. Moseley 1990); and, thistle milk-vetch (Astragalus kentrophyta var. jessiae), known from a limited number of sites in southern Idaho.

Two species being monitored at the state level are Murphy milk-vetch (Astragalus mulfordiae) and white eatonella (Eatonella nivea).

Two species are Category 3. Picabo milk-vetch (Astragalus oniciformis), a BLM sensitive species that may be extinct, and Murphy milk-vetch (A. camptopus), found in arid, sandy soils of southeastern Idaho in association with shadscale (Clark 1989). A primrose (Primula cusickiana), is currently undergoing taxonomic review and has no status at this time.

Nevada - Forty-five plant species in Nevada that have been identified by various agencies as requiring special consideration (Table 17 in the Technical Report). Status information on the state level is from "Endangered, Threatened and Sensitive Plants of Nevada" updated February 13, 1989. There are no federally-listed threatened or endangered plant species known to occur or potentially occur within the proposed SWIP corridors in Nevada.

Monte Neva paintbrush (Castilleja salsuginosa) is a Category 1 species and critically endangered on the state list. It is found at Monte Neva Hot Springs in Steptoe Valley. Sand-loving buckwheat (Eriogonum argophyllum) is listed as Category 1 on the federal level, and critically endangered on the state level. It is located in the Ruby Valley area (Lindsey 1989).

Clokey milk-vetch (Astragalus aequalis) is a C2 species, recommended as threatened by the Northern Nevada Native Plant Society (NNNPS). It is found on gravelly hillsides and ridges at elevations ranging from 5,900 to 8,400 feet. Smooth stickleaf (Mentzelia mollis) is a C2 species, recommended for deletion by NNNPS. Three-cornered pod Geyer milk-vetch (Astragalus triquetrus) is a C2 species, listed as threatened by NNNPS (1989) and critically endangered by the State of Nevada. It grows in sandy soils on dunes or in washes. Known locations are along the southern extension in the Dry Lake Valley.

There are 16 species on the federal Category 2 list, which are also on the NNNPS watch list. Exact locations for most of these are unknown, although habitats supporting known populations are similar to those traversed by proposed SWIP corridors. Therefore, the potential for occurrence of several different species of concern exists. Sunnyside green gentian (Frasera gypsicola), a C2 species, is a mound-forming plant found within remnant playas. Known locations include White Pine and Nye counties. Welsh's catseye (Cryptantha

welshii) is the C2 species with the highest potential for occurrence (Walker 1989). It has been located in Jake's Valley and is likely to be found within one mile of the proposed corridor due to similar habitat types.

Those Category 2 species with moderate potential for occurring along proposed corridors include maguire lewisia (Lewisia maguirei) and Blaine's pincushion (Sclerocactus blainei). Maguire lewisia is found on loose soils associated with piñon-juniper at elevations of 7,500 to 7,800 feet. Blaine's pincushion is currently not well documented. It is found in association with greasewood-shadscale. The Cactus and Yucca Law would apply to any found in the affected area. Jan's catchfly (Silene nachleringae), another newly described species, is found at elevations above 9,500 feet with subalpine vegetation.

Long calyx milk-vetch (Astragalus oophorus var. lonchocalyx) has low to moderate potential for occurrence (Walker 1989). It is located on dry, gravelly hillsides in association with piñon-juniper and sagebrush.

There are five species with low potential for occurrence. Eastwood milkweed (Asclepias eastwoodiana) is found on low alkaline clay hills away from other plants. Peck station milk-vetch (Astragalus eurylobus) grows in semi-badland sites with Utah juniper and black sagebrush. Currant milk-vetch (A. uncialis) is found on dry knolls and slopes at elevations of 5,300 to 6,050 feet. Sheep fleabane (Erigeron ovinus) grows on rocky outcrops at elevations exceeding 6,500 feet. Tuffed globemallow (Sphaeralcea caespitosa) is found on gravelly limestones with mixed shrub and piñon-juniper grass communities.

Seven additional C2-listed species, include several which are newly described making it difficult to discern the actual sensitivity of the species. The following descriptions are based on available information. Elko rock-cress (Arabis falcifructa) is found in barren or sparsely vegetated areas in Elko County and is of concern in the Wilkins area (BLM 1990). Grouse Creek rock-cress (A. falcatoria), also in Elko County, is found in high elevation coniferous forests. Goose Creek milk-vetch (Astragalus anserinus) is located in Elko County on undeveloped soils along Goose Creek and at Thousand Springs (BLM 1990). Broad fleabane (Erigeron latus) is found on gravelly or rocky hillsides, not enough is known about this species to make definite statements about its sensitivity (USDI, BLM 1989). Arching pussytoes (Antennaria arcuata) grows in meadows that are not permanently wet and in riparian areas. Lewis buckwheat (Eriogonum lewisii), is known on gravelly steep slopes. Barren valley collomia (Collomia renacta) is found in "badland areas" and is of concern in the Pequop Summit area (BLM 1990).

Six C2 species exist which may occur on the southern extension to Las Vegas. Merriam or white bear poppy (Arctomecon merriami), found on shallow gravelly soils, it is threatened by land development. Golden bear poppy (A. californica), considered critically endangered by the State, is found in gravelly desert flats in association with creosotebush. Alkali mariposa (Calochortus striatus) is found in alkali meadows in association with saltgrass. Beaverdam breadrood (Pediomelum castoreum), recently listed (January 1992) is known to occur in sandy gravels of the Mojave Desert. It is known to occur along Kane Springs Wash (Link 680). Two subspecies of penstemon (Penstemon bicolor var. bicolor, P. bicolor var. roseus) occur next to the Dry Lake substation site in the Dry Lake Valley. Both are known from

shallow, gravelly soils and appear to survive in disturbed areas (Mozingo 1980). The first variety is a watch species; the latter is recommended for deletion on the state level.

Blaine's pincushion, Clokey pincushion (Coryphantha vivipera var. rosea), and Great Basin fishhook (Sclerocactus pubispinus) are the three species of cactus specifically listed. All species of cactus and yucca are protected by The Cactus and Yucca Law, Nevada State Law (Revised Statutes 527). There are known populations of Great Basin fishhook along several of the links in the eastern part of the state. The proposed corridors may cross some healthy populations of cactus or yucca.

Eleven of the species identified are listed as 3C on the federal level. Habitat descriptions are given in Appendix C.

Two tree species merit mentioning. Bristlecone pine (Pinus aristata) occurs in eastern Nevada, found on dry, rock slopes and ridges of high mountains at elevations exceeding 7500 feet. They are classed among the oldest known living plants and can provide important historical information. Additionally, a rare variety of juniper, known as swamp cedar (Juniperus scopulorum), occurs in White River Valley east of one link.

Utah - Thirteen species of sensitive plants that are known to occur, or have the potential to occur, within the proposed corridors of SWIP (Table 18 in the Technical Report). According to the most recent data available, none of these species are listed as threatened or endangered on the federal or state level.

Nine species are C2 on the Federal level. Compact catseye (Cryptantha compacta), recently downgraded from a C1 species, is found within Millard County in association with desert scrub and grassland. Sunnyside green gentian (Frasera gypsicola) is considered extremely rare globally and statewide. The taxonomy is undergoing revision and may also be referred to as White River swertia (Swertia gypsicola) (Young 1989). Known locations include Millard County. Sand-loving buckwheat (Eriogonum ammophilum), associated with desert scrub, most likely occurs within the SWIP corridors. Frisco clover (Trifolium andersonii var. friscanum) is an S1 (S3) species, with this particular subspecies considered rare. It is found at elevations of 7,000 to 7,500 feet in association with piñon-juniper in Millard County.

Known locations of currant milk-vetch (Atragalus uncialis) exist near Delta, Utah. This species is found on dry knolls and slopes in limestone derived soils. Depressed bitterweed (Hymenoxys depressa) is undergoing taxonomic recombination resulting in a more extended range than previously defined (Boyce 1989.) It is found in association with black sagebrush. Tunnel Springs beardtongue (Penstemon concinnus) is known to occur in Millard County, although it may be south of proposed corridors. Jones globemallow (Sphaeralcea caespitosa) has been identified as occurring within a proposed corridor (USDI, BLM 1989). It is found on calcareous soils in association with mixed shrub and piñon-juniper communities at elevations of 5,000 to 6,500 feet.

The remaining five plants listed are categorized as 3C which indicates that they are no longer candidates for listing because they are more abundant than previously believed or have no federal status. They should still be taken into consideration, as the State of Utah lists several

of them as species of concern. Calloway milk-vetch (Astragalus callithrix) and terrace buckwheat (Eriogonum natum) are listed as S2. Their ranges include Millard County. Limestone buckwheat (E. eremicum) and Great Basin pincushion (Sclerocactus pubispinus) have not been ranked on the state level yet. Both are found in Millard County. Transmission lines are listed as a threat to limestone buckwheat, and harvesting for horticultural purposes threatens the Great Basin pincushion. Low beardtongue (Penstemon nanus) is found in Juab, Millard, and Toole counties.

Special Status Species - Wildlife

The FWS and the states of Idaho, Nevada, and Utah have all devised codes for defining the extent of rarity and level of threat to biotic taxa that are included on species lists maintained by each governmental entity. Definitions of these codes may be found in the technical reports. Concern for the species discussed below has been expressed by agencies contacted during the biological resource inventory.

Idaho - Federally-listed wildlife species known to occupy habitats within the study corridors include the bald eagle, (Haliaeetus leucocephalus) and peregrine falcon (Falco peregrinus anatum). Refer to Table BIO-19 in the technical reports for a list of special status wildlife species in the project area in Idaho.

Candidates for federal listing (Category 2) include one species of fish, the Shoshone sculpin (Cottus greenei) and five species of birds: long-billed curlew (Numenius americanus), ferruginous hawk (Buteo regalis), Swainson's hawk (Buteo swainsoni), Western yellow-billed cuckoo (Coccyzus americanus occidentalis), and white-faced ibis (Plegadis chihi). The spotted bat (Euderma maculatum) is the only candidate species of mammal known to occur in the project area in Idaho.

Species identified as sensitive or of concern to state agencies are sage grouse (Centrocercus urophasianus), burrowing owl (Athene cunicularia), and pronghorn (Antilocapra americana).

No specific locations of habitat for Swainson's hawk, yellow-billed cuckoo, white-faced ibis or spotted bat were identified within the study corridors. Although other species mentioned above occur within the SWIP study corridors, no specific locations of nests and/or crucial habitats were identified, with the exception of Shoshone sculpin and sage grouse strutting grounds.

Nevada - Federally-listed species identified within the study corridors include the desert tortoise (Gopherus agassizii), White River spinedace (Lepidomeda albivallis), bald eagle, and peregrine falcon. See Table BIO-20 in the technical reports for a detailed list of special status wildlife species in the project area in Nevada. The desert tortoise, bald eagle and peregrine falcon are included in the Biological Assessment being prepared for the SWIP.

Candidates for federal listing (Category 2) in the project area in Nevada include two butterflies, the Baking Powder Flat blue butterfly (Euphilotes battoides spp.) and Mattoni's blue butterfly (E. pallescens mattoni). Candidate fish species include: White River desert

shallow, gravelly soils and appear to survive in disturbed areas (Mozingo 1980). The first variety is a watch species; the latter is recommended for deletion on the state level.

Blaine's pincushion, Clokey pincushion (Coryphantha vivipera var. rosea), and Great Basin fishhook (Sclerocactus pubispinus) are the three species of cactus specifically listed. All species of cactus and yucca are protected by The Cactus and Yucca Law, Nevada State Law (Revised Statutes 527). There are known populations of Great Basin fishhook along several of the links in the eastern part of the state. The proposed corridors may cross some healthy populations of cactus or yucca.

Eleven of the species identified are listed as 3C on the federal level. Habitat descriptions are given in Appendix C.

Two tree species merit mentioning. Bristlecone pine (Pinus aristata) occurs in eastern Nevada, found on dry, rock slopes and ridges of high mountains at elevations exceeding 7500 feet. They are classed among the oldest known living plants and can provide important historical information. Additionally, a rare variety of juniper, known as swamp cedar (Juniperus scopulorum), occurs in White River Valley east of one link.

Utah - Thirteen species of sensitive plants that are known to occur, or have the potential to occur, within the proposed corridors of SWIP (Table 18 in the Technical Report). According to the most recent data available, none of these species are listed as threatened or endangered on the federal or state level.

Nine species are C2 on the Federal level. Compact catseye (Cryptantha compacta), recently downgraded from a C1 species, is found within Millard County in association with desert scrub and grassland. Sunnyside green gentian (Frasera gypsicola) is considered extremely rare globally and statewide. The taxonomy is undergoing revision and may also be referred to as White River swertia (Swertia gypsicola) (Young 1989). Known locations include Millard County. Sand-loving buckwheat (Eriogonum ammophilum), associated with desert scrub, most likely occurs within the SWIP corridors. Frisco clover (Trifolium andersonii var. friscanum) is an S1 (S3) species, with this particular subspecies considered rare. It is found at elevations of 7,000 to 7,500 feet in association with piñon-juniper in Millard County.

Known locations of currant milk-vetch (Atragalus uncialis) exist near Delta, Utah. This species is found on dry knolls and slopes in limestone derived soils. Depressed bitterweed (Hymenoxys depressa) is undergoing taxonomic recombination resulting in a more extended range than previously defined (Boyce 1989.) It is found in association with black sagebrush. Tunnel Springs beardtongue (Penstemon concinnus) is known to occur in Millard County, although it may be south of proposed corridors. Jones globemallow (Sphaeralcea caespitosa) has been identified as occurring within a proposed corridor (USDI, BLM 1989). It is found on calcareous soils in association with mixed shrub and piñon-juniper communities at elevations of 5,000 to 6,500 feet.

The remaining five plants listed are categorized as 3C which indicates that they are no longer candidates for listing because they are more abundant than previously believed or have no federal status. They should still be taken into consideration, as the State of Utah lists several

of them as species of concern. Calloway milk-vetch (Astragalus callithrix) and terrace buckwheat (Eriogonum natum) are listed as S2. Their ranges include Millard County. Limestone buckwheat (E. eremicum) and Great Basin pincushion (Sclerocactus pubispinus) have not been ranked on the state level yet. Both are found in Millard County. Transmission lines are listed as a threat to limestone buckwheat, and harvesting for horticultural purposes threatens the Great Basin pincushion. Low beardtongue (Penstemon nanus) is found in Juab, Millard, and Toole counties.

Special Status Species - Wildlife

The FWS and the states of Idaho, Nevada, and Utah have all devised codes for defining the extent of rarity and level of threat to biotic taxa that are included on species lists maintained by each governmental entity. Definitions of these codes may be found in the technical reports. Concern for the species discussed below has been expressed by agencies contacted during the biological resource inventory.

Idaho - Federally-listed wildlife species known to occupy habitats within the study corridors include the bald eagle, (Haliaeetus leucocephalus) and peregrine falcon (Falco peregrinus anatum). Refer to Table BIO-19 in the technical reports for a list of special status wildlife species in the project area in Idaho.

Candidates for federal listing (Category 2) include one species of fish, the Shoshone sculpin (Cottus greenei) and five species of birds: long-billed curlew (Numenius americanus), ferruginous hawk (Buteo regalis), Swainson's hawk (Buteo swainsoni), Western yellow-billed cuckoo (Coccyzus americanus occidentalis), and white-faced ibis (Plegadis chihi). The spotted bat (Euderma maculatum) is the only candidate species of mammal known to occur in the project area in Idaho.

Species identified as sensitive or of concern to state agencies are sage grouse (Centrocercus urophasianus), burrowing owl (Athene cunicularia), and pronghorn (Antilocapra americana).

No specific locations of habitat for Swainson's hawk, yellow-billed cuckoo, white-faced ibis or spotted bat were identified within the study corridors. Although other species mentioned above occur within the SWIP study corridors, no specific locations of nests and/or crucial habitats were identified, with the exception of Shoshone sculpin and sage grouse strutting grounds.

Nevada - Federally-listed species identified within the study corridors include the desert tortoise (Gopherus agassizii), White River spinedace (Lepidomeda albivallis), bald eagle, and peregrine falcon. See Table BIO-20 in the technical reports for a detailed list of special status wildlife species in the project area in Nevada. The desert tortoise, bald eagle and peregrine falcon are included in the Biological Assessment being prepared for the SWIP.

Candidates for federal listing (Category 2) in the project area in Nevada include two butterflies, the Baking Powder Flat blue butterfly (Euphilotes battoides spp.) and Mattoni's blue butterfly (E. pallescens mattoni). Candidate fish species include: White River desert

sucker (Catostomus clarki intermedius), White River speckled dace (Rhinichthys osculus spp.), Pahranagat speckled dace (R. o. velifer), Lahontan speckled dace (R. o. robustus), Preston White River springfish (Crenichthys baileyi albivallis), relict dace (Relictus solitarius), and Bonneville cutthroat trout (Salmo clarki utah).

One species of amphibian, the Arizona (southwestern) toad (Bufo microscaphus), and one species of reptile, the chuckwalla (Sauromalus obesus), are classified as a federal Category 2 species.

Category 2 bird species include long-billed curlew, ferruginous hawk, Swainson's hawk, western snowy plover (Charadrius alexandrius nivosus), western yellow-billed cuckoo, and white-faced ibis. The Fish and Wildlife Service (FWS) has received a petition requesting the listing of the ferruginous hawk as a threatened species. This species is included in the Biological Assessment being prepared for the SWIP.

Category 2 mammal species identified in the project area are the spotted bat (Euderma maculatum) , Desert Valley kangaroo mouse (Microdipodops megacephalus albiventer), Sierra Nevada red fox (Vulpes vulpes necatur), North American wolverine (Gulo gulo luscus), and North American lynx (Felis lynx canadensis).

Species classified as sensitive or of concern to state agencies include burrowing owl, sandhill crane (Grus canadensis), sage grouse, golden eagle (Aquila chrysaetos), Gambel's quail (Lophortyx gambelii), bighorn sheep (Ovis canadensis), pronghorn, elk, and mule deer (Odocoileus hemionus).

The breeding range of the loggerhead shrike occurs throughout the study area. The chuckwalla (Sauromalus obesus) is a resident of Mojave desertscrub communities. Chuckwallas prefer rocky hillside areas, particularly lava flows. Link 720 traverses chuckwalla habitat in the Arrow Canyon Range. Both species are Category 2 candidates for federal listing.

The burrowing owl is a species of concern to the Nevada Department of Wildlife. Burrowing owls occur in Mojave desertscrub habitat and, therefore, could occur on Links 690, 700, and 720. Burrowing owls often use desert tortoise burrows and could be found throughout all tortoise habitat.

No locations of habitat were identified within the SWIP study corridors for: Arizona toad, western snowy plover, yellow-billed cuckoo, white-faced ibis, Desert Valley kangaroo mouse, spotted bat, red fox, wolverine, lynx, White River springfish, White River spinedace, or Mattoni's and Baking Powder Flat blue butterflies.

Utah - Two federally-listed species occur in the project area in Utah, the bald eagle and peregrine falcon. Refer to Table BIO-21 in the technical reports for list of special status wildlife species in the project area in Utah.

A number of species are candidates for federal listing (Category 2). These include invertebrates such as the Great Basin silver spot butterfly (Speyeria nokomis nokomis) and a

Category 2 species of amphibian, the western spotted frog (Rana pretiosa). Category 2 fish species include the Bonneville cutthroat trout, and least chub (Iotichthys plegethontis).

Category 2 bird species occurring in Utah are the ferruginous hawk, Swainson's hawk, western snowy plover, western yellow-billed cuckoo, and white-faced ibis. Only one Category 2 mammal species, the spotted bat is known to occur in the project area in Utah.

Species identified as sensitive or of state concern include the golden eagle, pronghorn, and mule deer.

No specific locations of habitat were identified within SWIP corridors in Utah for bald eagle, peregrine falcon, Swainson's hawk, western yellow-billed cuckoo, white-faced ibis and spotted bat.

Alternative Routes - Midpoint to Dry Lake

Route A

Wildlife - From the Midpoint Substation to the Idaho-Nevada state line (Links 10, 20, 40, 41, 50, and 70) near Eden, Hansen, and Rogerson would traverse habitat for burrowing owls, long-billed curlew nesting populations, ferruginous hawks and pronghorn in Idaho. Sage grouse leks and wintering grounds would also be north of Jackpot, Nevada (Link 70).

Numerous links on the route segment from Jackpot to Robinson Summit would traverse crucial big game habitats including crucial pronghorn winter range from Jackpot to southwest of Wilkins (Links 72, 101, 102, 110, 130, 160, 161, 162), crucial mule deer winter range from Jackpot to Knoll Creek Area (Links 72, 101, 102, 110, 130) and Toano Draw and Goshute Valley (Links 200, 211, and 212), crucial pronghorn yearlong and summer habitat in the Steptoe Valley (Link 241), and pronghorn kidding grounds adjacent to Raiff (Link 291). Sage grouse leks and wintering grounds also occur on many alternatives (Links 72, 100, 110, 160, 161, 162, 1612, 200, 211, 212, 243, 291, and 293). Habitat for long-billed curlew and sandhill crane is encountered in Steptoe and Spring valleys (Links 241, 243, 245, 261, 270, 291, and 293). Bald eagle winter habitat occurs on numerous links along this route. An area of potential nesting habitat occurs where this route would cross Salmon Falls Creek Canyon (Link 72). Other species that occur on a limited number of links are Bonneville cutthroat trout in the Steptoe Valley (Link 241), relict dace (Links 241 and 291), and ferruginous hawk nests in the Egan Range (Link 293) on this route. Route A would follow an existing transmission line where the cumulative effects of raptor predation on sage grouse (Links 72, 101, 102, 110, 130, 160, 161, and 162) would be expected to be reduced. Route A, and all the other alternative routes (Midpoint to Dry Lake) would converge just north of Robinson Summit (Link 310).

From the Robinson Summit substation site south to the Dry Lake substation site, all the routes would follow the same links. A large number of ferruginous hawk nest sites occur on or near the route northwest of Riepetown (Link 340) and near Coyote Wash (Link 673). Other important raptor habitats include golden eagle nests and bald eagle winter habitat in

the vicinity of Gap Mountain (Link 672), burrowing owl nesting (Link 363), and crucial raptor (cliff nesting species) nesting areas in the Horse Range (Links 669, 670) and the vicinity of Gap Mountain (Link 672). Extensive areas of mule deer winter use and migration areas are encountered on this part of the route (Links 670, 672, and 673). Sage grouse leks are traversed by alternatives near the north end of White River Valley (Link 340 and 669).

Route A would traverse Mojave desert scrub vegetation in southern Nevada and would encounter habitat for bighorn sheep, desert tortoise, gambel's quail near Delamar Valley (Link 690), Pahranagat Wash (Link 690), Arrow Canyon Range (Link 670), and sandhill crane habitat (Links 690, 670).

Plants - Route A would cover approximately 314 miles (61 percent) of sage scrub and 108 miles (21 percent) of grassland. Sage scrub, as mapped, represents four identified communities: Great Basin sagebrush on the lower foothills, shadscale at low elevation saline basins, greasewood in saline soils, and samphire/iodine bush. Samphire/iodine bush is a unique plant community found where salt crystals form on the soil as a result of pooling water. Great Basin sagebrush is the most common, and is not highly sensitive. Grassland communities, characterized by cheatgrass brome and crested wheatgrass, are found largely ecotonal with other plant communities. Approximately, eight percent of the land that would be crossed is agricultural, including prime farmlands. The route would cross a small area of riparian (less than one percent) along 26 perennial streams which are crossed. Less than one percent of the route would traverse higher elevation piñon-juniper communities.

From Ely to the Dry Lake substation site, the route would traverse the northern portion of Delamar Valley (Link 690) through sage scrub, most likely blackbrush and other cooler, Great Basin desert scrub species. Where the route would pass the southern edge of Pahranagat Mountains, there is a distinct transition to Mojave desert scrub, characterized by creosote/bursage with some Joshua trees locally present. The route would cross approximately 56 miles (10 percent) of Mojave Desert Scrub.

Four plant species of concern occur along 1.3 miles of the centerline of Route A and four occur within one mile on either side of the centerline. In Idaho, four-wing milk-vetch (Astragalus tetrapterus) is found on the centerline east of Browns Bench (Link 70), and populations of two-headed onion (Allium anceps) occur on the centerline southwest of Eden (Link 41) and within one mile of centerline (Link 70). Both are Priority 2 in the State. In Nevada, Elko rock-cress (Arabis falcifructa), a Category 2 species, occurs within one mile of the route east of the Thousand Springs Valley (Link 162). In the Steptoe Valley less than one mile east of the route, Monte Neva Hot Springs (Link 291) provides habitat for monte neva paintbrush (Castilleja salsuginosa), a Category 1 species, critically endangered in the Nevada.

Three plant species occur on the route from the Ely area to Dry Lake substation site. One-leaflet Torrey milk-vetch (Astragalus calycosus var. monophyllidius), a watch species, is found on the centerline of the route through Jakes Valley (Link 670). A watch species called Meadow Valley range sandwort (Arenaria stenomeres) occurs on the route, and a Category 2 species called smooth stickleaf (Mentzelia mollis) occurs within the one mile of the route in the Arrow Canyon Range (Link 700). Penstemon bicolor, P. b. roseus and Astragalus triquestus are Category 2 candidate species which could occur on Links 690, 700, and 720.

Route B

Wildlife - From Midpoint Substation to Jackpot, Nevada, Route B is the same as Route A. South of Jackpot, this route would turn southeast through Trout Creek (Links 91, 92, 140, 141, 142, and 144) instead of paralleling the existing transmission lines south where it would encounter sage grouse leks. Route B route would encounter more sage grouse leks in Toano Draw (Link 200) and Goshute Valley (Links 221, 226), and again in the Steptoe Valley (Link 259) and Butte Valley (Link 280). Big game habitat on this route includes mule deer crucial winter range along the Toano Range and Goshute Mountains (Link 200, 222), and crucial summer habitat near Trout Creek (Link 91). Important raptor habitats include peregrine falcon winter habitat (Links 222, 224, and 226), bald eagle winter habitat (Links 259, 260), and ferruginous hawk habitat (Links 259, 260) and nest sites within the Butte Valley (Link 280). Habitat for long-billed curlew and sandhill crane would be encountered in Steptoe Valley (Links 259, 260, 270, and 261). An important water use area comprised of Antone Creek and surrounding springs is traversed by this route in Antone Pass (Link 280). The waters are important for wildlife, especially mule deer and sage grouse. From the Robinson Summit substation site to the Dry Lake substation site, Route B is the same as Route A.

Plants - Route B would traverse approximately 331 miles (64 percent) of sage scrub and 97 miles (18 percent) of grassland. Other plant communities crossed include agricultural land (8 percent), and less than one percent of both piñon-juniper and riparian areas. Twenty-seven perennial streams are crossed. The community types and vegetation described for Route A from the Robinson Summit substation site to the Dry Lake substation site also apply to Route B.

The four plant species of concern that occur along approximately 1.3 miles of the route include four-wing milk-vetch (Astragalus tetrapterus) east of Browns Bench (Link 70), two-headed onion - (Allium anceps) southwest of Eden (Link 41), One-leaflet Torrey milk-vetch (Astragalus calycosus var. monophyllidius) within the White River Valley (Link 670), and Meadow Valley range sandwort (Arenaria stenomeres) within the Coyote Spring Valley (Link 700). These species are identical to those discussed in Route A. One species that occurs in Nevada within the one mile zone adjacent to the Toano Range and Goshute Mountains (Link 222) is Great Basin fishhook (Sclerocactus pubispinus). Though it is a Category 3 species, it is protected by the Cactus and Yucca Law in Nevada.

Route C

Wildlife - From Midpoint Substation to north of (Link 200), Route C is the same as Route B. From the crossing of Interstate 80 (Link 211) to Dolly Varden (Link 230), Route C is the same as Route A. Link segment 250 is unique to Route C. Route C would traverse crucial pronghorn winter range in the Currie Hills (Link 250) and would also cross sage grouse leks and bald eagle habitat. From the North Steptoe substation site to the Dry Lake substation site, Route C is the same as described for Route A.

Plants - Route C traverses approximately 320 miles (63 percent) of sage scrub and 96 miles (19 percent) of grassland. Approximately eight percent of the area that would be crossed by

this route is agricultural. The remainder is less than one percent is piñon-juniper and less than one percent riparian. Twenty-three perennial streams would be crossed. Refer to Route A for a discussion of the communities and specific description of the Mojave desertscrub found south of the Pahranagat Mountains.

Plant species of concern occur along 1.3 miles of the centerline, as discussed in Route A. Species occurring within the one mile area are Castilleja salsuginosa (Link 291) near Monte Neva Hot Springs in Steptoe Valley, Allium anceps (Link 41) near Dry Gulch in Idaho, and Mentzelia mollis (Link 700) in the Arrow Canyon Range south of Ely.

Route D

Wildlife - From Midpoint Substation to just north of HD Summit, Route D is the same as Route A. From HD Summit to approximately Town Creek, Route D would follow an existing transmission line roughly parallel to U.S. Highway 93 (Link 167) and would traverse crucial pronghorn winter range southwest of Wilkins near Bishops Creek (Link 1611), sage grouse leks west of the Windermere Hills (Link 167) and near Interstate 80 east of Wells (Links 180), long-billed curlew habitat southeast of Wells (Links 180, 190), crucial deer winter range in Independence Valley (Link 180, 190), and in the Goshute Valley north of Dolly Varden (Link 230).

From Dolly Varden to the North Steptoe substation site (Link 241, 243, and 245), Route D would traverse antelope crucial summer range and antelope yearlong habitat. From the North Steptoe substation site to the Dry Lake substation site, Route D is the same as Route A.

Plants - Route D would traverse approximately 319 miles (62 percent) of sage scrub and 97 miles (19 percent) miles of grassland. Approximately eight percent of the land that would be crossed is agricultural. Other communities consist of less than one percent piñon-juniper and less than one percent riparian areas. Refer to Route A for a discussion of the communities and specific description of the Mojave desert scrub found south of the Pahranagat Mountains.

Plant species of concern occur along 1.3 miles of the assumed centerline, as discussed in Route A. Those within the one mile zone are also the same as those described for Route A (Links 41, 162, 291, and 700).

Route E

Wildlife - From Midpoint Substation to north of Interstate 80 (Link 200), Route E is the same as Route A. From north of Interstate 80 to the North Steptoe substation site (Links 221, 222, 224, 226, 259, 260, 261, and 270), Route E is same as Route B. From the North Steptoe substation site to the Dry Lake substation site, Route E is the same as Route C.

Plants - Route E would traverse approximately 320 miles (61 percent) of sage scrub and 116 miles (22 percent) of grassland. Agricultural lands constitute approximately 9 percent of the

land that would be crossed. Piñon-juniper and riparian communities constitute less than one percent of the land that would crossed. The route would cross 22 perennial streams. Refer Route A for a description of the communities and a description of the Mojave desert scrub found south of the Pahranagat Mountains.

Plant species of concern that occur along 1.3 miles of the route are identical to those discussed for Route A. Monte neva paintbrush (Castilleja salsuginosa) found near Monte Neva Hot Springs in Steptoe Valley (Link 291), smooth stickleaf (Mentzelia mollis) in the Arrow Canyon Range (Link 700), and two-headed onion (Allium anceps) near Dry Gulch (Link 41) in Idaho occur within the one mile the route. Great Basin fishhook (Sclerocactus pubispinus) appears adjacent to the Toano Range and Goshute Mountains (Link 222).

Route F

Wildlife - Route F would traverse west from Midpoint Substation (Links 61, 62). Near the Hagerman, the route would traverse habitat for burrowing owl, long-billed curlew nesting populations, and Shoshone sculpin. North and west of Hagerman, the route would traverse sage grouse leks, habitat for pronghorn and river otter at the Snake River (Link 62). Adjacent to the Hagerman Fossil Beds National Monument (Link 64), the route would also traverse several cooperative wildlife tracts that are managed for game birds, such as pheasant. Where the route would parallel Salmon Falls Creek Canyon, some long-billed curlew and burrowing owl habitat occurs.

From Jackpot, Nevada to north of Interstate 80 in Goshute Valley, Route F is the same as Route B. Then, the remainder of this route to Dry Lake substation site is the same as described for Route C.

Plants - Route F would traverse approximately 317 miles (60 percent) of sage scrub and 110 miles (20 percent) of grassland. Approximately 11 percent of the land that would be crossed by this route is agricultural. Other plant communities that would be crossed consist of less than one percent piñon-juniper and less than one percent riparian. Eight perennial streams would be crossed. Refer to Route A for a description of the plant communities a description of the Mojave desert scrub found south of the Pahranagat Mountains.

Plant species of concern occur along approximately 4.2 miles of the route. In Idaho, mourning milk-vetch (Astragalus atratus var. inseptus) occurs near Peters Gulch (Link 64), Lepidium davisii occurs from near Salmon Creek Falls Creek Reservoir (Link 64), two-headed onion (Allium anceps) east of Browns Bench (Link 70), and four-wing milk-vetch (Astragalus tetrapterus) adjacent to Salmon Falls Creek (Link 64, 70). In Nevada, one-leaflet Torrey milkvetch (A. calycosus var. monophyllidius) occurs in Jakes Valley (Link 670) and Arenaria stenomeres occurs in Coyote Spring Valley. Other species known to exist within the one mile corridor are Torrey's blazing star (Mentzelia torreyi var. acerosa) northwest of Hagerman (Link 62), Davis peppergrass (M. mollis) in the Coyote Spring Valley and Arrow Canyon Range (Link 700), and Owyhee mourning milkvetch (Astragalus atratus var. owyheensis) adjacent to Salmon Falls Creek (Link 64).

Route G

Wildlife - From Midpoint Substation to Jackpot, Nevada, Route G is the same as Route A. Route G would cross Salmon Falls Creek through the foothills west of Jackpot (Links 711, 714) and would traverse sage grouse leks and wintering grounds, crucial pronghorn and mule deer winter habitat, and bald eagle nesting and winter habitat.

From Jackpot to the Robinson Summit substation site, Route G is the same as Route A, except Route G uses Links 713 and 715 near Contact Nevada and Links 150 and 151 near Wilkins. Wildlife habitats the would be traversed are essentially the same as those which occur on Links 72, 101, and 102 as described for Route A. In Thousand Springs Valley (Links 150, 151), the route would traverse two sage grouse leks, skirt the edge of another sage grouse lek buffer, and cross an area of pronghorn winter range. From the North Steptoe substation site to the Robinson Summit substation site, Route G is the same as Route B.

From Robinson Summit substation to Dry Lake wildlife habitats traversed by Links 363 through 700 are the same as those discussed for these links on Route A.

Plants - Route G would traverse approximately 312 miles (62 percent) of sage scrub and 97 miles (19 percent) of grassland. Other plant communities the would be crossed include approximately 16.8 miles (3 percent) of agricultural land, less than one percent piñon-juniper at higher elevations, and less than one percent riparian. The route would cross about 78 miles (16 percent) Mojave desert scrub along the southern portion. Plant communities and vegetation types are the same as those described for Route A.

The four plant species of concern that occur along approximately 1.3 miles of the route include four-wing milk-vetch (Astragalus tetrapterus) east of Browns Bench (Link 70), two-headed onion - (Allium anceps) southwest of Eden (Link 41), One-leaflet Torrey milk-vetch (Astragalus calycosus var. monophyllidius) within the White River Valley (Link 670), and Meadow Valley range sandwort (Arenaria stenomeres) within the Coyote Spring Valley (Link 700). These species are identical to those discussed in Route A. Elko rock-cress, a Category 2 species, occurs within one mile of the route in the Thousand Springs Valley (Link 151).

Alternative Routes - Ely to Delta

Direct Route

Wildlife - The Direct Route would originate from the North Steptoe substation site, crosses the Schell Creek Range and continue past the Red Hills to a point south of the Little Hills (Links 262, 263, 265 and 266). This route would cross near areas of ferruginous hawk, long-billed curlew, bald eagle habitat, sage grouse wintering grounds, and lek and crucial pronghorn winter range.

Where this route would traverse the Snake Valley (Link 630), sensitive aquatic/wetland habitats are encountered. One of these, the Leland-Harris Spring Complex is inhabited by

least chub, desert dace, and spotted frog. Wetland areas associated with this spring complex are also habitat for the Great Basin silver spot butterfly. Crucial deer winter habitat would be traversed by this route in the House Range (Link 630). Crucial mule deer winter habitat and a migration corridor would also be encountered in the Drum Mountains (Links 630, 650). The route would traverse pronghorn habitat north of Sugarville (Link 582) at the Intermountain substation site.

Plants - The Direct Route would traverse a mosaic of sage scrub for approximately 83 miles (64 percent) and grassland communities for 27 miles (20 percent). The route would cross approximately 21 miles (16 percent) of playa in Utah. No sensitive plant species are known to occur within the one mile the route.

Cutoff Route

The Cutoff Route is the same as the Direct Route from the North Steptoe substation site to just south of the Little Hills. The route would then continue southwest across the Snake Valley (Link 266).

Wildlife - A number of raptor nesting areas would be traversed by this route including golden eagle nest sites within the Snake Valley (Link 268) and Tule Valley (Link 462). Ferruginous hawk nests also occur in the Tule Valley (Link 462). Crucial water Mule deer winter range and migration corridors occur in the Confusion Range and Middle Range (Link 462) and a mule deer migration corridor is traversed in the Congor Range (Link 268). Other important wildlife habitats include critical pronghorn habitat and crucial water use areas in the Snake Valley (Link 268). The route would traverse pronghorn habitat west of Smelter Hills (Links 571) and north of Sugarville (Link 582) at the Intermountain substation site.

Plants - The Cutoff Route would traverse a mosaic of sage scrub for approximately 101 miles (66 percent) and grassland communities for 34 miles (22 percent). The route would cross approximately 18 miles (12 percent) of playa in Utah. No sensitive plant species are known to occur along within the study corridor.

230kV Corridor Route

Wildlife - The 230kV Corridor Route would originate form the Robinson Summit substation site and parallel a 230kV transmission line east toward Ely, Nevada (Link 350). The route would traverse sage grouse leks and wintering grounds northwest of Ely (Links 350, 351, and 352) and at the southern end of the Schell Creek Range (Link 380). Ferruginous hawk nests and long-billed curlew habitat occur on in the Steptoe Valley (Link 351, 352, and 370). From east of the Nevada-Utah state line (Link 460), this route is the same as described for the Cutoff Route.

Plants - The 230kV Corridor Route would traverse a mosaic of sage scrub for 104 miles (65 percent) and grassland communities 37 miles (23 percent). In Utah, the route would cross

approximately 14 miles (9 percent) of playa. No sensitive plant species are known to occur within the one mile of the route.

Southern Route

Wildlife - The southern route exits the Robinson Summit substation site from the south and follows the west side of the Egan Range. Ferruginous hawk nest sites are encountered along Link 340 northwest of Riepetown and at the north end of the Fortification Range on Link 420. Sage grouse leks occur at the north end of White River Valley (Link 364) and in Spring Valley (Link 420). Long-billed curlew habitat is encountered where Link 420 traverses Steptoe Valley. Other important habitats include a crucial water use area (Link 364) and critical pronghorn habitat near the Nevada-Utah state line (Link 450). From here Link 571 through 582 are the same for both the 230kV corridor and the Southern Route.

Plants - The Southern Route would traverse predominately sage scrub for approximately 154 miles (73 percent) with grassland intermingled for 27 miles (13 percent). Approximately 22 miles (11 percent) of the route would cross areas of playa.

Five species that are known to occur along the route are:

- Great Basin fishhook (Sclerocactus pubispinus) along the southern end of the Snake Range (Link 430)
- compact catseye (Cryptantha compacta), sand-loving buckwheat (Eriogonum ammophilum), and low beard tongue (Penstemon nanus) at the southern tip of the Tule Valley (Link 451)
- currant milkvetch (Astragalus uncialis) located in the Swasey Wash (Link 490)

Populations of species that occur within the one mile corridor include Great Basin fishhook, currant milk-vetch, Jones globemallow (Sphaeralcea caespitosa), limestone buckwheat (Eriogonum eremicum), Calloway milk-vetch (A. callithrix), and terrace buckwheat (E. natum).

HUMAN ENVIRONMENT

Land Use Resources

Introduction

The SWIP routing alternatives pass through a variety of landscapes and predominant land uses within the states of Idaho, Nevada, and Utah. These landscapes include:

- agriculture and range lands in the Snake River Valley of Idaho
- sage scrub and grasslands in flat to slightly rolling basins, forested mountains, and desert valleys in eastern and southern Nevada
- rugged, rocky mountain ranges and wide, flat desert basins in central Utah

Land uses encountered along routing alternatives include farms and ranches, rural residences, mines and mining claims, grazing allotments and range improvements, energy and communication facilities, transportation systems, and recreation areas. There are also a number of developed recreation facilities such as campgrounds, day use areas and picnic areas, boat launches, public and private parks. Dispersed recreation occurs through the study area, with activities such as hiking, biking, fishing, hunting, camping, sightseeing, and off-road vehicle use.

The communities of Ely and Wells, Nevada, are the only incorporated areas identified within the study corridors. Unincorporated communities and population centers identified include:

- Hansen, Hagerman, Kimberly, and Rogerson in Idaho
- Jackpot, Contact, and Currie in Nevada
- Eskdale, Abraham, and Hinckley in Utah
- rural agricultural areas, residential subdivisions, and communes

All the tables cited in this section are located at the end of the chapter. The technical report contains detailed narratives and data tables that locate and describe specific land uses along each of the alternative study corridors (refer to Appendix H for the locations where technical reports can be reviewed).

Methods

The purpose of the land use inventory was to identify, map, describe, and document the existing, planned, and designated land uses within the vicinity of the routing alternatives. Inventory data were collected within study corridors, three miles on either side of the assumed centerlines of each of the routing alternatives. The inventory data were compiled to facilitate assessing potential land use impacts from the construction, operation, and maintenance of the proposed 500kV transmission line.

Land use data were initially collected and mapped during the regional environmental study at a scale of 1:500,000 from available secondary existing sources, including maps, resource management and planning documents . Satellite imagery was used to establish landcover and verify land uses. The SWIP regional environmental study was completed in 1988 as part of public and agency scoping and identifying alternatives for the SWIP (refer to Chapters 2 and 5). Key federal, state, and local land and resource management agencies contacted

during the regional study were again contacted to inform them of the EIS studies and to obtain detailed data. Detailed data collected were compiled and mapped at a 1:100,000 scale within the study corridor. The data were digitized into Dames & Moore's GIS to facilitate analysis, the impact assessment and mitigation planning process, and documentation.

The land use resources study was divided into five major components to document surface land uses, legislative designations, and land management policies that occur within the alternative study corridors:

- land jurisdiction
- existing and planned land uses
- parks, recreation, and preservation areas
- transportation and access
- mining claims and extractive uses

Results

Land Jurisdiction - The three major categories of land jurisdiction inventoried within the alternative study corridors are listed below. The agency, owner, or other entity that owns or administrates the lands are listed under these three categories:

- Federal
  - Public land BLM
  - National Forest (Forest Service)
  - National Park Service
  - US Department of Defense withdrawals
  - Bureau of Reclamation withdrawals

- State
  - Idaho trust lands
  - Utah trust lands

- Other
  - Incorporated area (city or community)
  - Unincorporated area (county)
  - Private (county)

The mileages of BLM, Forest Service, state, and private land jurisdictions are summarized by route in Table 3-1. Also, refer to the Land Jurisdiction maps in the accompanying Map Volume. The mileage of each county crossed by each alternative route is listed in Table 3-2. In addition, refer to the technical reports for detailed land jurisdiction along each of the alternative routes (refer to Appendix H for the locations where technical reports can be reviewed).

Existing and Planned Land Uses - Some important existing land uses that occur in the study corridors include agriculture, mining, airports and airstrips, utilities, commercial,

governmental, and industrial facilities. Residential uses inventoried included all dwellings, occupied and unoccupied, within the alternative study corridors.

Residential uses were identified throughout the region, but generally occur in greater concentrations along major transportation corridors (e.g., U.S. Highway 93, Interstate 80, etc.) and in agricultural areas. Residences mixed with commercial and public uses were identified in the communities of Eden, Hagerman, and Hansen in Idaho and Jackpot, Wells, Currie, McGill, and Ely in Nevada. Trailer parks in Hinckley and other dispersed rural residences were identified near Southerland, Abraham, and Sugarville in the vicinity of Delta, Utah.

The dominant land use within the alternative study corridors is livestock grazing. The majority of public lands in Idaho, Nevada, and Utah are managed by the BLM for range uses. Throughout the region there is evidence of range management including clearing of sage scrub and piñon-juniper woodland to promote grasses, pasture and allotment fencing, seeding, and prescribed burning. In addition, there are numerous range improvements such as water distribution devices and facilities, fences, wells, water tanks and guzzlers (water collection device), corrals, and windmills. The BLM has divided range lands in the region into grazing allotments to facilitate the management of the land for public livestock grazing. The grazing allotments crossed by the alternative routes are listed in Table 4-3. Much of the private and state trust lands are also open range. In addition, viable and nonviable rangelands were interpreted using the Thematic Mapper satellite imagery. The term "viable" refers to landcover types containing vegetation types that would produce forage species for grazing. Each of the thirteen classes of landcover, from satellite mapping and data obtained in the inventory, were evaluated for their ability to provide forage vegetation. Of these classes, agriculture, lava, and playa were considered "nonviable" land covers for the production of forage vegetation.

Approximately half of the lands crossed by the alternative routes in Idaho are actively cultivated. The high desert plateau of the Snake River Valley is fertile and productive when irrigated. Typically, the potential impacts that could result from a transmission line in agriculture lands consist of conflicts with irrigation systems, and farm equipment. Center pivot, wheel line, and hand line irrigation systems are all used in southern Idaho. The majority of the agricultural lands inventoried in Idaho are classified as prime or important farmland by the SCS (refer also to Soils under Earth Resources).

Agriculture lands in Nevada are sparse and dispersed. They are typically located adjacent to perennial streams and rivers in the middle of basins and valleys or at the base of mountain ranges where natural runoff or springs provide irrigation water. Prime farmlands in Nevada inventoried within the alternative routes are located east of Jackpot near the WD Ranch, in Clover Valley in the vicinity of Wells, in Goshute Valley south of Oasis, and in Steptoe Valley north and south of Ely. Throughout the agricultural lands in Idaho and in the vicinity of Delta, Utah, herbicides and pest controls are applied by aerial crop spraying operations, seasonally.

The FAA manages the airspace in the vicinity of all air facilities (e.g., airports, registered airstrips) to control potential obstructions to aircraft operations. The land use inventory identified four types of air facilities within six miles of the assumed centerlines of the alternative study corridors:

- public airports
- private airstrips
- utility airstrips
- abandoned airstrips

Air facilities identified within the study corridors in Idaho include a private utility airstrip southwest of Hagerman, Idaho (Link 64), and several unimproved airstrips (fields) used by aerial spraying operations. There is a private airstrip located west of Caliente, Nevada, at the southern end of Delamar Valley (Link 671) within one mile of the assumed centerline. Another private airstrip was identified in the Delamar Lake bed in the southern portion of Delamar Valley (Link 690).

There is a linear graveled area overgrown with sage adjacent to Interstate 80 just southeast of Oasis, Nevada (Link 223), that appears to be an abandoned airstrip. However, the Elko District of the BLM has no record of this area being used as an airstrip. A similar linear feature was identified northwest of Riepetown, Nevada (Link 300). This feature is indicated as "landing strip" on the USGS Mount Hamilton 1:100,000-scale metric series topographic map. However, according to the Ely District of the BLM, this area is used to stockpile highway paving materials.

The U.S. Air Force manages several large areas of airspace within the study corridors as military operating areas (MOAs) or Restricted Area (air space) used by military aircraft for flight and tactical training operations. Several of the Ely to Delta alternative routes would cross lands within MOAs in the Utah Testing and Training Range (UTTR) operated by Hill Air Force base (AFB) in west-central Utah. The above-ground-limit (AGL) varies in the UTTR. The AGL for the Restricted Area R-6405 (a portion of Links 610 and 630) is 100 feet, the Gandy MOA and Sevier A and B MOAs (Link numbers 222, 224, 226, 262, 461, 462, 451, 408, 470, 490, 590, 572, 580, 530, 520, 510, 550, 600, 571, 600, 630, 640, and 650) all have an AGL of 200 feet.

Nellis AFB in southern Nevada operates several MOAs that would be crossed by Midpoint to Dry Lake alternative routes including: Reveille MOA (Links 670, 671, 672, 673 and 674), Caliente MOA (Links 671, 673, 674, 675, 680 and 690), Elgin North MOA (Link 680) and Sally Corridor MOA (Links 680, 690 and 700). All of these MOAs have an AGL of 200 feet.

Linear Features - Linear facilities found within the study corridors in Idaho consist of existing electrical transmission lines, numerous sub-transmission lines and distribution lines, irrigation canals, roads and highways (also refer to Transportation and Access section), and other utility features. Idaho Power Company (IPCo) owns and operates two 230kV transmission lines and four 138kV transmission lines that would be crossed by Links 61 and 64. The IPCo Midpoint to Valmy 345kV transmission line is paralleled by Links 40, 50, 70, 72, 101, 102, 110, and 130. Links 70, 72, 101, 715, 110, and 130 also parallel the IPCo Upper Salmon to Wells 138kV transmission line. Three gas pipelines (Link 64) and two oil pipelines operated by Northwest Gas Company and Chevron (Links 41 and 64) would also be crossed.

In Nevada, linear facilities include a 69kV transmission line that cross the toe of the Schell Creek Range between Ely and Lages Station, a 230kV transmission line from Ely to Robinson Summit (Link 350), and two 230kV transmission lines that traverse the eastern edge of