INTRODUCTION

The potential environmental consequences (impacts) described in this chapter are based on the environmental effects that would result from the construction and operation of the transmission line along the alternative routes. The proposed action describes the proposed project design features, construction techniques, operational characteristics, and maintenance and abandonment procedures. The access requirements involved where and to what extent roads would have to be built or upgraded to construct and maintain the proposed project facilities for each routing alternative. Dames & Moore provided information on where existing roads were sufficient or would require upgrading, and where new access roads would have to be constructed. Potential vegetation clearing was also estimated.

The assumed centerline for the proposed action and alternative routes is approximately 2500-feet-wide. The proposed 200 feet right-of-way would be determined during engineering designs and would lie within this approximately 1/2 mile wide zone.

Impacts that would result from constructing and operating the proposed action and alternatives were determined by comparing these actions to the existing environment (described in Chapter 3). First the various types of impacts that could occur were defined and impact locations and intensity were identified. Impacts can be either direct or indirect, adverse or beneficial, and short- or long-term. Most of the impacts resulting from the Southwest Intertie Project (SWIP) alternatives would be adverse, direct, and long-term. Some of the socioeconomic impacts would be beneficial. Visual impacts and other impacts (e.g., biological, cultural, etc.) related to increasing the potential access into remote areas are considered indirect and long-term.

The impact locations and intensity were recorded by link number and milepost, and the impacted area described. In order to determine impact intensity, an "impact model" was developed for each resource classification using the same criteria:

- **resource sensitivity** - the probable response of a particular resource to project-related activities
- **resource quality** - the pre-project condition of the resource potentially affected
- **resource quantity** - the amount of the resource potentially affected
- **duration of impact** - the period of time over which the resource would be affected, measured as short-term (up to a few years) or long-term (life of the project and beyond)
- **time of year** - the season or period of time which the resource would be affected

Although the underlying criteria were conceptually the same for each model, characteristics of the criteria varied according to the characteristics of each resource. Applying the models to each route yielded qualitative levels of high, moderate, low or no-identifiable impacts:

**High Impact** - A high level of impact would result if the construction, operation, maintenance, or abandonment of the proposed project would potentially cause a significant or substantial adverse change or stress to an environmental resource(s).

**Moderate Impact** - A moderate impact would result if the construction, operation, maintenance, or abandonment of the proposed project would potentially cause some adverse change or stress (ranging between significant and insignificant) to an environmental resource(s).

**Low Impact** - A low impact would result if the construction, operation, maintenance, or abandonment of the proposed project would potentially cause an insignificant or small adverse change or stress to an environmental resource(s).

**No-Identifiable Impact** - No identifiable impact would be indicated where no measurable impact would occur to the specific resource(s) under investigation.

After the impact intensity, duration, and locations were identified, mitigation measures were examined to see if they could be effective in reducing either the intensity or duration of impacts. Mitigation for the proposed project included two types of programs: generic and selective. Generic mitigation consists of measures or techniques to which Idaho Power Company (IPCo) committed on a nonspecific, or project-wide, basis as part of its proposed project plan. Generic mitigation measures are listed in Table 4-1. Selectively committed mitigation measures, listed in Table 4-2, of measure(s) or techniques to which IPCo committed to on a case-by-case (or "selective") basis after impacts were identified and assessed. Mitigation measures can be applied individually to impacts or can be combined with other mitigation measures to reduce or even eliminate impacts. The impacts remaining after applying mitigation measures are termed residual impacts.

In some cases where impacts were low, or mitigation would not be effective, no mitigation was recommended. Where mitigation was warranted and would be effective, mitigation recommendations were made by the resource specialists to reduce or eliminate specific impacts.

Because the right-of-way grant for the selected route between Ely and Delta would be conveyed to Los Angeles Department of Water and Power (LADWP), mitigation commitments, generic and selective, for this route are conveyed in the same manner. A summary of the miles of committed mitigation for the environmentally, agency, and utility preferred routes are documented in Table 2-6.

Specific impacts for each resource are documented in the technical reports described in the introduction to Chapter 3. The technical reports are accompanied by data tables that indicate the location and description of specific resource features and values, the initial impact levels.
to these resources, the mitigation measure(s) recommended to reduce impacts, and the residual impacts expected following mitigation. The technical reports are available for public review (refer to Appendix H for the locations where technical reports can be reviewed). The environmental data, impact assessment, mitigation planning, and comparative data for substation and microwave facilities are located in Appendices E and F.

NATURAL ENVIRONMENT

Air Quality

Installation/Construction Emissions and Impact - The construction phase of the proposed SWIP includes installation of towers and construction of substations and series compensation facilities. Air quality concerns include fugitive dust and construction equipment exhaust emissions. Exhaust emissions from construction equipment include nitrogen oxides (NOₓ), carbon monoxide (CO), sulfur oxides (SO₂), hydrocarbons (HC), total suspended particulates (TSP), and fine pollutants from equipment usage. In addition, open burning of slash materials may be necessary in remote areas. Emissions from construction would be confined to daytime activity for the duration of the construction period. A ten-hour work day was assumed in this analysis.

Pollution emissions that occur during construction are generally exempt from Prevention of Significant Deterioration (PSD) review because the PSD requirements specifically exempt temporary increases in SO₂ and TSP emissions. Permit applications would need to be filed with the Nevada and Idaho Air Quality Boards and the Clark County Health Department for state review.

Operational Phase Emissions and Impacts - Principal air resource impacts associated with the operational phase of the transmission system would include dust and vehicle emissions during periodic maintenance checks or emergency repair activities.

For maintenance activities, potential effects to air quality would be associated with dust when accessing the transmission line. Effects from maintenance activities are expected to be very short in duration and would not significantly effect overall ambient air quality.

Mitigation - Because of potential impacts from construction activities, several measures may be necessary to mitigate particular impacts. Control technologies for dust control (e.g., watering and chemical stabilization) should be used. Watering is the most common, the least expensive, and is environmentally preferred. An effective watering program can reduce dust emissions up to 50 percent (EPA 1980). Using chemicals for long-term dust suppression can be used, but their cost and environmental effects to plants and animals can be detrimental factors. Thus, an effective watering program would be sufficient for dust control. Limiting traffic on dirt roads during construction would also help limit dust. Additional information on air quality effects and potential mitigation can be found in the Technical Report.
Earth Resources

Introduction

The issues of concern for earth resources regarding the construction of the transmission line include loss of soil and soil productivity, destruction of significant fossils, conflicts with mineral development, degradation of water quality, and possible scarring and increased erosion in landslide areas.

Methods

The following factors were considered during the impact analysis:

- type of impact
- sensitivity of the resource
- access level
- amount of impact
- duration of impact
- suggested mitigation measures to reduce impacts
- other proposed projects (cumulative impacts)

Initial impact levels were assigned to each of the potentially affected resources using computer models and the EIS database. Next, mitigation measures were analyzed to determine their effectiveness to reduce the initial impacts. Generic mitigation measures (Table 4-1) and agency Best Management Practices (BMPs) applied to data categories with a low to moderate initial impact are expected to reduce the impacts to low or not identifiable. Residual impacts, those impacts remaining after mitigation, were then determined and documented. Impact levels ranged from no identifiable to low, moderate, or high.

Several generic mitigation measures (Table 4-1) would be applied to reduce potential impacts to the earth and water resources. These measures include restricting construction vehicle movement outside of the right-of-way (#1), areal limits to construction activities would be predetermined (#2), recontouring and revegetating construction areas where needed (#s 3 and 4), roads would be built at right angles to streams and culverts installed where necessary (#13), and hazardous materials would be properly handled and disposed of (#20). Selective mitigation measures (Table 4-2) committed to include avoiding sensitive features (#6) and helicopter construction (#12).
<table>
<thead>
<tr>
<th>Sensitive Resource</th>
<th>Mitigation Measure</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas of High Paleontological Sensitivity (miles along centerline)</td>
<td>Paleontological resources would be mitigated on a site basis as determined by BLM-approved paleontologist or by appropriate agency resource specialist</td>
<td>None</td>
</tr>
<tr>
<td>Soils with High Hazard of Water Erosion (miles along centerline)</td>
<td>Refer to Table 4-1 Number 12 from Table 4-2</td>
<td>Moderate</td>
</tr>
<tr>
<td>Soils with High Hazard of Wind Erosion (miles along centerline)</td>
<td>Refer to Table 4-1</td>
<td>Low</td>
</tr>
<tr>
<td>Known Potential Landslide Hazard (miles along centerline)</td>
<td>Number 6 from Table 4-2</td>
<td>None</td>
</tr>
<tr>
<td>Areas of Active Mining (miles along centerline)</td>
<td>Number 6 from Table 4-2</td>
<td>None</td>
</tr>
<tr>
<td>Perennial Streams (number crossed along centerline)</td>
<td>Refer to Table 4-1 Number 6 from Table 4-2</td>
<td>Not Identifiable</td>
</tr>
<tr>
<td>Perennial Lakes (number crossed along centerline)</td>
<td>Refer to Table 4-1 Number 6 from Table 4-2</td>
<td>Not Identifiable</td>
</tr>
<tr>
<td>Springs (number within 0.5 miles of centerline)</td>
<td>Refer to Table 4-1 Number 6 from Table 4-2</td>
<td>Not Identifiable</td>
</tr>
</tbody>
</table>

**Results**

Residual impacts and cumulative effects were developed and evaluated with federal agency land management plans. The technical report contains detailed results of the studies (refer to Appendix H for the locations where technical reports can be reviewed).

Adherence to the generic and selectively committed mitigation measures (Tables 4-1 and 4-2) results in no identifiable to low residual impacts along the proposed routes since known potential landslide areas would be avoided. If significant fossils are found during construction they would be mitigated on a site by site basis under the direction of a BLM certified paleontologist or other appropriate agency paleontological resource specialist. Active mining operations and land anticipated to be developed for mining in the near future would be avoided. Perennial streams, lakes, and springs would be spanned or avoided.
Construction roads and tower sites would be located such that an adequate buffer is provided to prevent increases in sedimentation. Soil loss from wind erosion would be minimized through the application of water during construction where required. Although soil compaction along access roads is expected to occur, it would be mitigated by mechanical means where required.

The removal of fine soil materials beneath the desert pavement is likely to occur if the surface is broken by construction vehicles. The ruts that form may persist long term. However, the small areal extent of this impact would result in a low overall impact to the soils resource. Desert pavement occurs along the routes primarily south of U.S. Highway 93 in the Dry Lake Valley northeast of Las Vegas, Nevada.

Soil loss and loss of productivity would be minimized in most areas. However, soil loss and loss of productivity is likely to occur primarily on steep slopes (slope steepness greater than 35 percent) where soils have a potential hazard of water erosion and where new construction access is required. For these areas a moderate residual impact is expected, since reestablishing vegetation and the effects of other mitigative measure to reduce erosion would require a longer time to become effective.

**Alternative Routes - Midpoint to Dry Lake**

In comparing the proposed routes, Alternative Routes A, D, and G have the least high adverse impacts of water and wind erosion potential areas, and high paleontological sensitivity areas crossed. However, alternative Routes B, C, E, and F have only slight increases in total impacts.

The following summarizes the location and approximate mileage distance along the centerline resulting in moderate residual impacts that may occur from the construction of roads and towers on soils located on steep slopes with a high water erosion potential.

**Route A**

There would be a total of 2.7 miles of moderate residual impacts along this route. Steep slopes in isolated areas and high wind and/or water erosion potential would be the main cause of the impacts that would result near Henry, Nevada, along Link 130, near Willow Creek, Nevada, along Link 160, near Currie Hills along Link 250, and near Lages Station along Link 260.

**Route B**

There would be a total of 3.6 miles of moderate residual impact along Route B as a result of steep slopes and high wind and/or water erosion potential. Impacts would be expected near
Trout Creek along Link 92, near Clifside in the Toano Range along Link 222, in the area of Boone Spring in the Antelope Range along Link 226, and around the Lages Station area along Link 260.

Route C

A total of 1.9 miles of moderate residual impacts would be expected along Route C. Similar to Route A and B, the impacts would result from high wind and/or water erosion potential and on steep slopes. Impacts would occur near Trout Creek along Link 92, around Currie Hills along Link 250, and in the area of Lages Station along Link 260.

Route D

There would be a total of 2.9 miles of moderate residual impacts along Route D resulting from high water and/or wind erosion potential and steep slopes. Impacts would occur in the area of Henry, Nevada along Link 130, near Willow Creek along Link 160, and near Wood Hills along Link 180.

Route E

There would be a total of 3.8 miles of moderate residual impacts along Route E resulting from high water and/or wind erosion potential and steep slopes. Impacts would occur near Henry, Nevada, along Link 130, near Willow Creek along Link 160, near Clifside along Link 222, and in the area of Boone Spring along Link 226.

Route F

There would be a total of 1.9 miles of moderate residual impact along Route F. The impacts are the result of high wind and/or high water erosion potential of the soils and steep slope conditions. Moderate residual impact would result in steep slope areas near Trout Creek (Link 92), near Currie Hills (Link 250), and near Lages Station.

Route G

A total of 0.4 mile of moderate residual impact would result along this route. The impact is the result of soils with high water erosion potential and steep slope conditions of greater than 35 percent. The impacts would occur near Henry, Nevada (Link 130).
Alternative Routes - Ely to Delta

Direct Route

There would be a total of 5.9 miles of moderate residual impacts along this route resulting from a combination of steep slopes and high water and/or wind erosion potential. The impacts would occur in the Schell Creek Range east of Cherry Creek along Link 263, near Tippett Pass and the Red Hills along Link 266, near Tin Springs Mountain along Link 620, and in the Confusion Range along Link 621.

Cutoff Route

This route would have a total of 6.8 miles of moderate residual impacts in the Schell Creek Range east of Cherry Creek along Link 263, near Tippett Pass and the Red Hills along Link 266, in the Conger Range along Link 268, and near Marjum Pass along Link 462. These impacts would result from steep slopes and a high potential for wind and/or water erosion potential.

230kV Corridor Route

The 230kV Corridor Route would have a total of 4.6 miles of moderate residual impacts in Cooper Canyon along Link 380 and in the Buckskin Hills along Link 462. Steep slopes and areas of high water and/or wind erosion potential would account for these impacts.

Southern Route

The Southern Route has a total of 5.1 miles of moderate residual impacts in Water Canyon along Link 364 and east of the Ferguson desert along Link 462. Areas of high water/or wind erosion potential and steep slopes are where these impacts would occur.

Consistency with Agency Management Plans

The various agencies’ resource management plan objectives state that soil productivity would be maintained and sediment resulting from soil erosion would be minimized by applying soil and water conservation practices. These objectives would be obtained by incorporating Best Management Practices (BMPs) into all land use and project plans. These BMPs would serve as the principal mechanism for controlling nonpoint pollution sources and meeting soil and water quality goals. All of the alternative routes comply with the objectives of the resource management plans in regard to earth and water resources.
Biological Resources

Introduction

The vegetation types, sensitive wildlife, and plant species inventoried are described in detail in the technical report (refer to Appendix H for the locations where technical reports can be reviewed). Impact matrices were developed to identify the initial impacts anticipated as a result of the proposed project, to recommend mitigation measures to minimize those impacts, and to determine residual impacts.

Issues for wildlife species and important wildlife habitats are related primarily to increased public access into remote areas and/or ground disturbance. Ground disturbance caused by construction of the transmission line could result in habitat destruction and degradation, and future erosion problems where stabilizing plants are lost. Increased public access into remote areas, during and following construction, may result in increased human harassment of all classes of wildlife, increased levels of poaching, and increased take of certain species by legal hunters, trappers, or fishermen. Increased public access can also result in habitat damage from off-road vehicle use, accidentally set fires, and direct mortality of individual animals resulting from increased or higher speed vehicular traffic.

The GIS impact assessment models and matrices are described in the technical reports. Also in the technical report are narrative descriptions and data tables for each of the alternative route segments studied. The technical reports are available for review at the agency offices listed in Appendix H.

Methods

Impact types considered in the impact analysis models were:

1) Threatened, Endangered, Rare or Unique Species:
   - affect any federally classified threatened or endangered species or critical habitat thereof
   - affect any state listed protected, threatened, unique or otherwise sensitive species or habitat thereof

2) General Wildlife:
   - create a barrier or hazard to the migration or movement of any wildlife species
   - alter the diversity of any biotic community or populations of any animal species communities, or areas

3) Increase human activity/public access.
To determine the intensity (level) of impacts that would result from the construction and operation of the SWIP, two models were developed to identify direct and indirect impacts. The access requirements were determined in a model that was compared with sensitive wildlife resources and habitats.

Where access and other ground disturbance would be greater and sensitive biological resources were found (e.g., wildlife habitats, sensitive plants, etc.), initial impacts would be of a higher intensity. These adverse impacts would be long-term unless revegetation would be done.

Where access roads would have to be constructed into currently remote areas, indirect long-term impacts would likely result. These impacts would be from increased pressure on biological resources from potentially greater presence of humans (e.g., legal hunting, poaching, fishing, off-road vehicle access, etc.). Also refer to cumulative effects for a discussion of some of these indirect impacts that would occur over time.

Adverse, indirect, and long-term impacts would also result simply from the presence of the transmission lines. For example, because golden eagles will use transmission towers for hunting perches, predation on sage grouse within their sensitive habitats (e.g., leks and wintering grounds) may increase. Also, a similar predation issue is found for juvenile desert tortoise where ravens have transmission towers as hunting perches. These impacts were documented where these impact types could be identified, and where sensitive habitats corresponded to the potential presence of one of the alternative routes.

**Mitigation Planning**

In order to reduce potential impacts resulting from ground disturbance and increased levels of public access along the various alternative routes of the proposed transmission line, generic and selectively recommended mitigation measures were applied to initial impact levels.

Generic mitigation is part of the project description, is applied uniformly along the route, and tends to reduce impact potential to many resources (refer to Table 4-1). For example, restricting vehicle construction equipment movement to predesignated routes (#1) and recontouring and revegetating disturbed areas where necessary (#3 and #4), and construction of roads at right angles to streams (#13).

Selectively recommended mitigation measures are more specific and are applied to mitigate specific initial impacts (refer to Tables 4-2). These measures include overland access to minimize ground disturbance (#2), placement of towers to avoid sensitive features (#6), modified tower design to minimize avian conflicts (#7), use of helicopter construction under certain conditions (#12), and limiting construction activities during sensitive periods (#11).
Results

Alternative Routes - Midpoint to Dry Lake

Route A

Wildlife - From the Midpoint Substation to Jackpot, Nevada (Links 10, 20, 40, 41, 50, 70), initial impact levels (before applying of mitigation) resulting from construction of the project would be generally low and moderate. Mitigation (discussed at the beginning of this section) would reduce these impacts to low. The only high residual impacts on this route in Idaho would be where sage grouse leks are located near the Nevada state line (Link 70).

Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g. golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

There would be high initial impacts to long-billed curlew nesting habitat where the project would significantly increase potential public access (Links 10, 20, 40, 70) due to the difficulty of eliminating access in areas of flat or gentle terrain and the vulnerability of nesting curlews. These impacts would be adverse and long-term. However, mitigation measures (discussed at the beginning of this section) would reduce most of these impacts to insignificant levels.

From Jackpot to northwest of the Windermere Hills (Links 72, 101, 102, 110, 130, 160, 161, 162) in northern Nevada, Route A would cause mainly moderate to high initial impacts. These initial impact would be due primarily to crucial mule deer and pronghorn habitats, bald eagle wintering and potential nesting habitat (Link 72), and sage grouse leks and wintering habitat (Links 160, 161, 162). The impacts to sage grouse are largely unmitigable because of potential predation by golden eagles on adult and immature birds (see discussion above). There would be 0.2 mile of high residual impacts to sage grouse (Link 160). These impacts would be significant, adverse, and long-term. However, applying mitigation measures along this portion of Route A would reduce all other high impacts to insignificant levels.

Moderate residual impacts would occur in some areas along this segment of Route A where public access would be significantly increased in big game habitats and in ferruginous hawk habitats. These impacts would be adverse and long-term, but are not considered significant.
Because it is difficult to completely restrict new access where roads and trails have been constructed, there can be increased pressure on these species by hunting/poaching and harassment.

From the Windermere Hills to north of Interstate 80 near Oasis, Nevada (Links 1612, 152, 200), Route A would traverse the northern toe of the Windermere Hills and then southeast to East Squaw Creek. High initial impacts along this portion of the route would be primarily caused by increased public access in pronghorn winter range for 0.5 miles (Link 1612). These high impacts would be reduced to moderate, insignificant levels following mitigation (discussed at the beginning of this section). An additional 1.8 miles of high initial impacts would result to sage grouse winter range and leks north of East Squaw Creek (Link 200). Similar to the impacts to sage grouse described above, these impacts would remain high following mitigation.

In the section of the Route A between north of Interstate 80 and Dolly Varden in the Goshute Valley (Links 211, 212), high initial impacts would be expected to result from increased public access. Potentially high initial impacts from ground disturbance to sage grouse leks would occur on Link 211 at the north end of Goshute Valley (between mileposts 14.7 and 16.3). Following mitigation, these impacts to sage grouse leks would be expected to remain adverse and significant for about 1.6 miles.

From the Dolly Varden in the southern end of Goshute Valley to the North Steptoe substation site (Links 211, 250, 259, 260), high initial impacts from ground disturbance would occur for 0.2 miles because of sage grouse leks and known occurrences of wintering bald eagles near the north end of Steptoe Valley (Link 259). Despite applying mitigation measures, 0.2 miles of high residual impacts (adverse and significant) would remain.

From the North Steptoe substation site to the Robinson Summit substation site (Links 270, 291, 293, 310), increased public access would cause high initial impacts to sage grouse leks, long-billed curlew, and sandhill crane from increased public access near Monte Neva Hot Springs at the base of the Egan Range (milepost 11.8 to 11.9). No high residual impacts would be expected following mitigation. Ground disturbance along this segment of the route would result in high initial impacts along the base of the Egan Range (Link 291) in the Steptoe Valley (mileposts 4.4 to 6.1 and 7.9 to 11.8) and (Link 293) in the Egan Range (mileposts 1.9 to 4.4 and 4.8 to 6.5). Following mitigation (discussed at the beginning of this section), high residual impacts would occur for 3.0 miles in the Steptoe Valley (Link 291) and for 4.5 miles in Dry Canyon (Link 293). High residual impacts (significant impacts) on both links would result from the presence of sage grouse leks (refer to previous discussion of sage grouse effects).

Route A from the Robinson Summit substation site to the Dry Lake substation site (Links 340, 362, 363, 669, 670, 672, 673, 675, 690, 700), would cross through Great Basin desertscrub habitats along the north portion of this segment and Mojave desertscrub habitats in the southern portion. Generally, initial impacts for most of the route would be moderate to high. High initial impacts would be most notable where habitat of the desert tortoise are encountered in Coyote Spring Valley (Links 690, 700). Adding a transmission facility would reduce the amount of suitable tortoise habitat because of roads needed to construct and maintain the line, and would increase the potential for human activity.
The Links 690, 700 and 720 of the proposed transmission line traverse 52.1 miles of desert tortoise habitat. Link 690 enters desert tortoise habitat in the extreme southern portion of the Pahranagat Wash. The first three and one half miles of habitat are in an area designated as Category III. This area is at the northern limit of species' distribution and tortoise densities are very low (0 to 10 tortoises per square mile). The last 15.3 miles of Link 690 are in Category I habitat. Tortoise densities in this area (northern most extension of Coyote Spring Valley) range from low to very high (140+ per square mile.)

As Link 700 runs south along U.S. Highway 93 through Coyote Spring Valley, it traverses 30.3 miles of Category I habitat. About 14 miles is located on private land owned by Aerojet and is, therefore, not officially categorized by the BLM. However, for the purposes of this Assessment, it will be considered to be Category I habitat as requested by the BLM (Slone, 1990). This area has been proposed as a Tortoise Management Area in the Short-term Habitat Conservation Plan for Clark County (Regional Environmental Consultants, 1990). Surveys in this area indicate relatively high densities of tortoises (45 to 140+ tortoises per square mile) in portions of the valley. The habitat is generally considered to be in good condition. As the line enters the Dry Lake Valley (Link 720), it traverses 3.1 miles of Category III habitat. The dry lake bed itself is not tortoise habitat. Tortoise densities in this portion of the Dry Lake Valley are in the very low to low range (0 to 45 tortoises per square mile.)

Impacts to desert tortoise from increased human activity include being crushed by vehicles, shooting, illegal collecting, and destruction of burrows. Adverse, indirect, and long-term impacts could result simply from the presence of the transmission lines because ravens may use the transmission towers for hunting perches, and predation on juvenile desert tortoise may increase. Predation by ravens usually a problem near urban areas, water bodies, and solid waste disposal sites, where ravens are typically found. Although raven predation is not considered a significant problem at this time, federal biologists are concerned that the problem may become more significant if Las Vegas and surrounding areas continue to develop and expand.

Mitigation measures applied during construction would effectively mitigate direct impacts to desert tortoise (e.g., tortoise or tortoise burrows being crushed by vehicles, etc.). However, it is unclear how raven predation, if it becomes a significant problem in the future, can be effectively mitigated.

A Biological Assessment is being prepared for desert tortoise, and that formal consultation with the Fish & Wildlife Service (FWS) under Section 7 of the Endangered Species Act (1974) will be taking place by the fall of 1992. BLM requires that an opinion be rendered by FWS on the desert tortoise prior to a Record of Decision (ROD) on the SWIP. If a favorable opinion is rendered by FWS, detailed mitigation measures would become part of the stipulations required to construct and operate the SWIP. One of the major mitigation measures would be to construct the project through the sensitive area during the winter months when the tortoise are inactive (refer to #11 in Table 4-2). The Stateline Resource Area is preparing a Draft Resource Management Plan (RMP) for public review. The area of Coyote Springs Valley may be proposed as an Area of Critical Environmental Concern (ACEC) for desert tortoise in some alternatives. The BLM's RMP process is being prepared in coordination with the Short-term Habitat Conservation Plan for desert tortoise that was
prepared by Clark County (1991). Refer to the Technical Report for a description of the habitat classification for desert tortoise (e.g. category I, II, and III).

The burrowing owl is a species of concern to the Nevada Department of Wildlife. Burrowing owls occur in Mojave desertsrub 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 along the project. Limiting construction to winter months to reduce conflicts with owls has been recommended by BLM.

Other highly sensitive features include ferruginous hawk nest sites (Link 673, 340), crucial raptor nesting areas occur (Links 669, 672), sage grouse leks (Link 669), crucial mule deer winter range and migration corridors (Links 672, 669, 670, 363, 673), and desert bighorn sheep movement/migration corridors (Links 690, 700). There are two bighorn sheep water developments in the southern end of the Arrow Canyon Range and up to two more may be constructed before construction of the project. The BLM has recommended no new access within 2 miles of water and winter construction.

High initial impacts from potentially increased public access along this section of the Route A would result from the higher potential for human interaction with mule deer, desert bighorn sheep, and ferruginous hawks. Specifically, there would be potential high initial impacts to mule deer migration corridors and ferruginous hawk habitat along Sierra Valley into Jakes Wash (Link 363 between mileposts 10.6 and 11.1). There would also be potential high impacts to a mule deer migration between milepost 11.3 and 11.7 on Link 363 at the southern end of Sierra Valley. Along the foothills at the western edge of White River Valley (Link 669) the route would cause high initial impacts for 6.5 miles in a mule deer migration corridor. There would be 0.3 miles of high initial impacts to key deer winter range at the southern limit of the Egan Range in the White River Valley (Link 672). These impacts would be mitigated to insignificant levels (mitigation discussed at the beginning of this section).

Where Route A would cross the northeast end of Dry Lake Valley (Link 673), there would be approximately 1.7 miles of high initial impacts to ferruginous hawk nest sites and 0.7 miles of similar impacts to key deer winter range. There would be approximately 2.3 miles of potentially high initial impacts relating to increased public access and desert tortoise habitat and bighorn sheep movement corridors along the southern end of Delamar Valley and into Pahranagat Wash (Link 690). These impacts would be mitigated to insignificant levels (mitigation discussed at the beginning of this section).

Along Route A in Sierra Valley and into Jakes Wash (Link 363) there would be about 1.0 mile of high initial impacts (from ground disturbing activities) to ferruginous hawk habitat and nesting areas of other raptor species. There would be 12.7 miles of high initial impact from ground disturbance to mule deer migration corridors and staging areas and raptor nesting areas along the foothills at the western edge of White River Valley (Link 669). Where this route would cross the northeast end of Dry Lake Valley (Link 673), there would be 1.7 miles of high initial impact to nesting ferruginous hawks.

Mitigation measures (discussed at the beginning of this section) are expected to be effective in reducing high initial impacts on the Robinson Summit to Dry Lake section of the Route A to insignificant levels.
Moderate residual impacts would occur in some areas along this segment of Route A where public access would be significantly increased in big game habitats and in ferruginous hawk habitats. These impacts would be adverse and long-term, but are not considered significant. Because it is difficult to completely restrict new access where roads and trails have been constructed, there can be increased pressure on these species by hunting/poaching and harassment.

Moderate residual impacts to desert tortoise would likely result in some areas where public access is increased significantly.

**Vegetation/Sensitive Plant Species** - No federally listed endangered or threatened plant species are known to occur, however, this does not mean that none exist, as surveys have not been conducted over much of the area.

Ground disturbance along Route A would result in moderate to high initial impacts where two sensitive plant species, Astragalus tetrapertus and Allium anceps, occur for 1.3 miles along the assumed centerline east of Salmon Falls Creek Reservoir (Link 70). Additional moderate to high initial impacts would be expected where *A. calycosus* var. monophyllum occurs in White River Valley (Link 670) and where Arenaria stenomeres occurs in Coyote Spring Valley and Arrow Canyon (Link 700). Potential increases in public access would not be considered a serious threat. Following mitigation, residual impacts are expected to be low. Revegetation of disturbed areas in dry climates is difficult. Rehabilitation and revegetation will be addressed specifically in the Construction, Operation, and Maintenance Plan.

Two C2 species and one C1 species occur within the one mile of the assumed centerline. *Castilleja salsuginosa* (C1), also listed as critically endangered on the state list, occurs near Monte Neva Hot Springs in Steptoe Valley (Link 291). Increased public access to the Springs could result in trampling and destruction of habitat. *Arabis falicructa*, a C2 species, occurs along the western edge of Thousand Springs Valley (Link 162) and *Mentzelia mollis* occurs in Coyote Spring Valley (Link 700). *Penstemon bicolor*, *P. b. roseus* and *Astragalus triquestrus* are Category 2 candidate species which could occur on Links 690, 700, and 720. These plant species would most likely not be impacted by construction, if overland access to tower sites along the centerline were predesignated.

**Route B**

**Wildlife** - From Midpoint Substation to Jackpot, Nevada, the initial and residual impacts expected for Route B would be the same as those described for Route A.

From Jackpot to north of Interstate 80 near Oasis, Nevada (Links 91, 92, 140, 141, 142, 144), there would be high initial impacts for approximately 3.3 miles to sage grouse leks and crucial mule deer summer habitat along Trout Creek (Link 92) and 0.3 mile to sage grouse winter grounds in the Trout Creek area (Link 91) that would result from increased public access and ground disturbance. There would be high initial impacts to a sage grouse lek and approximately 1.5 miles high initial impacts to sage grouse winter range in Toano Draw.
Near the headwaters of Trout Creek (Link 92), there would be 2.2 miles of initial high impacts associated with sage grouse leks. Another 4.4 miles of high initial impacts associated with sage grouse leks and sage grouse winter range would occur in Toano Draw (Link 142). Following mitigation (defined at the beginning of this section), there would remain approximately 0.3 miles of high residual impacts to sage grouse winter range in Trout Creek (Link 91), 1.5 miles to sage grouse leks at the headwaters of Trout Creek (Link 92), and 4.4 miles to sage grouse leks and sage grouse winter grounds in Toano Draw (Link 142).

Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g., golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

Ground disturbance would result in approximately 0.3 mile of high initial impacts to key deer winter range, and pronghorn winter range in the Trout Creek area (Link 91). Near the headwaters of Trout Creek (Link 92), there would be 2.2 miles of initial high impacts associated with critical deer summer range. Mitigation measures (discussed at the beginning of this section) would be expected to effectively reduce high impacts to insignificant levels along this segment of Route B, except for long-term impacts of raptor predation on sage grouse.

Generally, impacts along the segment of Route B, from the north of Interstate 80 to the North Steptoe substation site (Links 221, 222, 224, 226, 259, 260), would be low, with some moderate impacts. Moderate initial impacts along this segment of the route would be associated with occurrences of peregrine falcon and sage grouse. High initial impact to sage grouse leks would occur along this segment of Route B in the Goshute Valley (Links 221) and to sage grouse leks and bald eagle habitat in Antelope Valley (Link 226). Mitigation measures (discussed at the beginning of this section) would be expected to effectively reduce high impacts to insignificant levels along this segment of Route B, except for long-term impacts of raptor predation on sage grouse.

From the North Steptoe substation site to the Robinson Summit substation site, initial impacts for Route B would be generally low to moderate where Route B would cross through Antone Pass at the north end of the Egan Range into Butte Valley (Link 280). High initial impacts along this section of the route would occur where increased public access would be significant in important water use areas (milepost 5.7 to 6.1) and in an area that is used by bald eagle, ferruginous hawk, and sage grouse (milepost 11.8 to 11.9). Potential impacts from ground disturbance along this section of Route B would range from low to high, with a fairly extensive potential for high initial impacts in areas where sage grouse leks and long-billed curlew and sandhill crane occur. Key water use areas are also identified as locations where high impacts could occur, as are areas of sage grouse wintering grounds. High initial
Impacts would occur for approximately 14.2 miles where this route crosses through at the north end of the Egan Range into Butte Valley (Link 280). Mitigation (discussed at the beginning of this section) would be expected to reduce the impacts from increased public access along this segment of Route B to insignificant levels. A total of 11.1 miles of high residual impact would be expected to persist from the construction and operation of the transmission line in the vicinity of Antone Pass (Link 280). Most of these high residual impacts would be associated with sage grouse leks (refer to discussion above regarding raptor predation).

From the Robinson Summit substation site to the Dry Lake substation site, the potential impacts of Route B would be the same as those described for Route A.

**Vegetation/Sensitive Plant Species** - Generally, the plant species described along the assumed centerline of Route A would be the same as those for Route B. One species of cactus, *Sclerocactus pubispinus*, occurs within one mile of the centerline of the section of this route along the eastern foothills of the Toano Range and Goshute Mountains (Link 222). It is often collected for horticultural purposes and may be impacted by increased public access. Suitable habitat for this species extends to areas on the centerline where ground disturbance could directly impact habitat and populations. This plant species is protected by the Cactus and Yucca Law in Nevada, which requires that permits be obtained from the Division of Forestry for removal of any plants.

**Route C**

**Wildlife** - From Midpoint Substation to Jackpot, Nevada (Links 10, 20, 40, 41, 50, 70), potential impacts to wildlife for Route C would be the same as described for Route A. From Jackpot to the southern end of Toano Draw north of Interstate 80 (Links 91, 92, 140, 141, 142, 144, 200), potential impacts to wildlife for Route C would be the same as described for Route B.

Then, from north of Interstate 80 in Toano Draw to the Dry Lake substation site, potential impacts to wildlife for Route C would be the same as described for Route A.

**Vegetation/Sensitive Plant Species** - Potential impacts to sensitive plants for Route C would be the same as discussed for Route A, except for impacts described for *Arabis falcifructa* (Link 162).

**Route D**

**Wildlife** - From Midpoint Substation to Jackpot, Nevada (Links 10, 20, 40, 41, 50, 70), potential impacts to wildlife for Route D would be the same as described for Route A. Potential impacts to wildlife for Route D, from Jackpot to northwest of the Windermere Hills (Links 72, 101, 102, 110, 130, 160, 161, 162), would also be the same as described for Route A.
From the Windermere Hills to Dolly Varden in Goshute Valley (Links 1611, 166, 167, 1613, 180, 190, 230), initial impacts to wildlife resources for Route D from potentially increased public access and ground disturbance would be generally low or indiscernible. Some potential high initial impacts would occur in pronghorn winter range west of HD Summit in the Bishops Creek area (Link 1611). Because of the relatively good access along this segment of this route, other impacts from increased public access would be low or indiscernible. In addition, some other high initial impacts would occur further south in Bishops Creek (Link 167). There would also be some moderate to high initial impacts to sage grouse leks and pronghorn winter range in this area (Link 166). Potential high initial impacts to sage grouse leks and long-billed curlew habitat would also occur along the western toe of the Wood Hills (Link 180). Where this segment of Route D would cross Independence Valley to the Pequop Mountains (Link 190), there would be some moderate initial impacts to long-billed curlew, sandhill crane, and key deer winter habitat.

Mitigation (discussed at the beginning of this section) would be expected to reduce potential high initial impacts from increased public access to moderate or low residual impacts. Potential high impacts to sage grouse leks would be expected to remain high following mitigation in Clover Valley (between mileposts 17.6 and 18.7) along the western toe of the Wood Hills (Link 180). Other residual impacts for this segment of the route would be expected to be moderate to low.

Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g. golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

From the Dolly Varden area to the North Steptoe substation site, Route D would result in some moderate and high initial impacts at the north end of the Steptoe Valley near Currie, Nevada (Link 241). These impacts would be associated with significant access increases in important pronghorn antelope habitat, long-billed curlew and sandhill crane habitat, Bonneville cutthroat trout habitat, and sage grouse leks. Other potential impacts in the Steptoe Valley would be expected to be moderate to low, with some high impacts. There would be high initial impacts to sage grouse leks, critical pronghorn habitat, and habitat of sandhill crane and long-billed curlew for approximately 11.5 miles in the northern portion of Steptoe Valley (Link 241) and for 0.1 miles where the route would cross Steptoe Valley (Link 243).

Following mitigation (discussed at the beginning of this section), potential high initial impact levels from increased public access and ground disturbing activities along this segment of Route D would be reduced to moderate or low residual (insignificant) impacts. Approximately 1.1 miles of high residual impacts would be expected to sage grouse leks that
occur (mileposts 28.3 to 29.4) in the northern portion of Steptoe Valley (Link 241) (refer to discussion above for long-term predation impacts to sage grouse).

From the North Steptoe substation site to the Dry Lake substation site, potential impacts to wildlife for Route D would be the same as described for Route A.

Vegetation/Sensitive Plant Species - The potential for impacts to occurrences of unique plant communities and/or sensitive plants on Route D would be the same as that described for Route A.

Route E

Wildlife - From Midpoint Substation to Jackpot, Nevada, potential impacts to wildlife for Route E would be the same as described for Route A. From Jackpot to northwest of the Windermere Hills (Links 72, 101, 102, 110, 130, 160, 161, 162), potential impacts to wildlife for Route E would be the same as described for Route A. Then, from the northwest of the Windermere Hills to north of Interstate 80 near Oasis, Nevada (Links 1612, 152, 200), potential impacts to wildlife for Route E would also be the same as described for Route A.

Continuing from the north of Interstate 80 near Oasis, Nevada to the North Steptoe substation site (Links 221, 222, 224, 226, 259, 261), potential impacts to wildlife for Route E would be the same as described for Route B.

From the North Steptoe substation site to the Robinson Summit substation site (Links 270, 291, 293, 310), potential impacts to wildlife for Route E would again be the same as described for Route A. Then, from the Robinson Summit substation site to the Dry Lake substation site, potential impacts to wildlife for Route E would also be the same as described for Route A.

Vegetation/Sensitive Plant Species - The potential for impacts to occurrences of unique plant communities and/or sensitive plants on Route E, from Midpoint Substation to north of Interstate 80, would be the same as those described for Route B. From north of Interstate 80 to the North Steptoe substation site, the potential for impacts to occurrences of unique plant communities and/or sensitive plants for Route E would be the same as that described for Route B. Then, from the North Steptoe substation site to the Dry Lake substation site, Route E would again be the same as described for Route A.

Route F

Wildlife - From Midpoint Substation to Jackpot, Nevada (Links 61, 62, 64, 70), approximately 1.3 miles of high initial impacts occur to pronghorn habitat and long-billed curlew nesting areas from where Route F would traverse areas of open range east of Hagerman, Idaho (Link 61). In addition, considerable moderate initial impacts associated with pronghorn habitat and sage grouse leks would result in plateau areas along Salmon Falls Creek Canyon (Link 64). Ground disturbing activities and increased public access in the area east of Hagerman (Link
61) would result in mostly moderate initial impacts. In the plateau areas along Salmon Falls Creek Canyon (Link 64) initial impacts would vary from low to moderate. Wildlife species that would be affected include pronghorn, burrowing owl, long-billed curlew, pheasant, and sage grouse leks.

Following mitigation (discussed at the beginning of this section), no high residual impacts would be expected to remain along this segment of the Route F.

From Jackpot to the north of Interstate 80 near Oasis, Nevada (Links 72, 91, 92, 140, 141, 142, 144), potential impacts to wildlife for Route F would be the same as described for Route B. Then, from north of Interstate 80 near Oasis, Nevada to the Dry Lake substation site, potential impacts to wildlife for Route F would be the same as described for Route A.

**Vegetation/Sensitive Plant Species** - From Midpoint Substation to Jackpot, Nevada (Links 61, 62, 64, 70), six sensitive plant species would be directly impacted by ground disturbance where they would occur along 4.2 miles of the assumed centerline on plateau areas above the Snake River (Links 61, 62) and along Salmon Falls Creek Canyon (Links 64, 70).

Two of the species that would be affected by the route are federal candidate species (C2). *Astragalus atratus* var. *inseptus* (also a BLM sensitive species) occurs along the route near Peters Gulch (Link 70) and *Lepidium davisi* on the plateau above Salmon Falls Creek Canyon (Link 64). Populations of *A. tetrapterus* also occur over a two square mile area along Salmon Falls Creek (Link 64) and *Allium anceps* occurs in the foothills west of Jackpot (Link 70). Both are Priority 2 species in the State of Idaho. One candidate species, *Castilleja salsuginosa*, and two watch species in Nevada, *Astragalus calycosus* var. *monophyllidius* and *Arenaria stenomeres*, occur within a one mile area and may experience indirect impacts (refer to discussion under Route A).

From Jackpot, Nevada, to the Dry Lake substation site, the potential for impacts to occurrences of unique plant communities and/or sensitive plants for Route F would be the same as that described for Route A.

**Route G**

**Wildlife** - From Midpoint Substation to Jackpot, Nevada, potential impacts to wildlife for Route E would be the same as described for Route A.

From Jackpot to northwest of the Windermere Hills, moderate to high initial impacts would be expected to occur where Route G would traverse crucial mule deer and pronghorn winter habitat, bald eagle nesting and wintering habitat and sage grouse leks and wintering grounds in the rolling hills between Jackpot and Contact (Links 711, 714). In addition, increased public access and ground disturbing activities would result in some high initial impacts to crucial mule deer and pronghorn habitats, and bald eagle nesting and wintering habitats in this area (Links 101, 713, 715). No high residual impacts would be expected to occur along this segment of Route G following the mitigation.
North of the Windermere Hills near Wilkins, Nevada (Link 150) in the Thousand Springs Valley, initial impacts would be moderate to high where pronghorn winter range and sage grouse leks occur along the assumed centerline. There would be some high initial impacts to sage grouse leks on the northern end of Link 151. Initial impacts on Link 150 would be moderate to high. Following mitigation there would be no high residual impacts expected to occur along this segment of Route G, except for the long-term significant impacts to sage grouse.

Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g. golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

From the Windermere Hills to Dolly Varden (Links 200, 211, 212, 230), potential impacts to wildlife for Route G would be the same as described for Route A. Then, from Dolly Varden to the North Steptoe substation site (Links 241, 243, 245), potential impacts to wildlife for Route G would be the same as described for Route D.

From the North Steptoe substation site to the Robinson Summit substation site (Links 270, 280, 310), potential impacts to wildlife for Route G would be the same as described for Route B. Then, from the Robinson Summit substation site to the Dry Lake substation site, potential impacts to wildlife for Route G would again be the same as described for Route A.

**Vegetation/Sensitive Plant Species** - *Arabis falciflora*, a C2 species, occurs within one mile the assumed centerline of Route G in Thousand Springs Valley (Link 151). This plant would not be impacted if access to the right-of-way is adequately controlled. Other sensitive plant species potentially impacted along Route G are described under Route A (Links 41, 70, 670, 700).

**Alternative Routes - Ely to Delta**

**Direct Route**

**Wildlife** - In Nevada, from the North Steptoe substation site to the Little Hills (Links 262, 263, 265, 266), increased public access and ground disturbing activities would generally cause low to moderate impacts. High initial impacts would occur for approximately 1.0 mile in Antelope Wash (Link 266) where increases in public access would be significant in areas of crucial pronghorn winter habitat and ferruginous hawk habitat. Mitigation measures (described at the beginning of this section) would reduce these impacts to insignificant levels.
Moderate initial impacts would also be expected along this route in the Schell Creek Range (Links 262, 263, and 620). There would be high initial impacts for approximately 1.0 mile where sage grouse leks occur at the northern end of Spring Valley (Link 263). Approximately 2.6 miles of high initial impacts in sage grouse winter grounds would be expected to occur (between mileposts 3.0 and 5.0), where this route would cross Spring Valley (Link 266). About 2.1 miles of high residual impacts to wintering bald eagle use areas would be expected to occur in the valley east of the Little Hills (Link 620). Also on Link 620, this route would result in high initial impacts from ground disturbance to bald eagle wintering areas for approximately 2.1 miles.

Further east, the Direct Route would cross the Snake Valley, Tule Valley, and Swasey Bottom (Links 621, 630, 640) in Utah. Initial impacts would generally be low, moderate, and indiscernible in the vicinity of Delta (Links 572, 580, 581, 582). High initial impacts would occur for approximately 3.6 miles from increased public access in the vicinity of the Leland-Harris Spring Complex (Link 630), where four federal candidate species (least chub, spotted frog, desert dace, and Great Basin silver-spot butterfly) are known to occur. High residual impacts from increased public access to the Leland-Harris Spring Complex would remain due to the potential long-term and cumulative effects of repeated public entry to this sensitive area. BLM biologists are concerned that any direct impacts from construction activities or indirect, long-term impacts from increased public accessibility could endanger the survival of these sensitive species. Crossing of the Leland-Harris Spring Complex area would also require a permit under Section 404 of the Clean Water Act (1972) if any filling were to occur within jurisdictional wetland areas.

Except for the impacts to sage grouse leks (Links 263, 266, and 620) and the potential impacts to the Leland-Harris Spring Complex (Link 620), committed mitigation measures (described in the beginning of this section) would effectively mitigate these high initial impacts to insignificant levels. Residual impacts to sage grouse would be adverse, long term, and significant despite mitigative measures. Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g. golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

Initial high impacts to critical deer winter range and pronghorn habitat would occur for 0.7 miles from increased public access south of the Drum Mountains (Link 640). Mitigation measures (discussed in the beginning of this section) would effectively mitigate these impacts to insignificant levels.

Vegetation/Sensitive Plant Species - No known populations of sensitive plant species or communities are known to occur along the Direct Route.
Cutoff Route

**Wildlife** - From the North Steptoe substation site to the Little Hills (Links 262, 263, 265, 266), this route would result in the same potential impacts to wildlife as described for the Direct Route.

Impacts from increased public access and ground disturbance activities along the remainder of the Cutoff Route (Links 267, 268, 462, 470, 540, 571, 572, 580, 581, 582) would be to pronghorn, mule deer, bald eagles, sage grouse leks and sage grouse wintering grounds. In the northern portion of the Snake Valley (Link 267), high initial impacts would occur in pronghorn winter range, sage grouse leks, and bald eagle habitats. Further south in the Snake Valley (Link 268), the route would result in a total of approximately 2.2 miles of high initial impacts to crucial pronghorn habitat and key deer winter range, as well as one golden eagle nest location. Approximately 0.5 miles of high initial impact would occur where public access would increase significantly in critical deer and antelope winter range further south in the Snake Valley (Link 268). This route would result in another 2.4 miles of high initial impact to key deer winter range and migration corridors (between mileposts 21.3 to 23.6) in the Confusion Range (Link 462). Mitigation measures (discussed in the beginning of this section) would effectively mitigate these impacts to insignificant levels, except for the adverse and significant impacts to sage grouse leks on Link 267.

Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g. golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

Approximately 3.5 miles of initial high impacts to critical pronghorn habitat, key deer winter range, and deer migration routes would occur in the Confusion Range (Link 462). In addition, the route would result in approximately 0.3 miles of high initial impact to pronghorn habitat in Whirlwind Valley (Link 470). No other high initial impacts would be expected to occur on the Cutoff Route. Mitigation measures (described at the beginning of this section) would be expected to effectively reduce these high impacts to insignificant levels.

**Vegetation/Sensitive Plant Species** - No known populations of sensitive plant species or communities occur along this alternative.
230kV Corridor

Wildlife - From the Robinson Summit substation site to the Buckskin Hills, initial impacts along the 230kV Corridor Route from increased public access and ground disturbing activities would generally be moderate with scattered areas of high impact. On Link 350, 1.1 miles of initial high impacts would result because of sage grouse leks. Initial high impacts on Link 351 are associated with sage grouse leks and long-billed curlew habitat (0.8 miles), ferruginous hawk nests and habitat, sage grouse winter grounds, long-billed curlew and sandhill crane habitat (approximately 2.1 miles).

Link 370 has approximately 4.5 miles of potentially high initial impacts as a result of the presence of ferruginous hawk nests and habitat, long-billed curlew and sandhill crane habitat, and bald eagle wintering grounds. On Link 380, a total of approximately 9.4 miles of high initial impacts would be expected due to the presence of ferruginous hawk nests and habitat, sage grouse leks, long-billed curlew habitat, bald eagle wintering areas, elk and deer summer range, and crucial elk winter range.

A total of approximately 1.6 miles of high initial impacts to key habitat areas for elk, critical pronghorn habitat, key deer winter range, (key) water source, and nesting areas for ferruginous hawks, bald eagles, and long-billed curlews would occur where the route crosses the southern end of the Schell Creek Range (Link 380) on the Humboldt National Forest and traverses the Snake Valley (Link 461). Initial high impacts on Link 462 (approximately 3.5 miles) would be reflected by the presence of critical pronghorn habitat, key deer winter range, and a deer migration area. There would be 0.3 miles of potential high initial impact associated with Link 470 (critical pronghorn habitat). No other high initial impacts from increased public access would be expected on the 230kV Corridor route.

Applying mitigation would result in only 0.1 miles of high residual impact to wildlife on the 230kV Corridor. Moderate residual impact persists in the Schell Creek Range (Link 380) where potential public access to long-billed curlew and ferruginous hawk habitat would increase significantly. With mitigation, most high initial impacts would be expected to be reduced to low or indiscernible for most of the route.

From the Buckskin Hills, in Utah, to the Intermountain substation site (Links 462, 470, 540, 571, 572, 580, 581, and 582), potential impacts to wildlife for the 230kV Corridor Route would be same as those described for the Cutoff Route.

Vegetation/Sensitive Plant Species - No known populations of sensitive plants are known to occur along this alternative.

Southern Route

Wildlife - The Southern Route originates at the Robinson Summit substation site and traverses south through Jakes Valley. Increased public access and ground disturbing activities would result in a total of approximately 54 miles of high initial impacts. On Link 364, approximately 12.1 miles of high initial impact would be attributable to the presence of
sage grouse leks on the route. Federal and state biologists are concerned that the SWIP would add yet another cumulative impact on sage grouse populations in southern Idaho and eastern Nevada (refer to cumulative effects section at the end of Chapter 4). Concern has focused on the increase in public access within sage grouse habitats, placement of towers and access roads in strutting or crucial wintering grounds, and the fact that predators of sage grouse (e.g. golden eagles) use the transmission towers as hunting perches. Adult and immature birds and nests are all thought to be vulnerable. Because there is no way to mitigate predation of sage grouse in these areas, these impacts would remain high even after mitigation and would be long term and significant. Also, eliminating access would be difficult, and there would be some potential for disturbance and poaching in addition to the loss of habitat and disturbance due to construction activities.

Link 420 would have 6.2 miles of high initial impact due to potential disturbance to ferruginous hawk nests, ferruginous hawk habitat, antelope kidding grounds, and long-billed curlew habitat. There would also be high initial impacts to key deer winter range on Link 430, and critical pronghorn habitat on Link 450. Link 451 would be characterized by a substantial 28.5 miles of potentially high initial impact associated with the presence of a number of sensitive features including critical pronghorn habitat, key deer winter range, important water sources, raptor nesting areas, and ferruginous hawk nests. Most of the initial high impacts on this link (23.0 miles) would be associated with important pronghorn habitat. There would be 0.5 miles of high initial impact on Link 490 associated with a known ferruginous hawk nest. In addition to these potentially high initial impacts, additional moderate effects to pronghorn, deer winter range, sage grouse leks, ferruginous hawk habitat and long-billed curlews would be anticipated.

Mitigation measures (described at the beginning of this section) would be expected to effectively reduce most of the high impacts along this route to insignificant levels, except for approximately 10.3 miles of high residual impacts would remain due to unavoidable, long-term, deleterious effects on sage grouse leks on Link 364 (refer to discussion above).

From the Smelter Hills substation site to the Intermountain substation site (Links 571, 572, 580, 581, and 582), potential impacts to wildlife would be the same as described for the Cutoff Route.

Vegetation/Sensitive Plant Species - Isolated areas of high initial impacts are expected in areas where five species of sensitive plants that occur along the centerline of this route would be directly impacted by ground disturbance. Two Category 2 species, *Cryptantha compacta* and *Eriogonum ammophilum* occur at the southern tip of the Tule Valley (Link 451). A third Category 2 species, *Astragalus uncialis* occurs in the Swasey Wash on Link 490. *Penstemon nanus*, an S3 species in Utah, has also been found along the centerline in the Tule Valley (Link 451). *Sclerocactus pubispinus*, a species protected by the Cactus and Yucca Law of Nevada occurs along the centerline near the southern end of the Snake Range (Link 430). This species, which is also a federal Category 3 candidate, also occurs on Link 451 in the Tule Valley of Utah.

Residual impacts to these species would be expected to be low following application of appropriate mitigation measures.
Populations of *S. pubispinus, A. uncialis, Sphaeralcea caespitosa, Eriogonum eremicum, A. callithrix*, and *E. natum* occur within one mile of the study corridor centerline in various areas. These plants, however, should not be directly impacted if access to the right-of-way is adequately controlled.

**HUMAN ENVIRONMENT**

**Land Use Resources**

**Introduction**

The primary issues associated with the construction of the proposed 500kV transmission line are expected to occur from the direct physical conflicts with land uses (e.g., agricultural operations, irrigation systems, airport clear zones, other utilities). A transmission line can also result in indirect land use impacts to quality of the recreation experience available to users of developed recreation sites and recreation areas (e.g., campgrounds, picnic areas, natural areas, wilderness study areas).

The potential adverse effects to land uses from the construction and operation of a transmission line related to the improvement of existing roads or construction of access roads, the physical presence of the line, and right-of-way encroachment are described in this section. In addition, this section also describes the potential effects of the SWIP on the land and resource management policies and land management plans of federal, state, and local agencies.

**Methods**

A resource sensitivity evaluation determined how susceptible the different land uses would be to changes that would result from the construction and operation of a 500kV transmission line. To determine the sensitivity of the inventoried land uses, the functional, social, and economic effects to each land use were considered.

Sensitivity is a measure of the probable adverse responses that a land use would have to the direct and indirect impacts associated with the construction and operation of the proposed transmission line. The adverse effects depend on three major criteria:

- the susceptibility of the land use to the *potential changes* caused by construction and operation activities
- the *significance* of the potential changes to the land use
- the local or regional *importance* of the land use
Once established, these sensitivity criteria were systematically applied to each land use. The degree or level to which each land use is sensitive to the introduction of a 500kV transmission line is dependent upon the relationship between the above criteria. The results of the resource sensitivity evaluation were used to determine potential impacts to land uses.

Using the impact assessment and mitigation planning process, the predicted effects of the proposed project were compared with the pre-project environment to determine the initial impacts on land use resources that would result from each alternative route. Generic and selectively recommended mitigation measures that would effectively reduce or eliminate impacts were then applied to initial impacts to determine the "residual" impacts of the SWIP on land use resources. The land use resources that were assessed include five major categories:

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

Initial impact levels were determined through a GIS model that described the location and magnitude of potential impacts. For a particular land use feature or area of affected resource, impacts were only assessed along the assumed centerline of each alternative route. The GIS impact assessment model assigned appropriate mitigation through a matrix to determine residual impacts. The GIS model generated maps and tabular reports to qualify and quantify initial impacts, recommended mitigation, and residual impacts in one-tenth mile increments along the centerline of each alternative route.

The data for the five land use categories are compiled in the data tables that accompany the technical report. The data tables show the milepost location of potential impacts, the access level (ground disturbance level), the land use feature or theme affected, the initial impact level, the recommended mitigation measure(s), and the residual impact level.

The high residual impacts that could significantly affect land use resources are described in the results section by alternative route. The following sections describe the impact types associated with the development of the proposed transmission line and summarize the mitigation measures that were recommended to reduce initial impacts. Refer to technical report for a detailed description of the impact assessment and mitigation planning process (refer to Appendix H for the locations where technical reports can be reviewed).

Impact Types

Impact types were identified by considering what effects the construction and operation of a 500kV transmission line and related facilities could have on the pre-project, or existing, environment. Inventoried land uses were evaluated to determine the types of the potential direct and indirect impacts that could occur along the assumed centerline routing alternatives.
The impact types identified for land use categories, mentioned previously, are characteristically direct and long-term, and include any impact that:

- displaces, alters, or otherwise physically affects any existing, developing or planned residential, commercial, industrial, governmental, or institutional use or activity
- displaces, alters, or otherwise physically affects any existing agricultural use or activity
- displaces, alters, or otherwise physically affects any area designated as suitable for timber production
- alters or otherwise physically affects any established, designated or planned park, recreation, preservation, or educational use area or activity
- affects applicable general and regional plans and/or approved, adopted, or officially stated policies, goals, or operations of communities or governmental agencies

Mitigation

Generic mitigation measures were applied to all affected areas (refer to Table 4-1). A set of selectively committed mitigation measures were applied, on a case-by-case basis where appropriate, to minimize potential initial high and moderate impacts levels identified during the first part of the impact assessment (refer to Table 4-2). Four of the mitigation measures from Table 4-2 were committed to in order to reduce potential land use impacts.

Two of these measures were designed to minimize the effects of new access road that would be built to access transmission tower construction sites by requiring that existing access be utilized where ever possible (#1) and by rehabilitating new access roads in remote areas following construction (#4). For localized effects or conflicts, measure #6 recommends that a potential conflict be avoided by adjusting the centerline. Where other linear features (e.g., roads, highways, canals, rivers) would be crossed, measure #8 would recommend that transmission line towers be placed at the maximum feasible distance from the crossing.

Results

No high residual impacts to land use resources were identified for any of the alternative routes described in this document.

Residual impacts to agricultural land uses are generally expected to be low. Specific locations of towers on agricultural lands would be negotiated with landowners during right-of-way acquisition, for the selected route. In addition, specific locations of transmission line
towers on private lands (e.g., ranch, range or pasture lands) would be negotiated between the utility and the landowner. Potential impacts from soil disturbance or compaction of soils on cultivated lands are expected to be short-term (e.g., during construction). Mitigation of potential operational conflicts with mechanized farm equipment and irrigation systems would also be negotiated with individual landowners during right-of-way acquisition.

Generally, the alternative routes would result in low to no identifiable impacts to range and range improvements. Potential impacts to fences, waterlines, and access rights-of-way can be easily mitigated by tower placement during engineering design and preconstruction activities for the SWIP. Because potential impacts can be mitigated, the impact assessment does not attempt to assign a level of impact to potential effects on range improvements. Potential impacts to range improvements would be specifically mitigated for the selected alternative route through the generic mitigation measures outlined in Table 4-1 and stipulations that will appear in the Construction, Operation, and Maintenance (COM) Plan to be developed prior to construction. Tables 4-3 and 4-3a list by alternative route and for each range allotment the name, total acreage, the approximate area of disturbance, and the approximate area of each allotment where "viable" forage cover would be disturbed. Viable forage cover was considered to be those land cover types that can sustain forage plant species. Of the 13 landcover types classified from Thematic Mapper satellite data, only basaltic flows, and water were considered non-viable (also refer to Landcover maps in Map Volume). The column in Table 4-3 and 4-3a labeled "Viable Acreage" indicates the area of a grazing allotment that would be temporarily taken out of production by ground disturbance.

All the alternative routes would cross mining claims. The total mileage of mining claims that would be crossed by each route is listed in Tables 2-4 and 2-5. The construction of the proposed transmission line would have no identifiable impact on mining claims. However, the presence of mining claims in the right-of-way could potentially affect the operation of the line if locatable minerals were discovered. In light of the recent trends in mining practices in Nevada toward heap-leach techniques, greater areas of land are covered by mining claims. The area below the right-of-way of the proposed transmission line would likely not result in significant loss of recoverable minerals. However, if a mining claim predates the right-of-way grant for the transmission line, and the claimant wants to reach what is believed to be a rich ore deposit, the right-of-way holder (the utility) would have to move the transmission line or negotiate an acceptable monetary payment for the mineral rights.

No high residual impacts to the quality of recreation experience available in parks, recreation, and preservation areas are expected as a result of the any of the alternative routes. Potential impacts to recreation users and their experience are expected to be somewhat lower where an alternative route would parallel an existing transmission line. However, cumulative effects of multiple transmission lines in a corridor would eventually result in greater adverse impacts.

Generally, impacts to the recreation experience result from impacts to the scenic or aesthetic qualities of the surrounding landscape (refer to Visual Resources). Because no Wilderness or WSAs would be crossed or otherwise directly affected, the potential impacts to the recreation experience in these areas is associated with the visual effects of the SWIP as seen from viewpoints within the boundaries of these areas.
Potential impacts would be reduced by selectively applying mitigation where appropriate. Construction access roads would be placed to avoid impacts to highways, trails, and recreation sites and areas, where possible. The use of existing roads and overland access, where possible, to construct the proposed project would effectively reduce any potential land use impacts.

**Alternative Routes Midpoint to Dry Lake**

**Route A**

No high residual impacts to land use resources are expected to occur along this route. Approximately 21.4 miles of irrigated prime and unique farmland and 16.8 miles of other agricultural lands would be crossed by this route. Specific tower placement and centerline position (e.g., along section lines, roads, etc.) would reduce the potential impacts to farm operations and agricultural production to low. The presence of a transmission line can be hazardous to aerial crop spraying operations and typically increase costs to farmers when they cross agriculture lands. The additional amounts of pesticides generally needed to cover the areas around transmission line are often charged directly to the farmer.

From the Midpoint Substation to Jackpot, some low and moderate residual impacts would result where the route would cross parks, recreation, or preservation sites or areas including the Minidoka Relocation Center Interpretive Site north of Eden (Link 20), the Oregon Trail (Link 41) southwest of Murtaugh, and the Salmon Falls Creek Reservoir Special Recreation Management Area (SRMA) located east of Browns Bench (Links 50, 64, 70). The Salmon Falls Creek SRMA, in Nevada, would also be crossed west of Jackpot (Link 711).

From Jackpot to the North Steptoe substation site, the route would cause some indirect impacts to recreation users where this route would cross the California National Study Trail adjacent to West Bush Creek (Link 1612). The California Trail Scenic Back Country Byway, the Pony Express Trail south of Cherry Creek Station (Link 291), and U.S. Highway 93, designated a scenic highway, in Dry Lake Valley west of Caliente (Link 675) (refer to Visual Resources section).

Route A would result in a total of 64.1 miles of moderate impacts to military operating areas (MOAs), where the portion of each route, from the Ely area to Dry Lake are common (Links 672, 673, 675, 690) in southern Nevada. The construction and operation of the proposed 500kv transmission line in these MOAs would have potentially direct conflicts with low level flight training operations in these areas. Nellis Air Force Base (AFB) has expressed concerns that the height and location of towers could interfere with low-level flying and would be potentially hazardous to pilots. In addition, the Air Force would have to alter flight plans and established training exercises.

In addition, moderate impacts are expected to result where Route A would pass through the edge of the clear zone of two unpaved utility airstrips along this segment of the route. The route would pass parallel one mile to the east of an airstrip located west of Caliente at the southern end of Delamar Valley (Link 671) near U.S. Highway 93. The route would pass
parallel and adjacent to another airstrip located in Delamar lake bed of the southern portion of Delamar Valley (Link 690).

**Route B**

From Midpoint Substation to Jackpot, potential impacts to land use resources for Route B would be the same as those described for Route A. No high residual impacts are expected to occur along this route.

From Jackpot to the North Steptoe substation site, this route would result in indirect impacts to the recreation experience including the California National Study Trail and the California Trail Scenic Back Country Byway in Thousand Springs Valley (Link 140) and to the California National Study Trail in the Toano Draw (Link 222) (refer to Visual Resources section). Route B would result in approximately 11.5 miles of moderate residual impacts to the R-6405 Restricted Area (Links 222, 224, 226) operated by Hill AFB. Transmission towers would cross the northwest corner of this restricted military air space and could interfere with low-level flying operations.

From North Steptoe substation site to the Dry Lake substation site, potential impacts to land use resources for Route B would be the same as those described for Route A.

**Route C**

From Midpoint Substation to Jackpot, potential impacts to land use resources for Route C would be the same as those described for Route A. No high residual impacts are expected to occur along this route.

From Jackpot to the North Steptoe substation site, there would be indirect impacts to the recreation experience of users where the route would cross the California National Study Trail and the California Trail Scenic Back Country Byway in Thousand Springs Valley (Link 140), the California National Study Trail, crossed southeast of Oasis (Link 211) and again south of Shafter (Link 212) (refer to Visual Resources section).

From North Steptoe substation site to the Dry Lake substation site, potential impacts to land use resources for Route C would be the same as those described for Route A.

**Route D**

From Midpoint Substation to Jackpot, potential impacts to land use resources for Route D would be the same as those described for Route A. No high residual impacts are expected to occur along this route.
From Jackpot and the North Steptoe substation site, Route D would result in some indirect impacts where it crosses portions of the California National Study Trail adjacent to Flats Creek (Link 170), in the vicinity of Wells (Links 170), and in the Pequop Mountains (Link 190) (refer to Visual Resources section).

From North Steptoe substation site to the Dry Lake substation site, potential impacts to land use resources for Route D would be the same as those described for Route A.

**Route E**

From Midpoint Substation to Jackpot, potential impacts to land use resources for Route E would be the same as those described for Route A. No high residual impacts are expected to occur along this route.

From Jackpot to the North Steptoe substation site, this route would cause some moderate impacts to the experience of recreation users where the route would cross portions of the California National Study Trail in Goshute Valley (Link 222) and adjacent to West Bush Creek (Link 1612) (refer to Visual Resources section).

Route E would result in approximately 11.5 miles of moderate residual impacts to the R-6405 Restricted Area (Links 222, 224, 226) operated by Hill AFB. Transmission towers could interfere with low-level flight operations where this route would cross the northwest corner of this military air space.

From North Steptoe substation site to the Dry Lake substation site, potential impacts to land use resources for Route E would be the same as those described for Route A.

**Route F**

From Midpoint Substation to Jackpot, Nevada, this route would result in approximately 32.0 miles of low impacts to irrigated prime and unique farmland and 22.0 miles of other agricultural lands crossed by this route. However, specific tower placement and centerline position (e.g., along section lines, roads) would mitigate potential impacts to farm operations and agricultural production.

Route F would cause indirect impacts to the recreation experience of users of the Oregon Trail east and southeast of Hagerman (Links 61, 64) the Hagerman Fossil Beds National Monument (Link 64), the Salmon Falls Creek Reservoir SRMA east of Browns Bench (Links 64, 70), and the Snake River Rim Recreation Area (Link 61) (also refer to Visual Resources section).

Moderate impacts would be expected to result where this route would pass through the edge of the clear zone of an unpaved utility airstrip that is used by crop dusters during agricultural spraying operations near Hagerman (Link 64).
From Jackpot to the North Steptoe substation site, indirect impacts to the recreation users would result where the route would cross the Salmon Falls Creek SRMA in the foothills southwest of Jackpot (Link 72), the California National Study Trail, southeast of Oasis (Link 211) and again south of Shafter (Link 212), and the California Trail Scenic Back Country Byway in Thousand Springs Valley (Link 140) (refer to Visual Resources section). From the North Steptoe substation site to the Dry Lake substation site, potential impacts to land use resources for Route F would be the same as those described for Route A.

Route G

From Midpoint Substation to Jackpot, potential impacts to land use resources for Route G would be the same as those described for Route A. No high residual impacts are expected to occur along this route.

From Jackpot to the North Steptoe substation site, indirect impacts to the recreationists would be expected to occur where this route would cross the California National Study Trail in Thousand Springs Valley (Link 151), southeast of Oasis (Link 211), and south of Shafter (Link 212). There would be similar indirect impacts where this route would cross the California Trail Scenic Back Country Byway in Thousand Springs Valley (Link 151).

From North Steptoe substation site to the Dry Lake substation site, potential impacts to land use resources for Route G would be the same as those described for Route A.

Alternative Routes Ely to Delta

Direct Route

No high residual impacts to land use resources are expected to occur along this route.

The route would result in a total of 57.3 miles of moderate residual impacts to the R-6045 Restricted Area (Link 630) and would cross 46.9 miles through portions of the Gandy, Sevier A, and Sevier B military operating areas (MOAs) (Links 572, 580, 620, 621, 630, 640). These areas are part of the Utah Testing and Training Range (UTTR) operated by Hill AFB. The construction and operation of the proposed 500kv transmission line in these MOAs would have potentially direct conflicts with low level flight training operations in these areas. Hill AFB has expressed concerns that the height and location of towers in the MOAs or in the R-6405 Restricted Area could interfere with low-level flying and would be potentially hazardous to pilots. Further, the Air Force would have to alter flight plans and established training exercises.

Potential conflicts are expected to be minimized through the use of shorter towers in critical areas. The Project Sponsor has negotiated locations for shorter towers in negotiations with Hill AFB. These locations are indicated in the column labeled "Recommended Mitigation" in the technical reports (refer to Appendix H for the locations where technical reports can be
reviewed). In the R-6405 Restricted Area, Hill AFB has stated that 30-foot-2 high towers would be required to avoid potential conflicts with low-flying aircraft. The minimum ground clearance for a 500kV transmission line would make this impractical.

Cutoff Route

No high residual impacts to land use resources would be expected along this route. Indirect impacts would occur where this route would cross the Pony Express Trail in the Spring Valley Creek area near Stonehouse (Link 265) (refer to Visual Resources section).

This route would result in approximately 123.0 miles of low residual impacts to portions of the Gandy, Sevier A, and Sevier B MOAs (Links 265, 267, 268, 462, 470, 540, 571, 572, 580) portion of the UTTR. This route would also pass through the southwest corner of the R-6405 Restricted Area for approximately 2 miles (Link 267). The mitigation of using shorter towers is expected to reduce moderate initial impacts and result in low residual impacts. Like the Direct Route, locations along the Cutoff Route for shorter towers have been determined in negotiations with Hill Air Force Base.

230kV Corridor Route

No high residual impacts to land use resources would be expected along this route. There would be approximately 1.2 miles of moderate initial impacts to irrigated prime and unique farmland where the route would cross agriculture lands in the vicinity of Delta (Links 540, 571, 572, 580, 581, 582). Specific tower placement would effectively mitigate the direct impacts to farm operations and agricultural production.

Indirect impacts to the experience of recreation users would occur where this route would cross Success Loop southeast of Ely, Nevada (Link 380), which also serves as a main access road to Cave Lake State Recreation Area and into the Humboldt National Forest. Similar impacts would also result to the recreation users of Silver Creek Road, a recreation destination road that provides primary access (Link 460) to the Mount Moriah Wilderness Area from U.S. Highway 50 (refer to Visual Resources section).

Similar to the Cutoff Route, this route would result in a total of about 79.0 miles of low impacts to portions of the Sevier A and Sevier B MOAs (Links 462, 470, 540, 571, 572, 580), part of the UTTR. Using shorter towers would effectively mitigate the initial impacts. Locations for shorter towers have been determined in negotiations with Hill AFB.

Southern Route

No high residual impacts to land use resources would be expected to occur along this route. This route would result in indirect impacts to recreation users of the proposed Horse and Cattle Camp Backcountry Byway in southern end of the Steptoe (Link 364) and the roads that
provide access to the Mt. Grafton (Link 364), Fortification Range (Link 420), King Top (Link 451), and Notch Peak (Link 451) WSAs (refer to Visual Resources section).

The route would cause a total of approximately 102.5 miles of low residual impacts to portions of the Sevier A and Sevier B MOAs (Links 450, 451, 490, 510, 560, 571), part of the UTTR. Using shorter towers would mitigate impacts to low. Locations along this route for shorter towers have been determined in negotiations with Hill AFB.

Visual Resources

Introduction

Visual resource impacts would result from the construction, operation, and maintenance of the proposed SWIP 500kV transmission line. Specifically, the impacts would be caused from the line being seen from sensitive viewpoints and from the effects to the aesthetic values of the landscape. Impacts to views are the highest when viewers are identified as being sensitive to change in the landscape, and their views are focused on and dominated by the change. Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or from parks, recreation and preservation areas, highways and travel routes, and important cultural features and historic sites.

Methods

The visual resource inventory for the SWIP study corridors consisted of the following components (also refer to Chapter 3):

- landscape character types and physiography
- scenic quality/variety class
- sensitive viewpoints
- visibility from sensitive viewpoints
- distance zones/visibility thresholds
- visual management classes (VRM/VQO)

The existing visual condition of the landscape that would be affected by the alternative routes is described by these components. The visual impacts that would result from the construction and operation of a 500kV transmission line are usually direct, adverse, and long-term. This analysis considered the potential impacts of changes in the landscape on:

- views from residences
- views from parks, recreation, and preservation areas
- views from travel routes
- views from sensitive cultural sites (e.g., historic landmarks)
The quality of scenic or natural aesthetic resources
• compliance with agency visual resources management objectives

The impact assessment is based on the guidelines in the BLM's Visual Resources Management 8400 Series (BLM 1986) and the Forest Service (FS) visual resource management systems (VMS) Chapter 2 (FS 1974). The methods and procedures described in these documents guided the collection of the visual resource inventory and were adapted to address the specific visual issues related to the construction, operation, and maintenance of the SWIP.

The visual analysis was conducted using a GIS to model the seen area, to derive maps and data tables, and document the effects of the proposed project. Several of the inventory maps were derived through computer models that utilized other available data in the system. For example, to determine project visibility from sensitive viewpoints, viewshed mapping was derived through a GIS computer model that "looked out" from selected viewpoints over terrain modeled from USGS digital elevation terrain to establish what portion of the landscape would be visible from a particular viewpoint. This model and the visual contrast model are referred to as pre-assessment models (refer to the Objectives, Procedures, and Results and the technical reports for further explanation of the GIS models).

Photo simulations - Important views and areas where issues of potential visual impacts were of high concern were further evaluated using photographic simulations techniques. Simulations were used to evaluate the accuracy of the predicted visual impacts, to determine the effectiveness of recommended mitigation, and to illustrate the expected impacts to the concerned agencies and the public. Some of these simulations are in the Map Volume. The viewpoints for which simulations were prepared include:

• Minidoka Relocation Center National Historic Site - views from a site on the National Register of Historic Places (Link 20), where Americans of Japanese descent were interned during World War II

• Contact - the potential visual effects of the crossing of U.S. Highway 93 (Link 102) by the SWIP parallel to two existing transmission lines north of Contact, Nevada

• Contact to Jackpot - view of the SWIP and two existing transmission lines parallel to U.S. Highway 93 (Link 101) between Contact and Jackpot, Nevada

• North Steptoe substation site - the view west from U.S. Highway 93 at a proposed alternative substation site in North Steptoe Valley is shown in this simulation

• Cave Lake State Recreation Area - the view of the SWIP crossing of the entrance road (Link 380) into the Cave Lake State Recreation Area (part of the Success Loop, a scenic route)

• Oasis - a view of the proposed SWIP transmission line crossing of the Interstate 80 (Link 211) near Oasis, Nevada, where the BLM has designated a low visibility corridor along Interstate 80
• Lake Valley Summit - the view from a proposed interpretive site for Great Basin National Park on Utah State Highway 21 (Link 451)

• Sacramento Pass - two photosimulations were prepared for this viewpoint illustrating the effects of self-supporting steel lattice towers and H-frame towers to views of Wheeler Peak from U.S. Highway 6/50 (Link 460)

• Great Basin National Park visitor center - the view of the SWIP where it would parallel a pair of existing 230kV transmission lines (Link 461) across the Snake Valley (the computer-based perspective drawing demonstrated that transmission line towers would be almost imperceptible at the viewing distance of 20+ miles)

• Bristol Wells - the view of the proposed SWIP transmission line from Bristol Wells (Link 674), a site on the National Register of Historic Places.

• Pahranagat Wash - the view south on U.S. Highway 93 (Link 690) near the Pahranagat Wildlife Refuge

These photo simulations were created using a combination of computer drawing techniques and hand rendering. Accurate perspective drawings of the proposed transmission line were completed using a computer. These drawings were combined with a three-dimensional model of the topography of the landscape created by computer to create an accurate representation of the scale and perspective of the transmission line as it would be seen from the viewpoint. The composite drawings guided the rendering of the transmission line and physical changes in the landscape directly onto photographs of a view. Renderings, using fine brushes, ink, pencils, and airbrush, created the "realistic" representations of features and elements in their respective colors, texture, lighting, and visual elements. Some of these simulations are located in the Map Volume.

Visual Contrast - Visual contrast is defined as a measure of physical change in the landscape that would result from the introduction of a project. The presence of the towers and conductors, substations, series compensation stations, microwave facilities, access roads, and other ancillary facilities cause visible change in the landscape. Potential visual impacts are determined by analyzing how visual contrasts are perceived from sensitive viewpoints. Visual contrast mapping was derived through a series of GIS models that generated mapping for three contrast components:

• landform contrast
• vegetation contrast
• structure contrast

Contrast levels of strong, strong-moderate, moderate, moderate-weak, and weak were delineated on maps for each of these three components. Overall visual contrast levels of strong, moderate, and weak were derived in GIS by combining the maps of landform, vegetation, and structure contrast. Each of the contrast components are described below.

Landform contrast is the change in landforms, exposure of soils, potential for erosion scars, slumping, and other physical disturbances that would be noticed as uncharacteristic in the
natural landscape. Landform contrast was determined through a GIS model that used the degree of ground disturbance that would be expected to result from access road construction, tower assembly and erection, and other ground disturbing construction activities.

Vegetation contrast is the change in vegetation cover and patterns that would result from construction activities. Vegetation contrast was determined through a GIS model that evaluated the diversity and complexity of vegetation types and patterns in the area along alternative corridors. Diversity is a major criteria in determining the inherent capability of the landscape to absorb visual change. The model determined vegetation diversity by evaluating the number of different landcover types encountered in the vicinity of alternative corridors. Land cover types were established from data classified on recent Thematic Mapper satellite imagery.

Structure contrast examined the compatibility of the proposed transmission line facilities with other structures in the landscape and the existing natural landscape. Structure contrast is typically strongest where there are no other structures (e.g., buildings, existing utilities) in the landscape setting. The key element in determining structure contrast for this project was the presence or absence of existing transmission lines. Structure contrast would be considerably weaker where the SWIP would parallel other transmission lines, especially lines of similar structure types. The structure contrast levels of proposed tower types for the SWIP and existing transmission lines paralleled by the alternative corridors are illustrated in the Technical Report (refer to Appendix H for locations where technical reports can be reviewed).

Visual Impacts - The potential effects of the visual contrasts that would be associated with the SWIP are described first in terms of visual impacts to viewers and impacts to the scenic quality of the natural landscape. In addition, visual effects are described in terms of their potential to comply with agency visual management direction, VRM and VQO. Initial visual impacts were determined by analyzing the visibility contrasts caused by the SWIP from sensitive viewpoints.

Generally, strong visual contrasts in the landscape viewed from high sensitivity viewpoints within a mile would result in high initial impacts. Visual impact levels generally get lower as visual contrasts become weaker or as the distance from the viewpoint increases. These contrasts are defined as follows:

**High**  
Strong visual contrast associated with the presence of the transmission line and vegetation removal and/or exposure of contrasting soil/rock color from ground disturbing activities that are visible from high sensitivity viewpoints (e.g., residences, recreation sites, scenic routes, etc.) within the 0-1/4 mile and 1/4 - 1 mile distance zones. Also, the result of moderate visual contrasts visible from high sensitivity viewpoints within the 0-1/4 mile distance zone.

**Moderate**  
Weak visual contrasts visible from high sensitivity viewpoints within the 1/4 - 1 mile distance zones and strong or moderate visual contrast visible in the 1 - 3 mile distance zone.
Low Weak visual contrast visible from high sensitivity viewpoints within the 1-3 miles distance zone, and strong, moderate, or weak contrast visible within the 3 miles and beyond distance zone.

In some cases, extensive areas of moderate impacts were considered to be significant. For example, a route adjacent to an existing transmission line that parallels a moderate sensitivity road (e.g., U.S. Highway) for several miles. This case would result in moderate impacts to views of travelers for several miles. Because of the extended duration of the view, these moderate impacts would be considered significant.

Mitigation - Potential initial visual impacts can be effectively reduced through mitigation measures that reduce the visibility of the project from sensitive viewpoints and/or the visual contrasts associated with the line (e.g., towers and conductors, access roads). Selectively committed mitigation measures (refer to Table 4-2) would be applied on a site specific basis when visual contrasts could be expected to be effectively reduced. In many cases high initial impacts that would be considered significant could be reduced to moderate impacts that would not be considered significant. Although in certain cases, the residual impact level (after mitigation) may be the same as initial impact level. Where this occurs, the mitigation is still considered effective in reducing visual contrasts, even though the residual impact may still be considered significant. A set of generic mitigation measures (refer to Table 4-1) would be applied to all impacted areas.

The use of nonspecular (nonreflective) conductors and dulled structures in sensitive viewsheds could substantially reduce visual contrasts. This mitigation measure involves treating structural and conductor surfaces to minimize the reflection of sunlight from the transmission line under specific lighting conditions. Other mitigation measures involve using modified or alternative tower types, positioning towers to match the span of existing lines being paralleled (where feasible), or placing towers at the maximum distance away from a road or trail crossings. The locations of specific mitigation recommendations along each alternative study are listed in the technical reports (refer to Appendix H for the locations where technical reports can be reviewed).

Results

Residual visual impacts in areas of VRM Class III and Class IV are expected to meet the guidelines of these management classes following the application of generic and selectively recommended mitigation measures to reduce visual contrasts.

BLM has expressed concerns for potential visual impacts to dispersed recreation viewpoints within WSAs and designated Wilderness areas. Because of the dispersed nature of recreation use within these areas, no specific viewpoints could be identified and no specific impacts or recommended specific mitigation could be made for these areas. However, IPCo has committed to recommended mitigation based on the distance from alternative route segments to the boundaries of these areas. Specifically, nonspecular conductors would be used where a route would pass within 1 to 3 miles of a WSA or wilderness area boundary, and a