Chapter 4 Environmental Consequences

In this Chapter:

- **Specific impacts from alternatives**
- **Mitigation**
- **Cumulative impacts**

For Your Information

Review Chapter 2 for a full description of the alternatives.

Impacts from the Single-Circuit Line Alternative would be the same as the Agency Proposed Action with some exceptions.

Impacts from the Short Line Alternative would be the same as the Single-Circuit Line Alternative from Targhee Tap to Teton Substation.

See Map 1 to review locations.

***Cumulative impacts** are created by the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions.*

Reminder

Mitigation lessens the impacts predicted for each resource. Mitigation may include reducing or minimizing the impact, avoiding it completely, or rectifying or compensating for the impact.

This chapter discusses the potential environmental impacts of the Agency Proposed Action, the Single-Circuit Line Alternative, the Short Line Alternative, the SVC Alternative, and the No Action Alternative.

To analyze potential impacts from construction, operation and maintenance activities, resource specialists analyzed actions using a scale with four impact levels: high, moderate, low and no impacts. Definitions of the impact levels vary with each resource and are given in the first part of each resource discussion.

Specialists considered direct, and indirect impacts in the short and long term. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. The impact discussion lists mitigation that could reduce impacts and ***cumulative impacts*** of the alternatives.

The level of detail in the impact discussion for each affected resource depends on the character of that resource, and the significance of the issue. Additional detail for some resources can be found in appendices.

Construction of the Agency Proposed Action, Single-Circuit Line Alternative and the Short Line Alternative would be typical of other BPA transmission line projects (see Appendix J, **Construction Actions** for detail). Construction steps are in the box below.

Construction Steps

Typical transmission line construction steps include:

- improve or construct access roads,
- clear ROW,
- prepare structure sites,
- excavate and install structure footings or steel poles,
- deliver structures to the sites (steel, insulators, conductors, and other miscellaneous equipment),
- assemble and erect structures,
- string and tension conductor (wire) and ground wire,
- install counterpoise (grounding wire), and
- restore and clean up sites.

4.1 Land Use

For Your Information

Construction, operation and maintenance of transmission line and substation facilities can create temporary and permanent impacts on land use. Land uses within rights-of-way are limited to uses that do not interfere with the safe operation and maintenance of a transmission line. For instance, no buildings or other structures may be built on the ROW, and no flammable materials may be stored there.

*In addition, BPA discourages new uses of its rights-of-way that may increase public exposure to electric and magnetic fields, such as parks and parking lots. Future development of lands next to rights-of-way could also be affected by actual or perceived effects of a transmission line (see Section 4.12, **Socioeconomics**).*

4.1.1 Impact Levels

Impacts would be considered **high** where transmission facilities would:

- preclude the primary existing or planned use of the land, and the area affected is greater than 5 percent of the available land designated for that use county-wide.
- create large areas of nonfarmable farmland (as defined in the Farmland Protection Policy Act (***FPPA***)(7 U.S.C. 4201 *et seq*.) by interference with land patterns and/or prevent or restrict existing farmland operations such as irrigation.

Impacts would be considered **moderate** where transmission facilities would:

- preclude the primary or planned use of the land, and the area affected is between 2-5 percent of the available land designated for that use county-wide.
- adversely affect existing farm operations and/or farmlands as defined in FPPA by construction such that previously unaffected productive land is lost around structures, and/or farm operations are affected by additional inconvenience to operations.

Impacts would be considered **low** where transmission facilities would:

- preclude the primary existing or planned land use of the land, and the area affected is less than 2 percent of the available land designated for that use county-wide, or where the transmission line would pose very minor or temporary impacts.
- create short-term disturbances such as minor crop damage during construction or restrict impacts to previously affected areas (e.g., existing structure locations).

No impact would occur to farmlands if no farmland as defined in the FPPA exists or no agricultural operations would be affected.

4.1.2 Agency Proposed Action

Reminder

Map 2 shows structure numbers and locations. Map 3 shows land use.

4.1.2.1 Impacts

Agriculture — From Swan Valley Substation to structure 4/5 at the base of the Big Hole Mountains, the line crosses Pine Creek Bench, an area of dryland farms that produce primarily wheat and barley. Impacts would be localized. About 0.04-0.12 hectares (0.1-0.3 acre) of wheat and barley would be removed from production for the life of the line from permanent placement of structures. Heavy machinery would damage crops and compact soils, causing a temporary loss of soil productivity. Impacts would be low to moderate.

From structures 4/7 through 5/2 the existing line crosses land used for hay production and pasture. Permanently placing three or four structures would cause the permanent loss of 60-80 m^2 (700-900 ft^2) of productive farmland. Impacts would be low to moderate and long term, with some short-term impacts from construction-related damage to soils and crops.

West of Teton Substation, the proposed transmission line crosses about 1.6 km (1 mile) of land used for pasture. West of Fish Creek, between structures 35/2 to 35/5, horses and cattle graze in a grass and sagebrush pasture. Between Fish Creek and Teton Substation (structures 35/7 to 36/4) the proposed line would cross flood-irrigated pasture. Impacts would be low and short term and include grazing interruptions and soil compaction. There would be no long-term impacts since the new double-circuit structures would occupy about the same amount of land as the existing wood pole structures.

Timber and Range — Clearing for the new line and access roads would remove about 31 hectares (77 acres) of timberlands. On the Targhee National Forest, removal of this amount would cause a low impact because though these lands are not part of the amount available for harvest, removal for other purposes is limited in the next decade according to the Revised Forest Plan (U.S. Department of Agriculture, Forest Service, 1997). On the Bridger-Teton National Forest, the amount harvested would be less than 1 percent of the available supply of timber, causing impacts to be low.

Rangelands used for cattle and sheep grazing are scattered throughout the existing ROW. Conflicts between livestock and construction equipment are not expected to occur on the ROW or at staging areas because equipment would be operated at slow speeds and cattle would likely move to more quiet areas, away from construction activities. With mitigation listed in Section 4.1.2.2, no adverse impacts to grazing are expected from adding new ROW or from staging areas.

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Routing Options A-C and E — Impacts for these options are included in the timber and range discussion above.

Pine Creek Routing Option D (preferred) — Combining the new and existing line on two to four double-circuit structures on the north side of State Route 31 would reduce the amount of ROW that would be needed over constructing the new line on new ROW; this would be a beneficial effect.

Residential and Commercial — Teton Substation and adjacent lands to the north, east and south are zoned "NC-SF" (Neighborhood Conservation-Single Family). Since all new line termination equipment would be placed within the existing property boundary at Teton Substation, no zoning changes would occur. Section 2390 of the Teton County Development Regulations requires that all utilities be located and designed to minimize negative impacts on natural, scenic, agricultural and residential objectives. A landscaping plan is required to screen the utility, except for utility lines, from roads and houses. Utility buildings that house utility equipment should be designed with as low a profile as possible and the building style should be compatible with the surrounding land uses, if the surrounding land uses are residential. BPA would strive to meet development regulations by developing and implementing a landscaping plan around Teton Substation and using double-circuit structures from below Phillips Ridge to Teton Substation. Appendix K, **Local Plan Consistency**, discusses Teton County Development Regulations in more detail.

4.1.2.2 Mitigation

- BPA would compensate landowners for any farmland removed from production. Compensation would be offered for the fair market value of the land rights acquired.
- The USFS would be compensated for the marketable timber (see Appendix L, **Property Impacts**).
- Work closely with the USFS, other land managers, and landowners to minimize conflicts and inconvenience from construction and maintenance activities.
- Locate structures outside of agricultural fields where possible or next to existing structures and schedule activities to avoid crop damage.
- Compensate farmers for crop damage, help them control weeds, and restore compacted soils.
- Keep gates and fences closed and in good repair to contain livestock.

- BPA would notify the Palisades and Teton Basin ranger districts of the construction schedule and when staging areas will be in use. This information would be passed on to the grazing permit holders.
- The construction contractor would exercise caution on Highway 31 and 33, access roads to and on the ROW, and USFS Road #253 (at Pine Creek Pass) for the presence of cattle and sheep.
- USFS Road #253 (at Pine Creek Pass) would be kept open for passage. No materials or equipment would block the road at any time.
- Develop and implement a landscaping plan around Teton Substation.
- Use double-circuit structures from below Phillips Ridge to Teton Substation and work with landowners next to the existing ROW from Fish Creek Road to Teton Substation on the color and placement of these new structures.
- Continue to work with landowners adjacent to Teton Substation on placement of new transmission structures and equipment at Teton Substation and on timing and other logistical requirements of construction.

4.1.2.3 Cumulative Impacts

Removal of agricultural land, rangelands, and timberlands from production would be an incremental increase in lands lost to previous development and to future development that were not necessarily intended to be used for utilities.

There would be cumulative impacts to property owners from Fish Creek Road to Teton Substation from adding a transmission line and additional equipment in the substation. The substation was built in 1968. BPA chose that site because no residential neighborhoods existed in the vicinity. Since 1968, property owners have chosen to build homes along the ROW and next to the substation. Residences now exist on the south side of the ROW and surround the substation on three sides. As a result, expanding utilities in neighborhoods can cause conflict in land uses. As utility infrastructure continues to be needed, this conflict can continue.

4.1.3 Single-Circuit Line Alternative

4.1.3.1 Impacts

Impacts would be the same as the Agency Proposed Action except for the following: an additional single-circuit line crossing the last 1.6 km (1 mile) of pasture land to Teton Substation would create low to moderate long-term impacts because a small amount of land occupied by the legs of the new transmission structures could no longer be used for grazing.

4.1.3.2 Mitigation

- Mitigation would be the same as the Agency Proposed Action, Section 4.1.2.2.

4.1.3.3 Cumulative Impacts

Impacts would be the same as in Section 4.1.2.3.

4.1.4 Short Line Alternative

4.1.4.1 Impacts

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap to Teton Substation.

Additional impacts could occur from construction of the switching station near Targhee Tap.

Preferred Site on the ROW - Siting the switching station within the Targhee National Forest would change approximately 0.4 hectare (1 acre) of timberland from multiple use such as recreation/wildlife habitat to a developed industrial use. Since the proposed use would be located within and on either side of the existing transmission line right-of-way (between structures 18/3 and 18/4), this impact would be considered low.

Site off the ROW - The switching station may be placed in a pasture north of structures 18/3 and 18/4 and Targhee Tap. The potential long-term impacts would be moderate and could include the permanent removal of 1-2 hectares (3-5 acres) from production and altered grazing practices. Short-term impacts would include soil compaction around the area surrounding the switching station construction site and a subsequent decrease in soil productivity.

4.1.4.2 Mitigation

- Mitigation would be the same as the Single-Circuit Line Alternative.
- Locate structures and the switching station to minimize interference with nearby agricultural activities where possible.

4.1.4.3 Cumulative Impacts

Impacts would be the same as in Section 4.1.2.3. In addition, livestock displacement from the permanent loss of pasture from switching station construction could cause nearby lands to be converted to pasture.

4.1.5 SVC Alternative

4.1.5.1 Impacts

Because the SVC would be placed within property boundaries at Teton Substation, no changes in land use would be required. BPA would strive to meet Teton County regulations (see Appendix K, **Local Plan Consistency**) so there would be no to low impacts to land use.

The addition of an SVC at LVPL's Jackson Substation would require expanding the existing substation by about 2000 m^2 (0.5 acre) to the north. Since the substation already exists within a residential/ commercial area, the expansion would cause no to low impacts to land use.

4.1.5.2 Mitigation

- Develop and implement a landscaping plan around Teton Substation.
- Continue to work with landowners next to Teton Substation on design and placement of new equipment at Teton Substation.

4.1.5.3 Cumulative Impacts

Impacts would be the same as in Section 4.1.2.3.

4.1.6 No Action Alternative

No impacts to land use are expected.

4.2 Visual Resources

For Your Information

Construction, operation and maintenance of transmission line and substation facilities can have short and long-term effects on visual resources. Structures, conductors, insulators, spacers, aeronautical safety markings, ROW clearing, access roads, clearing for structures, and pulling sites for the conductor can create an impact. Distance from sensitive viewpoints decreases visibility. Different landforms and vegetation influence visual impact; some are more able to screen transmission line features.

Facilities can be seen from potential viewpoints such as private residences, highways, and commercial areas. Locating facilities in areas where soils are highly erodible or have poor potential for revegetation can also create impacts. A transmission line's visual presence would last from construction through the life of the line.

4.2.1 Impact Levels

Because most of the existing ROW is on USFS land, impact definitions correspond to USFS guidelines for visual resource management (US Department of Agriculture, Forest Service, 1974).

Impacts would be considered **high** where:

- the transmission line ROW would become the dominant feature or focal point of the view,
- a large number of highly sensitive viewers view the ROW in predominantly the foreground and middleground of the view.

Impacts would be considered **moderate** where:

- the ROW would be clearly visible in the view but not the dominant feature of the view,
- a large number of sensitive viewers view the ROW mostly in the middleground of the view.

Impacts would be considered **low** where:

- the ROW is somewhat visible but not evident in the view,
- few sensitive viewers would see the ROW because it is screened, or predominantly viewed in the middleground and background of the view.

No impacts would occur where:

- the ROW is isolated, screened, not noticed in the view, or is seen at great distance,
- views would be of short duration,
- no visually sensitive resources would be affected.

4.2.2 Agency Proposed Action

4.2.2.1 Impacts

Visual impacts during construction would include:

- views of construction equipment in the ROW;
- views of fresh road cuts in some areas prior to restoration;

- construction staging areas along Idaho State Routes 31 and 33 and Wyoming State Route 22; and
- views of cranes over tree tops during structure assembly.
- views of helicopters during structure assembly and conductor stringing operations.

Reminder

See Map 4 for a review of visual assessment areas.

These impacts would be temporary and occur along the ROW during construction but would be most apparent in Visual Assessment Areas 2-7.

After the line is built, operation and maintenance of the ROW would create low to high impacts depending on the viewpoint and viewer sensitivity.

Foreground is within 0.4 to 0.8 km (0.25 to 0.5 mile) of the viewer; middleground is from the foreground to about 8 km (5 miles) of the viewer; and background is over 8 km (5 miles) from the viewer.

These distance zones are defined in the USFS guidelines for visual resource management (US Department of Agriculture, Forest Service, 1974).

Visual Assessment Area 1, Swan Valley — The ROW would be somewhat more visible in the background in the Swan Valley area with the added structures and conductors. ROW widening would be disguised in the foreground since farmers would continue to grow crops under the transmission lines. Temporary access roads for construction would be plowed under with the next season's crops and would not be visible.

Tourists are not expected to notice the transmission line more than during construction. Residential viewers may notice the additional structures and conductors immediately following construction, particularly if they view the ROW in the middle of the view. However, the transmission line would not be the dominant feature in any residential view. Visual impacts would be low.

Visual Assessment Area 2, State Route 31, Targhee National Forest — Tourists and recreationists traveling through this area and using the Targhee National Forest would see more predominant views of the ROW. Figure 4-1 simulates changes to this area. Foreground views would remain the same. The ROW would be more clearly visible in the middleground because coniferous vegetation would be cleared and transmission line structures and conductors would be added. Transmission line road crossings would become more dominant because of the addition of conductors and, in the Pine Creek area, possible marker balls to alert pilots and birds to the lines. Small spur roads, located within the newly cleared ROW between structures 5/2 and 5/6, would not be visible from State Route 31 due to elevation changes. For visual impacts resulting from new access roads between structures 5/10 and 6/5, refer to the option descriptions that follow. Between structures 7/2 and 8/1, a series of nine, short new access spurs off the existing road would be somewhat visible. The road scars, located within the newly cleared ROW, would not be highly visible from State Route 31 since trees would partially obscure views. A new road segment between structures 8/5 and 8/6 would be somewhat visible from State Route 31 but would be partially

Figure 4-1. Viewpoint 1 - Simulated View in Visual Assessment Area 2, State Route 31, Targhee National Forest

Note: *Since the release of the Draft EIS and after review of the comments received on the Draft EIS, BPA has improved the proposed design so that the clearing required would be 1/3-1/2 less than originally predicted. The clearing in this simulation assumes the original clearing estimated and has not been updated. The simulation does not truly reflect the proposed clearing, but is included to give readers an idea of the visual impacts. Actual clearing would be less than pictured.*

obscured by trees. All new roads from structure 8/9 to the end of Visual Assessment Area 2 would not be visible from key viewing locations. Impacts would be moderate.

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Routing Option A — This option would cause slightly greater impacts to visual resources than locating the line right next to the existing line (Option B) or double-circuiting the line (Option D). This is due to increased visibility of the line for a short distance along State Route 31 as it comes down the forested west facing slope to meet the existing ROW, and then crosses the highway. It is also due to the addition of another corridor clearing uphill of the existing corridor, and the impacts to views of the ridgeline from Pine Basin Lodge on the south side of the highway.

Pine Creek Routing Option B — This option would cause lower impacts than Options A, C, and E because fewer mature trees would be lost to clearing, no separate corridors would be added to the viewshed, and the line would be less visible from State Route 31, except where it crosses the highway. However, construction scars on the landscape of the rugged rocky cliffs would be slow to revegetate and would require a longer period of time to be screened by vegetation.

Pine Creek Routing Option C — This option would cause somewhat greater impacts to visual resources than Options A, B and D and would be similar to Option E. It would be more visible from State Route 31, particularly westbound, and would add an additional highway crossing. It would also encircle Pine Basin Lodge with transmission lines although they would not be very close.

Pine Creek Routing Option D (preferred) — Option D would cause the lowest impact to visual resources. Fewer mature trees would be cleared and the line would be less visible from State Route 31 due to the sharp rise in elevation between the road and the structure sites. Four new road segments would be required for Option D. The first two, between structures 5/10 and 6/1, and between 6/1 and 6/2, would not be visible from the sensitive viewing locations of State Route 31 or the lodge due to topography changes. The third and fourth roads would be located to access structures 6/4 and 6/5. These access roads are short spurs extending from State Route 31 diagonally up the steep cliff to each of the structure sites. These roads would be visible for a very short moment from State Route 31 as cars passed immediately by. They would not be highly visible from the lodge since vegetation would mostly obscure views.

Pine Creek Routing Option E — Similar to Option C, this option would cause a greater impact to visual resources than Options A, B, and D. This is caused by the addition of two more highway crossings by the new line, increased visibility of the line for about 1.6 km (1 mile) along State Route 31, and increased visibility of the new line from the lodge. The lodge would have clear views of the line to the north, east, and west.

Scars from a new access road from structure 5/8 to the highway would also be somewhat visible from State Route 31.

Visual Assessment Area 3, South of Victor and State Route 33 — Residential viewers would see more predominant views of the ROW and Targhee Tap. The ROW would be more clearly visible in the middleground and background because coniferous vegetation would be cleared and transmission line structures and conductors would be added. (See Figure 4-2.) Up to 30 short scars from spur roads leading to new structures would be somewhat visible in the new ROW between structures 16/1 and 20/7.

Visual Assessment Area 4, Idaho State Route 33 and Wyoming State Route 22, Targhee National Forest — Tourists and recreationists would see more predominant views of the ROW. Changes in the view would be similar to those shown in Figure 4-2. Foreground views would remain the same. The ROW would be more clearly visible in the middleground because coniferous vegetation would be cleared and transmission line structures and conductors would be added. Transmission line road crossings approaching the summit of Teton Pass would become more dominant because double-circuit structures are taller than existing structures, conductors would be added, and marker balls may be added. Just before the summit of Teton Pass the transmission lines may be viewed in the foreground. However, the lines would not be the dominant feature. About 30 very short spur roads leading from the existing ROW to the new structure sites between structures 21/4 and 24/4 would not be visible from State Route 22 due to steep topography. Impacts would be moderate.

Visual Assessment Area 5, Summit of Teton Pass, Bridger-Teton National Forest — Tourists and recreationists would see more predominant views of the ROW. (See Figure 4-3.) Foreground views would remain the same. The ROW would be more clearly visible in the middleground because coniferous vegetation would be cleared and transmission line structures and conductors would be added. Double-circuit structures would be used from 26/2 to 29/3 and would require some additional clearing where the new line crosses the highway between structures 28/1 and 28/2. This clearing together with the added conductors and the potential to add more marker balls would make this highway crossing approaching the summit of Teton Pass more dominant. Portions of a new access road between structures 27/7 and 28/1 on the west side of Teton Pass may be visible from State Route 22 and backcountry ski areas. The steep terrain and the roads proposed position high on the slope may hide it from some viewing areas. A new section of access road proposed to access structure 28/2 back on line from structure 28/5 would be visible from the highway on the west side of the summit. For a short section of ROW at Teton Pass summit, impacts would be high because the transmission line may be viewed in the foreground. The line would be within the boundary of the Palisades Wilderness Study Area on the Bridger-

Figure 4-2. Viewpoint 2 - Simulated View in Visual Assessment Area 3, South of Victor and State Route 33

Note: *Since the release of the Draft EIS and after review of the comments received on the Draft EIS, BPA has improved the proposed design so that the clearing required would be 1/3-1/2 less than originally predicted. The clearing in this simulation assumes the original clearing estimated and has not been updated. The simulation does not truly reflect the proposed clearing, but is included to give readers an idea of the visual impacts. Actual clearing would be less than pictured.*

Figure 4-3. Viewpoint 3 - Simulated View in Visual Assessment Area 5, Summit of Teton Pass, Bridger-Teton National Forest

Note: *Since the release of the Draft EIS and after review of the comments received on the Draft EIS, BPA has improved the proposed design so that the clearing required would be 1/3-1/2 less than originally predicted. The clearing in this simulation assumes the original clearing estimated and has not been updated. The simulation does not truly reflect the proposed clearing, but is included to give readers an idea of the visual impacts. Actual clearing would be less than pictured.*

Teton National Forest, where no modification to visual resources is the preferred visual resource management approach for the USFS. However, because the transmission line runs next to State Route 22, double-circuit structures would be used, and no new roads are proposed, the project should not affect the roadless characteristic of the area.

A new short road would be built from State Route 22 to access structure 30/4, but it cannot be viewed from the highway.

Visual Assessment Area 6, Ski Lake Trail, Phillips Ridge, Bridger-Teton National Forest — Recreationists would see more predominant views of the ROW. (See Figure 4-4.) Foreground views would remain the same. The ROW would be more clearly visible in the middleground because an additional 12 m (40 feet) of coniferous vegetation (although mostly within the existing backline), would be cleared and transmission line structures and conductors would be added. (See Figure 2-5.) Impacts would be moderate.

Visual Assessment Area 7, Below Phillips Ridge to Teton Substation — The ROW would be more evident in the view from the residential neighborhood next to Teton Substation. (See Figure 4-5.) In most locations, the ROW is in the middleground except for a row of condominiums and homes directly south of the ROW from Fish Creek to Teton Substation, from which the transmission lines would be in the foreground. Impacts would be high.

The new line would require new equipment at Teton Substation. These additions (equipment as high as 16.5 m (54 feet) would make it more visible to residents, causing a moderate impact except for about four residences, where impacts would be high.

Temporary access roads across the open areas under the new line (from Fish Creek Road to Teton Substation) would be restored to pasture and would not be noticeable in the view following construction.

4.2.2.2 Mitigation

The following mitigation measures would reduce impacts in all Visual Assessment Areas. Additional mitigation specific to a particular Visual Assessment Area is also included.

- Structures and above ground improvements would use native materials where feasible.
- Where the use of native materials is not possible, treat structures and related hardware to reduce reflectivity and obtain the darkest finish possible.

For Your Information

BPA can treat steel used for structures with an acid wash during manufacturing that darkens the steel and makes is less reflective.

Figure 4-4. Viewpoint 4 - Simulated View in Visual Assessment Area 6, Ski Lake Trail, Phillips Ridge/Bridger Teton National Forest

Note: *Since the release of the Draft EIS and after review of the comments received on the Draft EIS, BPA has improved the proposed design so that the clearing required would be 1/3-1/2 less than originally predicted. The clearing in this simulation assumes the original clearing estimated and has not been updated. The simulation does not truly reflect the proposed clearing, but is included to give readers an idea of the visual impacts. Actual clearing would be less than pictured.*

Figure 4-5. Viewpoint 5 - Simulated View in Visual Assessment Area 7, Below Phillips Ridge to Teton Substation

Note: *Visibility of conductors varies under changing lighting and cloud cover conditions. This simulation depicts conductors as they would appear under "worst-case" lighting and cloud cover conditions.*

- Use non-reflective conductors.
- Use non-luminous insulators (i.e., non-ceramic insulators [a polymer] or porcelain that match existing lines).
- Coordinate with the Forest Service on the use of stains or paints on structures on lands managed by the Forest Service.

For Your Information

Preserving the existing topsoil involves stripping the top 15-30.5 cm (6-12 inches) of topsoil, stockpiling it, protecting the stockpile, recontouring the site, and spreading the stockpiled soil.

- Minimize ground disturbing activities.
- Preserve the existing topsoil near disturbed structure sites by stockpiling it during construction and spreading it after construction so native plant communities would regenerate and blend exactly with the surroundings. Hand rake into disturbed areas from adjacent undisturbed areas to ensure a feathered ground edge and maximum use of adjacent seed sources. Phase and integrate these activities with the project construction schedule to ensure the quickest rehabilitation of sites.
- When clearing forested ROW areas, take additional trees in random locations beyond the additional ROW to create a jagged (scalloped or feathered), more natural edge to the clearing. This would blend the ROW into the surrounding vegetation rather than forming a clear straight line across the mountains. Coordinate and mark specific tree removal with the Forest Service.
- Where technically feasible and cost effective, use double-circuit single pole structures instead of double-circuit lattice steel structures.
- Site new structures next to or very near existing structures and use the same structure type. This would lessen visual clutter that can result when different types of structures are visible in a vast open landscape.
- Site new structures where feasible to minimize visual impacts by taking advantage of existing screening offered by topography and/or vegetation.
- Install new conductor at about the same height as existing conductor to lessen visual clutter.
- Use techniques as needed to revegetate cut and fill slopes on access roads and near structure locations.
- Minimize, where possible, access road placement in highly sensitive areas.

For Your Information

Double-circuit structures can create fewer impacts to visual resources because they require a narrower total ROW width than two single-circuit structures. Steel double-circuit structures can have longer spans between structures as compared to wood structures, which reduces the total number of structures. Double-circuit structures are usually taller than single-circuit structures.

***Preservation** is defined as an area where the natural landscape should be unaltered by forest management activities; only ecological changes occur.*

Visual Assessment Area 2, State Route 31, Targhee National Forest

- Construct Option D (across from Pine Basin Lodge), which uses double-circuit structures across from Pine Basin Lodge.

Visual Assessment Area 4, Idaho State Route 33 and Wyoming State Route 22, Targhee National Forest

- Use double-circuit structures from structures 26/2 to 28/5.

Visual Assessment Area 5, Summit of Teton Pass, Bridger-Teton National Forest

- BPA and LVPL will work with the USFS to meet the requirements of the Palisades Wilderness Study Area designated ***Preservation.*** Use double-circuit structures from 28/5 to 29/3 to eliminate the need to clear a wider easement.
- Do not build new access roads in the WSA.

Visual Assessment Area 7, Below Phillips Ridge to Teton Substation

BPA studied many alternatives to help mitigate visual impacts to landowners adjacent to Teton Substation and the existing ROW from Fish Creek Road to Teton Substation. Preferred mitigation and other mitigation considered are described below.

Preferred Mitigation —

- Continue to work with landowners next to Teton Substation on placement of new transmission structures and equipment at Teton Substation and on timing and other logistical requirements of construction.
- Work with landowners next to the existing ROW from Fish Creek Road to Teton Substation on placement of new structures.
- Use double-circuit single steel pole structures to reduce visual impacts to landowners adjacent to the existing ROW from Fish Creek Road to Teton Substation. Locate new structures in the same place as old structures to keep the lowest conductor at the same height above ground.
- Develop and implement a landscaping plan around Teton Substation.

Other Mitigation Considered —

- Re-route the new line north from Fish Creek Road one mile, east across the flat pastureland, then south one mile to Teton Substation. This option would cost about $1,000,000/mile and could create visual problems for Lake

Creek II Homeowners as the line runs south into Teton Substation. Land costs in this area are high, and other residents would be impacted visually from the presence of a new transmission line.

- Underground the last mile of new line from a point near Fish Creek Road to Teton Substation. This option would cost about $1,300,000 - $2,900,000. Undergrounding both the existing line and the new line would cost about $2,600,000 - $5,300,000. Building the new line overhead and parallel to the existing line would cost about $185,000. Double-circuiting the new and existing line would cost about $415,000.

- Relocate Teton Substation. Depending on where Teton Substation was relocated, a new location could create similar impacts to a new set of homeowners or homeowners who choose to buy property next to the substation in the future. This option would cost about $3,300,000 plus the cost to re-route the existing lines into the new substation. Depending on how far the new location would be from the existing location, the added cost of the re-routed lines could be relatively high.

- Underground the last 122 m (400 feet) of the new line into Teton Substation. The last double-circuit steel pole structure would branch into two steel pole structures, and then two wood pole structures. These wood poles would be about 6 m (20 feet) higher than the last existing wood pole H-frame structure (17 m [57 feet] high) located on the west property line. Electrical equipment would be placed below one of the new wood pole structures to allow the new line to transition from overhead to underground. From that point, the line would stay underground about 122 m (400 feet) and surface in the new bay, west of the existing bays. No new substation and transmission line dead-end structures would be needed and the tallest piece of equipment in the new bay would be under 6.7 m (22 feet). A simulation of what this might look like is in Appendix M, **Visual Simulations of Teton Substation**. This option could cost about $250,000 depending on final design specifications and cost of cable, hardware and labor.

- Underground the last 122 m (400 feet) of the new line and three existing lines into Teton Substation. This option would cost about $1,650,000. Underground entrance for the three existing lines would cost about $1,400,000.

- Remove the peaks of the existing steel lattice transmission deadend structures at Teton Substation. This option would reduce the height to about 13 m (43 feet). Structures would also be painted. Since the overhead ground wire would be

removed because of the height reduction, more electrical equipment called surge arrestors would be added at each line terminal to protect equipment from lightning strikes. This would cost about $80,000.

- Replace all existing lattice steel transmission deadend structures with square tubes. The height of these structures would be reduced to about 11 m (36 feet). Structures would also be painted. Surge arrestors would be added at each line terminal to protect equipment from lightning strikes. Costs would be about $180,000.
- Completely rework the existing substation yard to a low profile substation. The electrical configuration of the substation yard would need to be changed causing an expansion of the yard about 6 m (20 feet) to the south. All steel lattice transmission deadends would be replaced with square tubes. This would reduce the height of the structures to about 11 m (36 feet). The structures would also be painted. Surge arrestors would be added to each line to protect equipment from lightning strikes. The profile of the station would not exceed about 11 m (36 feet). Cost would be about $820,000.

4.2.2.3 Cumulative Impacts

Impacts are caused by the addition of the new ROW, transmission line, and substation equipment. Addition of any new development along the ROW in the national forests and on private land can further reduce the visual quality of the area. Individuals driving for pleasure may notice the ROW more because of the new structures.

There would be cumulative impacts to property owners from Fish Creek Road to Teton Substation from adding a transmission line and additional equipment in the substation. The substation was built in 1968. BPA chose that site because no residential neighborhoods existed in the vicinity. Since 1968, property owners have chosen to build homes along the ROW and next to the substation. Residences now exist on the south side of the ROW and surround the substation on three sides. As a result, expanding utilities in neighborhoods can cause additional visual impacts if landowners consider the existing facilities to be impacting their views. As utility infrastructure continues to be needed, this conflict can continue. For those residents who consider the existing facilities to be impacting their views, new transmission facilities may cause an incremental decrease in the visual quality around their homes.

4.2.3 Single-Circuit Line Alternative

4.2.3.1 Impacts

Impacts would be the same as the Agency Proposed Action in Visual Assessment Areas 1-7.

4.2.3.2 Mitigation

- Refer to measures under Agency Proposed Action, Section 4.2.2.2.
- In Visual Assessment Area 7, site new structures very near existing structures, use the same structure type, and sag the conductor the same as existing conductors to lower visual clutter along the ROW.

4.2.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.2.2.3).

4.2.4 Short Line Alternative

4.2.4.1 Impacts

Impacts would be the same as those described for the Agency Proposed Action in Visual Assessment Areas 4, 5, 6, and 7.

At Visual Assessment Area 3, impacts would be the same as described under the Agency Proposed Action, except there would be no impacts west of Targhee Tap.

There would be increased construction impacts in the area south of Victor because a switching station would be built near Targhee Tap.

Preferred Site on the ROW - If the switching station is built on the ROW, terracing of the site would make it more visible in the view. Landscape plantings around the site would lessen views of the facilities but the impacts would be considered moderate.

Site off the ROW - If the new site is built below Targhee Tap in agricultural land, placing it behind surrounding trees would minimize the visual impacts of the new station to residents of Victor.

4.2.4.2 Mitigation

- Mitigation would be the same as described for Visual Assessment Areas 3-7 of the Single-Circuit Line Alternative (see Section 4.2.3.2).
- If possible, site new facilities required around Targhee Tap to use existing natural vegetative screening.
- Additional landscaping around the sites may be needed to screen the facilities from nearby landowners.

4.2.4.3 Cumulative Impacts

Impacts are caused by the addition of the new ROW, transmission line and switching station. New development would reduce the visual quality of the area. (See also Section 4.2.2.3.)

4.2.5 SVC Alternative

4.2.5.1 Impacts

At Visual Assessment Area 7, residential areas surrounding Teton Substation would experience visual impacts. Construction activities would create temporary but visible impacts for residents.

Adding new equipment at Teton Substation in the foreground and middleground would make it the dominant feature in the view for nine single-family homes and one condominium building with about eight units. This would be a high impact.

Adding new equipment at Jackson Substation would impact this mixed use area of RV parks, motels and other commercial businesses, but the expansion of the substation yard would create low overall impacts. Construction activities would create temporary but visible impacts because tourists and other seasonal viewers could see the activities.

4.2.5.2 Mitigation

- Develop and implement a landscaping plan around Teton Substation.
- Continue to work with landowners next to Teton Substation on placement of new transmission structures and equipment at Teton Substation and on timing and other logistical requirements of construction.

4.2.5.3 Cumulative Impacts

Cumulative impacts would occur from adding more electrical equipment to Teton Substation, which is surrounded by a residential neighborhood where residents are sensitive to surrounding views, or at Jackson Substation in a mixed commercial-residential area. This development would reduce the visual quality of the area.

4.2.6 No Action Alternative

This alternative has no impacts beyond those that may be occurring to landowners, motorists, and recreationists viewing the existing transmission facilities.

4.3 Recreation Resources

4.3.1 Impact Definitions

For Your Information

*Map 10 displays **ROS** designations in the project vicinity for Targhee and Bridger-Teton National Forests.*

Because most of the proposed ROW would be on land managed by the USFS, impact definitions were developed by the recreation specialist but correspond to USFS Recreation Opportunity Spectrum (***ROS***) guidelines for recreation resource management. ROS categories are described in the box on the following page.

Impacts would be **high** where:

- An action causes a change in the ROS designation for an area.
- Motorized access/use would be terminated in motorized areas, or excess nonmotorized use would be encouraged in nonmotorized areas.

Impacts would be **moderate** where:

- An action may cause a site-specific alternation in a management area but an overall ROS change would not occur.
- Some motorized access would be terminated or some excess nonmotorized access/use would be encouraged.

Impacts would be **low** or **no impact** would occur where:

- No ROS change would occur.
- No motorized or nonmotorized access or use levels would change.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum was developed by the USFS to provide direction for land management and recreation planning within national forests. ROS classes are used to identify current recreation uses and to help specify the type and management of activities planned for the future. Categories are defined in terms of a combination of setting, experience, and activities. The following are in the project area:

- **Semi-Primitive Nonmotorized (ROS II):** Predominantly natural environment or natural-appearing environment of moderate to large size. Interactions between users is low, but there is often evidence of other users. There are minimum on-site controls, or restrictions may be present but are subtle. Motorized use is not permitted.
- **Semi-Primitive Motorized (ROS III):** Predominantly natural environment or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. There are minimum on-site controls, or restrictions may be present but are subtle.
- **Roaded Natural Appearing (ROS IV):** Predominantly natural-appearing environments with moderate evidences of the sights and sounds of humans. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.
- **Rural (ROS V):** Substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are often provided for special activities. Moderate densities are accommodated away from developed sites. Facilities for intensified motorized use and parking are available.

4.3.2 Agency Proposed Action

4.3.2.1 Impacts

Construction would create temporary recreation impacts because of clearing, road construction, equipment and material stockpiled at staging areas, structure installation, and conductor stringing and tensioning.

A portion of the new ROW along State Route 33 and State Route 22 would become somewhat more visible to tourists traveling through the area. However, the line is not expected to become the dominant feature in the landscape, nor is it expected to change the perception of tourists that this is a highly scenic area.

Motorized Recreation — Those access roads that are open to motorized recreation (about 9.6 km [6 miles]) on the Targhee National Forest) would be closed one at a time to accommodate grading equipment and construction access. Motorcycles and ATVs would be restricted during construction on the few access roads in the Targhee National Forest that allow their use (only roads between structures 15/2 and 20/10 or Murphy Creek to the highway crossing of Idaho State Route 33). Although a staging area is proposed at Mike Harris Campground, equipment and materials should not block access roads. Use of Phillips Ridge on the Bridger-Teton National Forest for parasailing would be restricted during construction. Impacts would be moderate, but temporary.

Once the line is built, impacts to motorized recreation would be low to moderate. No changes to ROS designations would be required. At the USFS request, BPA will gate access roads. Locked gates on access roads could limit opportunities for vehicle camping. A locked gate (only during spring when the road is wet) on the access road to Phillips Ridge would limit parasailing and snowmobiling only during this time because it would be very difficult to transport equipment to the ridge.

Nonmotorized Recreation — Temporary impacts on nonmotorized recreation during construction are expected to be in the form of inconvenience mostly limited to summer recreationists using the area for hiking, camping, mountain biking, horseback riding, and hunting/fishing. Recreationists would have to share access roads with construction equipment. They would view construction activities including machinery motion, cranes, and fresh roadcuts. Construction activity is expected to stop in high-use winter recreation areas and so there would be no impacts to ***"yo-yo" skiing***/snowboarding.

For Your Information

Yo-yo skiing *is shuttle skiing at Teton Pass. Skiers leave one car in Wilson at the bottom of the Pass and drive another car to the top of the Pass. After skiing down the hill, they use the second car to drive back up to the top of the Pass.*

Impacts to nonmotorized recreation would be low to moderate because no changes to ROS designations would be required along the proposed ROW. In addition, gating access roads is not expected to impact nonmotorized recreation because most users simply walk around or scale gates easily. Since gates would prevent motorized travel, there could be fewer conflicts between motorized and nonmotorized users. Where motorized and nonmotorized use is allowed together, some conflicts between users would continue to occur.

Nonmotorized recreationists would experience some changes in visual quality; see Section 4.2, **Visual Resources**.

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Routing Option A — Locating the line farther up the hill could create an additional access point for hikers and hunters on foot for a short distance along the corridor. Impacts would not change from those mentioned above.

Pine Creek Routing Options B and D (preferred) — Impacts would not change from those mentioned above.

Pine Creek Routing Options C and E — These options could create an additional hiking route around the south and north sides of the Pine Basin Lodge and could provide additional hiking access to Pine Creek at the new highway crossing. Impacts would not change from those mentioned above.

4.3.2.2 Mitigation

- Use mitigation in Section 4.2, **Visual Resources** to reduce impacts to the visual experience of recreationists and sightseers.
- Continue to coordinate with each Ranger District on the Targhee and Bridger-Teton National Forests to develop gating plans that would promote the types and levels of use desired at each access road.

4.3.2.3 Cumulative Impacts

If some roads are gated, and motorized and non-motorized recreation is restricted, some recreationists would be displaced from areas now being used. This could cause recreationists to use other existing developed areas more, which could create a need for new open areas at some other location. Displacement and crowding in other areas could have a negative effect on recreation experiences. Crowding in small areas could cause impacts to soils, vegetation, wildlife and water resources.

4.3.3 Single-Circuit Line Alternative

4.3.3.1 Impacts

Impacts would be the same as the Agency Proposed Action.

4.3.3.2 Mitigation

- Refer to measures listed under the Agency Proposed Action, Section 4.3.2.2.

4.3.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action.

4.3.4 Short Line Alternative

4.3.4.1 Impacts

For both motorized and nonmotorized recreation, impacts would be the same as those listed for the Single-Circuit Line Alternative east of Targhee Tap.

Neither site considered for the switching station is in a high-use recreation area so there would be no impact at these sites.

4.3.4.2 Mitigation

Mitigation would be the same as the Single-Circuit Line Alternative.

- A new switching station near Targhee Tap would be sited to take advantage of natural vegetative screening if possible.

4.3.4.3 Cumulative Impacts

Cumulative impacts would be the same as the Single-Circuit Line Alternative.

4.3.5 SVC Alternative

4.3.5.1 Impacts

Construction, operation and maintenance activities would cause no impacts to recreation because Teton Substation is not in the vicinity or within clear view of any recreation areas. No mitigation would be required and there would be no cumulative impacts.

Jackson Substation is near a ski area, but it is in an area of mixed commercial and residential use. No impacts to recreation are expected. No mitigation would be required and there would be no cumulative impacts.

4.3.6 No Action Alternative

There would be no direct impacts to recreation from the No Action Alternative, and no mitigation would be required.

4.4 Wilderness, Wilderness Study Areas, Recommended Wilderness, and Roadless Areas

4.4.1 Impact Definitions

Areas designated or recommended as wilderness, wilderness study areas, and roadless areas are characterized by unique attributes valued by society such as the opportunity for solitude, and the opportunity to experience lands primarily affected by the forces of nature, not humans. These lands are managed so that these attributes will remain for the long term. The discussion of potential impacts to these areas rests solely on whether an action would change or alter these characteristics.

4.4.2 Agency Proposed Action

4.4.2.1 Impacts

Designated Wilderness — The Agency Proposed Action will not impact any designated wilderness. No actions would occur within the wilderness.

Recommended Wilderness — The Agency Proposed Action will not impact any recommended wilderness. No actions would occur within recommended wilderness.

Designated Wilderness Study Area — Activities in WSAs must not, by regulation, degrade the wilderness character of the study area. In this case, however, the transmission line existed at the time of designation.

Structures 29/1 and 29/2 are in the portion of the Palisades WSA managed by the Bridger-Teton National Forest. BPA proposes to use the footings of the existing steel structures and replace the tops of the structures with taller double-circuit structures. This can be done with helicopter construction and no new roads will be needed. The new structures would be about 6-9 m (20-30 feet) taller than the existing structures. There would also be three additional conductors on each structure. Very little if any clearing would be required with the new structures. A rebuild of the

existing line to double circuit on the existing ROW would be no more obtrusive on wilderness characteristics than the existing line, and would thus not impair its wilderness character and potential for inclusion in the National Wilderness Preservation System. The Agency Proposed Action would not appreciably change the character of the existing corridor or the potential for future designation of the area as wilderness.

Roadless Areas — The new line and ROW would not enter the Garns Mountain Roadless Area, the West Slope Tetons Roadless Area, or the Phillips Ridge Roadless Area; they would not be impacted. Where the proposed line crosses the Palisades Roadless Area (structures 12/1-12/7, 13/5-15/2, 18/5-19/4, and 21/5-22/1), BPA would use existing and new spur roads and some timber would be harvested. However, impacts from these activities would be low. BPA would not impact the character of the roadless area because this utility corridor and its associated access roads had already lost all wilderness character. The existing transmission line created isolated tracts on the highway side of the ROW that contain fewer than 5,000 acres, and one of the criteria for designating a roadless area is that the area be 5,000 acres or larger. BPA would not affect the future designation of the roadless area as wilderness.

4.4.2.2 Mitigation

- Use the mitigation in Section 4.2, Visual Resources, to reduce impacts to the experience of recreationalists.
- Continue to coordinate with each Ranger District on the Targhee and Bridger-Teton National Forests to minimize impacts to the WSA and the Palisades Roadless Area.

4.4.2.3 Cumulative Impacts

Gates would be locked on the north side of Highway 22 in the vicinity of the Jedediah Smith Wilderness and the existing wilderness character would not be affected. The addition of gates would improve the ability to manage public motorized access on these access roads compared to the No Action Alternative. The Winegar Hole Wilderness, Bridger Wilderness Area, Teton Wilderness Area and the Gros Ventre Wilderness Area would not be affected in any way.

The Agency Proposed Action would not change the characteristics of these areas and would not create cumulative impacts. It is possible that any wilderness designation would exclude the existing line by express exemption or adjustment of the boundaries of the Palisades WSA.

4.4.3 Single-Circuit Line Alternative

4.4.3.1 Impacts

More ROW clearing would be required for this alternative in the WSA than for the Agency Proposed Action because a new single-circuit line would be built next to the existing line. The new line would require 23 m (75 feet) of additional ROW. Roads would be required to build these structures. Expanding the ROW could compromise the character of the WSA and affect its future designation as wilderness. In addition, in the portions of the line that cross the Palisades Roadless Area, this alternative would use H-frame structures instead of steel poles. More tree clearing would be required for these structures and slightly more area would be disturbed.

4.4.3.2 Mitigation

- Continue to coordinate with each Ranger District on the Targhee and Bridger-Teton National Forests to minimize impacts to the WSA and Palisades Roadless Area.

4.4.3.3 Cumulative Impacts

Expanding the transmission line ROW could change the character of the WSA. This could change the potential for the WSA to be designated as wilderness.

4.4.4 Short Line Alternative

4.4.4.1 Impacts

Impacts would be the same for the WSA as for the Single-Circuit Line Alternative. Expanding the ROW could compromise the character of the WSA and affect its future designation as wilderness.

4.4.4.2 Mitigation

- Continue to coordinate with each Ranger District on the Targhee and Bridger-Teton National Forests to minimize impacts to the WSA.

4.4.4.3 Cumulative Impacts

The new ROW could change the character of the WSA. This could change the potential for the WSA to be designated as wilderness.

4.4.5 SVC Alternative

This alternative would cause no impacts to these resource areas because Teton and Jackson substations are not in the vicinity of these areas. No mitigation would be required and there would be no cumulative impacts.

4.4.6 No Action Alternative

There would be no direct impacts to these areas from the No Action Alternative. No mitigation would be required and there would be no cumulative impacts.

For Your Information

The Public Health and Safety Section gathers different potential causes of impacts of concern to the public in one section. Impact levels are not defined for this section because specific measurements and/or research about impacts is inconclusive.

4.5 Public Health and Safety

4.5.1 Safety Precautions

Power lines, like electrical wiring, can cause serious electric shocks if certain precautions are not taken. These precautions include building the lines to minimize shock hazard. All BPA lines are designed and constructed in accordance with the National Electrical Safety Code (***NESC***). NESC specifies the minimum allowable distances between the lines and the ground or other objects. These requirements basically determine the edge of the right-of-way and the height of the line, that is, the closest point that houses, other buildings, and vehicles are allowed to the line.

People must also take certain precautions when working or playing near power lines. It is extremely important that a person not bring anything, such as a TV antenna or irrigation pipe, too close to the lines. BPA provides a free booklet that describes safety precautions for people who live or work near transmission lines (*Living and Working Safely Around High Voltage Power Lines*).

4.5.2 Electric and Magnetic Fields

Because the state of scientific evidence relating to EMF has not yet established a cause-and-effect relationship between electric or magnetic fields and adverse health effects, BPA is unable to predict specific health risks, or specific potential level of disease, related to exposure to EMF.

4.5.2.1 Transmission Line EMF

BPA has conducted ***exposure assessments*** of magnetic fields from transmission lines. Exposure assessments are estimates of the field levels to which people are potentially exposed.

A magnetic field exposure assessment is done by first identifying the areas along the ROW where homes and businesses exist nearby. For these areas, engineers estimate what future magnetic field levels would be without the new project. This analysis serves as a baseline measurement. Engineers then estimate the possible change in field levels assuming the proposed project is in place. An increase in public exposure is defined as a situation where field levels with the new project would increase and buildings exist nearby. These field levels are only indicators of how the proposed project may affect the magnetic field environment. They are not measures of risk or impact on health.

The most heavily populated area along the existing ROW is the 1.6 km (1 mile) stretch just west of Teton Substation. Homes and condominiums are located near the ROW. Calculations were done to compare magnetic fields along the ROW for the five proposed alternatives (No Action, SVC, Short Line and Single-Circuit Line Alternatives, and Agency Proposed Action). A graph of this comparison is in Appendix D, **Transmission Line EMF**.

For Your Information

Double-circuit designs, such as those proposed in the Agency Proposed Action, provide a unique opportunity to reduce or minimize magnetic fields through "field cancellation" techniques. If the electrical phase conductors on the transmission lines are properly and exactly arranged, the magnetic fields produced by the individual conductors tend to partially cancel each other. The resulting magnetic field levels then decrease more quickly with distance compared to other double-circuit phasing arrangements or single-circuit lines. These cancellation techniques would be used on the double-circuit portions of the Agency Proposed Action.

The calculations show that the Agency Proposed Action (double-circuit structures are proposed for this area) results in lower field levels than the No Action Alternative on both sides of the ROW.

Both the Single-Circuit Line and Short Line Alternative (structures would look the same as what is there now) would result in somewhat lower field levels on the south side of the ROW compared to the No Action Alternative. Since the new line would be located north of the existing line, field levels would be higher than the No Action Alternative on the north side of the ROW.

Since no new transmission line is included in the SVC Alternative, no change to the magnetic field level is expected when compared to the No Action Alternative.

4.5.2.2 Substation EMF

None of the transmission line alternatives are expected to increase the magnetic field environment at the residences near Teton Substation. This is because any new equipment additions (which would be similar to existing equipment within the substation) would be located at the far side of the substation away from residences. Since magnetic fields decrease rapidly with distance, contributions to residences from these new sources would be substantially less than the contributions from the existing transmission line and substation equipment, which are much closer to residences.

If the SVC Alternative is selected, the specialized SVC equipment would result in an additional, and somewhat unique, magnetic field source within Teton or Jackson substations. While BPA has no specific magnetic field information available related to the 115-kV SVC equipment proposed for this project, BPA's experience with 500-kV SVC equipment suggests the fields could be a much larger contributor to the magnetic field environment within the substation fence than the standard equipment for the transmission line alternatives or existing facilities. Increases to nearby residences are therefore possible, and the amount of any potential increase at either site would depend on the design, location and operating modes of the SVC equipment. Like the transmission line alternatives, the SVC is proposed to be located on the far side of the substation away from residences (see Figure 2-7.)

4.5.3 Noise

Idaho and Wyoming have no state noise regulations. However, Teton County, Wyoming and the Town of Jackson have regulations limiting noise in certain zoning districts to 55 dBa at the property boundary line. The Federal Noise Control Act of 1972 (42 U.S.C. 4903) requires that federal entities, such as BPA, comply with state and local requirements regarding noise.

4.5.3.1 Construction Noise

Noise impacts would result from construction activities. Construction noise would be short term, would occur mostly during the summer, and would typically occur for only a few days at any one location such as near a residence.

4.5.3.2 Transmission Line Noise

Audible noise can be produced by transmission line corona for lines of 345-kV and above. Since the Agency Proposed Action, Single-Circuit Line Alternative, and the Short Line Alternative are less than 345-kV, there would be no increase in the ambient audible noise level along the route and into the substation.

4.5.3.3 Substation Noise

None of the transmission line alternatives would result in noise increases at the substation sites. This is because the additional substation equipment required for these alternatives would be similar to equipment already in use.

If the SVC alternative is selected, the specialized SVC equipment would result in an additional noise source within Teton or Jackson substations. While BPA has no specific noise information available related to the 115-kV SVC equipment proposed for this project, BPA's experience with 500-kV SVC equipment suggests the noise would likely be noticeable to nearby residences in the form of a low frequency hum. The amount of noise increase would depend on background levels and operating modes of the SVC equipment. Noise generated from the new equipment at either site would be the same. The SVC would be designed so that the maximum noise level would be at 55 dBa at the property line of either substation to meet Teton County and Town of Jackson standards.

4.5.4 Radio and TV Interference

Federal Communications Commission (***FCC***) regulations require that incidental radiation devices (such as transmission lines) be operated so that radio and televisions reception would not be seriously degraded or repeatedly interrupted. Further, FCC regulations require that the operators of these devices mitigate such interference.

Reminder

EMI (electromagnetic interference) is a high-frequency noise caused by corona that can cause radio and television interference.

BPA policy is to comply with FCC requirements. While none of the proposed alternatives are expected to increase electromagnetic interference (***EMI***) above existing levels, each complaint about EMI would be investigated. If the Agency Proposed Action, the Single-Circuit Line Alternative or the Short Line Alternative is implemented and found to be the source of radio or television interference in areas with reasonably good reception, measures would be taken to restore the reception to a quality as good or better than before the interference.

Overall, BPA receives very few radio interference (***RI***) or television interference (***TVI***) complaints. BPA strives to correct all complaints and most are satisfactorily corrected. As a result of these factors RI/TVI impacts would be minimal.

4.5.5 Toxic and Hazardous Materials

Several common construction materials (e.g., concrete, paint, and wood preservatives) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) would be used during construction. BPA and LVPL would follow strict procedures for disposal of these or any hazardous materials. No impacts would occur.

Some of the new line termination equipment required for the Agency Proposed Action, Single-Circuit Line Alternative or Short Line Alternative would contain oil. The transformer used for the SVC Alternative would also contain oil. The spill containment system at Jackson Substation would most likely be extended to include the expansion for the SVC. At Teton Substation, a spill plan is in place and outlines response activities in case of a spill. BPA would also consider installing oil spill containment around the transformer.

4.5.6 Fire

Construction of the new transmission line would take place during spring, summer and fall. The construction season would be short, with most activities occurring during summer when the weather is hot and dry. The potential for a large fire is high because of the mostly mature trees that surround the existing ROW, but it increases even more with the increased use of vehicles, chainsaws and other motorized equipment. The addition of construction workers in the area also elevates the potential for fire.

For Your Information

*The **Project Plan** is permanent documentation of agreements made between the BPA and the USFS). The Plan identifies methods for improving or creating roads, clearing trees and other vegetation, erosion control, fire control, hazardous material requirements, protection of special resources, and mitigation.*

BPA, in concert with the USFS, would prepare a ***Project Plan*** that includes a Fire Plan to ensure that fire hazards are kept low. The Fire Plan would address the needs and requirements of the USFS and BPA.

BPA maintains a safe clearance between the tops of trees and power lines to prevent fires and other hazards. Electricity can arc from the conductor to a treetop. Generally, trees are not allowed to grow over 6 m (20 feet) high on the ROW. Trees that need to be cleared from the ROW, and any trees that could fall into the line (danger trees) would be marked and removed.

Operating transmission lines that use wood pole structures have the potential to initiate fires in the poles under certain atmospheric conditions. Where metal on a structure touches wood, heat can build up and wind can cause the wood to ignite. BPA prevents fires in wood pole structures by electrically connecting together the metal parts in the structure. When the parts are electrically connected, heat is dissipated and does not pose the same fire risk. This method has been successfully used by BPA for more than 30 years.

4.5.7 No Action Alternative

The No Action Alternative could lead to voltage collapse if a critical line is lost on the system. Collapse of the system could continue over a long period (a week or more) if outages occur in winter when deep snows make access to the existing transmission system difficult.

When electricity is lost, lighting for safe locomotion and security is lost. Residential consumers lose heat. Traffic signals fail. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Sewage transportation and treatment can be disrupted.

Electricity for cooking and refrigeration is lost. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments.

The No Action Alternative has negative public health and safety impacts.

4.6 Water Quality, Soils and Geology

4.6.1 Impact Levels

A **high** impact would occur where:

- A water body that supports sensitive fish, waterfowl, and animal habitat, and/or human uses such as drinking water would be extensively altered so as to affect its uses or integrity.
- The possibility of oil spills from substation equipment reaching groundwater is high, such as in shallow groundwater areas, highly ***permeable*** soils, and no secondary spill containment or protective measures are used.

For Your Information

Impacts to water, soils, and geology are interrelated and have been combined.

Impacts are based on a site's susceptibility to long-term degradation. Erosion and mass movement prone areas, soils susceptible to compaction, steep slopes, and extensive access road and clearing requirements increase an area's vulnerability. Disturbance of the surface and subsurface and removing vegetation increase the risk of soil erosion and mass movement, and may change soil productivity. Impacts may be great in areas sensitive to rill and gully erosion, and land movement. Runoff could increase sedimentation and water turbidity. Road improvements and vehicular traffic at stream crossings could increase stream turbidity and alter stream channels.

Nutrients leached from disturbed agricultural soils or transported on soil particles could stimulate undesirable aquatic vegetation growth. Clearing streamside vegetation increases a stream's exposure to sunlight, possibly raising water temperature.

For related water quality effects, see separate discussions under Sections 4.7 ***Floodplains and Wetlands,*** *4.9* ***Wildlife,*** *and 4.10* ***Fisheries****.*

- Water quality degrades below state or USFS standards and site conditions are so unfavorable that major reclamation, special designs or special maintenance practices are required.
- Road or facility construction and/or clearing are required on sites prone to mass movement or with a very high susceptibility to erosion.
- Soil properties or site features are so unfavorable or difficult that standard mitigation measures, including revegetation, would be ineffective.
- Long-term impacts associated with accelerated erosion, sedimentation, or disruption of unstable slopes would occur.

A **moderate** impact would occur if:

- Water quality degrades below state or USFS standards, but it can be partially mitigated. Site conditions require special planning and design.
- Construction and clearing take place near a water body on erodible soils with moderate revegetation potential.
- Where new roads would be constructed across a stream or where existing stream crossings are inadequate and would require rebuilding.
- Impacts continue to occur until disturbed areas are reclaimed and sediment is no longer transported to surface waters.
- Soil properties and site features are such that mitigation measures would be effective in controlling erosion and sedimentation within acceptable levels.
- Impacts would be primarily short term with a significant increase in present erosion rates for a few years following soil disturbance until erosion and drainage controls become effective.
- There is little possibility of oils or other pollutants affecting groundwater, because groundwater level is deep, soils are relatively non-porous, and facilities have some minor spill protective measures.

A **low** impact would occur if:

- Impacts to water quality could be easily mitigated to state or USFS standards with common mitigation measures.
- Structures or access roads near water bodies are in stable soils on gentle terrain, with little or no clearing.

- Structures are away from waters' banks and little or no sediments reach the water.
- There is little or no possibility of oil or other pollutants affecting groundwater; groundwater is deep, soils are relatively non-porous, and facilities have good oil spill containment protective measures.
- Where there would be no construction or major reconstruction of roads.
- Road and facility construction and clearing would be required on soils with a low to moderate erosion hazard and the potential for successful mitigation is good using standard erosion and runoff control practices.
- Erosion and sedimentation levels would be held near present levels during and following construction.

No impact would occur where water quality and soils would remain unchanged.

4.6.2 Agency Proposed Action

4.6.2.1 Impacts

Direct impacts would be caused by access road construction and improvements, maintenance activities, ROW clearing, and site preparation for structures and other facilities. These activities would disturb the soil surface; increase erosion, runoff and sedimentation in nearby water courses; and impair soil productivity and remove land from production. Until final designs are completed, the amount of soil exposed by project construction can only be estimated. About 4.5 km (2.8 miles) of new trunk roads off the ROW and about 2.7 km (1.7 miles) of new trunk roads on the ROW would be required. About 7.2 km (4.5 miles) of new spur roads would also be required. Most of this new access is in steep terrain, which because of road cut and fill slope requirements, increases the area of earth materials exposed. New access road and structure construction would temporarily expose an estimated 13-18 hectares (32-40 acres) of earth materials. Following construction, implementation of optimum erosion controls and revegetation of disturbed sites (cut and fill slopes and structure sites) would reduce the amount of exposed earth materials by about 60-70 percent. Impacts would be greatest in local sensitive areas susceptible to ***rill*** and gully erosion, and areas of unstable soil or rock. Short-term impacts during and following construction would be most intense. Intensity of long-term impacts would be directly proportional to the success of revegetation, and erosion and runoff control efforts. With

Reminder

*A **rill** is a channel made by a small stream.*

See Map 8 for soil limitations.

Table 4-1. Impacts to Water and Soil Resources

Area	Actions	Impacts to Soil	Impacts to Water Resources
Pine Creek Bench, structures 1/1-5/1	No permanant access. Structures in grain fields	low, direct, short-term; erosion; soil compaction; increased runoff, loss of productive soils around structures	low
structures 5/1-6/1	structure and road improvements	low	short-term low; possible sedimentation in intermittant drainage
structures 6/2-6/9	new access roads; blasting	moderate; talus destabilized; rockfall hazard; increased runoff; erosion and loss of productive soils	low; possible sedimentation in intermittent drainages
structures 6/12-7/1	Access adjacent to wetland	low if existing road used	low if road run-off is controlled to prevent sediment from entering wetland
structures 8/2	modify or replace bridge; disturb streambank and channel	moderate; erosion	moderate; short-term increased stream turbidity and sedimentation
structures 7/4-7/8	clearing and structure construction	low to moderate; erosion	short-term low to moderate; increases in sedimentation and stream turbidity; peak streamflows increased
structures 8/3-8/10	new access road construction; ripping or blasting bedrock; clearing	moderate; erosion, sedimentation, and loss of productive soils	short-term, moderate; sediment in streams
structures 9/1-9/4	ford to be used for maintenance only	low; erosion	low; short-term stream turbidity
structure 9/4	new access road construction; clearing	moderate; increased runoff, sedimentation, and loss of soils from production	low
structures 10/3-11/6	new bridge or culvert, road construction, clearing	moderate; erosion, rutting	short-term moderate; increased stream turbidity, sediment into Tie Creek.
structures 12/1-12/6	structure construction	low; erosion	short-term; moderate sedimentation

Table 4-1. continued

Area	Actions	Impacts to Soil	Impacts to Water Resources
structures 12/1-14/2	ROW clearing; upgrading access, construction	erosion; sediment; low-moderate	low-moderate sedimentation
Coalmine Fork crossing	upgrade crossing (if needed)	erosion	short-term low to moderate; increased stream turbidity
structures 14/6-15/4	clearing; install bridge at Little Pine Creek; install culverts in Murphy Creek	erosion	short-term; increased stream turbidity; sedimentation
structures 15/5-21/2	clearing;	low to moderate; erosion	short-term; low to moderate; sedimentation; increased turbidity
structures 21/3-23/4	clearing; access road upgrades	erosion	
structures 23/4-24/3	structure and road construction; clearing	short-term, moderate; increase runoff, erosion; soils out of production	short-term moderate; sedimentation, icreased runoff
structures 24/4-24/5	construction and maintenance	erosion	short-term low; increased sediment in Hungry Creek
structures 24/6-26/7	construction clearing	localized erosion	short-term moderate, sedimentation and increased runoff
structures 26/8-28/1	road construction and upgrades, clearing and line construction	low to moderate erosion, destabilize slopes	short-term, low to moderate; sedimentation; degraded water quality
structures 28/2-28/4	road and structure construction	erosion; low-moderate; soils out of production	low; localized increase in run-off and sediment transport
structures 29/3-34/7	clearing, structure construction; road improvements	erosion	short-term low; sedimentation
structure 35/1 to Teton Substation	construction of temporary bridge or culvert in Lake Creek and Phillips Canyon Creek	soil compaction; lower soil productivity; erosion	low to moderate; short-term sedimentation in Lake and Phillips Canyon Creeks from bridge or culvert construction
Teton Substation	construction	low	low; sedimentation in unnamed creek
Switching Station near Targhee Tap	construction, operation, maintenance	increased runoff, erosion	low; decreased infiltration; increased runoff

Reminder

Best management practices are a practice or combination of practices that are the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

Map 2 shows structure numbers and locations. Map 7 shows township, section and range.

implementation of BMP's, sedimentation could be reduced to acceptable levels that would not cause degradation of water quality below Idaho and Wyoming or federal national forest standards. Impacts to water and soils are summarized in Table 4-1; more detailed descriptions of impacts are described below.

Pine Creek Bench, Idaho — From the Swan Valley Substation to the mouth of Pine Creek Canyon (structure 5/1) the transmission line would traverse the nearly level Pine Creek Bench. The loess soils have a moderate erosion hazard if disturbed, except on the steep side slopes of drainages dissecting the Bench, where the erosion hazard is very high (U.S. Department of Agriculture, Soil Conservation Service, July 1981). The project crosses a steep-sided intermittent tributary to Rainey Creek between Swan Valley Substation and structure 1/1 and then parallels the drainage to structure 1/3. No permanent access would be constructed through or parallel to the drainage.

Impacts would be direct, low and short term, resulting in temporary local increases in erosion during and for a short period following construction. Heavy equipment traffic during construction and maintenance could compact soils causing a reduction in productivity.

Between structures 3/7 and 4/1 (T2N, R43E, Sec. 14) the proposed line crosses Pine Creek, a perennial tributary to the Snake River. New structures would be built within cultivated dryland grain fields. Surface disturbance within the canyon and surrounding agricultural fields would be minimal. Impacts would be low and mostly short-term. Disturbed areas would be replanted in the next crop season. Heavy equipment traffic could compact soils and reduce productivity in areas used for temporary access. Subsoiling and subsequent tillage operations would restore productivity to present levels within a few years. Only selected trees that could interfere with transmission line construction or operation would be cut on the steep upper slopes of the drainage. Felled trees would be left on the ground and no riparian vegetation would be impacted. No permanent roads would be constructed and temporary access to the structure sites would be through the existing agricultural fields.

For Your Information

This is an area where the USFS and BPA are discussing ways to construct a line without building roads and without blasting rock. As a result BPA and the USFS have proposed five options for routing the line through Pine Creek.

Pine Creek Drainage, Idaho — Between structures 5/2 and 11/3 the project would mostly parallel Pine Creek.

Between structures 5/7 and 5/8, at the lower end of Pine Creek Canyon, the line crosses an intermittent tributary to Pine Creek. An existing access road within 30 m (100 feet) of this tributary may need improvement. Impacts from access road improvement and structure construction would be low. Impacts would be primarily short term with soil disturbance possibly contributing to

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

sedimentation within the drainage. Impacts would be greater if storm events occur during construction or before disturbed areas are stabilized.

Pine Creek Routing Option A — This option would avoid the barrier posed by the limestone cliffs and would reduce the risk of destabilizing talus slopes close to State Route 31. This option requires construction of access roads to new structure sites outside the existing ROW between structures 6/1 and 7/1. Slopes are steep, in excess of 50 percent, and access road construction would disturb about 1.5-2.8 hectares (4-7 acres) of earth along an estimated 2500 m (8200 feet) of new access road. Clearing would remove about 5.3 hectares (13 acres) of forest. Roots and topsoil would not be removed. Impacts would be low and include increased erosion levels and runoff. The exact amount of disturbance depends on final transmission line and access road design and location. Revegetation of disturbed areas is impaired by rocky, droughty shallow soils. Impacts would be moderate to high and would include increased runoff, erosion, and sediment transported from disturbed sites. Impacts would be the greatest during and immediately following construction, but would decrease in intensity when disturbed areas are revegetated and stabilized. Long-term impacts, which would continue after site restoration, include an increase in runoff and erosion rates relative to present rates.

Pine Creek Routing Option B — From structures 6/2 to 6/9 (T2N, R44E, Sec. 6) the line crosses slopes greater than 55 percent. Limestone rock outcrops, talus, and shallow soils are prominent. No suitable access exists and new access, possibly including full-bench cut roads and end-hauling of excavated material, would be needed. Construction may require blasting. Talus slopes could be destabilized and increase the hazard of rockfall. The rocky, droughty shallow soils have a moderate erosion potential and a fair to poor revegetation potential. Clearing would remove about 3.2 hectares (7 acres) of vegetation. Construction would cause direct impacts including an increase in runoff and erosion and possible destabilizing of slopes. Impacts to soils would range from moderate to high depending on final design and location and the success of mitigation measures. Impacts would be reduced if access roads are not constructed and materials are delivered by helicopter or winched to structure sites. Impacts would be most intense during and shortly after construction, diminishing when erosion controls take effect. However, no prominent drainages are crossed and State Route 31 is located between Pine Creek and the proposed location, thus reducing the sedimentation risk to Pine Creek. Impacts to water quality would be moderate.

The ROW crosses Pine Creek between structures 6/12 and 7/1. To eliminate impacts at this creek crossing, BPA would exchange existing access for use of a concrete bridge located about 540 m (1800 feet) downstream from the ford currently used. This would

eliminate any disturbance caused by possible reconstruction and use of the existing ford for construction and maintenance. The existing access road does infringe on a wetland next to Pine Creek. Soil stabilization and runoff and sediment controls would be used to minimize the amount of sediment entering the wetland.

Pine Creek Routing Option C — This option would be located on a bench south of Pine Creek with slopes averaging about 15 percent. Impacts would be primarily due to access road and transmission line construction. Roads would be developed both on and off the ROW for this option, and existing roads would be used where practical. Access road construction would disturb about 1 hectare (2-3 acres) of soil. Clearing would remove about 3.2 hectares (8 acres) of Douglas fir and aspen open canopy forest. Impacts would be moderate and include increased erosion levels and runoff. The alternative crosses Flume Canyon Creek, an intermittent tributary to Pine Creek. Depending on the structure and access road location, sediment could enter this waterway during storm events. Due to decreased slopes, the absence of terrain barriers (i.e., rock outcrops, shallow soils, and talus-covered slopes), and good to fair revegetation potential, the impacts would be diminished relative to the other alternatives. After construction, impacts would lessen as site restoration and revegetation measures take effect.

Pine Creek Routing Option D (preferred) — From structures 6/1 to 6/9 (T2N, R44E, Sec. 6) the line crosses slopes greater than 55 percent. Limestone rock outcrops, talus, and shallow soils are prominent. No suitable access currently exists. Two to four double-circuit structures would replace up to seven existing structures from 6/2 through 6/8. About 485 m (1600 ft) of new access road would be constructed to reach the new structure at 6/2. New access to the other two double-circuit structures would be provided by two short 75 m (250 ft) spur roads from State Route 31. The rocky, droughty shallow soils have a moderate erosion potential and a fair to poor revegetation potential. No ROW clearing would be required for this option but about 0.6 hectares (1.6 acres) of mostly open canopy juniper would be cleared and the soil disturbed for access road construction. Access road and line construction, and clearing would cause direct impacts including localized increases in runoff and erosion. Impacts to soils would be moderate and would be most intense during and shortly after construction, diminishing when erosion controls take effect. The proposed access roads would provide needed access to the transmission line, eliminating the potential for inadvertent ground disturbance from road construction during an emergency that requires immediate access by heavy equipment. No prominent drainages are crossed by the proposed access roads. The access road to structure 6/2 is located more than 30 m (100 ft) from an intermittent stream. This is outside the aquatic influence

zone as defined in the revised Forest Plan. State Route 31 is located between Pine Creek and the proposed location, which reduces the sedimentation risk to Pine Creek from construction of the line. Impacts to water quality would be low.

The ROW crosses Pine Creek between structures 6/12 and 7/1. To eliminate impacts at this creek crossing, BPA would exchange existing access for use of a concrete bridge located about 540 m (1800 ft) downstream from the ford currently used. This would eliminate any disturbance caused by reconstruction and use of the existing ford for construction and maintenance. The existing access road follows the periphery of a wetland next to Pine Creek. Soil stabilization, and runoff and sediment controls would be used to prevent sediment from entering the wetland from construction traffic.

Pine Creek Routing Option E — This option departs from the existing ROW at structure 5/8, and would be located primarily on a bench south of Pine Creek with slopes averaging about 15 percent. Impacts would be primarily due to access road and transmission line construction, and clearing. About 485 m (1600 ft) of new roads would be developed off the ROW for this option, exposing about 0.4 hectare (1 acre) of soil. Existing roads would be used where practical. Clearing would remove about 1 to 2 hectares (4-5 acres) of Douglas fir and aspen open canopy forest. Impacts would be low and include increased erosion levels and runoff, and a loss of about 0.3 hectare (0.75 acre) of productive soil where new access is constructed. The alternative crosses Flume Canyon Creek, an intermittent tributary to Pine Creek. No new access road would be constructed across the creek and no clearing would be required. Sediment would not likely enter this waterway during storm events. Although this option crosses Pine Creek twice, the crossings would not require clearing of riparian vegetation. This alternative would decrease surface disturbance compared to Option D because slopes are less steep. This option also has a higher revegetation potential than Option D because of decreased slopes and less droughty soils. However, this option would open another ROW in the area and would not resolve the need for access along the existing line. After construction, impacts would lessen as site restoration and revegetation measures are implemented.

New access along the ROW has been constructed recently between structures 7/1 and 8/5. Between 7/4 and 7/8, some small intermittent drainages are crossed. Clearing of closed canopy Douglas fir forest and disturbance due to construction activities, particularly in wet weather, could cause sediment to reach channels. These short-term increases in sedimentation and stream turbidity could create low to moderate impacts. ROW clearing would slightly increase runoff and peak streamflows.

USFS Road #250 (up Mike Spencer Canyon in T3N, R44E, Sec. 31) would be used to cross Pine Creek and provide access to structure 8/2. This bridge would be replaced to be suitable for construction traffic. The channel and stream bank would be disturbed during construction and impacts would be moderate and short term. Placement of the bridge abutments would cause short-term localized increases in stream turbidity and sedimentation. The bridge would be designed and constructed to prevent any long-term harmful impacts on stream hydraulics, bank erosion, or otherwise degrade the stream's physical characteristics or water quality. Other impacts would result from clearing and structure construction. Revegetation potential is good and the erosion hazard is moderate. Although Idaho state water quality standards could be temporarily exceeded during bridge construction, with the use of BMP's, sedimentation could be reduced to acceptable levels that would not cause degradation of water quality below state or forest standards.

Between structures 8/3 and 8/7, soils are shallow on steep slopes, and there are many rock outcrops. Construction of new access would be needed between structures 8/5 and 8/7. In some areas along this section, the ROW is within 90 m (300 feet) of Pine Creek. Portions of this section may require ripping or blasting bedrock. The density of drainages, clearing requirements, the amount of material disturbed by road construction, and slopes approaching 55 percent in places increase the erosion and sedimentation risk to Pine Creek. With runoff and erosion control measures, impacts would be moderate, decreasing in intensity as runoff and erosion controls take effect and disturbed areas are stabilized.

An existing ford (T3N, R44E, Sec. 29) across Pine Creek used to access the Poison Creek area (structures 9/1 to 9/4) would be used for transmission line maintenance and not for construction. The ford would be evaluated and improved, if needed, so not to pose a risk to aquatic resources. Disturbance of the banks and streams would be minimal and the stream crossing would be maintained to prevent adversely affecting stream channel characteristics or bank stability. These impacts would be low.

Access to structures 9/1 through 9/4 would be along existing access that follows ridge crests to structure sites. These roads are extremely rocky and despite the steep slopes, erosion levels are expected to be low.

Between structures 9/4 and 10/1, previous access that had been put to bed would be reconstructed and new access would be constructed on and off the ROW. Side slopes approach 50 percent, clearing and road construction would create increased runoff and sedimentation, a moderate impact. Erosion would increase slightly above present levels until erosion control seeding

becomes effective. With the use of BMP's, no tributaries to Pine Creek would be affected and impacts to water quality would be low.

An existing ford across Pine Creek (which provides access to structure 10/7) (T3N, R44E, Sec. 28) would be abandoned thereby eliminating impacts from construction and maintenance traffic at this location.

An existing bridge across Pine Creek (USFS Road #252) (T3N, R44E, Sec. 27), which provides access to Tie Canyon and structures 10/1 to 11/6, would continue to be used.

An existing road follows the stream bed of Tie Creek. Water from Tie Creek currently flows across and continues down the road in several places. Traffic and unstable soils contribute sediment to the creek, a continuing long-term impact. Using the existing road for construction and maintenance would contribute sediment to Tie Creek and adjacent wetlands. The existing road would be upgraded, relocating the road's lower section to the east bank before crossing Tie Creek and rejoining the existing access road. The lower road would be located and constructed to avoid unstable soils. The section of the existing road that would be abandoned would be rehabilitated and put to bed. Installation of a bridge or culvert where the new road would cross Tie Creek would cause temporary localized increases in stream turbidity from bank disturbance, channel modification, and abutment placement. The streambank parallel to the road bed would be stabilized to prevent erosion of material during natural stream flows. To reduce sediment and channel bank degradation, it could be necessary to incorporate armoring in the design of the road and stream crossing. Impacts would be short term and moderate. All culverts would be designed and constructed to prevent diversion of streamflow out of the channel and down the road in case of failure, as prescribed in the revised Targhee Forest Plan. All culvert installations would also be coordinated with the U.S. Army Corps of Engineers, appropriate state agencies, and the U.S. Forest Service.

The proposed corridor parallels a tributary to Tie Creek between structures 12/1 to 12/6. The line would be built on the downslope (south) side of the existing ROW, and 3 new structures and spur roads would be within 45 m (150 ft) of the tributary on slopes approaching 25 percent. This is within the 150-foot boundary width prescribed for perennial nonfish-bearing stream reaches in the revised Targhee Forest Plan. This portion of the line is predominantly savanna-like and only a few scattered trees would need to be cleared. Localized erosion and increased run-off, due to surface disturbance, could carry sediment to the drainage, causing moderate short-term impacts to water quality until revegetation of structure sites takes effect and the soil is stabilized. Use of BMP's for construction and maintenance would control erosion and sediment transport and prevent water quality levels

from degradation below Idaho state levels. Road and structure construction, and maintenance activities would not inhibit riparian, wetland or aquatic ecosystems process or functions.

Teton River Drainage (Little Pine Creek and Warm Creek), Idaho — From Tie Canyon to Targhee Tap (structures 12/1 to 14/2), the line crosses an area of roughly parallel northwest trending ridges. Southwest slopes are treeless. ROW clearing would be required on northerly exposures, which are dominated by sub-alpine fir and Douglas fir. This section has good existing access, but short spur roads would need to be constructed to structure sites. Roads on steeper slopes are rutted. Upgrading existing access and installing runoff control structures (e.g., more water bars) would minimize erosion and sediment production. Impacts would be low to moderate, with impacts being greatest during construction and tapering off as run-off and erosion control measures take effect.

Between structures 13/5-14/3, several tributaries to Coalmine Fork would be spanned by the transmission line. Portions of existing access roads in this area are rutted. Short spur roads to reach new structure locations would be on ridges and not within riparian zones. Ground disturbance from transmission line construction, reconstruction of existing access and clearing could cause erosion, and sediment could reach these drainages and be transported downstream. Short-term impacts would be low to moderate. Improving access road drainage and use of best management practices would reduce long-term impacts.

A potential staging site is located at Pine Creek Pass on gently sloping terrain. Slopes are approximately 10 to 15 percent and the erosion potential is moderate. Impacts would be initiated by clearing of approximately 0.4 to 0.8 hectares (1 to 2 acres) and from ground disturbance due to heavy equipment movement and storage of construction materials. Impacts from erosion would be low to moderate and would diminish as mitigation and site restoration measures take effect. Clearing would result in a localized increase in run-off, a long-term impact. Implementation of best management practices to control run-off and sedimentation would prevent degradation of water quality below Idaho state standards.

The existing Coalmine Fork crossing near structure 14/2 is a culvert. If the crossing needs to be upgraded, impacts would be moderate, localized short-term increases in stream turbidity. Impacts would diminish to current levels when construction is completed and the site is stabilized.

Between structures 14/6 and 15/4, existing access roads use fords to cross Little Pine, Wood Canyon, and Murphy creeks. The Wood Canyon Creek ford would not be used. A bridge would be constructed at Little Pine Creek and the Murphy Creek ford would be replaced with a culvert causing slight short-term temporary

increases in stream turbidity during installation. The bridge and culvert would not constrict stream flows or collect debris, nor impair riparian or aquatic ecosystem processes or functions, and would be in compliance with the revised Targhee Forest Plan. Clearing requirements to widen the ROW in this section and eastward to Targhee Tap would cause localized increases in runoff, which could increase erosion. Sediment could reach Murphy and Wood Canyon creeks and several intermittent drainages. Use of BMP's for run-off and erosion control would prevent water quality from degrading below Idaho state standards. A spring flows across the existing access road near structure 16/4. A culvert would be sized and designed to adequately carry this water. Culvert installation would result in a temporary increase in turbidity and sediment transport until soil stabilization measures take effect. Impacts would be low.

Existing roads provide access from Targhee Tap to the Trail Creek crossing (18/4 to 21/2). ROW clearing would increase the risk of sediment entering tributary drainages to Warm Creek. Impacts would be low to moderate and short term with use of best management practices to control erosion and runoff. Long-term impacts include an increase in localized erosion and runoff rates relative to preconstruction values.

Teton River Drainage (Trail Creek), Idaho — The existing access from Pole Creek to structure 23/4 is susceptible to rutting and would require rock and runoff controls. Impacts would be low to moderate. No impacts from construction or maintenance are expected at the Trail Creek crossing (structures 21/2 to 21/3) (T3N, R46E, Sec. 30) where an existing bridge would be used.

Two possible construction staging areas have been proposed for tracts near the Trail Creek crossing. Both sites, one near Mike Harris Creek and another on the north side of State Route 33 are on level ground with a low erosion hazard. The proximity of the first site to Mike Harris Creek makes it less desirable as a staging area since it could infringe on the riparian boundary of the stream. The alternate site would not infringe on a riparian zone and is unlikely to contaminate or degrade the waters of Moose or Trail Creek. Any staging area should be located out of the 100-year floodplain to avoid contributing pollutants (e.g., fuel, oil, etc.) or debris to waters in case of a flood event.

Where the line would follow Trail Creek up the west side of Teton Pass, there is no current access from structures 23/4 to 24/3 and 24/6 to 26/7. Several potentially unstable areas including debris flows, rock slides, and avalanche chutes occur in these sections. Road construction, clearing, and erecting structures would increase runoff and erosion and could destabilize sensitive areas. The likelihood of sediment moving off-site would increase. Road and structure design and location would cause potential impacts that could result in adverse effects to water quality and the integrity of the transmission lines and access roads.

To minimize the amount of disturbance from road construction, roads would only be constructed to access structures 23/4-23/6 and 23/7-24/5. Access does exist within the Hungry Creek drainage between structures 24/3 and the access road that goes to 24/4. The existing road fords Hungry Creek several times. Construction and maintenance activities would cause short-term, minor increases in sediment within Hungry Creek. To comply with the revised Targhee Forest Plan, any culverts would be designed and installed to accommodate at least a 50-year flood, including associated bedload and debris. Clearing for new roads and ROW would cause localized increases in run-off. With use of best management practices to control runoff and erosion, impacts would be moderate. Helicopter, small construction equipment (brought in by helicopter) and manual construction would be used for structures 24/6 and 26/7. Impacts would be localized; areas surrounding the structure sites would be subject to localized increases in run-off and erosion. Clearing of open canopy forest on south-facing slopes would occur along this section of ROW. Impacts would be greatest during and immediately following construction. As stabilization and erosion control measures become effective, impact intensity would decrease. Although remaining higher than preconstruction values, in the 1-2 years following construction, erosion and runoff rates would decrease and stabilize.

A staging area is proposed at the roadside pull-out on the south side of State Route 22 at the mouth of Squaw Canyon near structures 25/5 and 25/6. The site is between State Route 22 and Trail Creek, is level and has a low erosion control potential. This site would be used as a staging and refueling area during helicopter construction of the line in the Teton Pass vicinity. To protect Trail Creek, berms or other suitable measures should be constructed to contain hazardous materials in the event of an accidental spill.

Current access between structures 26/8 and 27/7 is adequate for small vehicles. The use of helicopter and double-circuit construction removes the need for new roads and reduces potential impacts. This area has a high potential for mass movement; small slumps and earthflows are common, and use of heavy equipment is restricted because of slope. Disturbance could cause sediment to reach a nearby unnamed creek 38-61 m (125-200 feet) away from the existing ROW. Water from a drainage between structures 27/3 and 27/4 currently flows across the existing road. The drainage would be realigned to flow through the existing culvert currently in place. Modification of road drainage would also cause temporary degradation of water quality until runoff and stabilization measures take effect. New access road construction to structure 28/1 would cross an intermittent drainage that would require a culvert. The culvert would be installed so not to impede stream flow or cause degradation, or

pose a risk to aquatic resources. A new access road would also be needed from 28/5 back to structure 28/2. Impacts from line construction, road improvements, and clearing in this area would be moderate to water resources and soils. Use of BMP's would prevent adverse effects to the function and value of aquatic resources and water quality from degrading below Idaho state standards. Impacts would decrease with time as runoff and erosion controls take effect and disturbed areas are stabilized. Road and structure locations would attempt to minimize disturbance and prevent adverse long-term site stability impacts.

Trail Creek Drainage, Wyoming — On the east side of Teton Pass the line crosses marginally stable terrain (U.S. Department of Agriculture, Soil Conservation Service, July 11, 1985). No new roads would be constructed in this area; structures would be replaced using helicopters. Impacts to soil and water resources would be low.

The use of a road-side pullout off Highway 22 east of the pass as a staging area would create low impacts because it is paved asphalt. The risk of erosion is extremely low. Due to the impervious nature of the asphalt, existing run-off from the site is high and measures to prevent fuel or other deleterious substances from being transported off site should be instituted. This site shows evidence of ongoing downslope movement but staging activities would be short-term and are not likely to exacerbate this condition.

Phillips Ridge, Wyoming — Existing access roads along Phillips Ridge would be used from structures 29/3 to 35/1. From structures 30/5 to 34/7, the line follows Phillips Ridge. Impacts along this portion of the line would be primarily from clearing of continuous coniferous forest, structure construction, and access road improvements. Impacts would include increased runoff with a subsequent increase in erosion and off-site movement of sediment. However, the line and access road follows the ridge line and impacts on water quality would be low since no catchment areas are above the road and the road does not cross any well-defined drainages. The access road from the mouth of Phillips Canyon to the ridge crosses Phillips Creek using an existing concrete bridge. Ongoing stream bank erosion requires that the bridge abutments be reinforced. Work on the abutments would cause localized bank disturbance and small amounts of sediment to be discharged. Impacts to water quality would be short-term primarily until the repair work is completed and the stream bank stabilized. The bridge repair work would be done using BMP's and would not impair stream flow, water quality, or fish passage.

Fish Creek Drainage, Wyoming — Phillips, Fish and Lake creeks are crossed between structures 35/1-35/2, 35/5-35/6 and 35/7-35/8 (T41N, R117W, Sec. 2), respectively. There would be no through access across Fish Creek, avoiding impacts associated

with constructing a stream crossing at this location. To access structures, temporary roads would be used. Temporary crossings of Phillips and Lake creeks could be constructed depending on final design and the availability of road easements for ROW access. Construction of a temporary bridge or culverts to cross both Phillips and Lake creeks would disturb the streambank and channel. Impacts would be moderate and short term and include a localized increase in stream turbidity and sedimentation. To comply with state water quality standards, these crossings would be constructed and designed to minimize sedimentation and turbidity, provide for unobstructed streamflow and fish passage, and minimize damage to stream courses. Beneficial stream uses, including fish habitat and irrigation, would be maintained and ecological values would not be impaired by the proposed project.

The risk that sediment, disturbed at structure sites during construction, and removal of existing structures, would reach the creeks is low due to the level terrain and distance separating the construction sites and creeks. From structure 35/6 to Teton Substation the project crosses irrigated pasture. Construction traffic could cause soil compaction and rutting if soils are crossed when wet. Impacts would result in lower soil productivity along the vehicle travel route.

Construction within Teton Substation could allow sediment to enter a nearby unnamed creek. Use of standard erosion control practices during construction would keep impacts low.

Operation and Maintenance - The existence and continued use of transmission line access roads will contribute to increased localized erosion and run-off levels. Cleared sites and road surfaces have higher run-off and erosion rates compared to undisturbed areas. Vehicle traffic can dislodge soil particles which are then moved off-site by surface run-off. Use of access roads during wet conditions could cause rutting and consequently alter surface flow patterns, concentrate run-off, and increase erosion. Non-authorized use of access roads could further add to erosion related impacts. Periodic vegetation maintenance, to maintain transmission line access and safe operation, could cause slight localized increases in run-off and erosion due to vegetation clearing and associated minor ground disturbance. Impacts directly related to maintenance and operation activities would be low to moderate and persist for the life of the transmission line. Impacts are likely to diminish in intensity as mitigation and site restoration measures take effect. To minimize impacts; access roads, run-off and water control devices, and site restoration efforts would be periodically monitored. Any measures found to be ineffective or non-functional would be repaired or replaced.

4.6.2.2 Mitigation

Standard mitigation would use the measures best suited to each individual location to reduce erosion and runoff, and stabilize disturbed areas during and after construction. The following measures used alone or in combination would minimize soil disturbance and the effects of increased erosion and surface runoff created by access road improvements and transmission line construction:

- Properly space and size culverts, use ***crossdrains***, ***water bars***, rolling the grade, and armoring of ditches and drain inlets and outlets.
- Improve all existing culverts and stream crossings found to pose a risk to riparian, wetland or aquatic conditions to accommodate at least a 50-year flood and associated bedload and debris as prescribed in the revised Targhee Forest Plan.
- Coordinate all culvert installations with the U.S. Army Corps of Engineers, appropriate state agencies, and the U.S. Forest Service.
- Existing vegetation would be preserved where possible, and disturbed portions of the site stabilized. Stabilization measures would be started where construction activities have temporarily or permanently ceased, as soon as practicable.
- Promptly seed disturbed sites with an herbaceous seed mixture suited to the site.
- Use vegetative buffers and sediment barriers to prevent sediment from moving off-site and into water bodies.
- Assist farm operators with ***subsoiling*** to restore soil productivity.
- Design and construct all fords and bridges to minimize bank erosion. Specific locations and measures would be determined when road and line design are finalized.
- Schedule construction and maintenance operations during periods when precipitation and runoff possibilities are at a minimum to reduce the risk of erosion, sedimentation, and soil compaction.
- Design facilities to meet regional seismic criteria.
- Use double-circuit and/or helicopter construction (if feasible) to reduce impacts to moderate on Teton Pass (structures 26/2 to 29/3).

For Your Information

Compaction affects soil productivity, reduces infiltration capacity, and increases runoff and erosion. ***Subsoiling****, normal farming, cultivation and cropping, and freeze-thaw cycles restore soils to their preconstruction condition.*

Subsoiling *is plowing or turning up the layer of soil beneath the topsoil.*

- Site structures outside of known avalanche chutes or unstable areas to preserve transmission line integrity and slope stability.
- Consider full-bench road construction and end hauling excess sidecast material on slopes exceeding 55 percent if needed to stabilize the roadbed. Prior to construction, suitable waste areas would be located where excess materials could be deposited and stabilized.
- Construct access roads consistent with the standards and guidelines of the revised forest plans for the Targhee and Bridger-Teton National Forests and the BMP's instituted by the states of Idaho and Wyoming.
- Use the BMP's that would prevent further impairment of Water Quality Limited (WQL) drainages. The Teton River (headwaters to Trail Creek) is listed as WQL.
- Avoid riparian areas, drainage ways, and other water bodies. Where theses areas cannot be avoided, apply sediment reduction practices to prevent degradation of riparian or stream quality. Riparian plantings may be used where needed to restore streamside vegetation and insure streambank stability.
- Restrict road construction to the minimum needed and obliterate roads in agricultural land.
- Avoid or mitigate water quality and fish habitat degradation. Design and maintain roads so that drainage from the road surface does not directly enter live streams, ponds, lakes, or impoundments. Direct water off roads into vegetation buffer strips or control through other sediment-reduction practices. Restrict road construction to areas physically suitable based on watershed resource characteristics. Design stream crossings to avoid adverse impacts to stream hydraulics and deterioration of stream bank and bed characteristics.
- Avoid discharge of solid materials, including building materials, into waters of the United States unless authorized by a Section 404 permit of the Clean Water Act. Off-site tracking of sediment and the generation of dust shall be minimized. Vegetative buffers would be left along stream courses to minimize erosion and bank instability.
- Prepare a stormwater pollution prevention plan (as required under the National Pollution Discharge Elimination System General Permit).

- Set crossing structures as far back from stream banks as possible near any water body. Avoid refueling and/or mixing hazardous materials where accidental spills could enter surface or groundwater. This information will also be included in the Project Plan.
- Design the project to comply with local ordinances and laws and state and federal water quality programs to prevent degradation of the quality of aquifers and not jeopardize their usability as a drinking water source.

For measures required for stormwater regulations see Section 5.16, **Discharge Permits under the Clean Water Act**.

4.6.2.3 Cumulative Impacts

Current and future forest and agricultural management practices in the watersheds crossed might increase peak flows and introduce sediment into streams. Increased sediment in streams is expected from construction of the line alternatives in addition to agricultural and forest management activities. The volume of peak flow and the amount of sediment entering streams would depend on site-specific conditions. Mitigation measures proposed for construction of the line and those required by the USFS for logging-related activities would help reduce the chance of large amounts of sediment entering streams. The line alternatives would be constructed to prevent interfering with ongoing farm conservation efforts to control erosion and maintain water quality. Although minor, localized increases in erosion, runoff, and sedimentation are expected from construction and maintenance, these increases would have a low impact on the area's soil resources and water quality and would not impair the current beneficial use of any water body.

4.6.3 Single-Circuit Line Alternative

4.6.3.1 Impacts

Impacts to water and soils would be the same as the Agency Proposed Action except in the Pine Creek area (structures 6/1-7/2), the Teton Pass area (structures 26/2-29/3), and coming off Phillips Ridge (structures 35/1 to Teton Substation). In these areas, the line would not be double circuit as in the Agency Proposed Action. Soil and water resource impacts would increase relative to the Agency Proposed Action due to greater disturbance from increased clearing and access requirements for the single-circuit line.

4.6.3.2 Mitigation

- Refer to measures under Agency Proposed Action, Section 4.6.2.2.

4.6.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.6.2.3).

4.6.4 Short Line Alternative

4.6.4.1 Impacts

Impacts from transmission line construction and maintenance would be the same as for the Targhee Tap to Teton Substation portion of the Single-Circuit Line Alternative. Additional impacts would be from construction of the switching station near Targhee Tap.

Preferred Site on the Row - BPA would construct the switching station under the existing ROW just west of Targhee Tap. The volume of soil disturbance would be greater at this site due to slopes of over 20 percent. No prominent drainages would be affected and impacts to water quality would be low.

Site Off the ROW - The switching station could be placed in agricultural land north of structures 18/3 and 18/4 near the mouth of Pole Canyon. The erosion hazard is low and sediment is unlikely to be transported into any streams.

The potential long-term impacts of the switching station construction, operation, and maintenance would be low. Localized increases in runoff would occur from decreased infiltration at the site from the switching station's impervious surface. BPA would develop and implement a Stormwater Pollution Prevention Plan.

4.6.4.2 Mitigation

- Mitigation for the transmission portion of the project would be the same as for the Single-Circuit Line Alternative (see Section 4.6.3.2).
- Standard erosion and runoff control practices would be used during construction of the switching station. The specific location and type of measures would be determined when the facility location and design are finalized.

4.6.4.3 Cumulative Impacts

Cumulative impacts would be the same as the Single-Circuit Line Alternative (see Section 4.6.3.3).

4.6.5 SVC Alternative

Both the Teton Substation site and the site at Jackson Substation are nearly flat and there is minimal erosion hazard. Construction impacts related to soil disturbance and possible impacts on water resources would be low. At Teton Substation, preventive measures would be used to stop sediment from moving off-site into nearby waterways. At Jackson Substation, heavy equipment traffic along the existing road between the substation and Flat Creek could disrupt the road surface and allow sediment to be moved off-site. If necessary, sediment barriers would be used to prevent sediment from entering Flat Creek.

4.6.6 No Action Alternative

The current level of impacts would continue under the No Action Alternative. Impacts currently associated with ongoing maintenance and repair activities for the existing transmission line, substations, and right-of-way would persist. These impacts include localized soil disturbance and potential sedimentation due to vehicular traffic, transmission structure replacement, vegetation management activities, and access road improvements. In addition, vehicle and machinery use, and vegetation management practices could contribute minor amounts of pollutants (e.g., fuel, oil, grease, rubber particulate, woody debris) that could be transported to streams.

For Your Information

Floodplains are areas periodically inundated with water near lakes and rivers. They provide wildlife habitat, agricultural and forest products, and recreation areas and a channel for flood waters. Protection of floodplains is necessary to prevent damage to these functions and to protect human and natural features within them.

Wetlands provide a harbor for specially-adapted plants and animals, and benefit water quantity and quality.

Wetlands were identified using USFWS National Wetland Inventory maps, black and white aerial photographs, and field studies. Because of a lack of access to some areas, the whole ROW has not been field checked. Therefore, impacts are discussed for wetlands identified using available resources. When more exact information is available about structure locations, a more thorough field check would determine if additional wetlands would be impacted.

4.7 Floodplains and Wetlands

To comply with federal regulations (Compliance with Floodplain/Wetlands Environmental Review Requirements [10 CFR 1022.12]), BPA has prepared an assessment of the impacts of the Agency Proposed Action and alternatives (see Section 5.8, **Floodplain/Wetlands Assessment**). Executive Order 11988 (Floodplain Management) requires federal agencies to avoid or minimize adverse impacts associated with modification and occupancy of floodplains. Wetlands are also protected by federal legislation (Executive Order 11990,) which discourages development in wetlands whenever there is a practicable alternative. (See Section 5.8.) A notice of floodplain and wetlands

involvement for this project was published in the Federal Register on November 6, 1996. See Section 3.8, **Floodplains and Wetlands** and Map 7 for floodplain and wetland locations.

4.7.1 Impact Levels

4.7.1.1 Floodplains

Floodplains can be directly impacted by construction and development when channels for floodwaters are obstructed or changed, increasing downstream flows and/or upstream flooding. Indirect impacts can occur when resources are degraded (i.e., vegetation is removed and soils are compacted) enough to lessen the ability of the floodplain to store excess water, which increases the chance that flooding will occur.

A floodplain **impact** would occur when structures or permanent access roads encroach on designated floodplains and increase the potential for flooding; or might cause loss of human life, personal property, or natural resources within the floodplain.

No impacts are expected where floodplains are avoided, spanned, or standard mitigation would effectively eliminate impacts.

4.7.1.2 Wetlands

Transmission line construction could affect wetland functions directly by altering aesthetics; clearing tall-growing wetland vegetation such as willows or cottonwoods; reducing the ability of a wetland to provide for flood and sediment control; and altering wildlife habitat and patterns of use. Access road construction could directly modify wetland surface and groundwater flow patterns, and in some cases, reduce the wetland's ability to provide flood control. Wetlands can also be indirectly affected when wetland soil structure is changed by compaction or rutting, which in turn could change the productivity, water infiltration rates and flow patterns. Road improvements could increase sediment transport, destroy vegetation and wildlife habitat, and change recreation use patterns and aesthetics.

A **high** impact would occur:

- if wetland hydrology, vegetation, and/or soils, are extensively or permanently altered by excavation or fill, and the ecological integrity of a wetland is profoundly impaired;
- there is complete loss of a wetland or a wetland function is destroyed.

A **moderate** impact would occur:

- if wetland hydrology, vegetation or wet soils are altered by excavation or fill, but the change is seasonal and the ecological integrity is not profoundly impaired. Recovery generally requires restoration and monitoring;
- if there is a partial loss of a wetland or a wetland function is disturbed.

A **low** impact would occur:

- if vegetation or soils are changed for the short term, but hydrology is unchanged. Recovery is usually independent;
- if there is a short-term disruption of a wetland function.

No impact occurs if wetlands are avoided and would not be affected by new or rebuilt access roads or construction, operation and maintenance of facilities. Also, no impact would occur if the size, quality and functions of existing wetlands are not reduced.

4.7.2 Agency Proposed Action

4.7.2.1 Floodplain Impacts

The transmission line corridor would cross four creeks identified by FEMA as 100-year floodplains: Pine Creek and Trail Creek in Idaho, and Fish Creek and Lake Creek in Wyoming. New transmission line structures would not be located in 100-year floodplains if possible, however, impacts would occur from reconstruction of existing access roads and construction of new access roads and bridges.

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Drainage, Idaho —

Pine Creek Routing Options A-C — These options would not impact the Pine Creek floodplain because the floodplain would be spanned by the transmission line. The existing bridge that crosses Pine Creek is adequate for BPA use during construction. New access roads may be needed but would be located out of the floodplain.

Pine Creek Routing Option D (preferred) — There would be no impacts to the Pine Creek floodplain from double circuiting two to four structures between 6/2 and 6/8 because this would occur across the highway from Pine Creek, which is out of the floodplain.

Pine Creek Routing Option E — There would be no impacts to Pine Creek floodplains from this option. A new line would span the floodplain where it would cross the creek. New roads would be located uphill and away from the floodplain.

A new bridge is needed to replace an existing bridge across Pine Creek on USFS Road #250 (T3N, R44E, Sec. 31) to access structures near Mike Spencer Canyon. The construction of this bridge would have direct, adverse impacts on the floodplains. Abutments to the bridge would be located within the floodplain and would permanently remove about 1170 m^2 (1400 ft^2) of floodplain. A cement wall would be constructed in front of the abutments to shore up the streambank, and the abutments would most likely be poured-in-place concrete. About 23 m (75 ft) along either side of the creek would be impacted by construction of the abutments and wall, and 15 m (50 ft) back from the abutments would be impacted from reconstruction of the approach. The total disturbed area would be about 348 m^2 (3,750 ft^2). Disturbance of surrounding soils and vegetation during construction would cause short-term impacts to the floodplain, but would be minimized to the fullest extent possible (see Section 4.7.2.3, **Mitigation**). To mitigate impacts, the bridge and access roads would be designed to withstand and accommodate floodwater, including associated bedload and debris.

Where Poison Creek enters Pine Creek (T3N, R44E, Sec. 29) there is an existing ford across Pine Creek that is used for maintenance purposes only, and would not be used for construction. In compliance with the revised Targhee Forest Plan, this ford would be evaluated and improved if found to pose a risk to riparian, wetlands, or aquatic conditions.

Tie Creek (T3N, R44E, Sec. 27) and Little Pine Creek (T3N, R45E, Sec. 19) would need new bridges for construction. Murphy Creek (T3N, R45E, Sec. 19) would require a new culvert. These creeks are not mapped by FEMA as having 100-year floodplains. Flooding in these creeks can occur in spring and early summer during peak flows. The bridges and culvert would be designed and constructed so water is not restricted during heavy flows and debris does not accumulate.

Teton River Drainage (Trail Creek), Idaho — A possible staging area is located in the floodplain of Trail Creek, Idaho at Mike Harris Campground. The staging area would have a temporary impact on the floodplain. However, if the creek floods, it could contribute hazardous materials and debris to floodwaters. It is recommended that the staging area be sited outside the 100-year floodplain to avoid impacts. (Four other staging areas are proposed along the highway as described in Chapter 2. All are located away from floodplains.)

Fish Creek Drainage, Wyoming — The transmission line ROW would cross the floodplains of Fish Creek and Lake Creek, a tributary to Fish Creek. There would be no through access constructed across Fish Creek, however, structure 35/6 is located in the Fish Creek floodplain and would be removed to make room for double-circuit structures. A temporary bridge would be constructed over Lake Creek to provide access for installing two structures. Impacts from building the temporary bridge would be similar to those discussed earlier for bridge construction on Pine Creek. A pole would likely be located in the floodplain of Fish Creek. Any temporary roads or permanent structures located in floodplains would be designed so expected flows are not restricted and debris does not accumulate.

Operation and Maintenance — With bridges in place, operation and maintenance of the line should not cause further impacts to 100-year floodplains, except potentially at a Pine Creek ford (near Poison Creek). The ford would be evaluated and improved, if needed, so not to impede floodwaters or contribute to downstream flooding. Vegetation would be crushed by vehicles when the ford is used, however, because use is sporadic, it would recover quickly.

Reminder

Wetlands impact definitions are in Section 4.7.1.2.

4.7.2.2 Wetlands Impacts

Riparian associated wetlands and wet mountainside meadows occur along the new ROW. Riparian wetlands are found in association with major creeks such as Pine Creek and Fish Creek, as well as smaller tributaries including Murphy Creek, Tie Creek, Poison Creek, Trail Creek and Lake Creek. As the corridor passes through the mountainous areas, it crosses draws with wetlands and wet mountainside meadows, all being fed by surface runoff and/or seeps. Wetlands would be spanned by the conductor and new structures would not be located in wetlands. The one exception is on the valley floor by Teton Substation, which is discussed later in this section.

Impacts to wetlands could occur from on- and off-ROW road construction. BPA would need to build approximately 4.5 km (2.8 miles) of new roads off ROW and improve about 3.2 km (2 miles) of existing off-ROW roads. These numbers do not include any new trunk or spur roads constructed in the existing or new ROW. None of these new roads would be located through wetlands, however specific locations would be field checked to ensure no road construction could directly or indirectly impact wetlands in the area. If new road construction or upgrading occurs uphill from a wetland, erosion control devices should be placed to ensure soil is not washed downhill during a storm event. Two

existing access roads that ford Pine Creek (Road 7-1 and Road 10-3) would be released and no longer used, which would have beneficial impacts to riparian wetlands.

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Drainage, Idaho —

Pine Creek Routing Options A, B and D (preferred) — There would be no impacts on wetlands because riparian wetlands associated with Pine Creek are on the south side of State Route 31.

Pine Creek Routing Options C and E — These options would have no to low impacts on wetlands because riparian wetlands associated with Pine Creek would be spanned and an existing bridge would be used for access. Any new road construction or access road improvements on the south side of State Route 31 could carry sediment into the nearby wetland, affecting water quality and biological productivity, however, use of erosion control devices would ensure that these indirect impacts would be kept to a minimum.

Map 2 shows structure numbers and locations.

The existing access road crosses an area where a seep drains into a wetland adjacent to Pine Creek (downslope from structure 7/1). A new culvert was installed in 1996 to prevent water from flowing across the road and transporting sediment into the wetland. The culvert should be maintained and sediment barriers placed during construction so incidental sediment from construction traffic does not flow into the wetland.

A new bridge to replace the existing one is needed to cross Pine Creek on USFS Road #250 (T3N, R44E, Sec. 31) and access structures near Mike Spencer Canyon. The construction of this bridge would have a moderate impact on the riparian wetlands at Pine Creek. Direct, long-term impacts would include alteration of the vegetation, soils and hydrology due to permanent fill associated with bridge construction. An area of approximately 348 m^2 (3,750 ft^2) on either side of the creek would be disturbed by construction of the abutments and concrete wall. Approximately 365 m^3 (500 yds^3) of poured concrete would be required for each abutment and wall. Indirect impacts that could degrade wetland functions include increased sedimentation, which could affect water quality and biological productivity. Implementation of mitigation measures would reduce impacts and ensure recovery of surrounding vegetation within a season (see Section 4.7.2.3, **Mitigation**).

Bridge construction would require a Clean Water Act, Section 404 permit from the Corps of Engineers in coordination with the State Department of Water Resources, and a special use permit from the Forest Service. (See Section 5.1.6, **Clean Water Act Permits.**) Discussion of these impacts is based on a worse-case scenario because final design of the bridge has not been

completed. Coordination between the various agencies on design and permits will facilitate identification of additional mitigation that would further reduce environmental impacts.

USFS Road #252 crosses Pine Creek with an existing bridge. This access road parallels Tie Creek, crosses it and continues up the canyon (T3N, R44E, Sec. 27). The road is used to access structures 10/1-11/6. The existing bridge is sufficient for construction use. However, the lower portion of the road is difficult to use because water from Tie Creek flows across the roadbed into adjacent wetlands. The lower section of the road would be relocated out of any riparian wetland and the old road rehabilitated. A new bridge or culvert would be installed to cross Tie Creek. The bridge or culvert would be located to avoid riparian wetlands as much as possible. Impacts would be localized and short term. BPA would coordinate the design with the Forest Service, Corps of Engineers and the state of Idaho.

An existing access road crosses Little Pine Creek to access structures 15/1 to 18/1. The access road weaves through a scrub/shrub riparian wetland dominated by willows. A new bridge would be constructed across Little Pine Creek and the Murphy Creek ford would be replaced with a culvert. Moderate impacts similar to the bridge construction impacts previously described would occur to the riparian wetland. Impacts would be high but local to the portion of the wetland impacted by fill. Impacts would not profoundly impair the ecological integrity of the wetland. The access road turns sharply after crossing the creek and would need to be straightened so construction vehicles could maneuver the turn. This would require ripping up a portion of the existing road that winds through willows and constructing a small portion of new road elsewhere in the vicinity. The riparian wetlands would be delineated to avoid or minimize wetland impacts when locating the new road section. Design and permitting of the road, bridge, and culvert would be coordinated between BPA, the Corps of Engineers, the Department of Water Resources and the Forest Service.

Teton River Drainage (Trail Creek), Idaho; and Trail Creek Drainage, Wyoming — One potential construction staging area proposed south of the highway at Mike Harris Campground could infringe on the riparian boundary of the creek. It is not clear whether this vegetation is wetland vegetation. If equipment is stored away from the creek, no impacts would occur.

Near structures 24/3 and 24/4, in the Hungry Creek drainage (T3N, R46E, [no section], BPA's access road crosses a wet meadow fed by springs and surface runoff. The wetland supports a variety of forbs such as stinging nettles, sedges, and cow parsnip. The existing road is in poor condition and would need to be graded and rocked so it could accommodate construction vehicles. Portions of the road would have to be completely rebuilt. Impacts would be

moderate. Direct impacts would include additional fill where the road needs to be widened or reconstructed. Indirect impacts could occur from increased sediment transport that could impair wetland vegetation. About 365 m (1200 ft) of new road would have to be constructed uphill from the wet meadow to structure 24/3. Slopes are steep and erosion control devices would be required during construction of the road and maintained during construction of the line to ensure sediment is not carried downslope to the wetland. To minimize impacts, vehicles would be confined to the road only, avoiding wetlands.

Along Teton Pass, numerous draws exist that harbor forested and scrub/shrub wetlands. In this area (structure numbers 26/2 to 29/3), some of the existing structure footings would be used with new double-circuit structure bodies and tops. This type of construction would be done with helicopter which can greatly reduce soil disturbance that could cause indirect impacts to wetlands from sediment. Structures 27/5-28/2, 28/5, and 29/3 would need to be totally removed and replaced with new double-circuit towers. Ground disturbance at structures 27/5, 27/6, and 27/7 could cause indirect impacts to wetlands as slopes are steep in this area and sediment could be carried downslope to wetlands. The use of erosion control devices during construction would limit sediment transport.

Fish Creek Drainage, Wyoming — As the ROW descends Phillips Ridge and crosses onto the valley floor, the line would switch from single-circuit to double-circuit from structure 35/1 to Teton Substation. The ROW would cross Fish Creek and its tributary Lake Creek, and associated wetlands. A temporary bridge would be built across Lake Creek to access structures between Fish Creek and Lake Creek. Impacts to wetlands from building a temporary bridge would result from fill for bridge abutments and bridge approaches. The approximate area impacted would be 348 m^2 (3,750 ft^2). Soil compaction and vegetation damaged from vehicular traffic would occur reducing biological productivity. Use of BMP's and mitigation would reduce impacts. Temporary roads located in wetlands would be removed once construction is completed. Impacts would be moderate, but short term.

The double-circuit structures proposed for this area would be tubular steel poles. Each structure would be placed in an augured hole approximately 1.2-1.8 m (4-6 ft) in diameter and backfilled with approximately 3.5-11 m^3 (5-15 yds^3) of fill material, either crushed rock or concrete. Wetlands in this area would be delineated before final design so they could be avoided if possible. If they cannot be avoided, BPA would work with the Corps of Engineers and the state of Wyoming to determine permit and mitigation requirements for the activity. (See Section 5.16, **Clean Water Act**, for information on regulations and applicable permits.)

If wetlands cannot be avoided, impacts would occur from pole construction and could include disturbance of soil and vegetation including compaction from vehicle traffic. The disturbed area would be limited as much as possible, and the topsoil would be replaced to ensure the best wetland restoration opportunities.

Operation and Maintenance — Maintenance activities have the potential to impact wetlands. Sedimentation can reach wetlands from stormwater runoff of access roads improperly maintained. Existing roads should be upgraded to prevent this. If roads are upgraded and properly maintained, impacts would be low.

4.7.2.3 Mitigation

Standard mitigation measures would effectively keep impacts to a minimum:

- Locate structures and any new roads to avoid floodplain.
- Remove debris from construction and clearing.
- Design and construct bridges to minimize bank erosion, accommodate flood waters and associated bedload and debris.
- Use helicopter construction in areas where steep slopes and road construction would impact wetlands.
- Limit disturbance to the minimal amount necessary when working in wetlands and floodplains.
- Locate new access roads to avoid wetlands and floodplains.
- Locate staging areas to avoid wetlands and floodplains.
- Place all structures in upland where possible.
- Minimize vegetation removal where road construction impacts riparian zones.
- Delineate wetlands before final design so avoidance of wetlands is maximized.
- Identify and flag wetlands in project area for avoidance during construction.

- Use erosion control measures when conducting any earth-disturbing work uphill from a wetland.
- Stockpile wetland topsoil when excavating. Redeposit soil in place for site restoration after construction.
- Refuel equipment in designated areas away from water resources.
- Construct access roads and bridges consistent with the standards and guidelines of the revised forest plans for the Targhee and Bridger-Teton National Forests and the best management practices instituted by the states of Idaho and Wyoming.
- Coordinate activities between BPA and regulatory agencies to ensure compliance with wetland and floodplain regulations.

Mitigation would be monitored throughout the construction and post-construction phases to ensure effectiveness. Where adverse impacts could not be avoided, any necessary mitigation would be determined with appropriate jurisdictional agencies.

4.7.2.4 Cumulative Impacts

Building new bridges and improving access roads in floodplains would result in incremental impacts to floodplains as more of the floodplain is developed.

Wetlands over time have had incremental losses and degradation which have seriously depleted wetland resources. Cumulative impacts would result from line construction and maintenance. The disturbance from maintenance vehicles would be reduced by the use of permanent or temporary bridges (instead of fords) where wetlands are crossed. Maintenance vehicles using access roads upslope of wetlands could produce minor amounts of sediment that would temporarily impair wetland functions. Installation of permanent abutments in riparian wetlands would reduce the total size of these wetlands by a minor amount.

4.7.3 Single-Circuit Line Alternative

4.7.3.1 Impacts

Impacts to floodplains and wetlands would be similar to those of the Agency Proposed Action. Using single-circuit wood pole structures requires smaller spans than double-circuit steel structures, therefore, it would be difficult to avoid placing

structures and locating temporary roads in wetlands associated with Fish and Lake creeks. A temporary bridge would be needed across Lake Creek. Impacts would be high and long term. Direct impacts to wetlands would include wetland fill from permanent bridge abutments and structure footings. Indirect impacts would result from soil compaction and sediment transport from vehicular traffic. BPA would coordinate with regulatory agencies to develop site-specific mitigation.

4.7.3.2 Mitigation

- Refer to mitigation under Agency Proposed Action, Section 4.7.2.3.

4.7.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.7.2.4).

4.7.4 Short Line Alternative

Impacts to wetlands from this alternative would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

A new switching station would be built near Targhee Tap.

Preferred Site on the ROW - The switching station would be located directly under the line in the ROW. There would be no impacts to floodplains or wetlands from construction at this site.

Site off the ROW - The switching site would be located on the valley floor, downhill from Targhee Tap in agricultural land. The site would be field checked to make sure no wetlands are impacted. No impacts would occur to floodplains.

No additional mitigation is required and cumulative impacts would be the same as the Single-Circuit Line Alternative.

4.7.5 SVC Alternative

There would be no impacts from this alternative to floodplains or wetlands.

No mitigation is required and no cumulative impacts are expected.

4.7.6 No Action Alternative

Current levels of impacts would continue under this alternative. (See **Operations and Maintenance** in Section 4.7.2.2, **Wetlands Impacts**, and Section 4.7.2.4, **Cumulative Impacts**.)

4.8 Vegetation

resources can be directly affected by construction, operation and maintenance of transmission facilities. Short-term impacts can occur during construction and usually have minimal lasting impacts on vegetation. Other impacts are long term, such as ongoing maintenance practices that can permanently alter plant species composition and communities.

4.8.1 Impact Levels

Direct impacts to vegetation would be caused by access road construction, road improvements, clearing, structure construction and on-going maintenance activities. Road and structure construction would remove vegetation, including the root system and topsoil. Clearing can remove the overstory, which indirectly results in a change to the ecological community of the understory. Vehicular traffic can crush vegetation and cause dust that clogs the pores of plants. Soil compaction can also indirectly reduce plant productivity.

A **high** impact would be expected where:

- Native plants and their ecological communities are permanently removed (i.e., topsoil and the root system of the plant are removed), or noxious weeds are spread due to construction or maintenance.

Moderate impacts would be expected where:

- Native plants and their ecological communities are temporarily disturbed, the soil is compacted, but the topsoil and the root system remain intact.

Low impacts would be expected where:

- Native plants and their ecological communities are disturbed without displacing the root system or compacting soils.

4.8.2 Agency Proposed Action

4.8.2.1 Impacts

Construction — Construction of the Agency Proposed Action would require that the ROW be widened in some places between 0-30 m (0-90 feet), with an average additional width of about 12 m (40 ft). Clearing would include trees that interfere with the construction and operation of the line both in the ROW and outside. This includes trees that could be removed at a staging area proposed at Pine Creek Pass.

Approximately 31 ha (77 acres) of timber would be cleared. These trees include mixed conifers, predominately Douglas fir, lodgepole pine, and aspen. Impacts to vegetation from clearing would be moderate because root systems would be left intact, and the topsoil would not be removed. Also, the amount and type of vegetation cleared is relatively small compared to the amount of similar vegetation in the area. Clearing trees would open up the canopy, changing the habitat to a shrub/grass/forb community within the new ROW. Changing the habitat could impact those plants dependent on shade to survive. Impacts would be high to shade-loving plant species. In those areas where double-circuit structures are used on the existing ROW (from structures 6/2 to 6/8, 26/2 to 29/3, and 35/1 into Teton Substation), clearing would be limited; some clearing would occur between structures where the lines hang at their lowest point and could interfere with the tops of trees.

Wood H-frame and single wood or steel poles would be used for most of the project. To erect the structure, an H-frame structure would require two augured holes about 0.9-1.5 m (3-5 feet) in diameter, whereas a single wood or steel pole would require one augured hole about 1.2-1.8 m (4-6 feet) in diameter. As the holes are dug, a small amount of vegetation would be removed, causing low, localized impacts to vegetation. Additional disturbance would include vegetation crushed by vehicular and foot traffic.

Overall impacts to vegetation from structure construction would be low to moderate because the type of vegetation removed is abundant in the area, and any small disturbed area would be reseeded immediately after construction. Reseeding with native seed appropriate for the area and keeping topsoil intact in surrounding disturbed areas would help mitigate impacts. South facing slopes, shallow or unstable and excessively rocky soils would be more difficult to revegetate.

Low to moderate impacts would occur to vegetation that is crushed by vehicular traffic and equipment and material stockpiled at staging areas. Without root disturbance it should recover within a season depending on the degree of soil compaction.

Reminder

About 6-8 km (4-5 miles) of new roads are needed to have a complete trunk road system in place. Most existing access roads would need improvements, which would include grading the roads to 4 m (14 feet) wide, 5-6 m (18-20 feet) wide at the curves. Clearing and construction activities for new access would disturb an additional 3 m (10 feet) on either side of the road.

Approximately 4.5 km (2.8 miles) of permanent road construction off-ROW would require clearing approximately 6 ha (15 acres) of mixed conifers. Topsoil and any organic debris (i.e., roots, grasses, etc.) would be removed and gravelled to construct a stable roadbed. Impacts would be high where plants and topsoil are permanently removed, however the overall impacts to the ecological community would probably be moderate because the plant community being removed is relatively abundant in the area.

Road construction on-ROW would consist of 7.4 km (4.7 miles) of temporary road where land is privately owned and in agriculture. Impacts to vegetation would be low. The vegetation has been previously disturbed for crops or grazing, and the soil would be tilled and replanted after the road is removed.

About 2.7 km (1.7 miles) of new, permanent trunk roads and 7.2 km (4.5 miles) of permanent spur roads would be built on-ROW. The vegetation along with the topsoil would be permanently removed, creating high localized impacts to vegetation. However, because the vegetation has been previously disturbed and is maintained as a low-growing shrub/grass community, overall impacts would be moderate.

For a staging area proposed at Pine Creek pass, minor amounts of Douglas fir could be cleared to make the area larger. This would have a low impact on vegetation.

Pine Creek Drainage, Idaho — There are five options for routing the transmission line across Pine Creek from structures 5/8 to 7/1.

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Routing Option A — About 5.3 hectares (13 acres) of vegetation would be cleared for this option. Overall impacts would remain moderate because roots and topsoil would not be removed. Road construction would have high, localized impacts to vegetation; revegetation would be difficult on steep slopes.

Pine Creek Routing Option B — About 2.8 hectares (7 acres) would be cleared for this option. Impacts would be moderate. Road construction would have high, localized impacts and revegetation would be difficult on steep slopes with shallow soils.

Pine Creek Routing Option C — About 3.2 hectares (8 acres) would be cleared for this option. Overall impacts to vegetation would be moderate. Access road construction would have high, localized impacts, but revegetation potential is fair.

Pine Creek Routing Option D (preferred) — Approximately 0.6 hectare (1.6 acres) of juniper with scattered Douglas fir would be cleared to build 485 m (1600 feet) of new road to access structure 6/2, and 150 m (500 feet) of spur roads to access structures 6/4 and 6/5. Up to seven single-circuit structures would

be removed and two to four double--circuit structures constructed. No clearing would be necessary since the double-circuit section would be within the existing corridor. This area has steep slopes of up to 55 percent, with fair to poor revegetation potential due to shallow, droughty soils. Impacts to vegetation could be high but localized from road construction because topsoil and roots would be removed and revegetation potential is fair to poor.

Pine Creek Routing Option E — This area was previously logged and replanted with Douglas fir trees. Approximately 485 m (1,600 feet) of new road construction would be developed off-ROW removing about 1 to 2 ha (4 to 5 acres) of Douglas fir trees and aspen. Impacts from road construction would be moderate because of the small amount of trees removed and revegetation potential is fair.

No clearing of riparian vegetation for the new line is necessary at these Pine Creek crossings. An existing bridge across Pine Creek would be adequate for access during construction.

Impacts to riparian and wetland vegetation along several creeks in the mountains would occur from upgrading or constructing new road crossings. New bridges would be constructed to cross Pine Creek, Tie Creek, and Little Pine Creek. The construction of the bridges and road approaches would permanently remove a small amount (21 m [70 feet]) of riparian vegetation (dominated by willows) along the streambank causing long-term, high localized impacts to the vegetation. Areas of disturbance could be replanted with willow cuttings and reseeded immediately after construction to lessen impacts.

Fish Creek Drainage, Idaho — In the valley, near Teton Substation, wetlands are found associated with Fish Creek and its tributaries. Approximately 1.6 km (1 mile) of temporary access road would be constructed between Fish Creek Road and Teton Substation. Wetlands in the area have not been delineated, but they do exist to some extent throughout the area. Road construction could temporarily impact wetland vegetation (various grasses, sedges and rushes), causing moderate impacts. Temporary bridges or culverts would be needed to cross Phillips Creek and Lake Creek. Bridge construction would involve construction of permanent abutments that would permanently remove a small amount of wetland vegetation. Impacts from bridge and/or culvert installation would be high but localized to the vegetation removed, however, overall impacts would be moderate because of the small amount removed.

For Your Information

"Sensitive" is used here as a general term to describe a plant that holds special status.

"Sensitive" Species — The survey completed during the summer of 1997 documented the presence of four sensitive species within the Wyoming portion of the project area: Payson's bladderpod (*Lesquerella paysonii*), Scouler hawkweed (*Hiericium scouleri*), Columbia brome (*Bromus vulgaris*), and Western

For Your Information

*The Forest Service prepared a **Biological Evaluation** on Forest Service Sensitive Species. Eighteen species are classified "sensitive" by the Regional Forester in Region 4, the Targhee National Forest, and the Bridger-Teton National Forest, The Forest Service determined that the habitat of 17 species was not present in the project area. Payson's bladderpod is present in the project area. The Forest Service determined that the project may impact individuals or habitat but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.*

twayblade (*Listera caurina*). Some populations of these species are within the Targhee National Forest and other populations are within Bridger-Teton National Forest. None of the sensitive species are listed by the U.S. Fish and Wildlife Service as threatened or endangered. One specie is a USFS Region 4 Sensitive Species on both the Targhee and Bridger-Teton National Forest (a ***Biological Evaluation*** was completed by the Forest Service). Each species has been assigned a global and state rank by the National Wyoming Heritage Program. All of the sensitive species encountered are Wyoming State Species of Concern.

These four species are found from Mile 26 through Mile 34 of the existing and proposed ROW. The first species, Payson's bladderpod, is found at high elevations on rocky, sparsely vegetated slopes. A single large population (1,000-5,000 individuals) was found on either side of the boundary between the Targhee and Bridger-Teton National Forests (David Evans and Associates, 1997). This species is a Region 4 Sensitive Species on both the Bridger-Teton and Targhee National Forest. It is also on the state of Wyoming "Watch List" as being rare or local throughout its range or found locally in a restricted range. The habitat of this plant is open, with very few trees, so tree removal would probably not impact the species. The population was found within the existing ROW where BPA would double circuit the proposed line. Activities could include removal of the existing structure, construction of a new larger double-circuit structure, and road construction. These activities could have adverse, high impacts on the population. It would be necessary to delineate the populations to determine if it is possible to avoid them.

Scouler hawkweed is found in a wide elevational range, occurring from the foothills to rather high elevations in the mountains. It grows in dry, open or brushy places, open woods and occasionally in dense woods. This species is not listed as a USFS Region 4 Sensitive Species or as a Sensitive Species by the Targhee or Bridger-Teton National Forests. The Wyoming state rank assigned means the species is critically imperiled. Scouler hawkweed is present on the existing ROW in Miles 26, 32, 33 and 34, on steep forested slopes, and shrubby areas at an elevation of approximately 2255 m (7,400 feet) (David Evans and Associates, 1997). The 12 populations are small and found in areas that could potentially be impacted by road and structure construction, as well as foot and vehicular traffic. These populations should be delineated and flagged for avoidance. Clearing should not impact the species since it seems to have a broad tolerance for habitat conditions.

Columbia brome, a perennial grass species, is found in habitat described as moist hillsides in woods or meadows. The elevational range is broad. Columbia brome is not listed as a USFS Region 4 Sensitive Species or as a Sensitive Species by either the Targhee or Bridger-Teton National Forests. The Wyoming state rank of S1/S2

means it is critically imperiled or imperiled. It is found scattered throughout Miles 24 through 33 in the Phillips Ridge area. The populations occur within the existing ROW, proposed ROW, existing access roads, and along proposed access roads within the Targhee and Bridger-Teton National Forests. Those populations are found in portions of the existing ROW with trees and in the forested portions of the proposed ROW. This species is shade-loving, and could be indirectly impacted by tree removal, which could result in their destruction. Clearing should be kept to an absolute minimum in these areas and the populations should be flagged for avoidance so as not to be trampled by foot or vehicular traffic. Transplantation of these individuals is an option that could be considered. (David Evans and Associates, 1997.)

Western twayblade is a small orchid that grows in the shade of conifers. This species is not listed as a USFS Regional 4 Sensitive Species or as a Sensitive Species by the Targhee or Bridger-Teton National Forests. The Wyoming state rank is S1, which means it is critically imperiled. Three small populations are located in Miles 26 and 27. One population extends into the existing ROW, while the other two populations are in the proposed ROW. Since this is a shade-loving species, even without direct harm to the individuals, tree removal could indirectly result in their destruction. Tree removal should be limited to the least amount necessary and populations should be delineated and flagged for avoidance from foot and vehicular traffic. (David Evans and Associates, 1997.)

Threatened and Endangered — The USFWS has listed Ute Ladies'-tresses as threatened and as potentially occurring in the project area. Surveys did not locate any populations, however potential habitat exists in several places where access roads cross creeks and wetlands. Since the plant species is known to have periods of prolonged dormancy, those areas of potential habitat would be resurveyed during the summer of 1998 to again try and identify whether the plant species might be present.

Noxious Weeds — Noxious weeds are plant species designated by federal or state law. Disturbed areas such as transmission corridors often become infested with undesirable or non-native plants species. These species take advantage of disturbed soils and the lack of competing vegetation in areas recently cleared. Construction would disrupt vegetation and disturb soils, encouraging invasion of noxious weeds. Vehicles can transport seeds from infested areas to locations along the ROW and access roads. For specific measures that BPA would take to lessen the spread or introduction of non-native plant species during construction see Section 4.8.2.2, **Mitigation**.

A preconstruction weed inventory was conducted during the summer of 1997 to document existing infestations. The inventory provides baseline data to establish the need for and/or to develop

a weed control plan. A post-construction inventory would be conducted the second year after construction to determine if noxious weeds have invaded areas disturbed by construction.

The survey targeted species listed on state, regional and county weed lists. Thirteen species were documented as occurring on the existing and proposed ROW. The size and distribution of the populations of each of these species differs. Only three species were documented as being common and scattered throughout the survey area: Canada thistle, musk thistle, and hound's tongue. Other species that were found and are less common are spotted knapweed, bull thistle, erect cinquefoil, ox-eye daisy, and leafy spurge. These species only occur in one location on the ROW or as individuals: yellow toadflax, common burdock, tansy ragwort, and St. John's-wort.

The information gathered from this survey would be used to plan control or eradication measures. BPA would assist and cooperate with the USFS, landowners, and local weed control boards to control noxious weeds along the ROW.

Operations and Maintenance — Within the corridor, vegetation would be periodically cleared and kept low-growing to allow access to transmission facilities and prevent hazards to the line. Tall-growing brush and trees that could interfere with lines would be removed. Continued use of access roads could cause indirect impacts such as soil compaction and dust. Soil compaction damages root systems, and dust clogs leaf surfaces. Often access roads can become roads for off-road vehicles that can cause additional and ongoing destruction of plant habitat. Overall, maintenance-related impacts could be low to moderate, and would continue for the life of the line. In areas where soils are disturbed by maintenance activities, noxious weeds could invade causing high impacts to vegetation.

4.8.2.2 Mitigation

The following recommended mitigation measures would minimize impacts to vegetation. Site-specific mitigation action plans would be developed with the USFS before construction starts.

- Locate proposed project adjacent to existing corridor to keep clearing to a minimum.
- Use existing access road system with minimal development of new roads.
- Keep additional vegetation clearing to the minimum needed to maintain safety and operational standards.
- Delineate and flag sensitive species populations to avoid direct and indirect impacts from occurring.

- Ensure that adequate topsoil depth and texture are in place. Promptly reseed or revegetate disturbed areas with native seed mix as soon as construction in an area is completed.
- Limit construction activities during wet periods to minimize damage to plants.
- All reclamation plans would consist of native plant seed mixes approved by the USFS.
- Seed mix composition, rates and reclamation plans would be approved by the USFS.
- Any disturbed areas would require a minimum of 10.2 cm (4 inches) of native topsoils.
- Mulches would be approved by the USFS.

Control measures for sensitive plant species:

- Designate vegetation management zones that restrict certain activities.
- Delay tree removal until the fall, if possible, to avoid trampling species while they are flowering and fruiting. The areas should be disturbed as little as possible. If trees are felled into the habitat of these species from adjacent areas, they should be removed from the habitat so they do not crush and smother plants.
- Spot spray weed species within habitats of sensitive plants. Use extra caution in these areas. Crews responsible for spraying should be able to identify these species so they can avoid spraying near them or inadvertently trampling them. A knowledgeable person could accompany spray crew members or flag sensitive populations prior to any spraying.
- To minimize impacts to Lesquerella paysonii, access structure 28/2 by overland travel, cabling, and by minimizing tree and/or branch removal.

Control measures for undesirable plant species:

- Minimize disturbance to native species to the greatest extent possible during construction to prevent invasion by non-native species.
- Work with the Forest Service and county agencies to determine appropriate methods for treating existing weed populations before construction.
- Conduct preconstruction weed survey to document existing weed populations.
- Wash all earthmoving equipment at established wash stations prior to entry into project area.

- If earthmoving equipment has been operating in an area heavily infested with noxious weeds, wash equipment before moving into another area.
- Ensure that earth materials (such as gravel, fill, etc.) brought in from other sites are free of weed seed.
- Seed applied will be Wyoming and Idaho "CERTIFIED" as noxious weed free.
- Use certified noxious weed-free mulch.

4.8.2.3 Cumulative Impacts

Plant species and natural communities are interdependent parts of a complex system of soil, water, human and animal life, and many other biological resources. The system is weakened when plant communities become fragmented or when important native habitats are invaded by non-native weeds. The new corridor would be placed next to an existing corridor that has plant communities that have already been disturbed. The new transmission facilities would remove some plants from the plant community and noxious weeds could invade the area. This could have a continuing impact to vegetation.

4.8.3 Single-Circuit Line Alternative

Overall impacts would be similar to the Agency Proposed Action. The Single-Circuit Line Alternative would remove about 73 hectares (181 acres). This would be more than twice the amount needed to clear for the Agency Proposed Action. Areas where a double-circuit line would be used in the Agency Proposed Action would require less clearing and disturbance of existing vegetation than the Single-Circuit Line Alternative. Structure height and slope would determine how many additional trees in danger of falling into the line would be removed outside the ROW.

4.8.3.1 Mitigation

- Refer to mitigation under Agency Proposed Action, Section 4.8.2.2.

4.8.3.2 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.8.2.3).

4.8.4 Short Line Alternative

Impacts would be similar to the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation. A new switching station would be constructed near Targhee Tap.

Preferred Site on the ROW — The switching station would be located uphill and under the existing and proposed line. Approximately 0.4 hectare (1 acre) of mixed lodgepole pine, Douglas fir and aspen would be removed. Impacts would be moderate.

Site off the ROW — The switching station would be located in agricultural land below Targhee Tap, permanently removing about 0.4 hectare (1 acre) of pasture. A permanent road would be needed to access the substation. The road would be about 4 m (14 feet) wide and gravelled.

4.8.4.1 Mitigation

- Refer to mitigation under the Single-Circuit Line Alternative, Section 4.8.3.1.
- Locate the switching station in a cleared area to minimize tree removal.

4.8.4.2 Cumulative Impacts

Impacts would be the same as the Single-Circuit Line Alternative.

4.8.5 SVC Alternative

4.8.5.1 Impacts

At Teton Substation, the expansion could occur into an existing parking lot on the northwest side of the substation. A riparian wetland is present on the north and east sides of the substation. The existing parking lot is bordered by a ditch which carries irrigation water and surface runoff from a nearby field. Moving the fence line would remove little vegetation since the surface is currently gravelled. Overall impacts to vegetation from substation expansions would be low.

At Jackson Substation there would be no to low impacts from expanding the substation to the north and removing 13.5 m^2 (150 ft^2) of vegetation that has been previously disturbed.

4.8.5.2 Mitigation

Mitigation would be the same as those for the Agency Proposed Action, Section 4.8.2.2.

4.8.5.3 Cumulative Impacts

There would be no cumulative impacts to vegetation.

4.8.6 No Action Alternative

There would be no impacts to vegetation, but continued impacts from operation and maintenance of the existing transmission line would remain.

4.9 Wildlife

4.9.1 Impact Levels

High impacts on wildlife occur when an action would create a significant adverse change in present wildlife populations, individuals, or habitats. Significant adverse changes include impacts that:

- create an unavoidable adverse effect on a federally-listed threatened or endangered animal species;
- significantly reduce the quantity or quality of a regionally or nationally significant wildlife population or habitat area;
- significantly reduce the quantity or quality of habitat critical for the survival of local populations, such as big-game winter range; or
- adversely affect rare or declining species or other species with high public profiles, values, or appeal (e.g., sandhill crane, deer, and elk) at the regional level. For this project, the regional level is considered the Greater Yellowstone Ecosystem.

Moderate impacts on wildlife occur if the impacts:

- create an effect on threatened or endangered species that could be mitigated partially through interagency consultation with the USFWS under Section 7 of the Endangered Species Act;
- cause a local reduction in the quantity or quality of wildlife habitats (as opposed to regional reductions); or

- marginally reduce the productivity of adjacent wildlife habitats or resources (such as nest sites).

Low impacts occur when an action creates an impact that would:

- create an effect that could be largely mitigated;
- reduce the quantity or quality of wildlife habitat or species confined to the site of the action;
- cause no significant effect on productivity of adjacent wildlife habitat;
- temporarily disturb common wildlife species;
- reduce habitat that is very common in the project vicinity;
- adversely affect relatively common species at a local level (i.e., occurring within the immediate vicinity of the project and not affecting regional populations); or
- cause temporary effects or those that can be minimized by site planning or by placing seasonal restrictions on construction activities.

No impacts occur when an action creates no impacts or fewer impacts than the low impact level.

4.9.2 Agency Proposed Action

4.9.2.1 Impacts

Construction — Wintering deer, elk, and moose could be disturbed by construction noise and activity in or near delineated wintering areas described in Chapter 3. With mitigation, construction during winter would cause a low impact to these animals because the impact could be partially to fully avoided through timing restrictions. (See Section 4.9.2.2, **Mitigation**.)

Habitat loss from clearing the ROW would impact mostly species that use lodgepole pine and aspen forests. These forest types are plentiful in the area and the amount of clearing required would reduce forest habitat and increase shrub habitat. Because shrub habitat is not as common as the forest habitat that would be removed, the overall result is a minor increase in habitat diversity. Loss of about 31 hectares (77 acres) of mixed conifer trees along the ROW (including access roads) would be a very minor change in relationship to the amount of this habitat available in the immediate project vicinity and throughout the region. Clearing during construction would benefit species using shrubby, open habitats. This would cause a low impact for species associated

with forest (e.g., American marten and cavity-nesting birds) and a low beneficial impact for species associated with shrub habitats and forest edge (e.g., northern flicker and American kestrel).

Because the transmission line would either cross streams by spanning drainages, or be located well upslope of stream channels, little if any riparian vegetation would need to be removed during clearing. Construction or replacement of permanent or temporary bridges would incidentally remove a minor amount of riparian vegetation. Removing riparian vegetation during construction could affect wildlife. Riparian habitat provides water and dense cover, and food sources that attract wildlife. However, since such a small amount would be affected, the overall impact level would be low.

Impacts caused by noise from equipment and material stored and moved about at staging areas along the highway would be low and temporary. Ground disturbance would occur but recovery should occur in the following season.

Nesting habitat would be lost for veery, rose-breasted grosbeak, and olive-sided flycatcher, which are neotropical migrant species for which populations have declined somewhat (less than 3 percent) in North America. Nesting habitat would also be lost for Forest sensitive species and mammals. However, habitats that would be lost are common in the project vicinity and impacts would be confined to the site of action, so the level of impact would be low.

Reminder

Figures 2-3 and 2-4 show locations of Options A-E.

Pine Creek Routing Options A and B — Option A would require 5.3 hectares (13 acres) of clearing. Option B would require 2.8 hectares (7 acres) of clearing. Option A contains more cliff habitat that may contain hawk nests or other bird nests. The potential impacts on these species are greater than Option B.

Pine Creek Routing Option C — Option C requires 3.2 hectares (8 acres) of clearing. This option would cause greater spacing between where the existing and new lines cross the highway. This could increase the potential for avian collisions. This option would result in a minor increase in the amount of forest habitat lost. However, the overall impact from habitat loss would the same as described previously. This option could also increase human access in the area near Pine Creek, resulting in a minor increase in human disturbance to wildlife habitat.

Map 2 shows structure numbers and locations.

Pine Creek Routing Option D (preferred) — Double-circuiting two to four structures between 6/2 and 6/8 and constructing new road access to these structures would not substantially change impacts to wildlife from those anticipated with the Agency Proposed Action. The increased height of double-circuit structures increases bird collision risks somewhat over those associated with single-circuit structures; however, since the double-circuit structures would be located along a steep slope, an

area that is not likely to be used as a major flyway, the overall increased risk would be minimal. Routing Option D would require clearing about 0.6 hectares (1.6 acres) of juniper since the double-circuit structures would require no additional clearing other than that necessary to create spur roads to access the structures.

Pine Creek Routing Option E — This option requires two more transmission line crossings of Pine Creek than the other options, resulting in an increased level of risk for bird collisions with power lines. However, since markers have been shown to effectively mitigate this impact, the level of impact would be considered moderate. Though markers minimize the risk of bird collisions, the moderate level of impact is assigned because the species at risk (sandhill cranes, great blue herons, and other waterfowl) are high-profile species in some of the areas of concern. Routing Option E would require about 1-2 hectares (4-5 acres) of clearing.

Access Roads — Access roads would be improved and new access roads would be built. New roads would indirectly increase wildlife disturbance because of increased recreational use. Existing roads are used extensively by a wide range of recreationists. Teton Pass receives particularly high recreational use.

The most notable effect on wildlife would be for new access roads created within the big-game winter range areas identified in Chapter 3. The WDGF recommended that new access roads be minimized in these areas. Winter recreational use is not a major issue at higher elevations because most animals migrate to lower elevations or hibernate during winter. However, the WDGF has recommended seasonal restrictions on construction (prior to November 15 and after April 30) between the Idaho border and Mail Cabin Creek (from existing structure 22/8 to about structure 27/2) to protect big-game winter range. About 1.8 km (1.1 miles) of new roads would be constructed within this section, resulting in a moderate level of impact due to habitat loss and potential increased disturbance. The IDFG has recommended seasonal restrictions on construction activities (prior to December 15 and after April 15) from Poison Creek southwest to the Swan Valley substation. If unusually adverse weather conditions occur, restrictions are requested prior to December.

Increased recreation access during spring, summer, and fall would introduce human disturbance into areas that previously contained secure wildlife habitat. Species vulnerable to human presence, such as deer, elk, and nesting raptors, may avoid new roads that attract recreational use. Gating of new roads can partially mitigate this impact, though foot traffic may still occur.

Operation and Maintenance — Motorized access and project-related maintenance activities could occur during the fall big game hunts which begin August 30. Maintenance crews need to take advantage of the summer season to improve access roads and do whatever type of maintenance is needed on the transmission line.

Some types of birds, particularly water birds such as ducks and geese, are susceptible to collisions with power lines. Collisions typically occur in very specific locations where conditions combine to create a high potential for birds striking lines (Avian Power Line Interaction Committee, 1994). Four factors contribute to this potential: the current level of risk, the type of power lines, the amount of use, and the inherent tendency of species to collide with overhead wires. (See Appendix G, **Wildlife Report,** for a detailed discussion of collision risk.)

The existing transmission line creates a level of risk. Areas of highest concern are where lines cross bird flight paths in Swan Valley (between Swan Valley Substation and structure 4/3), along the second crossing of Pine Creek (between structures 6/12 and 7/1), Teton Pass (between structures 28/1 and 28/5), and the Jackson area (between structure 35/2 and Teton Substation). Trumpeter swans and other species of waterfowl, including sandhill cranes, may fly up Pine Creek drainage on their way between Teton Valley and Swan Valley, though no mortality has been reported where the existing transmission line crosses Pine Creek.

Other migratory birds, including neotropical songbirds, are potentially at risk but are not prone to collision because of their small size and ability to maneuver (Avian Power Line Interaction Committee, 1994). While actively migrating, most birds fly at very high altitudes (Alerstam, 1990) well above the altitude of transmission lines. However, during inclement weather, such as extreme low pressure or at storm fronts, these birds may fly low enough to be at risk.

Because a new line would be placed within an area already containing the same potential risk, the impact would be less than if a new line were placed where there is no existing line. Risks and associated mortality would increase, but risks would not double because there is already risk with the existing line. Avian collision hazards can be reduced by installing line markers. (See Section 4.9.2.2, **Mitigation**.) Markers have been shown to reduce collisions by 57 to 89 percent (Avian Power Line Interaction Committee, 1994). Because sandhill cranes, great blue herons, and other waterfowl are high-profile species in some of the areas of concern, this risk would be considered a moderate-level impact.

Double-circuit structures placed at Teton Pass, and from just below Phillips Ridge into Teton Substation would be taller than existing structures. Risks and associated mortality may increase because of the greater height. Avian collision hazards can be reduced by installing line markers (see Section 4.9.2.2, **Mitigation**).

Reminder

A ground wire is typically a single wire spanning the top of the transmission structure that is used to protect the lines from lightning strikes. Ground wires are usually much smaller in diameter than transmission line conductors (or wires).

Many reports list ground wires as a contributing factor to avian collisions. Ground wire would be installed about 3 m (10 ft) above the transmission line conductors. Fiber optic cable would also be added. The cable can be added to the ground wire or attached to the structure below the conductors. Separate ground wire and fiber optic cable could contribute more to avian mortality than if ground wire and fiber optic cable were installed together.

Generally, collision with transmission lines is not a major source of mortality for raptors (Olendorff and Lehman, 1986). Impacts to raptors are expected to be low.

Bird electrocution occurs where two energized lines are close enough for a bird to touch both at the same time. Larger perching birds, such as golden eagles, red-tailed hawks, and other perching raptors, are the types of birds most at risk. To prevent the problem, BPA provides adequate separation of poles, crossarms, and wires; insulates wires and other hardware where sufficient separation cannot be attained; and places perching platforms away from energized hardware (see Olendorff, et al., 1981). No or few avian electrocutions are expected.

Threatened, Endangered, Candidate, and Forest Service Sensitive Species — Disturbance from construction noise and activity and loss of habitat would have no significant effect on threatened, endangered, or candidate species listed under the Endangered Species Act except for possibly the bald eagle (a threatened species).

Wintering bald eagles occasionally occur along Pine Creek, occur in good numbers in the Jackson area, and occasionally forage along Trail Creek and scavenge on big game winter ranges (Oechsner, 1997). Wintering bald eagles would avoid active construction areas, and their primary foraging areas along the Snake River would be unaffected. Wintering bald eagles are likely to be relatively tolerant of human disturbance because they occur near human population centers. Bald eagle nests are far (2 km [1.2 miles]) from construction. Construction would have a moderate level of impact on individual wintering bald eagles if construction were to occur at that time (which is highly unlikely). Construction timing restrictions, similar to restrictions to protect big-game winter range, would substantially reduce the impact. Collision risk would incrementally increase to bald eagles. However, transmission lines are relatively common in the Swan Valley and Jackson areas, yet no bald eagle mortality from transmission lines has been reported. Human development is the primary factor affecting bald eagle populations, and mortality associated with power lines has a low to no effect on the local populations.

Impacts to species are given in Table 4-2.

Table 4-2. Impacts to Threatened and Endangered, Forest Sensitive, and Candidate Species

Species	Listing	No Impact	Not Likely to Adversely Affect Population Or Species	May Impact Individuals or Habitat, But Will Not Likely Contribute To A Trend Towards Federal Listing Or Loss Of Viability To Population Or Species	Will Impact Individuals Or Habitat With A Consequence That The Action May Contribute To A Trend Towards Federal Listing Or Cause A Loss Of Viability To The Population Or Species	Beneficial Impact
Bald Eagle	Threatened		X			
Peregrine Falcon	Endangered		X			
Whooping Crane	Endangered		X			
Grizzly Bear	Threatened		X			
Gray Wolf	Threatened		X			
Mountain Plovers	Category 1		X			
Western boreal toads	Category 1			X		
Ute Ladies'-tresses	Threatened		X			
Spotted Bat	USFS Sensitive	X				
Townsend Big-eared Bat	USFS Sensitive			X		
Canada Lynx	USFS Sensitive and Category 1			X		
Wolverine	USFS Sensitive			X		
Boreal Owl	USFS Sensitive			X		
Flammulated Owl	USFS Sensitive			X		
Common Loon	USFS Sensitive			X		
Harlequin Duck	USFS Sensitive			X		
Three-toed Woodpeckers and Other Cavity-nesting Species	USFS Sensitive			X		
Great Gray Owl	USFS Sensitive	X				
Northern Goshawk	USFS Sensitive			X		
Spotted Frog	USFS Sensitive			X		
Fisher	USFS Sensitive			X		
Yellowstone Cutthroat Trout (fine-spotted form)	USFS Sensitive			X		
Trumpeter Swan	USFS Sensitive			X		

Peregrine falcon nests are far from construction, closer to the Snake River and beyond. A low level of collision risk is expected for peregrine falcons because most of their activity is likely to occur along the Snake River, which is outside the project area. The project area receives very low use by both grizzly bear and gray wolf (both threatened), and no denning is expected near the project. Mountain plovers have never been reported in the area. Because most of the transmission line would either cross streams by spanning drainages, or be located well upslope of stream channels, few if any streams or wetlands that the western boreal toads may use would be disturbed directly during clearing. No to low impacts would occur to these species. Higher impacts could occur from construction of new access roads and placement of permanent or temporary bridges.

The Canada Lynx has been added as a candidate for listing by the USFWS. Canada lynx are extremely uncommon in the project area. Though they may be present near the project area, they are mobile and have large home ranges, so they could shift their use patterns with little or no effect on their survival.

For Your Information

The Forest Service prepared a Biological Evaluation on Forest Service Sensitive Species. Determinations are shown in Table 4-2.

Some USFS sensitive species could be affected by construction. The boreal owl, flammulated owl, great gray owl, northern goshawk, and three-toed woodpeckers and other cavity-nesting species, nest in the vicinity. Construction noise and activity would disturb local nesting three-toed woodpeckers and other cavity-nesting species. Low impacts are expected.

Although there are no known nests of boreal owl, flammulated owl, great gray owl, or northern goshawk near the ROW, surveys have not been completed and other nest sites may be present. Vegetation clearing would reduce potential habitat for these and other raptor species including Cooper's hawks, sharp-shinned hawks, Swainson's hawks, red-tailed hawks, northern harriers, and great horned owls. These species are particularly common in the Swan Valley (between Swan Valley Substation and structure 4/3) and Jackson area (between structure 35/2 and Teton Substation). Construction would temporarily disturb foraging areas. The largest potential impact for raptors is disturbing active nest sites.

Noise from heavy equipment and workers can cause raptor species to abandon their nest sites, particularly during the early stages of nest tending, when raptors are more likely to leave a nest (Newton, 1979). Raptors that remain at nests near active construction sites may have fewer young survive because adults spend energy defending their nest, rather than obtaining food for themselves and their young. In some situations, raptors may accept the activity as nonthreatening after a few days and remain unaffected. As a general rule, nests within 0.4 km (0.25 mile) are most vulnerable to abandoning or reduced survival. If nests are located and protected, impacts would be low.

Spotted bat and Townsend's big-eared bat are potentially present but no Townsend's big-eared bat roosting or breeding habitat is present (Christy, R. and S. West, 1993). Between existing structures 6/2 and 6/7, the Pine Creek drainage contains potential habitat for spotted and other bat species. Construction could temporarily disturb this area. Impacts would be low.

The wolverine, like the Canada Lynx (described above) are extremely uncommon in the project area. Though they may be present near the project area, they are mobile and have large home ranges, so they could shift their use patterns with little or no effect on their survival.

Harlequin duck nesting habitat is potentially present along Pine Creek, which would be spanned causing little or no disturbance to this potential habitat. Common loons are not found in the area.

Spotted frogs could be present within wetlands and streams but with standard construction practices no to low impacts are expected.

Trumpeter swan nest sites are outside the project area and would not be disturbed. Wintering trumpeter swans may use the Swan Valley and Jackson areas. Construction would temporarily disturb a small portion of wintering swan habitat. Low impacts are expected.

The whooping crane is no longer considered viable in the area, and has been removed from the Targhee National Forest's endangered species list it maintains through consultation with the USFWS (Oechsner, 1997).

More detail on the impacts to these species is provided in Appendices G and H.

4.9.2.2 Mitigation

To minimize raptor nest disturbance and comply with the Migratory Bird Treaty Act:

- Time project activity to avoid critical nesting periods (nest trees may be removed once young have fledged and/or a permit has been issued from the USFWS).
- Prior to initiating ground disturbing activities, conduct wildlife surveys, as determined through coordination with the USFS. BPA has worked closely with the Forest Service on survey timing and requirements. All surveys will be conducted in 1998 per an Interagency Agreement with attached protocols jointly developed by the Forest Service and BPA in 1997.

- After wildlife surveys are completed, coordinate with the USFS, USFWS, and the state wildlife agencies (IDFG or WDGF) on mitigation strategies. Mitigation would incorporate Revised Forest Plan for the Targhee National Forest standards and guidelines and may include nest site monitoring, shortened work days, or minimizing disturbance during the most critical early nesting period.
- If required, survey in spring (from March to June) to identify nest site locations for Cooper's and sharp-shinned hawks, Swainson's hawks, red-tailed hawks, northern harriers, goshawk, and owls. If necessary, BPA will develop site-specific management prescriptions in consultation with the Forest Service to protect nest sites or other sensitive features identified during pre-construction surveys. BPA and the Forest Service would implement construction constraints pending the results of the surveys.
- For danger trees that would be cut outside the new ROW, BPA will work with the Forest Service on the possibility of topping some of these trees for wildlife habitat.

To minimize disturbance of big-game winter range and disturbance related to new or expanded roads:

- Avoid construction at lower elevations (Swan Valley, Teton Basin, and the Jackson area) during extreme winter weather or unusually heavy snow accumulations, when big-game species are less mobile and more vulnerable to disturbance. Coordinate with the state wildlife agencies to ensure that construction does not significantly interfere with big-game wintering.
- Construct from the Idaho state line to Mail Cabin Creek (from structure 22/8 to about structure 27/2) prior to November 15 or after April 30 to protect big-game winter range (Baughman, 1996).
- Follow IDFG recommended seasonal restrictions on construction activities (prior to December 15 and after April 15) from Poison Creek southwest to the Swan Valley substation. If unusually adverse weather conditions occur, restrictions are requested prior to December.
- If an early spring occurs, BPA will coordinate construction in agricultural fields near Swan Valley before April 15 with the USFS and IDGF. BPA will request USFS and IDFG biologists to assess whether evidence of wintering deer, elk, and moose is in the area and whether construction may affect populations.

- Timing restrictions for activities in deer, elk, and moose wintering habitat would begin on November 15. Work in the fall may continue past November 15 for emergency reasons, and will be coordinated with the Forest Service, WDGF, and IDFG. Timing restrictions would not conflict with timing restrictions for other species.
- Gate new roads and consider posting some or all of the new roads for no trespassing.

To reduce avian collisions:

- Consult an expert on avian power line collisions to identify appropriate line markers, such as aerial marking spheres, spiral vibration dampers, or bird flight diverters. Areas where markers should be considered include the Swan Valley area (between Swan Valley Substation and structure 4/3), the second crossing of Pine Creek (location depends on which Pine Creek Routing Option is chosen), Teton Pass (between structures 28/1 and 28/5), and the Jackson area (between structure 35/2 and Teton Substation).
- Where possible, line up new structures with existing structures to minimize the vertical separation between the two sets of lines.
- After construction, periodically monitor potential problem areas to identify unmitigated problem areas and increase or modify markers as appropriate.

4.9.2.3 Cumulative Impacts

Most long-term impacts associated with building a new transmission line would be additive to similar impacts ongoing as a result of the existing transmission line. The risk of avian collisions with power lines has already been introduced. The new line would increase the risk. The cumulative risk of the two lines would be greater than the existing level of risk or the added risk caused by the new transmission line alone. However, when the risks from both lines are considered together, and because no or few avian electrocutions are expected, the project would not contribute to a situation that is likely to harm bald eagles, peregrine falcons, whooping cranes or other birds.

If construction occurs during winter, disturbance of wintering bald eagles, big game, and other species in the Swan Valley, Teton Basin and Jackson Hole areas would be additive to the increasing level of disturbance in these areas from residential development and associated human presence.

The project would add to the existing human influences that have altered the landscape. Development of additional roads in the project area, considered collectively with the existing impact, would result in a linear connection across the project alignment. However, road density standards in the Targhee Forest Plan would not be exceeded. While mitigation may include access restriction, use of the alignment by people would increase.

4.9.3 Single-Circuit Line Alternative

4.9.3.1 Impacts

Impacts would be the same as the Agency Proposed Action except for the possible increased risk of collision from the taller double-circuit structures in the Agency Proposed Action.

4.9.3.2 Mitigation

- Refer to measures under Agency Proposed Action, Section 4.9.2.2.

4.9.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.9.2.3).

4.9.4 Short Line Alternative

4.9.4.1 Impacts

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation. A new switching station would be built.

Preferred Site on the ROW - Construction of a new switching station at Targhee Tap on the ROW would require removal of aspen and conifer forest habitat. Although the exact dimensions have not yet been determined, about 0.4 hectare (1 acre) would be disturbed. To minimize the amount of forest that would need to be removed, the site would be built within the existing ROW as much as possible.

Site off the ROW - There would be no additional impacts from the switching station at this location.

4.9.4.2 Mitigation

- Mitigation would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.9.4.3 Cumulative Impacts

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.9.5 SVC Alternative

4.9.5.1 Impacts

Construction at Teton Substation or Jackson Substation would have no significant effect on wildlife. Operation and maintenance of the SVC would have no significant impact on wildlife because minimal noise or activity would be generated. Jackson Substation is in an urban environment and though bald eagles may use nearby Flat Creek, there would be no major added disturbance to eagles.

4.9.5.2 Mitigation

- Survey the area within 0.8 km (0.5 mile) of Teton Substation for nesting hawks. If nests are found, construction activities should be coordinated with the WDGF to minimize disturbance.

4.9.5.3 Cumulative Impacts

No cumulative impacts would occur.

4.9.6 No Action Alternative

No project-specific or cumulative impacts to wildlife would occur, but impacts would continue from operation and maintenance of the existing transmission line and substations.

For Your Information

Construction and operation of a transmission line can cause impacts to fisheries. If topsoil and vegetation are removed, soil erosion occurs and water quality in nearby streams can be degraded. Construction activities near streams could be scheduled to avoid sensitive fish spawning, incubation, and migration periods (April to mid-June). Though construction activities may occur in spring, BPA would try to use existing, new, reconstructed, or temporary bridges to cross sensitive streams. Culverts would typically be installed on smaller or intermittent streams and would pose no significant threat to sensitive fish resources.

4.10 Fisheries

4.10.1 Impact Levels

An impact would be **high** if an action causes:

- the killing of a federally-listed or proposed threatened or endangered fish species; or
- a significant long-term adverse effect on the populations, habitat, and/or viability of USFS sensitive fish species and state fish species of concern as a whole, which would result in trends toward endangerment and the need for federal listing.

An impact would be **moderate** if an action causes:

- a localized and/or short-term (to three years) reduction in the quantity or quality of an aquatic resource or habitats which does not result in the killing of a federally-listed species, or significantly affect a USFS sensitive species or state species of concern.

An impact would be **low** if an action causes:

- a temporary (less than 3 years) reduction in the quantity or quality of aquatic resources or habitats confined to the site of the action.

No impacts would occur when an action creates no impacts or fewer impacts than the low impact level.

4.10.2 Agency Proposed Action

4.10.2.1 Impacts

The Forest Service completed a Biological Evaluation on Forest Service Sensitive Species. The fine-spotted form of the Yellowstone Cutthroat Trout is classified "sensitive" by the Regional Forester in Region 4 and the Targhee National Forest. The Forest Service has determined that the project may impact individuals or habitat but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species. See Table 4-2.

Construction — The staging of equipment and material, and the construction of transmission lines, structures, and access roads have the potential to impact fisheries by disturbing stream beds and banks, removing riparian vegetation, and increasing stormwater runoff from disturbed upland sites and roads. New culverts and bridges could impede fish passage; however, all temporary and permanent culverts and bridges installed as part of this project would be designed to facilitate fish passage. No impacts to fish passage are anticipated.

Tree removal and construction of new ROW could result in a temporary, low to high increase in hillslope erosion and sedimentation to streams. However, nearly all ROW construction

would occur outside riparian buffers of streams, and BPA would implement BMP's to minimize sediment transport to streams from the ROW (see Section 4.6.2.2, **Mitigation**).

The use of staging areas along the highways could result in a temporary, low increase in erosion and sedimentation to streams. BPA would implement BMP's where needed to minimize sediment transport to streams from these areas (see Section 4.6.2.2, **Mitigation**).

Construction of access roads has a higher potential to impact fish habitat than other construction activities because roads are more permanent erosion sources and, in some cases, stream crossings would be required.

BPA evaluated access road alternatives to minimize potential impacts to fisheries (e.g., water quality degradation, removal of riparian vegetation, and habitat degradation from stream crossings). Several measures would be taken to avoid or minimize potential impacts to fisheries from access road construction and road use, including implementing construction BMP's to protect water quality (see Section 4.6.2.2); minimizing construction activities on steep or unstable slopes; eliminating the construction and use of fords during construction; using temporary or permanent culverts and bridges where required; moving or avoiding existing access roads or crossings with known erosion problems; and double circuiting or using helicopter construction techniques in lieu of new road construction in areas with high potential for erosion. Also, existing roads would be improved to remedy potential erosion problems prior to construction.

For about 80 percent of the proposed line, new access road construction would be limited to construction of short spurs from existing access roads within the ROW to new structure sites. With the exception of two locations, construction of these spur roads would occur in upland areas and is not anticipated to result in impacts to fisheries. New access roads in these three areas (discussed below) would be temporary, and would be restored following construction.

Pine Creek Drainage, Idaho — Temporary roads would be constructed on agricultural land from structures 1/3 to 3/7, and 4/1 to 5/1. After construction, these roads would be plowed under and returned to agricultural production. Roads would not cross Pine Creek in this section, and no impacts to fisheries are anticipated.

BPA proposes to replace one bridge and construct two new bridges in the Pine Creek drainage to facilitate equipment access to the ROW without using fords. The bridge on Mike Spencer Canyon Road (USFS Road 250) that crosses Pine Creek would be replaced with a wider bridge. A new bridge is proposed for crossing Tie Creek where the road would be realigned to avoid an

Reminder

Map 2 shows structure numbers and locations.

Figures 2-3 and 2-4 show locations of Options A-E.

erosion source and Little Pine Creek. Bridge construction could result in a temporary increase in turbidity and sedimentation. Bridges would be designed so they do not constrict flow or impede fish passage, and would be constructed to minimize bed and bank disturbance and removal of riparian vegetation. Impacts to fisheries would be low to moderate, but temporary and localized. Where fords would be replaced with bridges, potential impacts to fish would decrease.

Pine Creek Routing Options A-C — These routing options would generally result in no to low impacts, the same level of impact to fisheries described above.

Pine Creek Routing Options D (preferred) and E — Routing Option D includes two to four double-circuit structures between 6/2 and 6/8 and constructing new road access to them. Routing Option E includes construction of three new structures and an access road on the north side of Pine Creek, and the construction of nine new structures to the south of Pine Creek. Although more ground would need to be disturbed under Option E, both Options D and E would create no to low impacts to fisheries.

Teton River Drainage (Trail Creek), Idaho — In the Trail Creek drainage (west slope of Teton Pass), several short sections of new access road outside the ROW are proposed. They include access between structures 23/4 and 23/6, 23/10 and 24/1, 24/3 and 24/4, a road extension to 26/2, access between 27/7 and 28/1, and 28/2 and 28/5. This could result in a temporary increase in sediment transport to fish bearing streams (Trail Creek) downstream of the roads. However, road design and culvert installation would include BMP's to minimize sediment disturbance and transport (see Section 2.5.2.2).

BPA proposes to construct most of the structures within the Trail Creek drainage (structures 26/2 to 29/3) using a helicopter although some of the structure footings would need to be removed with an excavator. This would substantially reduce potential erosion and sedimentation problems in the drainage, and would eliminate the need for new roads in this area with the exception of the new access mentioned above between 27/1 and 28/1, and 28/2 and 28/5.

Fish Creek Drainage, Wyoming — Temporary roads are also proposed to access structure locations in the Fish Creek (structures 35/2 to 35/5) and Lake Creek (structures 35/6 to 36/4) portions of the proposed line near Teton Substation. Construction of these access roads would require temporary bridges and/or culverts to cross Lake Creek and Phillips Creek. Fish Creek would not be crossed. The bridges and/or culverts would be designed to facilitate fish passage while in place, and construction BMP's would be implemented to minimize erosion and maintain bank stability (see Section 4.6.2.2). Construction of these temporary

roads and structures is expected to result in low impacts to fish due to temporary and localized increases in turbidity during construction.

Operation and Maintenance — Operation and maintenance of the project has the potential to impact fisheries if erosion of roads or the ROW transports sediment to streams, or if herbicides used in vegetation management are transported to streams. The potential for these types of impacts would be minimized by road maintenance and coordinating vegetation management with the Forest Service over the life of the project (see Section 2.1.7, **Maintenance**). BPA would prepare a ROW Management Plan that would address how BPA would maintain the line, including roads and vegetation. In general, if roads or the ROW are disturbed during maintenance, areas would be repaired and reseeded (if necessary). Vegetation management, including the selective use of herbicides, would be used to control vegetation growth in the ROW. Buffers would be established to prevent the contamination of streams with herbicides. Only manual or biological methods of vegetation management would be allowed within 90 m (300 feet) of streams. With implementation of the ROW Management Plan, operation and maintenance of the line would cause no to low impacts to fisheries.

For Your Information

Manual methods of vegetation management include removing vegetation by chain saws and hand tools. Biological methods include encouraging low-growing species to dominate by eliminating the taller trees and introducing species-specific parasites.

4.10.2.2 Mitigation

- Because BPA would use standard bridge and culvert construction, and stabilization and erosion control measures, no other mitigation is required (see Section 4.6.2.2, **Mitigation**).

4.10.2.3 Cumulative Impacts

Construction is not expected to contribute significantly to existing amounts of sediment in streams. Very little riparian vegetation, streambeds, or banks would be disturbed by the proposed project.

4.10.3 Single-Circuit Line Alternative

4.10.3.1 Impacts

Impacts to fisheries would be the same as the Agency Proposed Action.

4.10.3.2 Mitigation

- Refer to measures under Agency Proposed Action, Section 4.10.2.2.

4.10.3.3 Cumulative Impacts

Cumulative impacts would be the same as the Agency Proposed Action (see Section 4.10.2.3).

4.10.4 Short Line Alternative

Impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.10.4.1 Mitigation

- Mitigation measures would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.10.4.2 Cumulative Impacts

Cumulative impacts would be the same as the Single-Circuit Line Alternative from Targhee Tap east to Teton Substation.

4.10.5 SVC Alternative

4.10.5.1 Impacts

Although there are streams and drainages around Teton Substation, new equipment would not require expansion into undisturbed areas. No impacts to fisheries would occur.

Jackson Substation is isolated from nearby Flat Creek. The site is fairly level and there is little risk of sediment reaching the creek. No impacts to fisheries would occur.

4.10.5.2 Mitigation

No mitigation measures would be required.

4.10.5.3 Cumulative Impacts

No cumulative impacts to fisheries would occur.

4.10.6 No Action Alternative

No additional project-specific or cumulative impacts to fisheries would occur.

4.11 Cultural Resources

4.11.1 Agency Proposed Action, Single-Circuit Line Alternative, Short Line Alternative and SVC Alternative

Reminder

A traditional cultural property is defined generally as one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs (e.g., traditions, beliefs, practices, lifeways, arts, crafts, and social institutions) of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community.

4.11.1.1 Prehistory and Traditional Cultural Property

No prehistoric sites were found during the surveys in 1997 and 1998.

The Wind River (Eastern) Shoshone identified a concern that a new transmission line would have the potential to affect traditional cultural property in the Teton Pass area. Consultation with the Tribe did not identify traditional cultural property in or near the existing ROW. The Tribe did express that they would prefer BPA to stay within the existing ROW at Teton Pass. This would be done under the Agency Proposed Action.

4.11.1.2 History

Two historic sites were found during the survey in 1997: a wagon road also used as a stock trail; and an abandoned ditch once used to bring water to Pine Creek Bench (see Appendix I). The historic sites are eligible for the NRHP. BPA has made a determination of no adverse effect as portions of these sites could be affected by construction but the effect would not be harmful. BPA has coordinated this determination with the Wyoming and Idaho SHPO and the Advisory Council on Historic Preservation. Mitigation in the form of recordation is proposed. BPA would work with the USFS and the SHPO's on mitigation. Mitigation would be done before construction.

4.11.2 No Action Alternative

No impacts are expected from this alternative.

4.12 Socioeconomics

For Your Information

In addition to positive and negative impacts, short-term socioeconomic impacts include those created by an influx of construction workers into a local area and the additional tax monies generated. Long-term impacts include the value of any agricultural crops taken out of production, interference with agricultural practices, the value of forestlands taken out of production, and the perceived effects on property values from new transmission and substation facilities.

4.12.1 Impact Levels

- A **positive** impact would provide employment, increase tax revenues, increase property values or create other similar effects on the social and economic vitality of affected communities.
- A **negative** impact would take land out of production without compensation, reduce a tax base, reduce employment or create other similar effects on the social and economic vitality of affected communities.

4.12.2 Agency Proposed Action, Single-Circuit Line Alternative, Short Line Alternative and SVC Alternative

4.12.2.1 Population

These alternatives respond to population growth occurring in northwestern Wyoming. Implementation of these alternatives could encourage growth if new businesses locate in the area because a stable power supply and other infrastructure such as water and sewer are available. This could have both positive and negative impacts on a community. Electricity is usually not the limiting factor in population growth, unless the economy is based on an industry that needs a large amount of energy.

None of the construction alternatives would have a negative impact on minorities or economically disadvantaged groups in the area because these groups do not reside in large numbers (fewer than 5 percent) in the project area.

4.12.2.2 Employment

Because transmission line construction requires specialized labor, construction crews would likely be brought in from outside the local area. Many workers would come from such places as Spokane, Billings, and/or Salt Lake City, and return home in the off-season, and following project completion.

Construction would likely occur over two years. About 18-24 persons would be needed to construct a project of this scale. This would be a positive impact on employment in general but not necessarily in the area if workers do not come from the project area.

4.12.2.3 Housing/Public Services

Socioeconomic impacts on public services and temporary housing facilities are relatively minor for transmission line construction projects in most areas. Because low-cost temporary housing is in short supply in the area, especially during spring and summer, most construction workers would likely provide their own housing (e.g., campers and trailers) rather than seek commercial lodging. Because of limitations imposed on camping within national forests (usually a 14-day maximum) construction crews would likely use RV parks. RV parks are available in the Swan Valley, Driggs, and Victor areas of Idaho and also in the Jackson and Wilson areas of Wyoming. These parks could accommodate construction personnel. Facilities are available by the day, week, month or season. Because of the large number of RV parks in the area and the relatively small size of the construction crews who would build the project, there should not be any negative impacts to the temporary housing supply in the area.

4.12.2.4 Sales Tax/Use Tax

The major cost of any transmission line project is labor and materials. No sales or use tax would be levied in Wyoming on materials purchased by BPA for the proposed project, but Idaho would assess a 5 percent sales/use tax on those materials. No additional amount would be assessed by counties within the state. Therefore, the Agency Proposed Action would generate about $200,000 for the state of Idaho.

Idaho and Wyoming sales taxes would also be assessed on incidental purchases by the contractor, crews, and subcontractors. Because crews would be in the area only temporarily and would not likely stay in commercial lodging facilities, incidental purchases would be limited to provisions such as food (tax exempt), fuels (non-tax exempt) and other minor purchases such as tools and clothing. These purchases would be in small amounts and any sales tax collected would be a positive but minor impact.

4.12.2.5 Income Tax

Construction of the alternatives would generate additional income taxes for the state of Idaho, a positive impact. No additional funds would be generated for the state of Wyoming, since Wyoming does not assess a state income tax.

4.12.2.6 Property Tax

BPA, as a federal agency, is exempt from paying local property taxes, so the alternatives may not benefit local governments.

The expansion of Jackson Substation in the Town of Jackson to accommodate an SVC would require additional land be acquired next to the substation. Depending on whether BPA or LVPL would acquire the land, and which entity would own the facility, property taxes could be assessed on the new facility by the Wyoming Department of Revenue. Because public utilities cross county lines, they are not a locally assessed item (Sutton, 1997).

If it is determined that property taxes would be levied on the land and new facility at Jackson Substation, and assuming the market value of the improvement (including the land) would be between $3-5 million, property taxes would range from $22-36,000 per year, based on the current 11.5 percent level of assessment placed on industrial properties within the state, and the current millage rate of 64.04 for the Town of Jackson (Uhrich, 1997). This would be a small positive impact for the state of Wyoming and the property owners within those taxing districts who would benefit from the increased tax base.

If BPA owns the land and improvements and they would be exempt from property taxes, the land acquired would be removed from the tax rolls for the life of the facility, about 50 years. This would be a small negative impact for the state of Wyoming, Teton County and the Town of Jackson.

4.12.2.7 Property Value

Any new transmission line or access road easement would be appraised, and the landowners would be offered the fair market value for these land rights. Some short-term adverse impacts on property value and salability along the proposed new ROW may occur on individual properties. However, these impacts are highly variable, individualized, and not predictable. The new line is not expected to cause overall long-term adverse effects on property values along the existing ROW. (See Appendix L, **Property Impacts**, for more information on impacts to property.)

4.12.2.8 Land Taken Out of Production

For the Agency Proposed Action and the Single-Circuit Line Alternative about 400-1200 m^2 (0.1 to 0.3 acre) of land in wheat and barley would be removed from production for the life of the line in the Swan Valley area. From Teton Substation west about 1.6 km (1 mile), the legs of the new structures for the Single-Circuit Line Alternative would permanently remove a small amount of land available for grazing.

Reminder

BPA estimates that about 31 hectares (77 acres) of trees would be cleared for the Agency Proposed Action and about 73 hectares (181 acres) would be cleared for the Single-Circuit Line Alternative. About half that amount would be cleared for the Short Line Alternative.

The Agency Proposed Action, the Single-Circuit Line Alternative, and the Short Line Alternative would remove both marketable and non-marketable forest products from the Targhee and Bridger-Teton National Forests. The Forest Service may require BPA to lop and scatter or burn all or portions of the timber. If any of the timber can be sold it would be a beneficial impact to the three counties affected, that is, Bonneville and Teton counties, Idaho, and Teton County, Wyoming. About 25 percent of the stumpage value of the trees harvested would be distributed and used for county roads improvements and schools within these counties. This would be a short-term, positive impact.

The Short Line Alternative would remove land for a switching station.

Preferred Site on the ROW - Siting the switching station within the Targhee National Forest would change a small portion of the forest, up to 0.4 hectare (1 acre) from multiple use such as recreation/wildlife habitat to a developed industrial use. Since the proposed use would be located within and on either side of the existing ROW (between structures 18/3 and 18/4), this impact would be low.

Site off the ROW - The switching station may be placed in agricultural land north of structures 18/3 and 18/4 near the mouth of Pole Canyon. The potential long-term impacts would be moderate and would include the permanent removal of 1-2 hectares (3-5 acres) from production and altered grazing practices. Short-term impacts would include soil compaction around the area surrounding the switching station construction site and a subsequent decrease in soil productivity.

4.12.2.9 Mitigation

- BPA would compensate private landowners for the fair market value of any land taken out of production.
- BPA would work with the landowners/land managers to site the proposed line and individual structure locations to minimize the impact.

4.12.2.10 Cumulative Impacts

These alternatives respond to increasing load growth that has stressed the transmission system so that voltages are unstable. The introduction of new, more stable, infrastructure as a catalyst to population growth is unclear. Other infrastructure such as water, sewer, etc. play an important role in whether an area can absorb population increases. These alternatives could contribute, along with other factors, to increased growth in the area.

4.12.3 No Action Alternative

4.12.3.1 Impacts

The No Action Alternative could lead to voltage collapse if a critical line is lost on the system. Collapse of the system could continue over a long period (a week or more) if outages occur in winter when deep snows make access to the existing transmission system difficult. The chance that service would be disrupted increases with time as load grows. Commerce and industry would be adversely affected as the quality and reliability of power decreased. Some businesses and their employees could decide to relocate to an area where the power supply is more reliable. Loss of businesses and an unstable power supply could influence whether some people move to the area.

When a loss of electricity occurs, all services provided by electrical energy cease. Illumination is lost. Lighting used by residential, commercial, industrial and municipal customers for safe locomotion and security is affected. Residential consumers lose heat. Highways experience gridlock where traffic signals fail to operate. Industrial production is halted. Residential, commercial, and industrial customers experience comfort/safety and temperature impacts, increases in smoke and pollen, and changes in humidity, due to loss of ventilation. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Commercial and industrial customers also lose service for elevators, food preparation, cleaning, office equipment, heavy equipment, and fuel pumps. Transportation impacts include propulsion loss. Sewage transportation and treatment can be disrupted.

Electricity for cooking and refrigeration is lost. Residential, commercial, and industrial customers cannot prepare or preserve food and perishables. A special problem is the loss of industrial continuous process heat. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments.

The No Action Alternative has negative socioeconomic impacts.

4.13 Air Quality

4.13.1 Impact Levels

A **moderate** impact would create one or more of these outcomes:

- Create an effect that could be mitigated partially.
- Cause a localized reduction in air quality.
- Create a possible, but unlikely risk to human health or safety.

A **low** impact would create one or more of these results:

- Create an effect that could be largely mitigated.
- Reduce the air quality near the construction/clearing.
- Create insignificant or very unlikely health and safety risks.

A **low or no** impact would create no, or fewer impacts than the low impact level.

4.13.2 Agency Proposed Action, Single-Circuit Line Alternative, and Short Line Alternative

4.13.2.1 Impacts

For Your Information

*Burning **slash** is an option, but it is not BPA's preferred method for disposing of slash. Disposal methods would be coordinated with the Forest Service on all National Forest lands.*

Short-term impacts during construction would be created by vehicles and ***slash*** burning.

Vehicles and heavy equipment would emit pollutants such as ***carbon monoxide*** (***CO***), ***sulfur oxides***, particulate matter, ***nitrogen oxides***, ***volatile and semi-volatile organic compounds***, and ***carbon dioxide*** (***CO_2***). Emissions would be short term and would have no to low impacts on air quality.

Dust generated during line construction and clearing activities would have a short-term effect on air quality. Dust would have no to low impact on air quality.

Reminder

BPA estimates that about 31 hectares (77 acres) of trees would be cleared for the Agency Proposed Action and about 73 hectares (181 acres) would be cleared for the Single-Circuit Line Alternative. About half that amount would be cleared for the Short Line Alternative.

Burning slash would emit particulate matter, CO, CO_2 and semivolatile and volatile organic compounds. Predicting the precise quantity of air emissions from these fires is difficult since variables such as the exact quantity of debris to be burned and wood moisture content are not known. However, if the Agency Proposed Action were chosen and 60 percent of the tree mass was slash and burned, approximately 19 ***metric tons*** (21 tons) of particulate matter would be emitted. For the Single-Circuit Line Alternative, between 27-45 metric tons (30-50 tons) of particulate

matter would be emitted. The Short Line Alternative would emit about half that amount. The amount depends on the exact acreage to be cleared and the tree density. All of these amounts are a relatively large amount of particulate matter that would temporarily affect visibility in several Class I Areas, and create a moderate impact on local air quality.

The only potential for long-term impacts to air quality would be from the transmission lines themselves, which cause limited air emissions. The high electric field strength of an 115-kV transmission line can cause a breakdown of air at the surface of the conductors called corona. Corona has a popping sound that is most easily heard during rain storms. When corona occurs, small amounts of ozone and oxides of nitrogen are released. These substances are released in very small quantities too small to measure. No impacts are expected.

4.13.2.2 Mitigation

- If necessary, water trucks would be used to spray roadways and construction areas to minimize dust.
- All on-road vehicles would be in good running condition, thus minimizing their emissions.
- On-road vehicles would use low sulfur fuel.
- BPA would try to avoid burning slash because of its potential detrimental effects on local air quality and visibility in nearby Class I areas.
- Burning permits and ignition approval would be obtained from Wyoming and Idaho and all permit requirements would be met.
- Burning on national forests would be coordinated with the USFS.
- Burn as little material as possible.
- Burning would not occur during inversions.
- Initiate burning in late October or early November, after the first snows. Burning during this period would allow the slash to dry, decreasing emissions; provide fire protection (because of the snow); and adequately disperse smoke from the fires, reducing impacts to the Jackson Valley and to the surrounding Class I areas.
- Lop and scatter residues on the ROW to degrade.

4.13.2.3 Cumulative Impacts

There would be no cumulative effects on local or global air quality over the long term. In the short term, if burning occurs in the fall when woodstoves are being used, it could cumulatively add to air quality impacts already caused by wood burning stoves.

4.13.3 SVC Alternative

No impacts are expected.

4.13.4 No Action Alternative

No impacts are expected from this alternative.

4.14 Short Term Use of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The alternatives under consideration do not pose impacts that would significantly alter the long-term productivity of the affected environment. A good example of this is the existing line. It was built in 1968. The affected environment has recovered since then and while there is never complete recovery, the long-term productivity of the affected environment has not been significantly altered. Likewise, if the measures proposed in the alternatives were removed and the affected areas restored, little change in the long-term environmental productivity would have been caused.

For Your Information

Irreversible commitment of resources *is use of nonrenewable resources such as minerals and petroleum-based fuels.*

Irretrievable commitments of resources *cause the lost production or use of renewable resources such as timber or rangeland.*

4.15 Irreversible and Irretrievable Commitment of Resources

The Agency Proposed Action, Single-Circuit Line Alternative, Short Line Alternative, and the SVC Alternative would use aluminum, steel, wood, gravel, sand, and other nonrenewable material to construct steel structures, wood poles, conductors, insulators, access roads and other facilities. Materials may come either from on-site borrow pits or from outside sources. These alternatives would also require some petroleum-based fuels for vehicles and equipment and steel for structures.

Development of the Agency Proposed Action, Single-Circuit Line Alternative, and the Short Line Alternative would cause commitments that result in the loss of wildlife habitat for certain species and lost production or use of renewable resources such as timber and rangeland. These alternatives would permanently convert wildlife habitat, forested land, and rangeland to utility and

transportation uses. Increased volume growth that could have been achieved through silvicultural prescriptions would be foregone, an irreversible and irretrievable commitment of timber resources. This loss of timber would also cause an irreversible and irretrievable commitment of wildlife habitat. Other irretrievable commitments include small amounts of land lost to grazing, crop production, and in some cases, recreational use if access roads are gated. These commitments are irretrievable rather than irreversible because management direction could change and allow these uses in the future.

4.16 Adverse Effects that Cannot be Avoided

Adverse effects on some resources cannot be avoided by actions proposed under the alternatives. Actions to benefit one resource may have temporary or permanent effects on another. Alternatives include recommended mitigation to avoid or reduce adverse environmental effects. Many adverse effects would be temporary, occurring during site-specific activity.

Some of the adverse effects that cannot be avoided in the alternatives include the following:

- Intermittent and localized decreases in air quality from dust from road construction, road maintenance and use.
- Long-term, localized increases in visual impacts from the addition of elements of the construction alternatives: new access roads and spur roads, new structures, clearing, and new equipment at substations.
- Short-term, localized increases in visual impacts from construction equipment and ground disturbing activities, and maintenance activities.
- Short-term, localized increases in soil compaction, soil erosion, vegetation degradation and stream sedimentation from construction and maintenance.
- Elimination of small areas of vegetation, including some wetland vegetation, due to construction of permanent physical developments such as transmission line structures and bridge abutments.
- Temporary disturbances of wildlife and their habitat in localized areas from increased human activity during construction.