
4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4.0 of this EA provides an analysis of the potential environmental impacts that could result from implementation of the Proposed Action and No Action alternative. Narrative descriptions of potential impacts under the Proposed Action are provided for each environmental resource in Sections 4.1 through 4.15. The impacts of the No Action Alternative are discussed in Section 4.15. No other alternatives were analyzed for this EA. The impact discussions reflect the implementation of the project-committed protection measures, as listed in Section 2.5.

4.1 Air Quality

National Ambient Air Quality Standards and Wyoming Ambient Air Quality Standards are presented in Table 4-1. Concentrations of these pollutants in the ambient air may not exceed these levels. In addition, the emissions from the project and construction activities may not cause or contribute to an exceedence of these levels.

Pipeline construction activities would result in short-term emissions for the operation of construction vehicles, the generation of fugitive dust, and the approved burning of debris. Assuming an average daily construction rate of up to 4 miles and using construction emission factors from the California Environmental Quality Act, Air Quality Handbook (South Coast Air Quality Management District 1993), the daily exhaust emission levels for pipeline construction were estimated (Table 4-2).

**Table 4-1
Applicable Ambient Air Quality Standards for the Proposed PSC CO₂ Pipeline Project**

Pollutant¹	Averaging Period	Wyoming Standard (µg/m³)	National Standard (µg/m³)
TSP	24-hour	150	No standard
PM ₁₀	24-hour	150	150
	Annual	50	50
NO ₂	Annual	100	100
O ₃	1-hour	160	235
SO ₂	3-hour	1,300	1,300
	24-hour	260	365
	Annual	60	80

¹ TSP = Total suspended particulates

PM₁₀ = Particulates smaller than 10 micrometers aerodynamic diameter.

NO₂ = Nitrogen dioxide

O₃ = Ozone

SO₂ = Sulfur dioxide

**Table 4-2
Construction Emissions Estimates for the Proposed PSC CO₂ Pipeline Project**

Source	CO		VOC		NO _x		SO ₂		PM ₁₀	
	lbs./day	total tons	lbs./day	total tons	lbs./day	total tons	lbs./day	total tons	lbs./day	total tons
Construction Equipment Operations	552.4	22.4	107.9	4.4	1,102.5	44.7	95.5	3.9	93.3	3.8
Vehicular Operations	27.2	1.1	4.5	0.2	31.9	1.3	0.3	0.01	2.6	0.1
Construction Fugitive Dust	-	-	-	-	-	-	-	-	1,430.7	57.9
Wind Erosion Dust	-	-	-	-	-	-	-	-	1,533.3	62.1
Total Construction Emissions	579.6	23.5	112.5	4.6	1,134.4	45.9	95.8	3.9	3,059.9	123.9

Assumptions: Types and quantity of equipment are shown in Table 2-4. Total time for pipe laying would be approximately 81 days. Operation time of construction equipment would be 12 hours/day. CO = carbon monoxide, VOC = volatile organic compounds; other pollutant descriptions are provided as footnote in Table 4-1.

Pipeline construction operations also would generate fugitive dust emissions from earth-moving activities and wind erosion of disturbed acreage. The assumed average daily pipeline construction progress of up to 4 miles per day in conjunction with an estimated disturbance width of 75 feet yields a total disturbed acreage of approximately 36.4 acres per day. The average daily fugitive dust emissions for a typical pipeline spread are estimated at 1,431 pounds per day using an emission factor of 1.2 tons per acre per month for construction activities (USEPA 1985). It is estimated that as much as half of the total disturbed acreage along the pipeline route (162 miles x 75 feet) would be exposed to wind erosion at any one time. With a maximum exposed area of 736 acres, the predicted emissions from wind erosion are 1,533 pounds per day using the emission factor of 0.38 tons per acre per year (USEPA 1985). This is equivalent to about 0.03 pounds of dust becoming airborne each day from a length of 10 feet of pipeline ROW. The resulting concentrations of dust averaged over a 24-hour period would be less than 0.01 µg/m³, or less than 1 percent of the daily standard of 150 µg/m³. This estimate includes dust from the use of roads and the ROW.

These emissions would result in minor short-term impacts on local air quality. These impacts would be restricted to the brief construction period along each stretch of the pipeline route. The construction impacts would diminish once construction activities end and after disturbed areas are reclaimed. Construction impacts would be minimized by watering or chemically stabilizing exposed areas on access roads, limiting the clearing of vegetation, and curbing vehicle and

equipment operation where practical. Vehicular exhaust and crank case emissions from gasoline and diesel drivers would comply with applicable USEPA mobile emission regulations (40 CFR 85).

Air quality impacts due to operation of the proposed pipeline would be minimal. Minor transient emissions would occur from maintenance activities along the pipeline route. Emissions would include exhaust from maintenance vehicles and equipment, as well as fugitive dust from maintenance activities, wind erosion, or vehicular traffic. Emissions from operation of the pipeline would be infrequent and short-term resulting in no significant impact to air quality.

Abandonment of the proposed pipeline would result in short-term emissions from the operation of vehicles and the generation of fugitive dust. Fugitive dust emissions also would be generated from earth-moving activities and wind erosion of limited disturbed areas from surface facility removal. Pipeline abandonment operations would be relatively small in scale, spread out at various locations along the pipeline route, and short-term, resulting in no expected significant impact to air quality.

4.2 Geology and Soils

4.2.1 Geology

Based on maps of known geological hazards, the potential geological hazard areas include: 1) scattered landslide deposits in the Green Mountain area; 2) two active faults just north of Green Mountain; 3) one area of semi-active windblown sand deposits just north of Natrona; and 4) a location within 1 mile of a historic (1916) earthquake epicenter located on the Green Mountain fault segment of the North Granite Mountain fault system (approximately MP 121), plus 16 other earthquake epicenters located within 25 miles of the proposed pipeline and 7-mile lateral (see Table 3-1). These geological hazards would require detailed evaluation during final engineering for pipeline construction practices and safeguards. Verification of the presence of these hazards could dictate special construction techniques, special revegetation requirements, and/or monitoring after construction. These areas are addressed in the POD (Section VI); protection measures are presented in Section 2.5.

The landslide deposits in the project area (approximately 22.7 acres) appear to be old, and they should not pose a problem to the operation of the buried pipeline (Table 3-1). However, there would be a short-term hazard during pipeline construction, if a storm event reactivated surficial deposits when the construction trench was open (Case 1990). Windblown sand deposits may constitute a minor to moderate hazard to any downwind homes or roads if reactivated during construction (Case 1990).

Numerous areas crossed by the proposed route contain steep slopes and erodible soils (see Table 3-2). In addition, areas with historic landslide occurrences have been identified along the route (see Table 3-1). Special construction practices, as discussed in the Section 2.5, would be employed to cross areas of steep slopes.

Operation and maintenance of the proposed pipeline would not be expected to affect any areas with geologic hazards. If vegetation cover is disturbed in potential landslide or windblown sand areas during maintenance activities, these areas would be revegetated as soon as practical. Periodic monitoring inspections after the first and second growing season would determine the status of these areas.

Since the pipe would remain in the ground, pipeline abandonment would not be expected to disturb or reactivate geologic hazard areas such as windblown sand deposits and potential landslide areas.

4.2.2 Soils

Pipeline construction would create surface disturbances associated with: 1) ROW clearing and grading, 2) access trail and road maintenance, and 3) ancillary facility construction. Land disturbance would result in: 1) vegetation removal where grading is needed; 2) compaction of soil by construction equipment; 3) alteration of the soil profile within the excavated trench area of the pipeline, on hillside cuts in steep-sloping areas, and in borrow areas for roads; and 4) potential reduction in soil stability on steep sidehill areas. Accelerated wind and water erosion would occur where land has been disturbed. Vehicles could cause ruts in unsurfaced access roads during wet weather, and the ruts could concentrate runoff causing gully erosion. Measures to control these impacts are included in Section 2.5 and the POD.

In total, an estimated 1,240 acres located within the construction ROW contain sensitive soils. The types and locations of these sensitive soils are listed in Table 3-2. Reclamation and erosion control would be difficult on some of the soils along the proposed pipeline route, especially in areas of less than 9 inches of annual precipitation (from MP 128 to 205) and on the steeper sloping areas (15 percent or more), particularly those steeper sloping areas over shallow soils (20 inches or less to bedrock). Soils with unfavorable properties, including thin surface layers, moderate to strong salinity and alkalinity, clayey surface and subsoils, and shallow depths over bedrock are common and would present problems for erosion control and revegetation. Locations of sensitive soils along the proposed mainline and 7-mile lateral routes are presented in Table 3-2.

The erosion control, reclamation, and revegetation program, (Section VII and Appendix G in the POD) and Storm Water Pollution Prevention Plan (Appendix C in the POD), would provide an

effective program that would ensure successful erosion control and restoration of all land disturbance. PSC would follow the reclamation plans described in the POD when operating on BLM and State of Wyoming lands, and would comply with soil protection and land use goals identified by the landowner on private lands.

Most of the impacts to soil resources would be short-term, since all disturbed areas not needed for operations would be reclaimed within 1 year of construction. Most reclamation would be completed within a few months of disturbance. However, some soil impacts may occur if adverse weather conditions (mainly heavy rainstorms) occurred during construction or before reclamation and erosion control measures could be implemented.

Some unquantifiable soil loss resulting from accelerated wind and water erosion would occur until erosion measures were implemented (up to 1 year). In addition to the sensitive areas outlined in Table 3-2, a few small unquantifiable areas (mainly abrupt steep slopes and localized areas with soil containing unfavorable physical and chemical properties) would be subject to accelerated erosion and require intensive and continuing follow-up erosion control measures.

With effective use of POD erosion control/revegetation procedures, understory vegetation on sites without special problems is expected to return to near preconstruction conditions within 5 years after construction. Problem areas may require replanting and/or use of special revegetation techniques, if revegetation does not respond in one to two growing seasons. In areas of limited precipitation (less than 9 inches), and where there are shallow soils and/or low permeability soils, reclamation techniques that enhance permeability and conserve moisture would increase the potential for successful revegetation. Impacts to overstory vegetation would be long-term with shrubs and trees taking several years to become reestablished, e.g., 10 to 20 years for sagebrush, 20 to 30 years for desert shrub vegetation, and 50 to 75 years for coniferous woodland tree species (BLM 1985a).

As described above, some soil loss would result from wind and water erosion until erosion control measures are implemented and begin to take effect (approximately 1 year after construction). Operations and maintenance of the majority of the pipeline route and 7-mile lateral would not result in additional impacts to soil after erosion control measures have stabilized. Problem areas such as abrupt steep slopes may require continuing follow-up measures during the operations phase of the project.

Potential effects of fuel spills on soils would include contamination at the spill site. Protection measures such as berming around the refueling areas and monitoring for leaks or spills would minimize effects on soils. Fuel-contaminated soils would be removed and disposed of following WDEQ regulations.

The proposed pipeline would be abandoned in place and would involve the removal of surface facilities along the route. Problem areas may continue to require monitoring and the implementation of additional erosion control measures to ensure minimal impacts to soils. All areas disturbed during abandonment would be seeded with the appropriate seed mixture to ensure that an acceptable stand of vegetation is established.

4.3 Mineral and Paleontological Resources

Pipelines can affect the recovery of mineral resources in an area where prior mineral rights have not been established, and mineral extraction equipment would be required to work around pipes or avoid the ROW. If the resource is already leased (e.g., coal) or under valid claim (e.g., uranium), issuance of a ROW would not affect the potential for development of the resource, since the mineral resource would have a prior right. In this case, PSC may be responsible for facilitating mineral extraction at a later date.

Areas having moderate or high coal development potential have not been identified along the mainline route or 7-mile lateral. Uranium development, particularly in the Pumpkin Buttes area, could introduce potential surface facility problems, although no conflicts are projected at this time. With a large pipeline crossing a uranium area, the complexity of placing distribution and collection lines for uranium in situ development would increase. This would not significantly affect actual uranium extraction.

Since an adjustment of 75 feet would not be critical for placement of wells for oil and gas development, the ROW should not adversely affect future oil and gas development. The presence of a CO₂ source near other proposed oil and gas developments may have a positive impact on oil recovery in the future. Other existing oil fields in the vicinity of the proposed pipeline are likely candidates for future enhanced oil recovery.

Mineral resources in the area of the proposed 7-mile lateral are scarce. The only identified economic mineral resource in the area is bentonite deposits commonly associated with the Cody Shale (Harris et al. 1985). The route would not hinder any current mining operations, and because of the relatively short length of the proposed lateral, it is unlikely that any future mining operations would be impacted.

Fossils may be disrupted or destroyed during ROW clearing, trenching, or access road maintenance. As a result, irreplaceable knowledge could be affected. Table 3-3 indicates that approximately 49 miles (or 32 percent) of the pipeline route has a high potential for paleontological resources. In addition, 11 significant sites were found during the 1986 paleontological survey; these sites and their mitigation recommendations are summarized in

Table 3-3. Conversely, construction activities, such as trenching, are often responsible for the discovery of previously unknown important paleontological resources.

In accordance with BLM's standard stipulation for surface-disturbing actions in strata with a high potential for paleontological resources (BLM 1989), highly sensitive areas would be monitored during construction by a qualified paleontologist with a permit issued by the Wyoming State Office of the BLM. Should significant fossil resources be encountered along the pipeline route, a paleontologist from the appropriate state or federal agency would be contacted and measures would be taken to identify and preserve the fossils. While pipeline construction may inadvertently destroy some paleontological resources, no significant impacts are expected with implementation of the required environmental protection measures (Section 2.5 and Table 3-3 in EA and the POD).

It should be noted that the results of the previous paleontological survey, along with recommendations for mitigation of significant sites, were submitted to the BLM for review. BLM concurred with the recommended mitigation of paleontological resources (BLM 1987a). The applicant would submit any fossils discovered as a result of construction to the attention of the Authorized Officer. In addition, a paleontologist would complete the recommended mitigation procedures prior to or during construction.

Because of the relatively short length of the proposed lateral route and the nature of the geologic media underlying the proposed lateral, it is highly unlikely that any vertebrate remains would be encountered. Personal communication with Ms. Laurie Bryant (2000), Regional Paleontologist for the BLM in Wyoming, supports this conclusion and has recommended that no further mitigative action (i.e., paleontological surveys) be required for the proposed lateral. In the unlikely event significant fossilized remains are discovered during construction, the remains would be treated in a manner consistent with the protective measures described for the mainline portion of the proposed route.

No conflicts are anticipated at this time with regard to extraction of minerals along the proposed pipeline route or 7-mile lateral. Routine operation and maintenance of the pipeline would not affect the potential extraction of coal, uranium, oil, or gas resources in the vicinity of the route.

Impacts to the paleontological resources would occur primarily during the construction phase of the project. Operation of the proposed pipeline would not involve additional ROW clearing, trenching, or surface disturbance and, therefore, it is anticipated that no additional impacts to these resources would occur.

The proposed pipeline would be abandoned in place. Abandonment would not result in significant surface or subsurface disturbance and, therefore, is not expected to result in impacts to mineral or paleontological resources.

4.4 Water Resources

4.4.1 Surface Water

Impacts to surface water resources would depend upon the crossing technique and the physical characteristics of the streams crossed by the pipeline. Directional drilling would be used to cross the Sweetwater River, while all other streams (perennial and intermittent) would be trenched. By using directional drilling at the Sweetwater River, direct disturbance to the channel would be minor. One work area (250 feet x 400 feet) would be located approximately 300 feet from each bank on each side of the river. The erosion control and revegetation measures (Section VII and Appendix C in the POD) would be used to avoid sediment input to the river.

A temporary bridge would be used to transport construction equipment across the Sweetwater River (see Figure 3-7 in POD). By placing the bridge structure in the river, temporary disturbance to the banks and stream bottom (8 feet x 50 feet) would contribute increased sediment in a localized area. Erosion control and revegetation measures also would be used in the disturbed areas to reduce sediment input to the river (see Section 2.5). No other effects on water quality are expected to occur, as a result of construction across the Sweetwater River.

During trenched crossings of streams, potential impacts to surface water resources would be restricted to those locations where the pipeline crosses a perennial, intermittent, or ephemeral stream. Construction involves the excavation of a trench across the stream, placement of pipe, and backfill of the trench. The trench would be placed at right angles to the stream to minimize the length of streambed disturbance during construction. Backfill would be placed such that the grade of the streambed is maintained, and banks would be restored to their approximate original condition so that flow conditions in the stream are not modified. Water quality standards for turbidity may be temporarily exceeded at the pipeline crossing and for a distance of less than 1 to 3 miles downstream of the crossing (BLM 1985a).

A small surface water depletion would occur as a result of withdrawals for hydrostatic testing, directional drilling, and dust abatement. A total of approximately 6.4 acre-feet would be withdrawn from the Sweetwater River in the fall for hydrostatic testing (3.3 acre-feet) and directional drilling (3.1 acre-feet). Most of this water (approximately 80 percent) would be returned to the Sweetwater River after filtering through a straw bale structure. The consumptive loss of water would result from evaporation and directional drilling use. The quality of hydrostatic test water discharges

would be in compliance with the Wyoming permit requirements. Approximately 1.7 acre-feet of water would be obtained from irrigation companies or municipal sources for dust abatement. The dust abatement water would be 100 percent consumptively used.

The pipeline would cross approximately 2.5 miles of the BLM Salt Creek ACEC, which is located in the Casper Field Office Area. The pipeline crosses Government Creek, west of the Smoky Gap Oil Field. Impacts to the water quality in the ACEC are not expected to be significant because Government Creek is an intermittent drainage and would be crossed during low-flow periods. Salt Creek is crossed at MP 236, 2.5 miles northwest and downstream of the ACEC.

Potential leaks or spills from construction equipment could affect water quality if petroleum products entered perennial drainages. Inspections would be required daily to detect any spills or leaks. No refueling would be allowed within 100 feet of streams to eliminate risks of fuel entering water bodies (Section 2.5 and the POD).

In summary, temporary construction impacts to surface water resources would occur at perennial stream crossings as a result of the introduction of sediment. This short-term impact would dissipate within less than 1 mile downstream of the pipeline crossing. Water for hydrostatic testing would be obtained from the Sweetwater River and would be disposed of according to applicable federal, state, and local regulations. Therefore, impacts to surface water resources due to construction of the pipeline are not expected to be significant.

The probability of a pipe leak or rupture occurring at a stream crossing is extremely low due to the thicker-walled type of pipe used. A rupture would be detected immediately, and block valves would halt the CO₂ flow. Any minor leaks would be detected through periodic maintenance inspections. However, should such a rupture occur, the pressurized CO₂ would be vented rapidly into the atmosphere. The initial rupture could toss sediment, rocks, and other debris into the air in the immediate vicinity of the rupture and could disturb sediment in the streambed causing temporary elevation of TSS levels and turbidity at the crossing and a short distance downstream. Most of the CO₂ would bubble through the water and vent into the atmosphere (PIC 1988a). However, CO₂ is soluble in water as carbonic acid which could influence the alkalinity of the stream.

Upon abandonment of the proposed pipeline, all surface facilities would be removed, and the resulting disturbed ground would be reclaimed. The pipe would be abandoned in-place. Therefore, no disturbance of surface streams is anticipated. The impact to surface water resources due to abandonment of the pipeline would not be significant.

4.4.2 Groundwater

The trench excavated for pipe placement is above the water table along most of the proposed pipeline route. Portions of the route in the immediate vicinity of perennial streams may encounter shallow groundwater during excavation. Following backfill of the trench, these areas would be returned to their original condition, and groundwater impacts would not be expected. No groundwater would be encountered at the Sweetwater River crossing, since directional drilling would be used. There would be no withdrawals of groundwater for use in hydrostatic testing. Therefore, no impacts to groundwater resources due to these activities are anticipated.

4.5 Vegetation, Wetlands, Agriculture, and Range Resources

4.5.1 Vegetation and Wetlands

The estimated acreage of each vegetation type that would be disturbed, removed, and reclaimed as a result of construction and installation of the pipeline and associated ancillary facilities is provided in Table 4-3. Approximately 1,494 acres of vegetation would be temporarily disturbed, including 1,421 acres of sagebrush-grass, 4 acres of saltbush-greasewood, 8 acres of juniper woodland, 4.5 acres of riparian and wetland areas, and 30 acres of cropland. Approximately 1,489 acres (99.7 percent) of the total disturbance (1,494 acres) would be reclaimed; 4.9 acres (0.3 percent) associated with the construction of aboveground facilities would not be reclaimed, resulting in the permanent loss of 4.9 acres of sagebrush-grass vegetation.

**Table 4-3
Estimated Acreage of Vegetation Types Disturbed, Removed, and Reclaimed
During Construction of the Proposed PSC CO₂ Pipeline**

Vegetation Type	Main Route and Salt Creek Lateral			Aboveground Facilities		
	Acres Disturbed ¹	Acres Removed	Acres Reclaimed	Acres Disturbed ²	Acres Removed ²	Acres Reclaimed
Sagebrush-grass	1421.2	0	1421.2	19.1	4.9	14.2
Saltbush-greasewood	4.1	0	4.1	0	0	0
Juniper woodland	8.1	0	8.1	3.0	0	3.0
Wetland, Riparian or other Waters of the U.S.	4.5	0	4.5	3.7	0	3.7
Cultivated cropland	30	0	30	0.1	0	0.1
Total	1,468	0	1,468	25.9	4.9	21

¹ Acreage determined using the following formula: mileage crossed (Table 3.5) x 5,280 feet (in mile) x 75 feet (width of ROW) divided by 43,560 (square feet in an acre). Differences in acreage totals compared to Table 2-1 are due to rounding.

² Provided by Universal Engineering.

Impacts to vegetation would not be considered significant with implementation of the proposed environmental protection procedures identified in Section 2.5 and the POD. PSC also has developed an Erosion Control, Revegetation, and Restoration Plan; a Reclamation Plan; and a Weed Control Plan as part of the POD to be approved by the BLM. These plans would include specialized rehabilitation procedures tailored to the variety of local environments and conditions. With effective use of the proposed erosion control/revegetation procedures, grasses and forbs would become reestablished along the ROW to near pre-construction conditions within 5 years of construction. Shrubs would take longer to become established in the construction ROW, with sagebrush taking 10 to 20 years and saltbush and greasewood taking 20 to 30 years. Trees greater than 10 inches in diameter would not be allowed to grow in the ROW, resulting in a long-term loss of this vegetation type.

Impacts that may occur if desirable plant species are not established in the ROW within a short period of time include higher soil erosion rates and reduced forage production. Understory vegetation in this zone may take a considerable amount of time to become reestablished due to limited annual precipitation, and as a result, the construction ROW may be subsequently invaded by weedy plant species.

Potential effects of fuel spills on vegetation could include direct toxicity and contamination of soils. Protection measures involving berming around refueling areas and monitoring for spills and leaks would minimize effects on vegetation.

Approximately 4.5 acres of wetlands and riparian areas would be temporarily disturbed by the pipeline project, based on a construction ROW width of 75 feet. If a ROW of 50 feet or less can be used in all of these areas, the disturbance acreage would be reduced to approximately 1.78 to 3 acres. An additional 3.22 acres of potential wetland areas could be disturbed at TUA locations proposed at the Sweetwater River crossing. TUA sites also were identified in other Waters of the U.S. locations at MP 122.6, 206.5, and 259.6. Based upon the protection measures identified in Chapter 2.0, disturbance to wetlands and other WUS would be reduced if field confirmation indicates that the crossings could be avoided.

PSC has committed to avoiding wetlands and other sensitive water features wherever reasonably possible. If a feature cannot be avoided, ROW construction widths would be reduced wherever possible to 50 feet or less.

The largest wetland area identified along the proposed route was associated with a series of beaver ponds located at MP 113.35 and measured approximately 450 feet in width at the crossing. If the wetland cannot be avoided, approximately 0.52 acre (or less) of the wetland would be disturbed, assuming a construction ROW width of 50 feet or less in this area. Other potential

jurisdictional wetland crossings along the main ROW that could experience a disturbance area of 0.07 acre or more (based on a 50-foot-wide ROW if they cannot be avoided) were identified at MP 119.38, 134.25, 157.9, 158.01, 162.04, 187.6, 228.21, 233.90, 235.84, 235.87, 238.45, and 248.17 (see Table B-1). Two wetland areas with the potential for disturbance of greater than 0.09 acre also occur at MP L0.60 and L2.24 on the lateral ROW. Eight locations were identified where the ROW parallels a surface drainage for more than 500 feet; these areas occur at MP 118.6, 118.8, 121.21, 152.8, 165.05, 192.10-192.5, 232.0, 233.8, and 256.5. The COE generally requires formal notification if more than 0.1 acre at a wetland crossing would be disturbed or if a project parallels a waters of the U.S. within 50 feet for more than 500 feet. Formal notification can involve preparation of an individual Section 404 permit application. The majority of the paralleled areas could be avoided by relocating the ROW 50 to 100 feet away from the drainage.

The largest crossing of a riparian area would occur at MP 124.28, with a potential disturbance area of 0.06 acre assuming a 50-foot-wide ROW. The total acreage potentially disturbed in riparian areas, assuming a 50-foot construction ROW, was 0.11 acre. Five crossings of riparian areas were identified along the proposed ROW at MP 116.25, 116.30, 116.95, 124.28, and 253.02. The COE has indicated that riparian areas, particularly those with cottonwoods, should be avoided and PSC has agreed to make reasonable efforts to avoid these areas.

To confirm wetland and riparian locations in relation to the ROW, a biological monitor would accompany or immediately follow the survey crew during staking of the route to identify wetland, riparian, or other sensitive surface waters that may have been missed during the original surveys and to offer suggestions on modifying the route to avoid sensitive areas. Wherever reasonably possible, wetlands and other WUS would be avoided. Additionally, environmental inspectors would be present during construction of the line to ensure that wetlands and other important surface water features are either avoided or sufficiently mitigated. Implementation of these protection measures, as well as others as discussed in Section 2.5, should reduce effects to wetlands and other significant surface water features.

Disturbance within riparian/wetland areas and other waters of the U.S. from construction of the proposed route would be temporary. Herbaceous vegetation in palustrine emergent wetlands would be expected to reestablish itself to pre-construction levels within 3 to 5 years following the completion of reclamation, resulting in a short-term loss of vegetation and available habitat for some wildlife species. Reestablishment of woody wetland species (shrubs or trees less than 10 inches in diameter) in palustrine scrub/shrub wetlands would take greater than 5 years to achieve pre-construction levels, resulting in a long-term loss of vegetation and available habitat for some wildlife species.

The potential effects of a fuel spill would be the same as discussed for surface water and vegetation. Committed protection measures, including no refueling within 100 feet of water bodies and berming around refueling areas, would prevent impacts to wetlands from fuel spills.

4.5.2 Noxious Weeds

Approximately 50 existing noxious weed populations were identified along the proposed ROW during the June and July 2000 surveys of the proposed line. The intent of the noxious weed surveys was to identify the location and extent of as many existing noxious weed populations along the proposed ROW as possible. The weed survey data are being used to plan weed control measures along the proposed route to prevent the spread of noxious weed populations within existing infestation areas or to areas previously free of noxious weeds. Depending upon BLM approval, PSC would implement weed control measures along the ROW as described in Section 2.5 of this EA, in the Noxious Weed Control Plan (Appendix F of the POD), and the reclamation plan (Appendix G of the POD). Control measures could include pretreatment of weed infestations, reseeding disturbance areas as soon as possible, placement of temporary fencing to reduce grazing pressures until native vegetation becomes reestablished, and post-reclamation monitoring to identify weed locations requiring additional treatment.

Information collected during the noxious weed surveys, including species identified, proximity to the project area, locations of infestations, and extent of infestations, has been submitted to the jurisdictional BLM offices and local Weed Districts. Weed control measures, as described in the Noxious Weed Control Plan being provided to the BLM and the local Weed Districts, would be put into practice along the proposed ROW as directed by the BLM and the Weed Districts.

Weed surveys of the proposed ROW were conducted in June and July 2000 in anticipation of an August 2000 construction start date. By the time of construction, weed populations may have expanded or reduced in size and location from those identified during the 2000 surveys. Because of this, PSC would coordinate with the appropriate BLM Field Offices prior to initiation of construction to determine whether additional weed protection measures would be warranted.

Implementation of the proposed environmental protection measures and control techniques identified in the Noxious Weed Control Plan should limit the spread of noxious weeds along the proposed ROW. No significant effects to vegetation or substantial increases in weed infestations are anticipated as a result of activities associated with the Proposed Action.

4.5.3 Agriculture and Range Resources

Disturbance to cultivated cropland, hay meadows, and rangeland by the construction of the proposed route would be temporary. Approximately 30 acres of cultivated cropland would be disturbed during construction. Removal of rangeland vegetation from the 75-foot-wide construction ROW and other disturbance areas would result in the temporary loss of forage production. No reductions in stocking rates would occur in any allotments as a result of project construction, since the loss of vegetation would be short-term. Forage production could take several years to return to pre-construction levels in areas with poor soils (e.g., rocky, shallow, saline, or alkaline). Areas within the construction ROW that have not been successfully reclaimed would be seeded in accordance with the reclamation success monitoring program included in the Reclamation Plan. Long-term impacts to rangeland or livestock grazing operations are not anticipated as a result of project construction or operation activities. Protection measures for livestock grazing are listed in Section 2.5 and the POD.

Construction may temporarily displace wild horses, if present, from their accustomed range; however, use areas and migration routes would not be expected to change. Short-term impacts to wild horses would include the temporary reduction in forage along the ROW. Approximately 5 years after reclamation, highly palatable forage would be reestablished in the construction ROW. No long-term impacts to wild horse herds are anticipated.

4.5.4 Threatened, Endangered, Candidate, and Sensitive Plant Species

Field surveys determined that two special status plant species occur within the ROW: Porter's sagebrush at MP 176.7 and Nelson's milkvetch at MP 196. Construction could result in a direct impact (e.g., crushing, removal) to a maximum of 15 individual Porter's sagebrush and 7 individual Nelson's milkvetch. If possible, individual plants would be avoided by construction equipment. The total estimated populations of these two species are not known; however, based on reviews of previously documented occurrences, occupied habitat within the ROW represents less than 1 percent of the total potentially suitable habitat in Wyoming. As a consequence, the loss of individuals from the ROW would result in localized sub-population effects; however, it is not expected that the overall species' populations would be affected.

4.6 Wildlife

The construction activities associated with the proposed pipeline would result in both direct and indirect impacts to wildlife resources. The degree of impacts to wildlife species and their associated habitats from project construction would depend on the temporal and spatial

relationships of these resources to the project area and on the mobility and sensitivity of the wildlife species.

Overall, impacts to wildlife species could include the effects of habitat loss, incremental habitat fragmentation, animal mortality, animal displacement, increased noise, and additional human presence. Habitat loss would affect forage availability, escape and thermal cover, and breeding and wintering areas for certain wildlife species. Project construction could result in the loss of less mobile species and temporarily displace animals from the project area into adjacent and perhaps less suitable habitats and/or habitats that are already at their respective carrying capacities. Environmental protection measures have been developed for the project to minimize potential construction-related impacts to wildlife resources. These measures are listed in Section 2.5.

4.6.1 Game and Nongame Wildlife Species

4.6.1.1 Big Game Species

Construction-related impacts to big game species (e.g., mule deer, pronghorn, elk, and moose) would result in an incremental, short-term loss of native vegetation within the proposed construction ROW and the temporary displacement of big game species away from the proposed ROW. Big game animals would likely decrease their use of habitats within 0.5 mile of the construction activities (Lyon and Ward 1982; Reed 1981). This disturbance would be short-term, and it is assumed that animals would return to the area following the completion of construction. Table 4-4 summarizes the designated big game seasonal ranges crossed by the proposed project route, which coincides with the seasonal ranges shown in Table 3-8. PSC has committed to a number of environmental protection measures to minimize potential impacts to big game species (see Section 2.5). The committed constraint periods for sensitive big game ranges are presented in Table 4-4. These constraints would entail a “no-disturbance construction constraint window” along these areas. However, exceptions or waivers to these seasonal construction constraints may be authorized in writing by the BLM’s Field Office Manager on a case-by-case basis. Based on these committed measures, no direct impacts to wintering pronghorn, mule deer, elk, or moose from project construction would be anticipated. In addition, no impact to elk calving areas from increased noise or human presence would occur.

Pipeline construction activities would result in an incremental disturbance to vegetation on 256 acres of pronghorn crucial winter range, 53 acres of mule deer crucial winter range, 23 acres of elk crucial winter range, and 22 acres of moose crucial winter range. Construction would temporarily remove most of the vegetation on 19 acres of elk parturition range. Big game crucial winter and parturition ranges are important to maintain big game populations. However, these disturbance acreages represent a relatively small percentage of the crucial winter and parturition

Table 4-4
Constraint Periods for Big Game Crucial Winter and Partuition Ranges
Crossed by the Proposed PSC CO₂ Pipeline Project

Species	Habitat Type	Mileposts	Miles Crossed	Constraint Period
Pronghorn	Crucial Winter	125.6-137.8	12.2	November 15 to April 30
Pronghorn	Crucial Winter	180.4-195.9	15.5	November 15 to April 30
Mule Deer	Crucial Winter	136.1-136.5	0.4	November 15 to April 30
Mule Deer	Crucial Winter	138.5-143.9	5.4	November 15 to April 30
Elk	Crucial Winter	115.4-117.5	2.1	November 15 to April 30
Elk	Parturition	115.4-117.1	1.7	May 1 to June 30
Moose	Crucial Winter	132.6-134.7	2.1	November 15 to April 30

ranges available in the region for these species. Loss of available forage (e.g., woody shrubs) for big game species from construction activities would result in a long-term (greater than 5 years) impact. However, herbaceous forage production would return to pre-construction levels within 5 years, following the completion of reclamation.

PSC has committed to constructing soft plugs and ramps along prominent game trails (see Section 2.5). These features would allow crossing of the trench and provide an escape route for animals that enter the trench, thereby minimizing the potential for animals to become trapped. Based on these committed environmental protection measures, construction-related impacts and potential disturbance to big game species from human activities would be low.

4.6.1.2 Small Game Species

Effects to upland game birds associated with the proposed project would consist of the incremental loss of wintering, breeding, nesting, and/or brooding habitat. Because of their relative sensitivity to disturbance, sage grouse would be the most likely species impacted by construction activities, if construction was to occur during the breeding season (March 1 to May 15) or nesting period (March 1 to July 7). A total of 13 active leks were identified within a 2-mile radius of the proposed ROW during the 2000 sage grouse survey. Indirect long-term (greater than 5-year) impacts would result from the temporary loss of approximately 336 acres of breeding/nesting habitat. Habitat disturbance within 0.25 mile of a lek site could result in increased predation of sage grouse during the breeding season. To minimize this potential impact, PSC has committed to a 0.25-mile permanent construction avoidance buffer around known lek sites, which would be implemented on a site-specific basis, as determined in coordination with the BLM.

If construction was to occur during the breeding or nesting season, direct impacts to sage grouse, if present, could include abandonment of a lek site, nest abandonment, or loss of eggs or young. As described in Section 3.6.1, 13 active leks were identified within a 2-mile radius of the proposed ROW during the 2000 sage grouse surveys. Table 4-5 summarizes the constraint periods for breeding and nesting sage grouse along the proposed project route, based on the 13 active leks documented during the 2000 surveys. However, no direct impacts to breeding or nesting grouse would be anticipated from construction activities based on the current construction schedule (August 2001 through late January 2002). If construction were to extend into the 2002 breeding season, SPC has committed to: 1) conducting additional sage grouse surveys through areas of suitable habitat prior to construction, and 2) implementing a seasonal construction constraint within a 2-mile radius of active lek sites. However, exceptions or waivers to these seasonal construction constraints may be authorized in writing by the BLM's Field Office Manager on a case-by-case basis.

Table 4-5
Constraint Periods for Breeding and Nesting Sage Grouse
Along the Proposed PSC CO₂ Pipeline Project¹

Mileposts	Miles Crossed	Constraint Period
128.2-134.5	6.3	March 1 to July 7
151.4-155.3	3.9	March 1 to July 7
171.3-178.7	7.4	March 1 to July 7
193.2-197.2	4.0	March 1 to July 7
214.6-222.7	8.1	March 1 to July 7
244.6-246.6	2.0	March 1 to July 7
259.4-264.7	5.3	March 1 to July 7

¹Based on 2000 sage grouse survey results.

Incremental habitat loss for chukar, mourning dove, and Hungarian partridge also would result from the proposed project construction. In most instances, suitable habitat adjacent to the project areas would be available for use by these species. This displacement would be temporary and short-term.

Construction activities associated with the proposed pipeline could temporarily displace small game mammals from the proposed ROW, as a result of short-term habitat loss. Some species with depressed populations would be able to relocate to adjacent habitats. Other species, with populations at or near the maximum carrying capacity, could suffer some increased mortality and

corresponding potential reduction in productivity during the construction year. However, it is not likely that the expected loss would have a measurable effect on species populations.

Effects to waterfowl could result from the short-term loss of wetland and riparian habitats. Potential impacts to nesting waterfowl would depend upon nest location relative to the proposed project area, the timing of the proposed construction, and the duration of the proposed disturbance. Potential impacts would be expected to be low, as the extent of wetland and riparian habitats is primarily limited to the Sweetwater River and small perennial creeks (e.g., Salt and Meadow creeks), and construction is currently scheduled to occur outside the breeding season (April through July). However, if construction were to occur during the breeding season, the potential loss of or disturbance to an active nest, if present, could result in abandonment of the nest and loss of eggs or nestlings. These losses would reduce the pair's productivity for one breeding season.

4.6.1.3 Nongame Species

Construction activities could result in mortalities of less mobile or burrowing nongame species (e.g., small mammals, reptiles and amphibians, and invertebrates) within the ROW, as a result of crushing from construction vehicles and equipment. Other impacts would include temporary displacement of more mobile species (medium sized mammals, adult birds) from the proposed ROW, due to the short-term loss of vegetation. Although habitat exists adjacent to the proposed ROW to support some displaced animals, species that are at or near carrying capacity could suffer some increased mortalities and corresponding potential reduction in productivity during the construction year. Short-term temporary displacement of some species would result until herbaceous vegetation returns to pre-construction conditions (approximately 3 to 5 years). For those species dependent on the sagebrush-steppe habitat, long-term (greater than 5 years) displacement would occur until shrubs become reestablished. The proposed project would result in an incremental increase in habitat fragmentation, which would influence the suitability of adjacent habitats, particularly in undisturbed areas. However, due to the temporary and linear nature of the project, habitat fragmentation would likely have a greater impact on smaller animals that may leave the ROW until vegetation becomes reestablished.

A number of raptor species (e.g., golden eagles, ferruginous hawks, prairie falcons, red-tailed hawks, Swainson's hawks, great-horned owls, and burrowing owls) seasonally occupy the habitats crossed by the proposed project. The incremental, temporary loss of nesting and foraging habitat along the ROW would result in a short-term indirect impact to these species. To minimize the potential impact to nesting habitat, raptor nest sites identified within the proposed areas of disturbance would be avoided to prevent their removal. In addition, attempts would be made to avoid trees 10 inches in diameter or greater during construction to protect future nest sites (see

Section 2.5). If project construction were to occur during the breeding season (February 1 to July 31), indirect impacts could result from human-oriented activities, particularly for ferruginous hawks, if present. Direct impacts to nesting raptors, as a result of project construction, could include abandonment of a breeding territory or nest site or the potential loss of eggs or young. These losses, if they were to occur, would reduce productivity for that breeding season. However, no direct impacts to nesting raptors would be anticipated from construction activities based on the current construction schedule (August 2001 through late January 2002). If construction were to extend into the 2002 breeding season, PSC has committed to conducting aerial and/or pedestrian nesting raptor surveys, as applicable, through areas of suitable habitat to identify active nest sites within the project area, prior to construction (see Section 2.5). Since a number of variables (e.g., nest location, species' sensitivity, breeding, phenology, topographical shielding) would determine the level of impact to a breeding pair, appropriate protection measures, such as seasonal constraints and establishment of buffer areas, would be implemented at active nest sites on a species-specific and site-specific basis, in coordination with the jurisdictional agencies. As a result of these committed environmental protection measures, construction-related impacts to raptor species would be anticipated to be low.

Other avian species that would be impacted by the proposed construction activities include nesting passerines or songbirds that use grassland, sagebrush/grassland, riparian/wetland, greasewood, or saltbush habitats that would be crossed by the project. Construction activities during the breeding season (April through July) could result in the abandonment of a nest site or the potential loss of eggs or young, resulting in a loss of productivity for the breeding season. Potential impacts to nesting birds would depend on the nest location relative to the proposed ROW, the phase of the breeding period, the duration of the anticipated disturbance, and species tolerance. Based on the current construction schedule outside the breeding season, construction impacts would be anticipated to be low.

In summary, impacts to game and non-game wildlife associated with the proposed pipeline are anticipated to be minimal, as: 1) only a small portion of the potentially suitable, available habitat would be impacted by project construction; 2) established topsoil handling techniques and subsequent reseeded of disturbed areas would aid in the reestablishment of habitats; 3) the committed environmental protection measures would minimize potential impacts to species during the breeding season and minimize the impacts to their breeding territories; and 4) the short-term nature of the project would minimize the length of time that wildlife would potentially avoid habitats along the ROW.

4.6.2 Threatened, Endangered, and Sensitive Species

This section focuses on the impact analyses of federally listed, federally proposed, federal candidate, and other sensitive species that were identified for the project area by the WGFD and WYNDD. Listed and other sensitive species were identified based on available habitat and results of surveys conducted within the project area. Surveys are currently planned for black-footed ferret.

Environmental protection measures were developed for the project to minimize potential construction-related impacts to sensitive species. These measures are presented in Section 2.5.

4.6.2.1 Mammals

Black-footed Ferret (Federally Endangered)

Because the black-footed ferret is closely associated with prairie dog populations, prairie dog colonies or complexes of sufficient size and burrow density are considered to be potential habitat for this species. If ferrets were present in prairie dog colonies crossed by the proposed pipeline, they may be impacted by pipeline construction from either the direct crushing of prairie dog burrows occupied by black-footed ferrets or indirectly from increased noise and human presence. If present, ferrets would be most vulnerable in early summer when young kits would be present in the burrows.

In accordance with the USFWS' 1989 black-footed ferret guidelines (USFWS 1989), the Cheyenne USFWS has determined that "because the proposed pipeline construction would represent a minor and temporary disturbance, ferret clearance surveys will be required only for colonies meeting the survey criteria which will be directly disturbed by construction activity. While these colonies must be surveyed in their entirety, no surveys are required on colonies not directly disturbed by the proposed project" (Long 2000). A total of 12 prairie dog colonies would be directly disturbed by the proposed project ROW. These 12 colonies are presented in Table 4-6. Based on relative densities of colonies in the project region, it is assumed that all prairie dog colonies are associated with larger complexes and, therefore, would meet the acreage or size criteria established by the USFWS 1989 guidelines. Consequently, prior to the initiation of construction activities, PSC has committed to conducting black-footed ferret clearance surveys within the 12 colonies that meet the USFWS 1989 survey criteria (i.e., active colonies with burrow densities of at least 8 burrows per acre). A survey report would be prepared for the USFWS for their review and concurrence upon completion of the surveys. This report would summarize the methods used and survey results obtained from each of the 12 colonies. If an occupied territory or fresh sign (i.e., tracks, scat, diggings) is documented, the USFWS would immediately be notified, and appropriate protection measures would be developed.

Table 4-6
Prairie Dog Colonies That Would be Crossed by the Proposed
Petro Source CO₂ Pipeline Project¹

Milepost	Prairie Dog Species	Acres	Meet USFWS' Ferret Habitat Criteria²
122.0 – 122.5	White-tailed	67	Yes
123.2 – 124.3	White-tailed	148	Yes
150.8 – 151.0	White-tailed	2	Yes
153.3 – 153.9	White-tailed	54	Yes
225.3 – 225.9	Black-tailed ³	179	To be determined
231.2 – 231.5	Black-tailed	29	To be determined
241.6 – 242.5	Black-tailed	205	To be determined
247.6 – 248.8	Black-tailed	960	To be determined
250.0 – 251.0	Black-tailed	238	To be determined
253.0 – 253.3	Black-tailed	46	To be determined
Lateral 0.7 – 1.0	Black-tailed	8	Yes
Lateral 1.7 – 1.9	Black-tailed	20	To be determined

¹These colonies have either been determined to be active or activity status is unknown.

²In this area of Wyoming, it is assumed that all colonies that would be crossed by the project ROW are associated with larger complexes; therefore, whether these individual colonies meet the applicable USFWS' 1989 ferret criteria is limited to activity levels and relative burrow density.

³It is assumed that black-tailed prairie dogs occur from MP 225.3 through 253.3 (including the project lateral); however, this has not been confirmed.

Black-tailed Prairie Dog (Federal Candidate)

Construction-related impacts to the black-tailed prairie dog would result in direct mortalities of individuals, as a result of crushing from construction activities, vehicles, and equipment. A total of 8 black-tailed prairie dog colonies occur within the proposed construction ROW, and approximately 58 acres of these colonies would be affected. However, it would not be anticipated that construction activities would permanently alter prairie dog colonies that would be crossed by the proposed project, and installation of the pipeline would not restrict the colonization of the ROW by prairie dogs. In fact, habitat disturbance may encourage future colonization in the short term, based on the availability of soft, permeable soils that would occur along the ROW subsequent to project construction, and PSC's committed reclamation plan (Appendix G in POD).

Swift Fox (BLM Sensitive)

Direct impacts to breeding swift fox, if present, could result from abandonment of den sites and the potential loss of adults and young from the compaction of dens during project construction. The incremental, temporary loss of potentially suitable breeding habitat along the ROW would

result in a short-term impact to this species, if present. Indirect impacts also could result from increased noise and human presence. However, potential impacts to breeding swift fox would be considered low, based on the rarity of the species and the current construction schedule (August 2001 through late January 2002) which would be outside of the swift fox breeding season. However, if an active swift fox natal den were identified along the ROW during construction, all construction in the vicinity of the den would cease, the BLM would be immediately notified, and appropriate protection measures would be implemented to minimize potential impacts. Consequently, no direct impacts to breeding swift fox would be expected due to project construction.

4.6.2.2 Birds

Bald Eagle (Federally Threatened)

No direct or indirect impacts to breeding bald eagles would be anticipated from project construction. As discussed in Section 3.6.2.2, no historic or current bald eagle nest sites have been documented within or adjacent to the proposed project ROW (BLM 2000). In addition, no bald eagle observations or bald eagle nest sites were found during the 2000 breeding raptor surveys for the project (ENSR 2000b). Based on the 2000 raptor survey results and the current construction schedule (August 2001 through late January 2002), which is outside of the bald eagle's breeding season, no impacts to breeding bald eagles would be anticipated from construction activities. If construction were to extend into the 2002 breeding season (February 1 to July 31), PSC has committed to conducting aerial and/or pedestrian raptor surveys, as applicable, through areas of suitable habitat during the breeding season to identify active nest sites within the project area, prior to construction (see Section 2.5). Appropriate protection measures, such as seasonal constraints and establishment of buffer areas, would be implemented at active nest sites on a species-specific and site-specific basis, in coordination with the jurisdictional agencies. As a result of these committed protection measures, no impacts to breeding bald eagles from construction activities would be anticipated.

As discussed in Section 3.6.2.2, no historic or active communal roost sites, winter roosts, or winter concentration areas have been identified within 2 miles of the proposed route; however, individual bald eagles have been observed using the Sweetwater River corridor during the winter (BLM 2000). The nearest historic bald eagle winter roost site areas occur from approximately 2 to 5 miles from the proposed route in the Pine Mountains area (BLM 2000). Consequently, no direct or indirect impacts to roosting eagles are anticipated as a result of project construction, based on the distance of the known historic bald eagle winter roost sites to the project area.

Project construction would result in the incremental loss of potentially suitable bald eagle foraging habitats associated with the upland and wetland areas along the ROW. However, based on the distance of the project ROW from known bald eagle winter roost sites, the lack of bald eagle nest sites in the project area, and the amount of existing foraging upland and wetland habitats in the project region, no impacts to foraging bald eagles would be anticipated as a result of project construction.

In conclusion, project construction or operation would not affect nesting bald eagles, based on the lack of historic or current bald eagle nest sites in the project area and the current construction schedule outside of the breeding season. No effect to historic or active bald eagle communal roost sites, winter roosts, or winter concentration areas, based on the infrequent occurrence of wintering eagles in the immediate project vicinity and the distance (>2 miles) of historic winter roosts from the proposed project. No effect to foraging bald eagles from project construction, based on the distance of the project ROW from historic bald eagle winter roost sites, the lack of bald eagle nest sites in the project area, and the amount of existing foraging upland and wetland habitats in the project region.

Mountain Plover (Proposed as Federally Threatened)

No direct impacts to breeding plovers from project construction would be anticipated, based on the current construction schedule (August 2001 through late January 2002). As discussed in Section 2.5, if construction was to occur during the breeding season (April 10 to July 10), PSC has committed to conducting presence/absence surveys within areas of potentially suitable breeding habitat, in coordination with the jurisdictional agencies, to identify any potentially active nest sites in the project study area (200 meters on either side of the pipeline centerline) (see Section 2.5). If active nests were identified, appropriate protection measures including seasonal construction constraints and buffer areas would be implemented on a site-specific basis, as appropriate, to minimize the potential impacts to breeding plovers. In conclusion, no direct impacts to breeding mountain plovers would be anticipated.

Indirect impacts to mountain plover would include the incremental, temporary loss of potentially suitable breeding habitat, as a result of project construction, if present. Based on the Wyoming Gap analysis data, the proposed project would disturb approximately 532 acres of potentially suitable nesting habitat. However, this estimate overstates the amount of potentially suitable habitat that would be crossed by the project, based on the use of generalized vegetation types in the Gap analysis (Folley 2001). If the mountain plover was listed as a federally threatened species, prior to, or during construction, PSC has committed to conducting field verification surveys to further delineate the amount of potentially suitable habitat within the areas identified by the Wyoming Gap. In addition, revegetation seed mixes would be developed and applied within

these areas, in coordination with the USFWS and BLM. As a result of these committed protection measures, potential impacts to potentially suitable nesting habitat for mountain plover would be low.

In conclusion, project construction or operation would not affect nesting mountain plover, based on the current construction schedule outside of the breeding season. Indirect impacts would result in the incremental, temporary loss of potentially suitable breeding habitat. However, if the mountain plover was listed as a federally threatened species, prior to, or during construction, potential impacts to suitable habitat would be considered low, based on PSC's committed protection measures for this species.

Burrowing Owl (BLM Sensitive)

No direct impacts to breeding owls from project construction would be anticipated, based on the current construction schedule (August 2001 through January 2002). As discussed for raptors in 4.5, if construction were to extend into the 2002 breeding season, PSC has committed to conducting aerial and/or pedestrian nesting raptor surveys, as applicable, through areas of potentially suitable habitat to identify active nest sites within the project area, prior to construction. In the event that an active nest were located, appropriate protection measures, including seasonal constraints and establishment of buffer areas, would be implemented on a site-specific basis, as necessary. The incremental, temporary loss of nesting and foraging habitat along the ROW would result in a short-term indirect impact to this species until final project reclamation has been completed and the plant communities have been reestablished.

4.6.2.3 Other Sensitive Species

A number of other BLM sensitive species also could be affected by project construction. Four sensitive bat species including long-eared myotis, fringed myotis, spotted bat, and Townsend's big-eared bat could potentially occur within the project area. No impacts to communal roosts (e.g., hibernacula, nursery colonies, bachelor roosts) would be anticipated for from project construction, based on the lack of suitable roost trees, buildings, underground structures, or mines within the project corridor. Project construction would result in the temporary, incremental loss of potentially suitable foraging habitat for these bat species until final project reclamation has been completed and the plant communities have been reestablished.

Impacts to the white tailed prairie dog from project construction would parallel those described for the black-tailed prairie dog in Section 4.6.2.1. A total of four white-tailed prairie dog colonies would be crossed by the proposed construction ROW and approximately 22 acres of these colonies would be affected. Impacts could result in direct mortalities of individuals, as a result of crushing

from construction activities, vehicles, and equipment. However, as stated above, it would not be anticipated that construction activities would permanently alter prairie dog colonies that would be crossed by the project, and installation of pipeline would not restrict the colonization of the ROW by prairie dogs in the future.

Impacts to the common loon, white-faced ibis, American bittern, Wilson's phalarope, and amphibians (northern leopard frog, great basin spadefoot, boreal toad, and spotted frog), if present in the project area, could occur as a result of a short-term, temporary loss of potentially suitable habitat within the wetland/riparian habitats that would be crossed by the ROW. Committed environmental protection measures for minimizing impacts to wetlands (see Section 2.5), including preservation of woody root systems in riparian/wetland areas, where practical, and supplemental planting of woody wetland species removed during construction, would reduce potential effects to these species.

Impacts to the merlin, sage thrasher, loggerhead shrike, Brewer's sparrow, sage sparrow, Baird's sparrow, and McCown's longspur, if present, could occur as a result of a short-term, temporary loss of potentially suitable upland habitats that would be crossed by the ROW. Potential impacts to these species, if present, could include abandonment of a nest site or the potential loss of eggs or young, resulting in a loss of productivity for that breeding season. Potential impacts to these species would depend on the nest location relative to the proposed ROW, the phase of the breeding period, and the duration of the anticipated disturbance. Based on the currently proposed construction schedule outside the breeding season, impacts to this species are anticipated to be minimal.

In summary, impacts associated with the proposed project are anticipated to be minimal as: 1) only a small portion of the potentially suitable, available habitat would be impacted by project construction; 2) established topsoil handling techniques and subsequent reseeding of disturbed areas would aid in the reestablishment of habitats; 3) the committed environmental protection measures would minimize potential impacts to terrestrial wildlife species during the breeding season and minimize the impacts to their breeding territories; 4) the short-term nature of the project would minimize the length of time that wildlife would potentially avoid habitats along the ROW; and 5) the short-term nature of the proposed construction at the Sweetwater River crossing.

4.7 Aquatic Resources

Impacts to fish and other aquatic communities from construction of the proposed pipeline would depend upon the physical characteristics of the streams (e.g., flow, bottom substrate, channel configuration, and gradient), construction technique, and time of year. The duration of construction

at each perennial stream crossing could range from several days to several weeks, depending upon the technique.

Direct impacts to aquatic communities and habitat in the Sweetwater River would be minor, since directional drilling techniques would be used. Construction would not affect aquatic habitat because the disturbed areas would be located outside the wetted channel. Vegetation and soil disturbance would occur in one area on each side of the river. However, no overhanging cover would be disturbed. Slight increases in sedimentation would occur due to bridge placement and storm water runoff entering the river. Erosion control structures would be used to minimize sediment input the river, as described in Section 2.5.

Trenching would occur at 10 perennial streams, 5 of which contain recreational game fish species. The other five streams contain native and introduced fish species. Salt Creek contains two sensitive fish species, plains minnow and flathead chub. Direct impacts resulting from trenching across the perennial streams would include increased sedimentation, substrate removal or alteration, and possible removal or disturbance to streamside vegetation. The effects of these changes on aquatic biota could include the following: reductions in the abundance and diversity of plant and macroinvertebrate species, displacement of fish, and alteration of habitat (Reed 1977; Murphy et al. 1981; Waters 1995). Trenching could cause direct mortalities to macroinvertebrates in these streams, as substrate is removed or altered. Macroinvertebrate communities would likely recolonize the disturbed area within 2 to 6 months (Robinson 1979). Stream flow would be maintained during construction by trenching and culverting.

In general, most of the aquatic species would be able to tolerate short-term increases in sediment as a result of trenching. No critical spawning or nursery areas are known to occur in the immediate vicinity of the crossings. Five of the streams (Sheep, West Cottonwood, Middle Cottonwood, East Cottonwood, and Dry creeks) contain brook trout, which is a fall spawner. Construction is not expected to affect potential brook trout spawning in these streams, since field surveys in 1990 and 2000 indicated that the proposed crossing areas in the Cottonwood Creek drainage are often dry or contain limited flow.

Potential fuel or other petroleum product spills would not affect aquatic biota, since these activities would be restricted within a minimum of 100 feet of all perennial and intermittent streams. Refueling in upland areas would be bermed and inspected to identify any leaks and spills.

Water withdrawal from the Sweetwater River (total of 6.4 acre-feet) for hydrostatic testing and directional drilling would result in a temporary depletion. This slight flow reduction is not expected to affect aquatic communities, including two sensitive species, lake chub and mountain sucker. Hydrostatic test water would be filtered through a straw bale structure, with final discharge to the

Sweetwater River. Water quality in the discharge water would have to meet National Pollution Discharge Elimination System requirements.

Water depletions in the Platte River drainage potentially could affect habitat for threatened and endangered species in the Platte River in Nebraska (i.e., whooping crane, least tern). As required by the USFWS, a fee would be applied to minor depletions (<25 acre-feet) in the Platte River drainage, as part of mitigation for threatened and endangered species.

Impacts of pipeline operation on aquatic communities would include possible leaks or ruptures. A rupture or leak in a perennial stream could cause limited fish and macroinvertebrate mortalities in a localized area due to asphyxiation. As liquid CO₂ is released, it would quickly volatilize into a gas. The gas stream could reduce oxygen levels and reduce pH. It is expected that most fish would avoid the area. The duration of this impact would be short-term because of the block valve system (see Section 2.2.1.2).

Maintenance activities also would remove vegetation within the permanent 30-foot ROW. Maintenance activities near perennial streams would remove a small amount of riparian vegetation. The removal of grasses and small shrubs near the stream crossings would represent a relatively small portion of streamside cover for fish. Repairs in areas near streams could result in temporary increased erosion. Erosion control procedures, as part of the National Pollution Discharge Elimination System Pollution Prevention Plan, would be implemented as part of the project to minimize any erosion in disturbed areas.

Abandonment would involve leaving the pipeline in place after the project is terminated; therefore, no new disturbance or impacts would occur for aquatic biota and their habitat.

4.8 Land Use and Recreation

Approximately 53.2 miles of the proposed route (MP 112.4 to MP 165.6) would be constructed in the BLM Lander Field Office Area. Approximately 27.7 miles (52 percent) of the proposed route through the Lander Field Office Area would parallel an existing pipeline corridor (MP 112.4 to MP 140.1). Approximately 2.5 miles of the proposed route would cross designated ACECs, including crucial elk winter range and the Oregon/Mormon/Pony Express Trail; however, the pipeline would be parallel to existing pipelines in these areas. The proposed route is adjacent to the Green Mountain area and crosses the Oregon/Mormon Pioneer National Historic Trail at MPs 132.0, 132.2, and 132.3. Resource Management Plan restrictions would be satisfied, and no other plan conflicts are expected.

Approximately 70.3 miles of the proposed route (MP 165.6 to MP 228.9 and the 7-mile lateral) would be constructed in the BLM's Casper Field Office Area. Approximately 16.7 miles (24 percent) of the proposed route through the Casper Field Office Area would parallel existing pipeline corridors and the general corridor along U.S. Highway 20/26. The remaining 53.6 miles (76 percent), including approximately 2.5 miles through the Salt Creek ACEC, would parallel existing utility corridors. The short-term construction impacts would be adequately mitigated. RMP restrictions would be satisfied, and no other Plan conflicts are expected.

Approximately 38.2 miles (MP 228.9 to MP 267.1) would be constructed in the BLM's Buffalo Field Office Area. The proposed pipeline route could not feasibly make use of established corridors and is considered a cross-country alignment. The short-term construction impacts from placing the proposed pipeline outside designated corridors would be adequately mitigated by the measures described in Section 2.5 and the POD.

Construction of the proposed pipeline would have no impacts on any developed recreation facilities. Scenic views from points of interest (e.g., the Split Rock Interpretive Site), historic trails (e.g., the Oregon/Mormon/Pony Express Trail), and the four WSAs (see Section 3.9) would be temporarily affected during construction until revegetation blends the colors and textures of the ROW into the surrounding landscape. Areas of high visual sensitivity for the remainder of the proposed pipeline are further discussed in the Visual Resource section (4.10). Impacts to urban and dispersed recreation resources are expected to be minimal due to the short-term population increase (210) during construction.

Portions of the proposed ROW would cross several big game hunting units in the Lander and Casper Field Office areas, including the Green Mountains, Sweetwater Rocks, Rattlesnake Range, and the area between Powder River and Midwest. The recreational enjoyment of wildlife, such as hunting, during big game hunting seasons may be temporarily affected by pipeline construction activities, depending on season and location. However, this effect would be short-term.

The operations incremental work force size (after construction) for the proposed pipeline is estimated to be one person. Following rehabilitation and revegetation of disturbed areas, there would be no impacts to land use or recreation resources during operation of the proposed pipeline.

Impacts from pipeline abandonment would be considerably less than those described for construction. Surface facilities would be removed, and the pipeline would be abandoned in place. Consequently, there would be only minor surface disturbance during abandonment.

4.9 Wilderness

Construction of the proposed pipeline would not impair the wilderness characteristics of the four WSAs within 10 miles of the proposed route because none of the activity would occur within either of the WSA boundaries. The BLM's interim management guidelines for these WSAs would not be violated. Construction-related impacts, which would be located outside of the WSA boundaries, would be temporary, and the disturbed areas would be reclaimed and revegetated in accordance with applicable regulations and permit requirements.

Operation of the proposed pipeline would not impair the wilderness characteristics of the four WSAs within 10 miles of the proposed route. Surface traffic along the proposed route would be limited to workers performing periodic pipeline and valve maintenance and emergency repairs to the pipeline or corrosion protection devices. The only aboveground facilities that would be located within 10 miles of the four WSAs are block valves at MP 132.1 (approximately 1 mile southeast of the Split Rock WSA) and at MP 149.9 (approximately 8 miles northeast of the Miller Springs WSA). These facilities would not impair the WSAs' suitability for preservation as wilderness.

Impacts from pipeline abandonment would be similar in nature to those described for construction, although at project termination only surface facilities would be removed, and the pipeline would be abandoned in place. Consequently, there would be far less surface disturbance during abandonment. Impacts would be temporary and would not impair the suitability of the WSA for preservation as wilderness. All disturbed areas would be rehabilitated and reshaped to blend into adjoining areas to the extent possible.

4.10 Visual Resources and Noise

4.10.1 Visual Resources

Potential visual effects of the proposed pipeline would result from landform changes that contrast with the existing visual environment. Visual contrast results from project-generated modifications to form, line, color or texture of existing land forms, water bodies, vegetation, or structures. Examples of possible pipeline-related visual contrasts could include sharp, geometric cut/fill areas across natural ridge lines, surface facilities located in a sensitive viewshed as seen from an important tourist overlook point, or unreclaimed ROW exposing pale, beige soil through a previously undisturbed, dark green juniper woodland.

Pipelines, because they are largely below ground when completed, often produce their greatest visual effects during the construction period when the visual environment is first altered from the existing condition. If the construction scars are effectively revegetated, these effects may be short-

term in nature. Longer lasting effects may result from aboveground facilities such as surface facilities and valves, or from permanent changes to terrain or vegetative patterns. For purposes of this analysis, two timeframes were evaluated: the period between completion of construction and successful revegetation of the disturbed areas with grasses (short-term), and the period following to the end of the productive life of the project (long-term). The actual construction activity was only minimally evaluated because it would typically last for 2 to 4 weeks at any particular location.

Contrast ratings of the proposed project were conducted using the principles of the VRM contrast rating process (BLM 1986c). The most critical viewpoints, designated key observation points (KOPs) by the VRM system, were considered to be major highway crossings at U.S. 287, U.S. 20/26, and I-25 plus a secondary highway, State Highway 50, where it crosses the Hartzog Draw Unit oil field. In addition, more remote KOPs were selected to evaluate the two VRM Class II areas at crossings of the Green Mountains and the Granite Mountains.

From the short-term perspective, construction of the proposed pipeline would result in moderate to strong color and line contrasts as a result of clearing vegetation in a distinct band along the pipeline alignment. The degree of contrast would vary somewhat, depending on the color of soil laid bare and the sharpness of the edge of the cleared strip. The effects would be similar at all three major highway crossings, although the contrast would be slightly less at U.S. 287, where the Frontier Pipeline already creates a moderately to weakly defined linear feature.

There would also be an element of structural contrast introduced by aboveground block valves adjacent to I-25 and scraper receipt/launch traps adjacent to U.S. 20/26. The industrial appearance would be out of character with the surrounding landscape, but the visual effect would depend on paint color selected and the degree of screening afforded by vegetation or terrain.

The visual contrast at the major highway crossings would likely meet the VRM objectives for Class III areas near the major highway KOPs. The sharp linear feature and color contrast between soil and vegetation would attract attention but would not dominate the view of the casual observer because of the modest scale of disturbance in the vast Wyoming landscape. The effects would be mitigated somewhat where topography drops off away from the road. Visual effects would also be slightly less at I-25 because the ROW is nearly perpendicular to traffic flow, making the visual contrast visible for a shorter time to motorists than at U.S. 20/26 and U.S. 287 where the ROW would intersect diagonally.

The visual contrast would gradually recede over time, as reclamation plantings begin to grow and finally mature, greatly reducing color contrast and softening the sharp linear edges of the cleared construction disturbance strip. Over the long term, after successful revegetation, the pipeline would meet the VRM Class III management objectives at the major highway crossings.

Through the VRM Class II areas, visual management objectives are more stringent. At the Green Mountains crossing, the visual contrast noted above would be intensified during construction by side-slope cut and fill that would noticeably alter the natural landform and add vertical landform and vertical elements to the band of soil stripped of vegetation. In the very short term, this would “attract the attention of the casual observer” in opposition to the dictates of the Class II management objective. Over the long term, however, the land form contrast would be eliminated as reclamation activities would refill the sideslope cut and return the land to near its original condition. The color and line contrast would be reduced with successful revegetation. The visual effects of disturbing large boulders would be eliminated by applying an artificial desert varnish (e.g., Permeon) to the surface of the rocks. The rock staining would be used in two areas adjacent to the Green Mountain Road (MP 118.0 to 120.9 and MP 121.1 to 122.0). Consequently, the pipeline would not continue to attract attention, and once vegetation is successfully reestablished, the VRM Class II objective of retaining landscape character would be achieved.

The situation at the Granite Mountains Class II area is somewhat different. The terrain is relatively flat so there would be no landform modification. Also, the Frontier Pipeline is an existing linear feature in the landscape. In the short term, the new, raw cut would exceed the Class II objectives. Over the long term however, successful revegetation would substantially reduce the visual contrast, and the proposed pipeline would create a minor expansion of existing visual contrast that would not attract attention. The corridor through the Granite Mountains benefits from being surrounded by more scenic and dramatic landscape features that serve to distract viewers from the valley bottom pipeline route. Once successful revegetation occurs, the VRM Class II objectives would be satisfied.

The VRM Class I areas at the Oregon/Mormon/Pony Express Trail and Bozeman Trail crossings are special cases. Class I objectives have very strict standards that prohibit all but very minor changes to the characteristic landscape that would not attract attention. Project-committed protection measures for these trail crossings are listed in Sections 2.5, 4.14, and in the POD.

The area proposed for the pipe yard is located on private land that has previously been used as a pipe yard. Due to the existing disturbance at this site, it is unlikely to be visually sensitive.

Operation and abandonment of the pipeline would result in virtually no change to the long-term visual effects because: 1) the aboveground facilities would be limited to four sites (1 acre each); and 2) the pipeline would be abandoned in place. There would be a minor reduction in visual contrast from removal of aboveground valves, scraper traps, etc.

4.10.2 Noise

As a result of the distance (0.5 mile) between the ROW one measurement facilities and the nearest noise receptor (private residence), no construction or operation-related noise impacts would be anticipated as a result of the project. Noise resulting from construction activities would be short-term (2 to 3 weeks) in duration and limited to daylight hours.

4.11 Socioeconomics

This section evaluates the beneficial and adverse effects of the proposed project within the context of social and economic changes in the study area. Calculations of impacts were based on known characteristics of the study area, supported by professional planning standards and empirical data from other projects studied in Wyoming.

Two spreads of up to a total of 210 workers would construct Phase I of the proposed 155-mile CO₂ pipeline. Workers needed for construction of the water crossings are included in the spread totals presented in Table 2-2. The construction period is projected to begin in August 2000 and be completed by late January 2002.

Local and non-local labor forces have been estimated for the pipeline spread based on skilled and unskilled labor availability, primarily from the Casper area, since the temporary pipeline headquarters would be located in Casper, which is central to the work location. Work force availability in Rawlins, Gillette, and Riverton also may contribute to the percentage of local workers. A local worker is identified as a worker who is able to commute to and from his permanent place of residence on a daily basis. A non-local worker is identified as a worker who has moved into the construction area for the duration of the project. The Wyoming labor force has a fairly large contract construction employment sector and has some trained and experienced pipeline workers in counties from which the labor force would be drawn particularly in Natrona, Campbell, and Fremont counties (Lotsenhauser 1990). The labor force is assumed to be composed of 75 percent (157) non-local labor during peak construction. Since there are no anticipated shifts in employment among sectors, and the construction period is of short duration (6 to 7 months), employment impacts would be considered beneficial to the local area economies.

Because of the short duration of pipeline construction, it is assumed that only a small percentage of the non-local work force would bring their families. Based on information from the 1979 Pipeline Construction Workers and Community Impact Surveys Reports, only 0.3 dependents per worker are estimated (Mountain West, Inc. 1979). Using these criteria, the 157 non-local workers would bring an estimated 47 dependents, for a total temporary increase in population of 204 people. Adverse social and economic impacts of pipeline construction are considered minimal because of

the quick pace and short duration of the construction schedule. The number of workers would be very small relative to the regional population. The largest population increase that could occur would be no greater than 0.32 percent in the Casper area.

The estimated labor cost for contract construction in 2001 dollars is \$3.16 million. This cost would be spread over the 4-month construction period and includes salaries for contract supervisors' wages, benefits and overtime for skilled and unskilled labor, and rental on labor force trade equipment. The average monthly payroll is estimated at \$791,700. A portion of this total income would be spent in the area and would result in increased sales tax receipts throughout the area. Local spending is estimated to be \$197,917 per month.

Increased spending in the local areas would result in increased retail sales to merchants, as well as increased sales tax to local taxing jurisdictions. The overall impact of this local spending and tax generation would be positive.

In addition to construction worker local expenditures, other income generated by pipeline construction would include local material purchases paid by contractor(s) and other support personnel. It is assumed that the contractor would locally purchase as many materials as possible. These expenditures would include tools, fuel, oil, parts and repairs. Smaller communities would benefit from fuel sales and repair expenditures.

The proposed pipeline construction work force would not be large enough to place a permanent demand on local services such as police, medical facilities, fire or educational services; nor would the construction population cause any detrimental effects to community social well-being due to the short time frame of the construction period. No significant impact on the existing infrastructure would occur.

Because construction would be short in duration, housing demand would be of a temporary nature. It is generally accepted that pipeline workers prefer to stay in accommodations closest to the pipeline that offer adequate housing and amenities. Based on typical pipeline construction, it is assumed that housing for the non-local pipeline work force would be divided among rental units, hotels/motels, RVs, and other accommodations. Assuming that 25 percent of the non-local workers would reside in rental units, 20 rental units would be required throughout the study area. Under the assumption that 45 percent of workers would reside in motel/hotel units and 30 percent in RVs, 35 motel/hotel units and 47 RV sites would be required throughout the study area. The majority of workers would share a motel room or apartment. Welders are most likely to bring their own RVs to the area (Mountain West, Inc. 1979).

A potential effect of the pipeline construction work force on housing would be competition with travelers and recreationists for temporary accommodations. Since peak construction would not occur during peak tourist season, travelers seeking accommodations are not anticipated to be impacted. However, in some areas, where hunting activity is typically high, competition for accommodations with pipeline construction workers may be increased, as construction is scheduled to occur during big game hunting seasons. Apartment rental units would be most available in larger cities such as Rawlins or Casper. Adequate accommodations exist throughout the study area, within commuting distance of the pipeline.

The permanent work force for pipeline operation would be an incremental increase of one full time position, probably stationed at Casper. Pipeline maintenance would be done with local contractors specializing in this type of work. The annual cost of pipeline operation and maintenance is expected to range from \$100,000 to over \$1.5 million in 2001 dollars.

The estimated project-related assessed valuation for the first year of operations is compared with 1998 county-wide assessed valuation in Table 4-7. Each county and school district would benefit from the increased tax base. Tax revenues for the first year are estimated in Table 4-7, based on a 1998 average county-wide tax rate. The largest increase in the tax base attributed to the pipeline and facilities would occur in Natrona County.

**Table 4-7
Contribution to Tax Base for the Proposed PSC CO₂ Pipeline**

County	Miles of Pipeline	1998 Tax Rate^{1,3} (mills)	Estimated Valuation of Pipeline and Facilities^{2,4} (Thousands \$)	1998 Assessed Valuation³ (Thousands \$)	Pipeline Percent of Total County-wide Assessed Valuation⁴	Estimated Property Tax Receipts from Pipeline and Facilities (Thousands \$)⁴
Fremont	17.77	76.844	437	288,983	0.15	33,600
Natrona	105.48	72.926	2,300	416,733	0.55	167,000
Johnson	34.86	67.009	264.5	79,674	0.33	17,725
Campbell	3.39	60.419	69	1,495,260	<0.01	4,170
Total	161.5		3,070.5	2,280,650		

¹Estimated county -wide tax rate, may not reflect actual tax rate applied to pipeline.

²Pipeline mileage percent of total cost by county.

³Source: Wyoming Department of Revenue (1998b).

⁴Source: Petro Source (2000).

Abandonment of the pipeline and facilities would decrease the tax bases of those counties through which it passes. At the time of abandonment, tax receipts in each county would be reduced from the pipeline's in-service date due to depreciation. Total decreases in tax receipts cannot be quantified at this time.

4.12 Environmental Justice

The estimates on minority population percentages and median household income for the three communities of Powder River, Edgerton, and Midwest as described in Section 3.12.2, indicate there are no minority and/or low-income populations living within 5 miles of the project or in what has been defined as the “affected area.” Therefore, no environmental justice issues concerning minority and/or low-income populations are expected to occur as a result of the construction and operation of the proposed PSC pipeline.

4.13 Transportation

Construction of the proposed pipeline would generate traffic increases from rail and truck transport of pipe and construction materials, and from commuting by construction workers. Load limit restrictions on roads, bridges, and highways would be observed at all times to prevent surface and structural damage. Oversize loads would comply with special permit requirements of the Wyoming Department of Transportation and county highway departments.

The pipe and most construction material would be shipped by rail to Casper where the construction headquarters and a material staging yard would be established for the pipeline project. The rail activity would not be great enough to adversely affect other rail traffic or highway traffic on intersecting roads to any measurable degree. Temporary increased traffic would occur on Highway 20/26, I-25, and the heavy-duty access roads due to the transport of pipe and materials to the ROW during the 6-month construction period.

The routes used would change as construction progressed along the route, but existing traffic levels on all major highways are sufficiently low that this incremental increase would have no appreciable effect on levels of service or travel times on area highways. Traffic generated during off-peak hours would be fewer than 20 vehicles per hour, most of which would be heavy trucks. Effects on traffic flows would be minor, although the increase in heavy trucks could create some queuing delays on hilly or curved road segments where passing is restricted.

Effects of traffic increases on county road traffic are difficult to quantify. Generally, existing traffic levels are very low on such roads; therefore, the overall effects on traffic flow would be minor. An individual motorist using one of these roads regularly may experience delays, but even individual effects would be short term, lasting no more than a few weeks on any particular road.

Project-related effects on traffic accidents would be expected to be minor. The total number of accidents in the project area could increase approximately in proportion to the increase in travel. There is no reason to believe, however, that the vehicle accident probability, commonly expressed

as the number of accidents per million vehicle miles, would increase beyond state average levels (PIC 1988b). Increased local traffic congestion during the construction period would tend to increase accident probability above the current low levels, but an increase in the proportion of professional bus and truck drivers in overall traffic flow would tend to counter this effect (PIC 1988b).

Increased heavy truck traffic would tend to accelerate deterioration of road surfaces. This effect would be minimal on state and U.S. highways built to accommodate such traffic. Maintenance requirements on unpaved county roads may be notably increased during the brief periods of heavy usage for access to particular segments of the pipeline route. The degree of increase in maintenance needed would depend on weather conditions and the quality of the existing roadway.

Traffic delays on roads and highways intersecting the pipeline route would be minimal. All major highway crossings would be bored; therefore, traffic interruptions would be limited to equipment and personnel crossing the road, which would be controlled and protected by flagmen, signage, and other standard construction safety procedures. For minor roads that would be trenched, alternate access would be maintained by temporary measures such that delays would be limited to no more than 10 minutes per hour.

Where the pipeline would cross existing pipelines, powerlines, or communication links, construction techniques would be designed to prevent disruption of existing services.

Operation of the proposed pipeline would have no measurable effect on transportation in the project vicinity. Long-term traffic increases would be negligible. Occasional maintenance or repair requirements would cause activity similar to construction but only for very brief periods and generally on a much smaller scale than those that would be experienced during the construction period.

Abandonment of the pipeline would result in only minor transportation effects because most of the facility would be abandoned in place.

4.14 Cultural Resources/Native American Concerns

4.14.1 Cultural Resources

The NHPA and 36 CFR 800 require consideration of all cultural resources that may be affected by direct surface-disturbing activities and indirect effects from such operations. A number of archaeological investigations were conducted for the proposed pipeline to identify and evaluate

cultural resources. These included pedestrian surveys, testing, on-site inspections, formulation of a project treatment plan, and various historic studies. Where possible, significant sites would be avoided. Mitigation of adverse effects was required in cases where avoidance is not possible.

The cultural resources inventories conducted for the proposed pipeline identified 29 prehistoric and historic sites along the proposed pipeline ROW, including 5 trail crossings, which are eligible for nomination to the NRHP. Potential impacts to these cultural resources would primarily result from construction-related activities. Impacts would be considered significant if any information were lost that impeded efforts to reconstruct the prehistory or history of the region.

Only those sites that are eligible to the NRHP under the criteria for eligibility defined in 36 CFR 60.4, or those sites with the potential to preserve significant cultural information or heritage values, require avoidance, mitigation, or special consideration once an area has been inventoried. Of the 29 prehistoric and historic sites eligible to the NRHP, 20 of these would not have significant cultural deposits impacted by construction of the proposed PSC pipeline. Site-specific instructions for six of the sites would avoid or minimize impacts associated with construction activities. Data recovery was conducted at three of the prehistoric sites (48NA1079, 48NA1086, and 48CA2195) where avoidance was not possible. The eligible sites and their management recommendations are presented in Table 4-8.

Five historic properties, the Oregon/Mormon/Pony Express, Bridger, and Bozeman Trails, Morton Ranch, and North-South Railroad grade, are included on the list of NRHP-eligible sites. Mitigation of adverse effects to these properties would consist primarily of limiting construction activities to previously disturbed areas, restricting the amount of area used during construction, barring construction traffic from driving on trails or through the Ranch (other than on the ROW), monitoring construction by a qualified archaeologist, use of a special seed mixture during reclamation to promote rapid revegetation, and replacement of trail markers if they are removed during construction.

The potential for undiscovered cultural resource sites, such as deeply or shallowly buried cultural materials, does exist despite the substantial amount of previous archaeological investigations. Part of the mitigation procedures to be undertaken in conjunction with the proposed pipeline project includes an OTI of the entire 155-mile-long proposed pipeline and 7-mile lateral based on the high potential to encounter buried cultural deposits. The OTI is defined as: Inspection of the trench after it has been dug, but before pipe has been laid in the trench. If cultural resources were discovered in the trench wall, the location would be mapped, samples collected, and a datum staked outside the ROW to assist in relocating the site. Pipe installation and covering would proceed through the area once documentation is complete. The OTI would be conducted in

Table 4-8
Field Recommendations for Eligible Sites Located Along the Proposed
PSC CO₂ Pipeline Route

Site Number	Site Type	Field Recommendations
Lander Field Office		
48FR736	Oregon Trail/Mormon Trail/Pony Express	Oregon Trail/Mormon Trail/Pony Express. Complete site forms with reference to overviews. Stay as close to, or within Frontier easement, as possible; brush beat ROW at crossing; special seed mixture to promote revegetation; reset existing trail signs; archaeological monitor.
48FR1499	Open camp	No impacts to significant cultural deposits.
48FR1475	Open Camp	No impacts to significant cultural deposits.
48NA257	Open camp/lithic procurement	No impact to significant cultural deposits.
48NA359	Lithic scatter/stone circle	ROW will not impact site.
48NA728	Open camp	ROW will not impact site.
48NA884	Open camp	No impacts to significant cultural deposits.
48NA1060	Open camp	Archaeological monitor during topsoil stripping; if features are discovered, work would be halted, BLM Archaeologist notified, and features treated in accordance with the project's PA (Appendix A).
48NA1067	Open camp/stone circles	No impacts to significant cultural deposits.
Casper Field Office		
48NA207	Bridger Trail	Restrict ROW blading within 200 feet of trail; brush beat ROW at crossing; mark ROW width; archaeological monitor.
48NA226	Stone circles/open camp	No impact to significant cultural deposits
48NA242	North-south railroad grade	ROW will not impact site
48NA1019	Lithic scatter/historic trash scatter	No impact to significant cultural deposits
48NA1061	Stone feature, open camp	No impact to significant cultural deposits
48NA1079	Open camp	Data recovery to mitigate impacts ¹
48NA1080	Open camp	No impact to significant cultural deposits
48NA1083	Open camp	Limit ROW to 15 meters on west side; marking this limit will avoid significant cultural material
48NA1086	Open camp	Data recovery to mitigate impacts ¹
48NA1090	Morton Ranch historic site	Moving pipeline to east side of an existing pipeline will avoid structures
Buffalo Field Office		
48CA2195	Open camp	Data recovery to mitigate impacts ¹
48JO134	Bozeman Trail	Minimal blading of ROW through valley; narrow and brush beat the ROW at the crossing; limit vehicular traffic in the valley; construct in dry season, preferably August or September; on-site monitor; equipment matting at crossing; harrow the soil in preparation for seeding; no pipeline markers within the viewshed.
48JO938	Open camp/historic trash	No impact to significant cultural deposits; alternative alignment avoided the site.
48JO946	Open camp	No impact to significant cultural deposits
48JO947	Open camp	No impacts to significant cultural deposits.
48JO950	Lithic scatter	No impacts to significant cultural deposits.
48JO954	Open camp	No impact to significant cultural deposits
48JO958	Open camp	No impact to significant cultural deposits
48JO959	Open camp	No impact to significant cultural deposits
48JO963	Open camp	ROW will not impact site

¹Data recovery was conducted at these sites by AS-WWC (Darlington et al. 1995).
Source: Bower et al. (1991).

accordance with the provisions of the PA (Appendix A) and agreed upon by the BLM, SHPO, and Petro Source.

If human remains were discovered during project construction, construction would be halted within 328 feet of the discovery, and the find reported to the BLM Authorized Officer. The discovery would be evaluated and treated in accordance with the provisions of the project's PA. Work would not be reinitiated in the vicinity of the discovery until authorized by the BLM.

Operation and abandonment of the proposed pipeline would not result in impacts to cultural resources along the proposed pipeline route. These activities would not involve any additional land disturbance; therefore, no additional impacts to cultural resources along the proposed pipeline route are anticipated.

4.14.2 Native American Consultation

Traditional Cultural Properties include sites or areas of concern to Native American groups either for heritage or religious reasons. They may include burials or locations where medicinal and subsistence resources are gathered. At this time, no Traditional Cultural Properties have been identified in the project area. If Traditional Cultural Properties were identified in or adjacent to the construction ROW, the BLM, in consultation with a tribal representative, would determine an appropriate course of action.

If human remains were discovered during project construction, construction would be halted within 328 feet (100 meters) of the discovery, and the BLM authorized officer notified. The discovery would be evaluated by the BLM authorized officer in accordance with the provisions of the project's PA. Treatment of any human remains located on federal land would be handled in accordance with the Native American Graves Protection and Repatriation Act; human remains found on private land would be handled according to the provisions of appropriate state laws and the Programmatic Agreement for this project. Work would not be reinitiated in the vicinity of the discovery until authorized by the BLM.

4.15 No Action Alternative

Under the No Action Alternative, the proposed PSC CO₂ Pipeline would not be constructed. As a result, the natural and human resource impacts and benefits identified under the Proposed Action would not occur. Without the development of the CO₂ pipeline, enhanced oil recovery of the Salt Creek, Sussex, and Hartzog Draw oil fields would not occur, thereby reducing the amount of oil recovered and transported to markets. In addition, CO₂ currently being vented at the LaBarge Gas Plant would continue to be emitted to the atmosphere rather than be used by the PSC Project.

Tax revenues would not be received by the State of Wyoming or counties crossed by the pipeline. In addition, the construction and operation work force payroll would not be available for purchase of local goods and services. Royalties and payments to the federal and state governments for recovered oil would not be realized.