4 ENVIRONMENTAL ANALYSIS

This section describes the affected environment as it currently exists and addresses the environmental consequences of constructing and operating the proposed Project. The environmental consequences of the proposed Project would vary in duration and significance. Four levels of impact duration were considered: temporary, short term, long term, and permanent. Temporary impact generally occurs during construction with the resource returning to preconstruction condition almost immediately afterward. Short-term impact could continue for up to 3 years following construction. An impact was considered long term if the resource would require more than 3 years to recover. A permanent impact could occur as a result of any activity that modifies a resource to the extent that it would not return to preconstruction conditions, such as with the construction of a meter station.

CIG, as part of its proposal, developed certain mitigation measures to reduce the impact of the proposed Project. In some cases, we determined that additional mitigation measures could further decrease the Project's impacts. We will recommend to the Commission that these measures be included as specific conditions of any Certificate the Commission may issue to CIG for this proposed Project.

The conclusions in this draft EIS are based on our analysis of the environmental impact and the following assumptions:

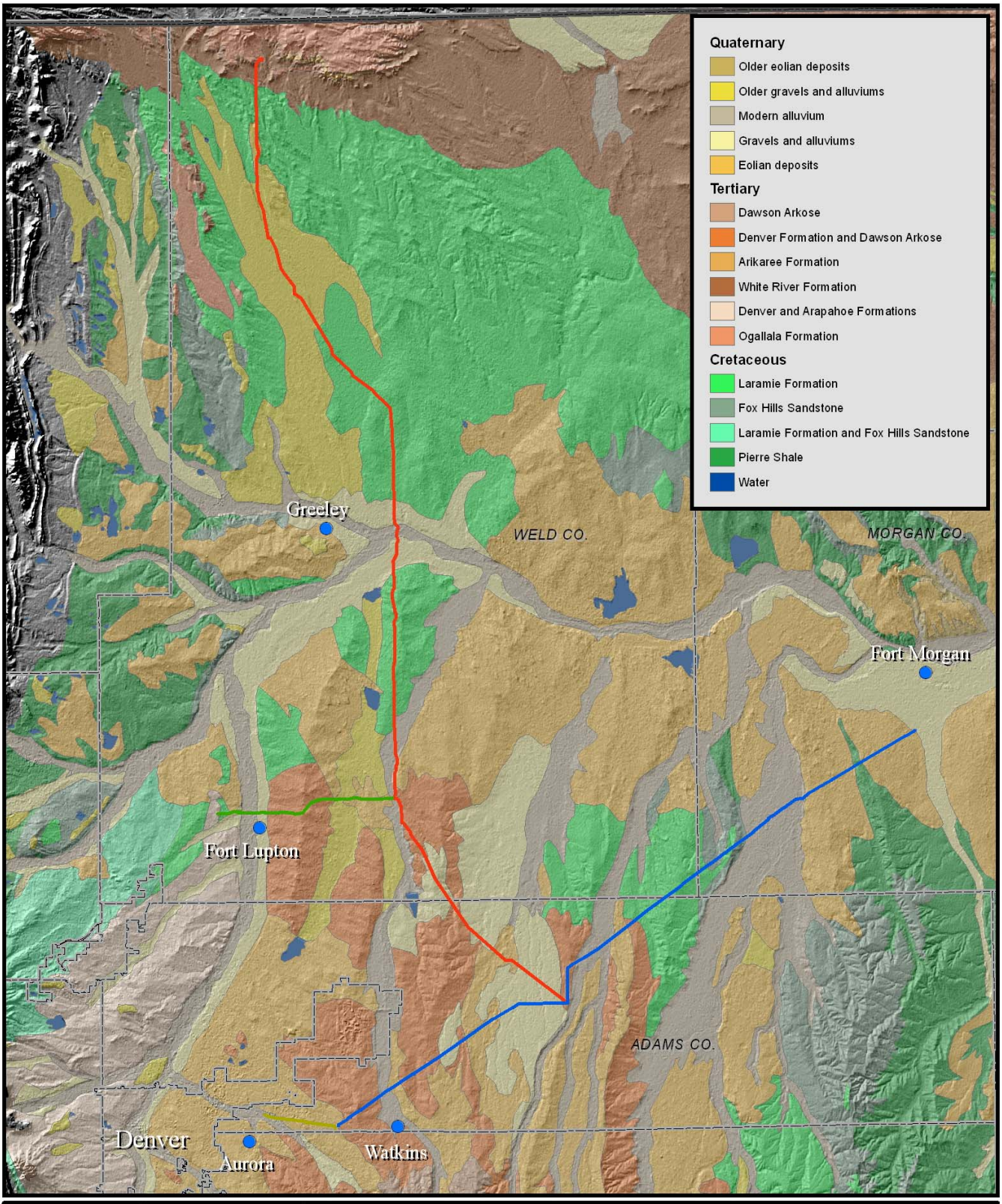
- CIG would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in section 2.0; and
- CIG would implement the mitigation measures included in its applications and supplemental filings with the Secretary of the Commission (Secretary).

4.1 GEOLOGY

4.1.1 Geologic Setting

The proposed Project would be within the Great Plains Physiographic Province of the Interior Plains, which includes the eastern one-third of Colorado. This province lies immediately east of the Southern Rocky Mountain Physiographic Province, which greatly influenced the geology of the Project area. Sediments from both the ancestral and modern-day Rocky Mountains have been deposited in the plains (Kirkham and Ladwig 1980). The proposed pipeline routes would cross unconsolidated Quaternary deposits and Tertiary- and Cretaceous-age sedimentary formations (see figure 4.1.1-1). The Quaternary deposits consist largely of Pleistocene and Holocene loess (wind-blown silts) and sand dune complexes. The Tertiary- and Cretaceous-age formations consist of unconsolidated sedimentary rocks and hard bedrock consisting of sandstones, shales, and limestones. Locally thick sequences of Quaternary alluvium occupy the South Platte River Valley, the only major basin crossed by the proposed Project. The proposed Project area consists of nearly level plains. About 90 percent of the pipeline routes have slopes of 5 percent or less. Slope class exceeds 10 percent along less than 2 percent of the pipeline routes.

Construction and operation of the Project would not materially alter the geologic conditions of the proposed Project area. Effects from construction could include disturbances to the natural topography along the right-of-way and at aboveground facility sites due to trenching and grading activities. Over most of the proposed Project area, alteration of topographic contours would consist of minimal grading of the construction right-of-way to provide a safe level work surface. Some segments of steeply sloping



Rock Type Locations

High Plains Expansion Project

Figure 4.1.1-1

ground could require additional grading to achieve a safe work surface. Following construction, CIG would restore all areas as closely as practicable to their preconstruction contours.

The typical depth of the trench necessary to install the pipeline would be about 6 feet. Soil survey data identified 6 areas along Line 250A where shallow and hard bedrock may be encountered during trenching activities (see table 4.1.1-1). When rock or rocky formations are encountered, tractor-mounted mechanical rippers or rock trenchers would be used to fracture the rock. CIG stated no blasting would be required to construct the pipeline through areas of shallow bedrock.

Table 4.1.1-1 – Shallow Bedrock Locations

Pipeline Segment	Location (MP Range)	Depth to Bedrock (inches)	Length (miles)
Line 250A	0.9 – 1.2	43	0.3
Line 250A	24.0 – 24.2	46	0.2
Line 250A	32.4 – 32.5	46	0.1
Line 250A	33.2 – 33.5	46	0.3
Line 250A	33.9 – 34.0	46	0.1
Line 250A	64.9 – 65.0	46	>0.1

4.1.2 Mineral Resources

Known mineral resources in the vicinity of the proposed Project include 13 oil and gas fields, 5 abandoned coal mines, and one gravel pit that is no longer in use.

The Project would cross 13 oil and gas fields that have a total of 61 wells within 200 feet of the proposed pipelines: 45 on Line 250A, 6 on Line 251A, and 10 on Line 252A. Additionally, eight storage tanks would be within 100 feet of the proposed pipelines. The proposed Project could affect oil and gas fields by trenching across gathering pipelines associated with existing wells and by restricting access across the work area to wells and tanks during construction. CIG would be required to call "one-call" so that the gathering line operators could mark their pipelines prior to ground disturbing activities. To address restricted access to oil and gas wells and tanks, CIG stated that it would provide operators of oil and gas fields access to wells and tanks throughout construction. Future exploitation of the oil and gas fields also could be affected by prohibiting exploration (*e.g.*, drilling) within the permanent right-of-way; however, modern drilling techniques (*e.g.*, horizontal drilling) would allow continued development of the fields below the proposed Project area despite the presence of pipeline facilities. Therefore, construction and operation of the Project would not affect continued and future oil and gas operation or production.

Five abandoned coal mines are known to occur along proposed Line 250A between MPs 49.6 and 51.7. Additionally, one inactive gravel pit would be near MP 40.8 on Line 250A. The proposed Project has the potential to affect future production of coal and gravel (and other mineral resources) by restricting mining activities within the permanent right-of-way and at aboveground facility sties. However, the proposed Project would not be near any active mines and it is unlikely that the small coal deposits in the vicinity would be mined in the foreseeable future since large coal deposits are located north of the proposed Project area in the Powder River Basin. If necessary, future development of the coal and gravel resources could be addressed by CIG and the affected landowners and/or mineral rights owners during easement negotiations. To date, no landowners or mineral rights owners have commented on potential impacts on mineral resources due to construction or operation of the Project. Therefore, we believe potential impacts on mineral resources would be minor.

4.1.3 Geologic Hazards

Geologic hazards are natural physical conditions that can, when present, result in damage to land and structures or injury to people. Such hazards typically include seismicity (*e.g.*, earthquakes, faults), soil/sediment liquefaction, landslides, sinkholes, and flooding. The potential for geologic hazards in the proposed Project area is described below.

The proposed Project would cross an area of relatively low seismic risk. No Quaternary faults are within the proposed Project area (USGS 2007e). The only measured earthquake in this region occurred 110 miles southeast of Fort Morgan near Burlington, Colorado, on May 27, 1984 at about 3 miles depth. This earthquake measured 3.6 on the Richter scale. An earthquake of this magnitude would produce ground vibrations similar to a passing truck (Cargo and Mallory 1977). CIG would construct the pipeline to accommodate both the intensity and duration of transient ground motions resulting from seismic activity in the proposed Project area. The proposed facilities would be constructed to meet federal standards outlined in USDOT's regulations in Title 49 CFR Part 192 which govern the construction and operation of natural gas pipelines throughout the country, including areas like California and Alaska with greater seismic hazards.

Liquefaction is a phenomenon in which saturated, non-cohesive soils temporarily lose their strength and behave as a liquid when subjected to intense and prolonged ground shaking. For soil liquefaction to occur a relatively shallow water table; rapid, strong ground motions; and unconsolidated soils must all be present. Soil liquefaction can affect the integrity of a pipeline by causing lateral spreading, flow failures, loss of bearing strength, and flotation. Because of the low seismic risk and the limited amount of unconsolidated soils with high groundwater levels in the proposed Project area, liquefaction hazards associated with the proposed Project would be minimal.

Landslides refer to the downward and outward movement of slope-forming materials reacting under the force of gravity. There are no steep slopes that could result in a landslide along any of the proposed routes and no known landslides on the eastern plains of Colorado according to the Colorado Geological Survey (Morgan 2004). Additionally, the proposed routes would be within an area of low seismic hazard potential, which reduces the potential for landslides to occur.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can be dissolved naturally by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Also, spaces and caverns develop underground as a result of human activity such as mining. If there is not enough support for the land above the spaces, then a sudden collapse of the land surface can occur forming a sinkhole. The proposed Project would not be constructed or operated on geologic strata prone to sinkhole development (Colorado Geological Survey, 1974). However, five abandoned coal mines are located along proposed Line 250A between MPs 49.6 and 51.7. According to Colorado Geological Survey personnel (Greenman 2006), the main hazard associated with the abandoned coal mines is accidental entrapment in an open shaft or inadequately closed shaft. Sinkhole development is not considered a significant risk because of the intrinsic stability of the overburden. To minimize the potential for encountering an open or inadequately closed shaft, CIG indicated it would employ experienced personnel to locate potential shafts within 100 feet of centerline and have them properly closed. However, in some areas near these abandoned mines, temporary extra workspaces would extend more than 100 feet from the centerline of the proposed pipeline. Therefore, **we recommend that:**

- **CIG locate abandoned mine shafts within 100 feet of all construction workspaces along Line 250A between MPs 49.6 and 51.7. CIG shall revise its alignment sheets to show these locations and shall file the revised documents with the Secretary prior to construction for**

review and written approval of the Director of OEP. CIG shall consult with the mine owners to determine if the abandoned mine shafts are properly closed and shall install appropriate warning signs and fencing on the construction right-of-way to mark the mine locations. Abandoned mine shaft shall be located on the pipeline alignment sheets and filed with the Secretary for review and written approval of the Director of OEP.

Seasonal flooding can be expected along the South Platte River and adjoining perennial and intermittent drainages. During construction, flooding could pose a hazard to pipeline facilities and project personnel when installing the pipeline across dry washes or flowing waterbodies. During operation, flooding could lead to bank erosion and/or stream bottom scour that could expose the pipe. To mitigate potential impacts from flooding, CIG would avoid construction of waterbody crossings during periods of high flow or during heavy precipitation events. The pipe would be buried deeper (5 feet of cover) at waterbody crossings to minimize the potential for stream bottom scour. CIG would limit bank erosion by adhering to the waterbody crossing methods outlined in section 4.3.2 and in CIG's Procedures and BMPs (appendices D and F, respectively). During operation, potential impacts resulting from stream bottom scour would be identified during periodic monitoring required by the USDOT's Office of Pipeline Safety (OPS).

4.1.4 Paleontological Resources

The pipeline route would cross various geologic formations that are known or have the potential to contain significant paleontological resources. While most geologic formations have the potential to contain fossils, those containing vertebrate fossils are considered the most significant. Vertebrate fossils tend to occur more rarely, and thus have greater scientific importance than the more common invertebrate and plant fossils.

The proposed Project has the potential to encounter shallow bedrock (see table 4.1.1-1), and as such, trench excavation could disturb fossil-bearing strata. CIG indicated that it would hire a paleontologist to conduct a literature review of the known outcroppings along the proposed route prior to construction and submit a report of its findings to the Commission. CIG also stated that, should any areas of potential significance in shallow bedrock be identified, it would hire a paleontology inspector to accompany and observe construction in these areas.

Normal operation of the proposed pipeline and its associated facilities would not disturb important paleontological resources. Maintenance activities would result in surface disturbance, but typically would occur within the trench line previously disturbed during construction. Since no new disturbances would be anticipated from maintenance activities, impacts on paleontological resources would be negligible during facility operation.

4.2 SOILS

4.2.1 Existing Soil Resources

Information contained in the Soil Survey Geographic Database was used to identify soil types and characteristics that occur in the proposed Project area and to assess soil limitations for pipeline construction and potential impacts of construction on soils.

The soils in the proposed Project area are diverse and include dune sands, thick loess (wind-blown sirs), and loamy and clayey soils derived from various bedrock materials. These soils form in unconsolidated Quaternary sediments (alluvium and eolian sediments), as well as residuum and local colluvium derived from Cretaceous and Tertiary bedrocks (largely sandstones, shales, and limestones).

The proposed Project area is characterized by nearly level to gently rolling topography. About 90 percent of the pipeline routes have slopes of 5 percent or less. Slope class exceeds 10 percent along less than 2 percent of the routes. Because of the semi-arid to arid climate, non-irrigated soils in the proposed Project area generally support a combination of mixed and shortgrass prairie, sagebrush shrubland, and dryland farming. Irrigated soils support a variety of agricultural crops, including sunflower, sorghum, corn, wheat, and alfalfa.

Pipeline Facilities

We evaluated the soils along the pipeline route to identify prime farmland and major soil limitations that could affect construction or increase the potential for construction-related soil impacts. The soil limitations evaluated include: compaction potential, stony or rocky soils, erosion potential, highly sandy soils, and droughty soils. The nature and prevalence of each of these soil characteristics are discussed below. Acreages of impacted prime farmland and of land with soil limitation factors are summarized in table 4.2.1-1.

Table 4.2.1-1 – Acreage Summary of Prime Farmland and Soil Limitations

Pipeline	Prime Farmland[a]	Highly Wind Erodible[b]	Highly Water Erodible[c]	Compaction Prone[d]	Stony-Rocky[e]	Highly Sandy[f]	Droughty[g]
Line 250A	739.4	534.5	907.9	15.8	19.4	321.2	1,009.7
Line 251A	404.8	264.2	498.2	14.5	35.2	195.2	683.6
Line 252A	144.2	163.6	143.0	6.1	1.2	82.4	173.3
Line 253A	59.4	35.2	63.0	-	-	9.7	74.0
	1,347.8	997.5	1,612.1	36.4	55.8	608.5	1940.6

Note: acreages are based on a 100-foot-wide construction right-of-way. For highly sandy soils, a 150-foot-wide construction right-of-way was used to determine impacts (50 foot extra work space required in highly sandy soils).

[a] Includes lands listed as prime farmland if adequate drainage and irrigation is provided and farmland of statewide importance.

[b] Includes soils in wind erodibility groups 1, 2, and 3.

[c] Includes land that has a moderate or high erosion potential (*i.e.*, Kw factor ≥ 0.37).

[d] Includes soils that have clay loam or finer texture in somewhat poor, poor, and very poor drainage classes.

[e] Includes soils that contain greater than 5 percent (weight base) stones larger than 3 inches in the subsoil.

[f] Includes soils that have a very limited restriction for shallow excavations due to cutbank caving.

[g] Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained.

Prime Farmland – The U. S. Department of Agriculture, Natural Resources Conservation Service (NRCS) defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops." This designation includes cultivated land, pasture, wood land, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few or no rocks; is permeable to water and air; is not excessively erodible or saturated with water for long periods; and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (*e.g.*, artificially drained or irrigated). About 68 percent of the area that would be crossed by the pipeline routes is designated prime farmland, farmland of statewide importance, or prime farmland if soils are irrigated or drained.

Compaction Potential – The movement of heavy construction equipment back and forth along the construction right-of-way and access roads can result in soil compaction. Compaction modifies soil structure and reduces the porosity and moisture-holding capacity of soils, resulting in loss of soil

productivity and lower vegetation growth rates. The degree of compaction is dependent on moisture content and soil texture. Fine-textured soils with poor internal drainage are the most susceptible to compaction. Soils are also prone to structural damage during the wettest part of the spring and fall seasons, in areas of poor drainage, or during and following each heavy rainstorm. Less than 1 percent of the soils that would be crossed by the pipeline route are highly susceptible to soil compaction.

Stony or Rocky Soils – Stony soils are identified as soils that contain greater than 5 percent (weight basis) stones larger than 3 inches in the surface layer. About 3 percent of the pipeline route would cross lands that contain stones or rocks greater than or equal to 3 inches in diameter. Less than 1 percent of the pipeline route would cross lands that have shallow bedrock (see section 4.1.1).

Erosion Potential – Erosion is a continuing natural process that can be accelerated by human disturbance. Factors that influence the degree of erosion include soil texture, structure, length and percent of slope, vegetative cover, rainfall intensity, and wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, noncohesive soil panicles, and moderate to steep slopes. Wind erosion processes are less affected by slope angles and generally occur in dry, sandy soils with minimal vegetative cover. Soils susceptible to severe erosion typically have little or no cover, unconsolidated soils, and/or steep terrain. Soils resistant to erosion include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. About 50 percent of the soils that would be crossed by the pipeline route are susceptible to wind erosion. About 81 percent of soils are susceptible to water erosion.

Highly Sandy Soils – Many of the soils that would be crossed by the pipeline route developed in wind-blown sand deposits. About 31 percent of the soils along the proposed route are considered highly sandy.

Droughty Soils – Droughty soils have a surface texture of sandy loam or coarser and are moderately well to excessively drained. Consequently, droughty soils are susceptible to moisture deficits within the rooting zone of most plants and can be difficult to revegetate. About 98 percent of the soils that would be crossed by the pipeline route are considered droughty.

Aboveground Facilities

The aboveground facilities associated with the proposed Project include 10 meter stations, 19 MLVs, and 12 pig launcher/receiver facilities. We evaluated each aboveground facility site to identify potential impacts on soils that could result from construction and operation of these facilities. Twelve aboveground facilities would be constructed in prime farmland.

4.2.2 General Impact and Mitigation

Pipeline construction activities such as clearing, grading, trench excavation, backfilling, and the movement of construction equipment along the right-of-way may affect soil resources. Clearing removes protective vegetative cover and exposes the soil to the effects of wind, rain, and runoff, which increases the potential for soil erosion and sedimentation of sensitive areas, such as wetlands and waterbodies. Grading, spoil storage, and equipment traffic can compact soil, reducing porosity and percolation rates and increasing runoff potential. Construction activities can also affect soil fertility by mixing subsoil with topsoil and bringing rocks to the surface.

Erosion is a continuing, natural process that can be accelerated by human activities. Clearing, grading, and the movement of equipment on the right-of-way can accelerate the erosion process and, without adequate protection, result in discharges of sediment to wetlands and waterbodies and lower soil

fertility. Factors that influence the rate of erosion include soil texture and structure, the length and percent of slope, vegetative cover, and rainfall or wind intensity. The most erosion-prone soils are generally bare or sparsely vegetated, non-cohesive, fine textured, and situated on moderate to steep slopes. Soils more resistant to erosion include those that are well vegetated, well structured with high percolation rates, and located on flat to nearly level terrain.

Construction equipment operating and traveling on the construction right-of-way, especially during wet periods and on poorly drained soils, can compact the soil. Soil compaction can also result from the storage of heavy spoil piles on certain types of soil for extended periods of time. Soil compaction destroys soil structure, reduces pore space and the moisture holding capacity of the soil, and increases runoff potential. If unmitigated, compaction results in soils with a reduced revegetation potential and an increased erosion hazard. The degree of compaction depends on the moisture content and texture of the soil. Wet soils with fine clay textures are the most susceptible to compaction.

Construction activities such as grading, trenching, and backfilling can also cause mixing of soil horizons. Mixing of subsoil with topsoil, particularly in agricultural lands, dilutes the superior chemical and physical properties of the topsoil and lowers soil fertility and the ability of disturbed areas to revegetate successfully. Trenching of stony or shallow bedrock soils can bring stones or rock fragments to the surface. Excess rocks on or near the soil surface could interfere with agricultural practices and hinder restoration of the right-of-way.

The general measures that CIG would follow to avoid or minimize the potential effects of construction on soils are described below. More detailed site-specific information is provided in section 4.2.3. The impacts on soils can be minimized through the use of erosion control and revegetation measures. CIG's Plan describes the measures it would implement to control erosion and sedimentation during construction and to ensure revegetation to prevent erosion following construction. CIG's Plan is based largely on the mitigation measures contained in our Plan. Some of the relevant mitigation measures specified in CIG's Plan are described below.

- Restrict the construction right-of-way width to 100 feet in most areas to minimize overall impacts.

- Segregate topsoil from the entire trench line throughout the proposed Project area, and from over the entire work area where substantial grading is required.

- Identify agricultural drainage and irrigation systems before and during construction to ensure their restoration if affected by construction activities. Drain tile systems would be restored to their original or better condition using qualified local specialists. Irrigation systems would be repaired using appropriate specialists.

- Provide temporary erosion control measures, such as mulch and temporary slope breakers, during construction and implement permanent erosion control measures (*e.g.*, permanent slope breakers, trench breakers, and revegetation of the right-of-way) following construction.

- Implement sediment control measures, such as silt fencing and straw bales, to prevent transport of sediment from construction areas into adjacent waterbodies, wetlands, and roads.

- Mitigate soil compaction following construction and right-of-way restoration activities.

- Remove excess rocks from the right-of-way in areas where soils off the right-of-way do not contain similar materials.

- Ensure revegetation of all areas disturbed by project-related activities. Disturbed areas would be seeded in accordance with written recommendations from local soil conservation authorities or as prescribed by the land management agency.

- Provide post-construction monitoring of mitigation practices to ensure their successful implementation. Revegetated areas would be monitored for at least 2 years following construction to ensure successful restoration. If vegetative cover and density are not successfully restored after two full growing seasons, the need for additional restoration measures would be determined by a professional agronomist.

- Implement the Spill Plan if a spill or leak occurs during construction.

- Utilize EI's to ensure implementation of the practices outlined above.

Six of the mitigation measures for upland construction included in CIG's Plan differ from those in our Plan. These are addressed below.

4.2.3 Project-specific Impact and Mitigation

Pipeline Facilities

About 1,348.8 acres of land that would be affected by construction of the pipeline are considered prime farmland, farmland of statewide importance, or prime farmland if soils are irrigated or drained. Potential impacts on prime farmland from pipeline construction include interference with and/or damage to agricultural drainage or irrigation systems, the mixing of topsoil and subsoil, the potential loss of topsoil, and compaction/rutting. These impacts would result primarily from trench excavation and backfilling, and equipment and vehicle traffic along the right-of-way. CIG would implement the measures included in CIG's Plan to mitigate these impacts. These measures include topsoil segregation, compaction relief, and removal of excess rock from surface soils. Impacts on prime farmland from pipeline construction would be short term and would not result in the permanent conversion of prime farmland to non-agricultural uses.

CIG proposed a topsoil segregation procedure that differs from that described in section IV.B.1. of our Procedures. CIG proposed trench line-only topsoil segregation for the majority of the pipeline route. Topsoil segregated from the trench line would be stored on undisturbed topsoil next to the trench in the area where the pipe would be strung, welded, and stored before lowering-in and backfilling. Trench line-only topsoil segregation would minimize the quantity of topsoil disturbance, and the amount of topsoil excavated thereby reducing the potential for wind erosion of excavated topsoil. Further, it would preserve a larger amount of undisturbed existing root stock. Leaving as much of the sod and root layer intact as practical would increase the probability that post-construction revegetation would be successful and reduce the potential for weedy plant species to become a dominant component. However, subsoil excavated from the trench would be placed directly on undisturbed topsoil on the non-working side of the right-of-way (also referred to as the subsoil storage area or the spoil side), thereby increasing the potential for mixing of topsoil and subsoil in these areas especially during backfilling.

In areas that would require substantial grading, full right-of-way topsoil segregation would be conducted. CIG proposes to strip no less than 6 inches and no more than 12 inches of topsoil where topsoil is available. CIG believes that even if topsoil is less than 6 inches deep, a 6-inch-deep salvage is necessary because a lesser depth would involve too small a volume of soil, which could be easily lost by erosion of the topsoil pile. CIG also states that the native seed base is contained in the top 12 inches of

topsoil and that the removal of a deeper layer would dilute this seed base and would not promote reestablishment of native vegetation when the construction right-of-way is restored.

Section IV.B.1. of our Plan requires segregation of topsoil from either the full right-of-way or from the trench and subsoil storage area in actively cultivated or rotated crop lands and pastures, residential areas, hay fields, and other areas at the landowner's or land management agency's request, or unless the landowner or land management agency specifically approves otherwise. The use of these methods would minimize the potential for mixing of topsoil and subsoil because topsoil would be stored on topsoil and subsoil would be stored on subsoil until backfilling. The more limited topsoil stripping proposed by CIG may not be adequate in crop land and some pastures and would likely result in the mixing of topsoil and subsoil on these lands. However, CIG had success with revegetation on a recent pipeline construction project using this topsoil removal and storage technique and therefore CIG's proposal would be reasonable.

Section IV.B.3 of our Plan requires at least 12 inches of topsoil to be segregated in deep soils (soils with more than 12 inches of topsoil) and every effort to be made to segregate the entire topsoil layer in soils with less than 12 inches of topsoil. CIG's proposal to segregate 12 inches of topsoil is consistent with our Plan. However, its proposal to segregate at least a 6-inch-layer of soil where topsoil is less than 6 inches deep is not consistent. This procedure would result in the mixing the thinner topsoil layer with subsoil and may not adequately protect soil resources in agricultural or residential land. CIG indicated that it would use this procedure because stripping a thinner layer of soil may result in the loss of the seed base which is usually found within the top 6 inches of soil. CIG stated that it would implement this procedure only if specifically approved by the affected landowner or land management agency. Section IV.B.d. of our Plan also states that every effort should be made to segregate the entire topsoil layer where topsoil is less than 12 inches thick. The thinner topsoil would be preserved to the greatest extent practicable by using this procedure. Therefore, CIG's proposal would be acceptable.

Construction equipment traveling over wet soils could disrupt soil structure, reduce pore space, increase runoff potential, and cause rutting. Compaction and rutting would be more likely to occur on most soils when the soils are moist or saturated. Construction would affect about 36.4 acres of soils highly susceptible to compaction (see table 4.2.1-1). Soil compaction mitigation is addressed in section V.C. of our Plan. In accordance with CIG's Plan, CIG would test for and alleviate compaction in agricultural and residential areas. CIG stated that these decompaction efforts would be based on the results of comparative compaction tests performed along the right-of-way and in adjacent off right-of-way locations. The tests would be conducted on similar soils and under similar moisture conditions. This approach would result in decompaction efforts that are appropriate for the levels of compaction identified by testing. CIG would mitigate compaction impacts through the use of deep tillage operations during restoration activities using a paraplow or similar implement. In areas where topsoil segregation occurs beyond the trench line, plowing to alleviate compaction would be conducted before replacement of the topsoil. CIG would be responsible for adequate decompaction and restoration of the right-of-way and other areas of project-related disturbance following construction. CIG stated that it would decompact soils on the working side of the right-of-way to a depth no greater than 12 inches. This depth of ripping may not be adequate to alleviate compaction in all areas and CIG would be required to rip soils to a depth necessary to adequately alleviate compaction. Section IV.C of our Plan does not specify the depth to which subsoil should be decompacted prior to replacing the topsoil during right-of-way restoration. CIG would monitor restoration of construction work areas for successful revegetation and crop productivity. If they are not successful, CIG would investigate the reasons for lack of success. This may result in subsequent mitigation measures which could include additional decompaction, and perhaps additional landowner compensation as may be determined by easement agreements. Therefore, since restoration success would be monitored and the procedure in CIG's Plan is not substantially different from that in our Plan, we believe it is reasonable.

During rain events or when upland areas of the construction right-of-way are saturated, operation of construction equipment is likely to cause ruts. These may exceed 12 inches in depth. CIG proposes to allow equipment to create ruts greater than 12 inches deep in agricultural lands to minimize the need to suspend construction. Section II.B.9, under the responsibilities of the EIs, states that the EI should advise limiting construction activities when conditions (such as wet weather) make it advisable to avoid excessive rutting. Unless the topsoil has been stripped from the working side of the right-of-way, excessive rutting would significantly increase the potential for the mixing of topsoil and subsoil, which could result in decreased soil productivity, including in agricultural areas where topsoil quality is important. CIG indicated that it would mitigate the impacts of rutting greater than 12 inches deep by importing locally available topsoil to fill the ruts and restore soil productivity in crop lands. Importing topsoil would assist in mitigating impacts due to excessive rutting. However, given the thin nature of topsoils within much of the Project area, shallower rutting (less than 12 inches deep) also could result in topsoil mixing and soil impacts. CIG's proposal to mitigate the impact of ruts on topsoil may be adequate. CIG would monitor restoration of construction work areas for successful revegetation and crop productivity. If they are not successful, CIG would investigate the reasons for lack of success. This may result in subsequent mitigation measures and perhaps additional landowner compensation as may be determined by easement agreements. Therefore, since restoration success would be monitored, CIG's procedure is reasonable.

Trenching through stony/rocky soils could bring rocks to the surface, which could interfere with agricultural practices and hinder revegetation of the right-of-way. About 55.8 acres of the soils along the pipeline route have subsoils that contain 5 percent or more rocks greater than or equal to 3 inches in diameter. These soils have a high potential for increasing the rock content of surface layers following construction. An additional 12 acres of soils along the proposed route have shallow bedrock. These soils would have a moderate to low potential to increase the rock content of surface layers following construction. A commenter expressed concern about impacts on soil fertility as a result of trenching through shallow shale bedrock and mixing the shale bedrock with topsoil. CIG's Plan specifies segregating topsoil from subsoil over the trenchline throughout the entire Project area and removing rock with a 3 inch or greater diameter from the top 12 inches of soil in all actively cultivated or rotated cropland and pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. CIG's Plan regarding treatment of stones and rocks in the top 12 inches of soil is consistent with our Plan and would minimize impacts on agriculture and revegetation.

CIG's Plan differs from our Plan with regards to sections that address seeding during right-of-way restoration. CIG proposes extending the time between final grading and seeding from six working days as recommended in section V.D.3.d., to twelve days, weather permitting and with landowner approval. The NRCS confirmed that a delay of six to eight days would not create an erosion hazard and concurs that this timing would be reasonable. Therefore, we believe that implementation of CIG's procedure would be reasonable.

CIG proposes a seeding procedure that would differ from section V.D.3.c. of our Plan which states that seeding of permanent vegetation should be accomplished within the recommended seeding dates. CIG proposes seeding the right-of-way when cleanup is complete even if it occurs outside the recommended seeding dates. This is proposed because some vegetation may begin to be established outside the recommended seeding dates. Section V.D.3.c of our Plan also states that if seeding is not done within the recommended seeding dates that appropriate temporary erosion controls should be installed and that seeding should be done at the next recommended seeding season. CIG would mulch all areas that are seeded outside the recommended seeding dates and would install all appropriate temporary erosion controls. Revegetation would be monitored in all restored areas. If revegetation is not successful, additional seeding may be performed as needed. Therefore, since CIG would monitor the success of

revegetation, would mulch the areas seeded outside the recommended seeding window, and would install appropriate erosion controls, CIG's seeding procedure is reasonable.

Construction would affect soils with a high potential for water and wind erosion. Most of this acreage is at risk from water erosion (1,612.1 acres). The remaining acreage (997.5 acres) is at risk from wind erosion. Severe erosion is possible in many Project areas because of unconsolidated soils and steep slopes and because the low-growing prairie and agricultural vegetation provide little protection from the wind. Clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands. Erosion could also reduce soil fertility and impair revegetation as a result of topsoil loss. The susceptibility of soils to wind erosion would result in a potential for dust hazards. The erosion control practices contained in CIG's Plan combined with CIG's proposal to control dust by watering the right-of-way and/or applying tackifiers would minimize potential impacts from erosion and sedimentation in upland areas.

Trench dewatering could also cause erosion. Where dewatering is required, CIG has indicated it would pump water from the trench into sediment filtration/energy dissipation devices located in well vegetated upland areas. CIG's Procedures provide that it would dewater trenches in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any wetland or waterbody.

About 608.5 acres of highly sandy soils would be crossed by the pipeline route. They have severe limitations for shallow excavations due to potential caving of the trench walls. Trench excavation in these soils would likely require a wider trench to provide a stable trench and safe work area. A wider trench would result in the need for a additional temporary workspace due to the additional trench width and additional spoil storage requirements that would be generated. This would increase the potential for erosion impacts on soils in highly sandy, unconsolidated soils and in areas of steep terrain. In addition to the potential need for a wider trench in highly sandy soils, these areas would also be more susceptible to rutting and mixing of topsoil and subsoil due to equipment and vehicle traffic. Unlike finer textured soils, highly sandy soils would be more susceptible to rutting impacts when they are dry. Implementation of the erosion and sediment control measures in CIG's Plan would minimize the potential for soil movement off the right-of-way. Highly sandy soils in the proposed Project area typically have very thin, unproductive topsoil layers, and mixing of topsoil and subsoil would not significantly affect the native productivity of these soils. Establishment of vegetation on the right-of-way following construction in areas of highly sandy soils would adequately protect these soils from further erosion and assist in restoring soil productivity. However, the recovery of vegetation in highly sandy soils in the proposed project area would likely be a long-term process. Though a substantial group of native plant species may be present in seedbank of the reclaimed segregated topsoil, the dry to xeric conditions typical of the proposed Project area may greatly reduce the germination and establishment of the seedlings. Vegetation establishment is further described in section 4.4.1.

The pipeline route would cross about 1,940.6 acres of droughty soils. Droughty soils have a reduced revegetation potential and could also increase the potential for soil losses due to wind erosion following restoration. CIG would apply mulch where needed following final cleanup as a temporary erosion control measure. These areas, like all areas affected by construction of the Project, would be monitored for successful revegetation following construction and restoration of disturbed workspaces.

All of the soils crossed by the route would be susceptible to contamination from spills or leaks of fuels, lubricants, and coolants from construction equipment. These impacts would typically be minor because of the low frequency and volumes of these occurrences. CIG developed a Spill Plan that specifies cleanup procedures to minimize soil contamination from spills or leaks of fuels, lubricants, and coolants (appendix E). There are no known contaminated soils or sediments along the proposed pipeline routes.

During the scoping process, concerns were expressed about the potential for soil subsidence in the trench to occur in irrigated fields after construction. Soil subsidence in the trench could interfere with water movement through areas that are irrigated using ditch and canal irrigation techniques, and could interfere with the movement of center-pivot equipment in areas that are irrigated using overhead water guns. Commenters suggested the use of "water packing" during backfilling of the pipeline trench in areas constructed through irrigated crop lands. Water packing involves backfilling the trench to the top of the pipe and then saturating the trench with water to compact soil around the pipeline. Successive layers of soil are compacted in this way (or by mechanical means) until the trench is completely backfilled, thereby reducing the likelihood of trench subsidence. CIG stated it would use water packing during backfilling in irrigated agricultural lands. This technique would be water-intensive, requiring an estimated 420,000 gallons of water (about 5 gallons per linear foot of pipe). CIG is seeking authorization from the appropriate regulatory authorities to obtain water for this activity. In areas where water packing is not used, CIG has proposed the use of heavy equipment or other suitable compaction methods to compact the backfilled trench to minimize settling. Alternatively, CIG could leave a soil crown over the trench to compensate for future settlement. In areas where CIG leaves a soil crown over the trench, CIG would place breaks in the soil crown to allow water movement from ditch and canal irrigation and wheel movement from center-point equipment. If after implementing the trench compaction techniques, subsidence develops over the trench, CIG states that it would be responsible for restoring any trench subsidence. CIG would also be responsible for repairing damaged irrigation systems. Impacts on irrigated crop lands and CIG's proposed mitigation are described further in section 4.7.1.

Aboveground Facilities

Impacts and mitigation associated with aboveground facilities would be similar to those described for pipeline facilities. Temporary impacts resulting from construction of aboveground facilities would occur on about 47.6 acres of land. Operation of the aboveground facilities would permanently affect about 14.5 acres of land and would convert about 4.9 acres of prime farmland into industrial land (*i.e.*, fenced and graveled pipeline facilities). Mitigation measures would include soil erosion and sediment control procedures as described in CIG's Plan. Although not fully mitigated since operation of aboveground facilities results in permanent impacts, soil impacts at aboveground facility sites would not be considered significant due to the relatively small amount of soils involved. See section 2.3.3 for additional construction procedures that CIG would use at aboveground facility sites.

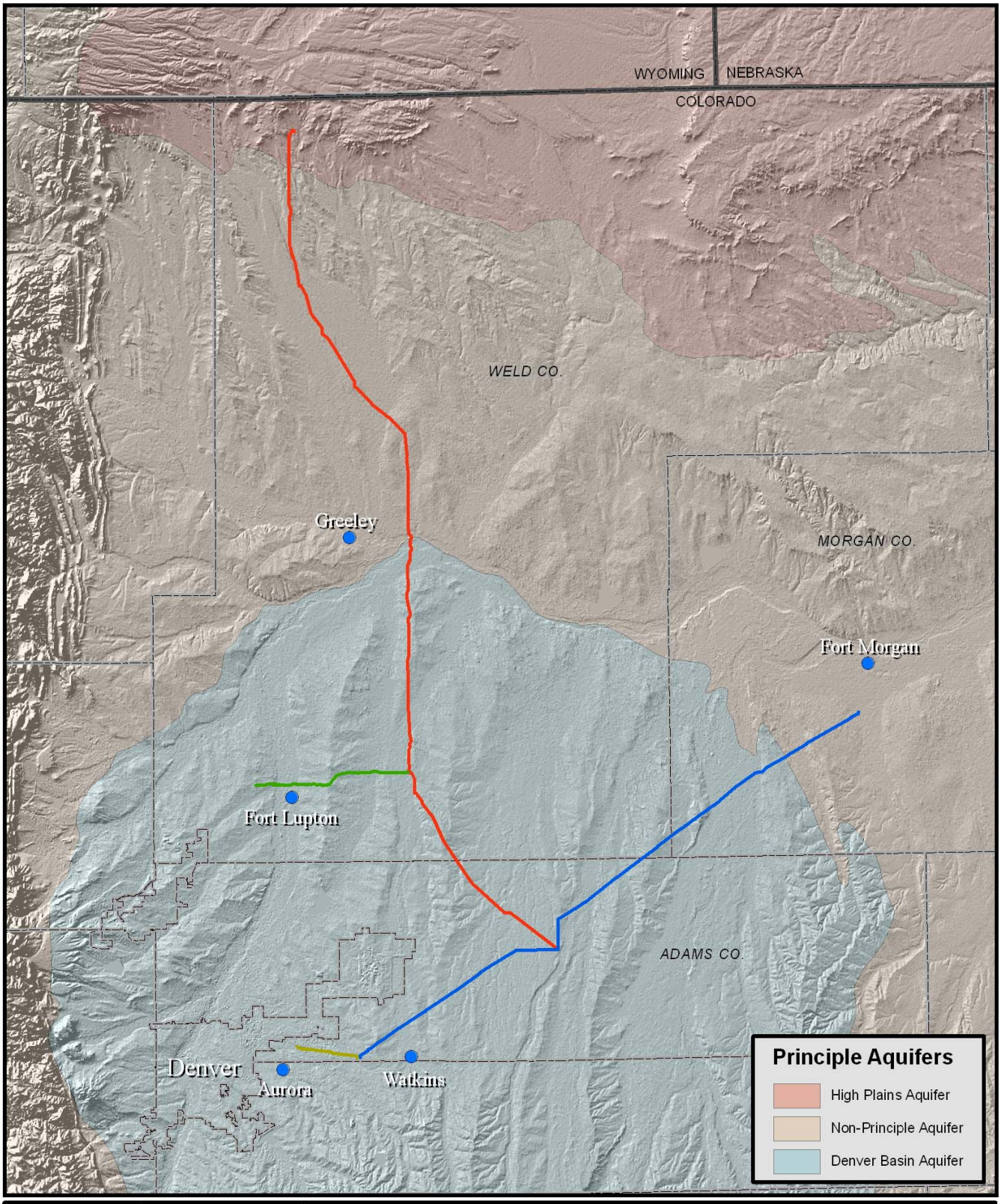
4.3 WATER RESOURCES

4.3.1 Groundwater

Aquifers

The proposed Project would cross two principle aquifers: the High Plains aquifer and the Denver Basin aquifer (see figure 4.3.1-1). The High Plains aquifer system underlies large portions of eastern Colorado and is a major supplier of water for agriculture in the proposed Project area. The aquifer consists of near-surface deposits of unconsolidated to partially consolidated gravel, sand, silt, and clay that range in age from late Tertiary to Quaternary. Water tables within the High Plains aquifer range from 100 to 200 feet below the land surface in Colorado. The aquifer yields from about 250 to more than 750 gallons per minute (gpm).

The Denver Basin aquifer system consists of a layered sequence of four aquifers in beds of permeable conglomerate, sandstone, and siltstone. Layers of relatively impermeable shale separate the aquifers and impede the vertical movement of ground water between the aquifers. The northern part of


WYOMING
NEBRASKA
COLORADO
WELD CO.
Greeley
MORGAN CO.
Fort Morgan
Fort Lupton
ADAMS CO.
Denver
Aurora
Watkins
Principle Aquifers
High Plains Aquifer
Non-Principle Aquifer
Denver Basin Aquifer
Prepared By:
Merjent
N
0 5 10
Miles
Proposed Pipeline Facilities
250A Pipeline
251A Pipeline
252A Pipeline
253A Pipeline
Principle Aquifer Locations
High Plains Expansion Project
Figure 4.3.1-1

this aquifer system underlies the surficial aquifer of the South Platte River. Although the Denver Basin aquifer system and the surficial aquifer are hydraulically connected in part of this area, they primarily function as separate aquifer systems. The Denver Basin aquifer has limited large volume water uses. About 53 percent of the fresh ground water withdrawn from the basin is used for public supply; about 34 percent was used for agriculture; and the remaining for domestic and commercial water use (USGS 2007a). Total withdrawals from the aquifers in 1985 were estimated at 36,000 acre-feet (USGS 2007a). While current total withdrawal volumes for the basin are not available, nearly 445,000 acre-feet of ground water was withdrawn in Adams, Arapahoe, Denver, Douglas, and Elbert Counties, which lie almost entirely in the basin, in 1995 (USGS 2007a).

The pipeline routes would also cross the surficial aquifer associated with the South Platte River. The surficial aquifer along the South Platte River consists of Quaternary-aged deposits of alluvial gravel, sand, silt, and clay and, in places, the overlying wind-blown sand and silts. In the proposed Project area, these deposits are underlain by relatively impermeable shales and interbedded sandstones that confine the aquifer to the river valley. The South Platte River aquifer ranges from 20 to 200 feet in thickness and varies from 1 to 15 miles in width. In the area that would be crossed by the pipeline route, the South Platte River aquifer is nearly 200 feet deep. Near the river, groundwater is close to the land surface, but it increases in depth toward the edges of the river valley.

About 38 miles of Line 250A and 9 miles of Line 251A would cross an area in which aquifers either do not exist or yield too little water to wells to be significant. This area may contain small isolated aquifers that yield sufficient water to supply local requirements but are not extensive enough to be classified as a major aquifer.

None of the aquifers in the proposed Project area are considered USEPA-designated or petitioned sole-source aquifers and no designated wellhead protection areas would be crossed by the proposed Project.

Construction of the pipeline and aboveground facilities could affect groundwater in several ways. Clearing, grading, trenching, and soil stockpiling activities could temporarily alter overland flow and groundwater recharge. Near-surface soil compaction caused by the operation of heavy construction equipment could reduce the soil's ability to absorb water, which could increase surface runoff. These impacts would be localized and temporary. Upon completion of construction, CIG would restore the ground surface as closely as practicable to original contours and revegetate the right-of-way to ensure restoration of preconstruction overland flow and recharge patterns. Soil compaction would be alleviated by implementation of CIG's Plan as enhanced by our recommendations (see section 4.2.3), which states CIG would test topsoil and subsoil for compaction at regular intervals in agricultural areas disturbed by construction and plow severely compacted soils with a paraplow or other deep tillage implement to minimize disruption to groundwater recharge.

In locations where groundwater is close to the surface, trench excavation (about 6 feet deep) could intersect the water table. After construction, the backfilled trench could have a different soil permeability from the surrounding undisturbed matrix and could act as a conduit to transport groundwater. This could cause subsurface erosion and ground subsidence along the pipeline. CIG would install trench breakers where necessary to minimize the potential for unimpeded subsurface water flow along the trench. CIG also would water pack the trench in irrigated agricultural land. Water packing the trench would better restore soil properties to pre-construction conditions and minimize the potential for subsurface water flow.

Trench dewatering may be required in areas of high groundwater. Localized, minor changes to the water table could occur as a result of these activities. Because pipeline construction at a given location would be completed within a short period of time, potential impacts from dewatering would be

short-term. Further, trench dewatering would be conducted in a manner consistent with the requirements of CIG's Plan for this construction activity.

Unconfined aquifers and shallow groundwater areas could be vulnerable to contamination caused by inadvertent surface spills of hazardous materials used during construction. Accidental spills and leaks of hazardous materials associated with equipment trailers; the refueling or maintenance of vehicles; and the storage of fuel, oil, and other fluids pose the greatest risk to groundwater resources. If not cleaned up, contaminated soils would continue to leach and add pollutants to groundwater long after a spill has occurred. Impacts associated with spills or leaks of hazardous liquids could be avoided or minimized by restricting the location of refueling and storage and by requiring cleanup in the event of a spill or leak.

CIG developed a Spill Plan to address preventive and mitigative measures that would be used to avoid or minimize the potential impact of hazardous material spills during construction (see appendix E). The Spill Plan specifies preventive measures such as regular inspection of storage areas for leaks, replacement of deteriorating containers, and construction of containment systems around hazardous liquids storage facilities. The Spill Plan also restricts refueling or other liquid transfer areas within 100 feet of wetlands and waterbodies, prohibits refueling within 150 feet of any water supply well, and provides additional precautions when specified setbacks cannot be maintained. CIG's Spill Plan identifies emergency response procedures, equipment, and cleanup measures in the event of a spill, and requires the construction contractor to complete an inventory of all construction fuels, lubricants, and other hazardous materials that may be used or stored in designated areas, and the amount and type of containers that would be used to store these materials. We have reviewed CIG's Spill Plan and find that it adequately addresses the storage and transfer of hazardous materials and the response to be taken in the event of a spill. Therefore, the potential for the proposed Project to contaminate local aquifers would be minimal.

Water Supply Wells and Springs

The proposed Project would come within 150 feet of 3 wells. Two wells (both on Line 250A at MP 53.2) supply water to center pivot irrigation systems and are used for agricultural purposes. The third well (Line 251A at MP 57.7) is used to provide water to livestock. No other water wells or public water supply wells would be within 150 feet of the proposed pipeline or aboveground facilities.

Based on the subsurface geology in the proposed Project area, natural springs and seeps may be found near the pipeline routes. CIG has identified one spring about 95 feet north of Line 250A at MP 29.8. No other springs are known within 150 feet of the construction right-of-way.

Potential impacts on wells and springs located within 150 feet of the construction right-of-way could include: localized decreases in groundwater recharge rates, changes to overland water flow, contamination due to hazardous materials spills, decreased well yields, decreased water quality (such as an increase in turbidity or odor in the water), interference with well mechanics, or complete disruption of the well. These impacts could result from trenching or equipment traffic.

CIG would prohibit refueling and storage of hazardous materials within 150 feet of all wells and springs. Each well would be marked and avoided by equipment during construction. The potential for contaminating wells or springs due to spills of hazardous materials is considered to be minor due to the low volume of contaminants present during construction and the substantial distance between any spill and the underlying groundwater surface. However, in the event of a spill, CIG would implement its Spill Plan to minimize or avoid potential impacts.

CIG stated that it would conduct pre- and post-construction water well quality and yield testing of potable (domestic) water wells within 150 feet of the edge of the construction work areas. The wells would be sampled for potential contaminants as well as standard drinking water parameters. In the event that any well is damaged by construction, CIG would provide a temporary source of water and would restore the well to its original condition or provide other remedies as agreed with the owner.

CIG would require about 29.9 million gallons (92 acre-feet) of water for HDD operations, dust control, trench compaction, and hydrostatically testing the proposed pipelines. Nearly all of water would be withdrawn from the South Platte River (see section 4.3.2). However, CIG has stated an unspecified amount of this water could be obtained from irrigation wells through arrangements with well owners.

The use of groundwater for construction purposes would result in short-term, temporary increases in groundwater usage that could impact other groundwater users. However, most water would be obtained from surface water sources and the total volumes of groundwater to be used are anticipated to be low. Potential impacts that could result from the discharge of hydrostatic test water onto land include soil erosion. CIG would minimize the potential for these effects through the use of energy-dissipating devices that would disperse and slow the velocity of any discharges and by complying with the requirements of their state-issued discharge permits.

4.3.2 Surface Waters

The proposed Project would cross the South Platte sub-regional watershed basin on the Missouri Regional Watershed (USGS 2007b). Within this sub-region, the proposed Project would cross six cataloging hydrologic units (see figure 4.3.2-1). Line 250A would begin near the Wyoming border in the Lone Tree-Owl Creek Hydrologic Unit (Line 250A from MP 0 to MP 38), would pass through a small section of the Cache La Poudre River Unit (Line 250A from MP 38 to MP 41) into the South Platte River-Cherry Creek Unit (Line 250A from MP 41 to MP 84.7). Line 251A would begin in the South Platte-Cherry Creek Unit at its west end (Line 251A from MP 0 to MP 22), would pass through the Kiowa Creek Unit (Line 251A from MP 22 to MP 43), then the Bijou Creek Unit (Line 251A from MP 43 to MP 48), and would end in the Middle South Platte-Sterling Unit (Line 251A from MP 48 to MP 58). Line 252A and Line 253A would both be entirely in the South Platte-Cherry Creek Unit.

Three perennial waterbodies and 119 intermittent waterbodies, drainages, canals, and washes would be crossed by the proposed Project. A complete list of the waterbodies that would be crossed is included in appendix J. Table 4.3.2-1 lists the location, flow, width, fishery classification, water quality/use classification, impaired water quality, and proposed crossing method that would be used for perennial waterbodies along the pipeline route.

Table 4.3.2-1 – Perennial Waterbody Crossings

Waterbody	Pipeline Segment	MP	Crossing Width (feet)	Fishery Classification	State Water Quality/Use Classification
Lone Tree Creek	Line 250A	36.7	2	None	AqLife Warm 2, Rec 2, Agriculture
South Platte River	Line 250A	41.3	44	Warmwater	AqLife Warm 2, Rec 1, Agriculture, Water Supply
South Platte River	Line 252A	11.6	105	Warmwater	AqLife Warm 2, Rec 1, Agriculture, Water Supply

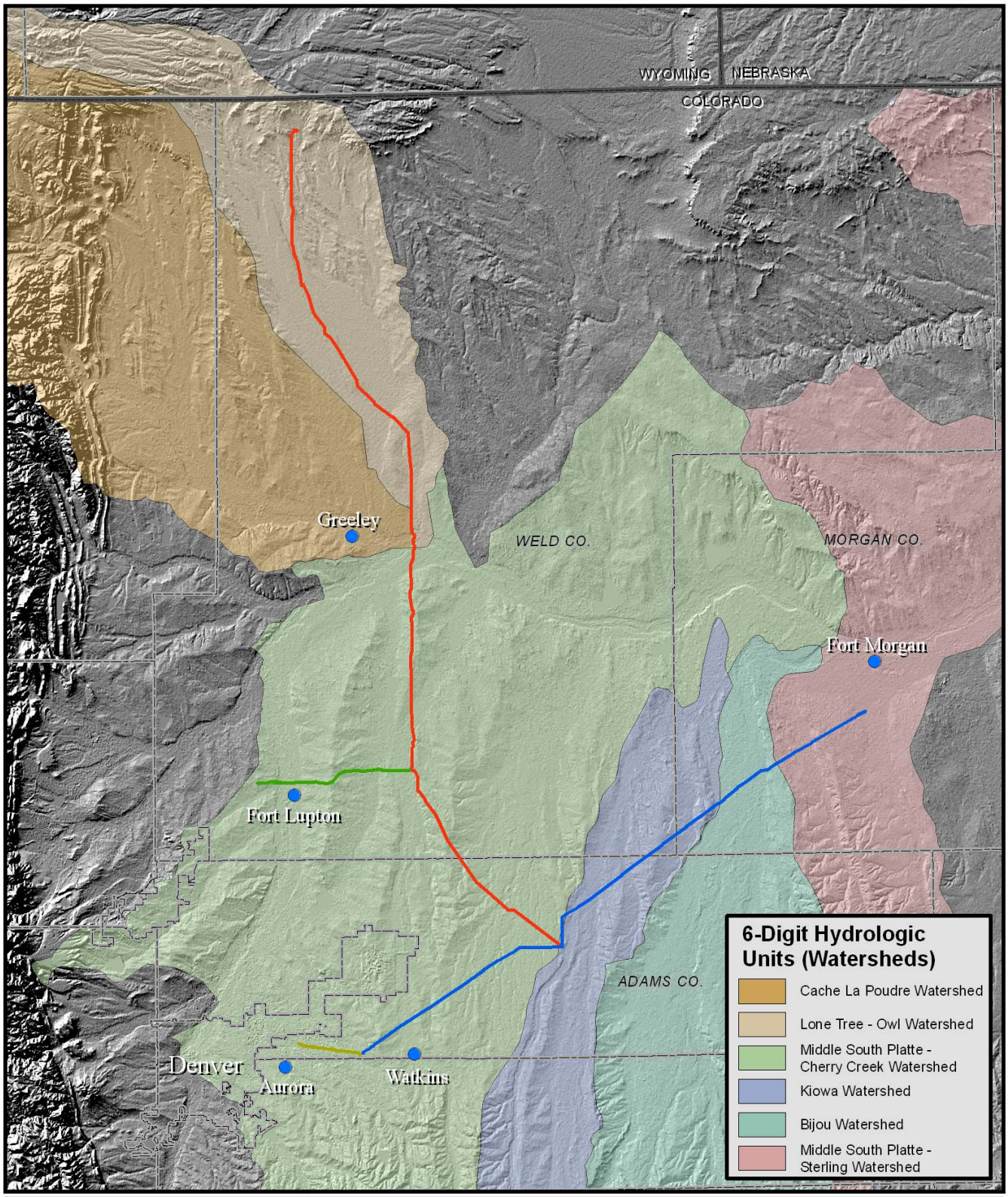
AqLife Warm 2 – Waters that are not capable of sustaining a wide variety of cold or warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.

Rec 1 – Surface waters are suitable for primary recreational uses including swimming.

Rec 2 – Surface waters are not suitable for primary recreational uses but are suitable for secondary recreational uses involving contact (*e.g.*, wading, fishing).

Agriculture – Waters are suitable or intended to be suitable for irrigation of crops grown in Colorado and which are not hazardous for livestock.

Water Supply – Waters are suitable or intended to become suitable for potable water supplies.



Hydrologic Unit (Watersheds) Locations

High Plains Expansion Project

Figure 4.3.2-1

Surface waters in Colorado are classified according to water quality and use. Water quality is classified as impaired if it exceeds the state-designated total maximum daily load (TMDL) for various pollutants. A TMDL specifies the maximum amount of a pollutant that a waterbody can receive and still meet the intended or designated water quality use standards. The state of Colorado categorizes surface water uses according to the most beneficial existing and potential future uses of the waterbody and to provide protection for a variety of uses. The five main use classifications are: recreation, agriculture, aquatic life, domestic water supply, and wetlands. Colorado also groups waters into three classifications to provide varying levels of protection. These classifications are: outstanding waters, use-protected, and non-designated.

None of the waterbodies are classified as outstanding waters, although the South Platte River and Lone Tree Creek are classified as use-protected, which requires that they be protected and maintained for their current designated uses (*i.e.,* agriculture and domestic water supply). No specially designated surface water protection areas would be in the proposed Project area, and no potable water intake structures would be within 3 miles downstream of any of the proposed waterbody crossings. None of the waterbodies that would be affected by the Project are designated as impaired waters by the USEPA. The South Platte River is classified as a warmwater fishery by the State of Colorado (see section 4.5.2). CIG's Procedures require crossing of warmwater streams occur between June 1 and October 30. There are no surface waters within or immediately adjacent to the boundaries of the aboveground facility sites. The nearest waterbody to any aboveground facility is Box Elder Creek, which is an intermittent waterbody about 200 feet from the construction workspace of a MLV on Line 250A. Implementation of CIG's Procedures should minimize impacts on this waterbody.

Even without special federal or state designations, waterbodies may be considered sensitive to pipeline construction for a number of reasons, including, but not limited to, the width of the crossing; the presence of coldwater aquatic habitat, fisheries, and special status species; the presence of high-quality recreational, visual resource, or historic value; or the presence of impaired water or contaminated sediments. The South Platte River on Line 252A at MP 11.6 would be the only major waterbody crossing (*i.e.,* greater than 100 feet wide) on the proposed Project. The South Platte River crossing on Line 250A at MP 41.3 would not be a major crossing because it is less than 100 feet wide. However, both crossings of the South Platte River would be considered sensitive because the South Platte River is known to contain state-listed threatened and endangered species, as well as six federal-listed species downstream of the proposed Project area in Nebraska (see section 4.6).

Pipeline construction could affect surface waters in several ways. Clearing and grading of streambanks, in-stream trenching, trench dewatering, and backfilling could affect waterbodies through modification of aquatic habitat, increased sedimentation, increased turbidity, decreased dissolved oxygen concentrations, stream warming, releases of chemical and nutrient pollutants from sediments, or introduction of chemical contamination such as fuel and lubricants. The crossing of irrigation canals could interrupt the flow of irrigation water, which could damage crops and reduce crop yields.

The greatest potential impact on surface waters would result from the temporary suspension of sediments during in-stream construction. The extent of the impact would depend on sediment loads, stream velocity, turbidity, bank composition, and sediment particle size. These factors would determine the density and downstream extent of sediment migration. In-stream construction could cause the dislodging and transport of channel bed sediments and the alteration of stream contours. Changes in the bottom contours could alter stream dynamics and increase downstream erosion or deposition, depending on circumstances. Turbidity resulting from the suspension of sediments from in-stream construction or erosion of cleared right-of-way areas would reduce light penetration and photosynthetic oxygen production. In-stream work could also introduce chemical and nutrient pollutants from sediments. Suspension of deposited organic material and inorganic sediments would cause an increase in biological

and chemical use of oxygen, resulting in a decrease of dissolved oxygen concentrations in the affected area. Lower dissolved oxygen concentrations could cause temporary displacement of motile organisms and may kill non-motile organisms within the affected area.

The clearing and grading of stream banks would expose soil to erosional forces and would reduce riparian vegetation along the cleared section of the waterbody. The use of heavy equipment for construction would cause compaction of near-surface soils, an effect that could result in increased runoff into surface waters. The increased runoff could transport additional sediment into the waterbodies, resulting in increased turbidity levels and sedimentation rates in the receiving waterbody.

Refueling of vehicles and storage of fuel, oil, or other hazardous materials near surface waters could create a potential for contamination. If a spill were to occur, immediate downstream users of the water could experience degradation in water quality. Acute and chronic toxic effects on aquatic organisms could also result from a spill.

CIG proposes to cross all three perennial waterbodies using the open-cut method. Additionally, CIG proposes to open-cut all irrigation canals and ditches before the irrigation season begins when no flow is present. If flow is present, CIG would bore beneath the canals or flume the canals to maintain flow during construction. CIG would cross intermittent waterbodies, drainages, and washes using conventional upland cross-country construction techniques. Open-cut construction across waterbodies with flow could result in temporary increase of sediments; however, intermittent waterbodies, drainages and washes typically do not support fisheries or provide critical aquatic habitat or migratory passage for aquatic organisms. The various crossing methods are described in section 2.3.2.

The short-term impacts on surface waters described above can be effectively minimized through the use of special construction techniques, and no long-term impacts or changes in designated uses would be expected on waterbodies, including canals and ditches. CIG developed project-specific Procedures and BMPs that describe the measures it would use to minimize potential Project effects. CIG's Procedures and BMPs are based largely on the mitigation measures contained in our Procedures. Some of the relevant mitigation measures specified in CIG's Procedures relative to waterbody construction are described below.

- Limit clearing of vegetation between extra work areas and the edge of the waterbody to preserve riparian vegetation.
- Maintain adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses.
- Restrict storage and refueling activities near surface waters.
- Limit the use of equipment operating in the waterbody to that needed to construct the crossing.
- Require construction across waterbodies to be completed as quickly as possible and during the windows specified in CIG's Procedures or required by applicable permits.
- Complete all waterbody crossings, with the exception of the South Plate River, in 48 hours.
- Develop site-specific construction procedures for each waterbody greater than 100 feet wide (this would be limited to the one South Platte River crossing).

- Require temporary erosion and sediment control measures to be installed across the entire width of the construction right-of-way after clearing and before ground disturbance.

- Require maintenance of temporary erosion and sediment control measures throughout construction until streambanks and adjacent upland areas are stabilized.

- Require bank stabilization and reestablishment of bed and bank contours and riparian vegetation after construction.

- Limit post-construction maintenance of vegetated buffer strips adjacent to streams.

- Implement the notification and clean up procedures in the Spill Plan if a spill or leak occurs during construction.

Temporary extra workspaces would be required on both sides of most waterbodies and canals to stage construction, fabricate the pipeline, and store materials. Temporary extra workspaces would be located a minimum of 50 feet from the waterbody edge, except at the South Platte River or where adjacent upland consists of actively cultivated or rotated cropland or other disturbed area. CIG proposes to locate temporary extra workspaces extra work spaces up to the edge and through the South Platte River at both proposed crossing locations.

CIG filed site-specific construction plans for crossing the South Platte River illustrating how it would establish workspaces. CIG stated that large workspaces would be needed due to the large size of the waterbody crossings. Further, CIG stated that placing workspaces within 50 feet of and through the waterbody would minimize damage to adjacent riparian and upland habitats by eliminating the need to relay spoil back over a 50-foot set-back distance. This also would reduce the amount of spoil lost in the transfer. CIG indicated that it would minimize tree clearing to the maximum extent possible, clearing only trees that would impede equipment operation in the construction workspace. After backfilling, CIG would return the streambanks to their original contours and stabilize the area as required in CIG's Procedures. By implementing these measures, we believe impacts on the river would be minimized.

CIG would require about 29.9 million gallons (92 acre-feet) of water for HDD operations, dust control, trench compaction, and hydrostatically testing the proposed pipelines. CIG indicated that nearly all of water would be withdrawn from the South Platte River. About 17.3 million gallons (53 acre-feet) would be obtained at MP 41.2 on Line 250A, and about 12.6 million gallons (39 acre-feet) would be obtained at MP 11.6 on Line 252A.

The appropriation of large volumes of surface waters from the South Platte River could temporarily affect the recreational and biological uses of the river if the diversions constitute a large percentage of the river's total flow or volume. The diversion of large volumes of water could also result in the temporary loss of habitat, changes in water temperature and dissolved oxygen levels, and entrainment or impingement of fish or other aquatic organisms.

The South Platte River is known to contain state-listed endangered and threatened species. In addition, federal-listed species are known to occur downstream in Nebraska. We are conducting consultations with the USFWS regarding potential impacts of water depletions on downstream federal-listed species. These consultations are discussed in section 4.6.

CIG would be required to obtain necessary authorization from the South Platte Water Related Activities Program (SPWRAP) before withdrawing the water (SPWRAP is discussed further in section 4.6.1). CIG would minimize the potential effects of water withdrawals by adhering to the measures in

CIG's Procedures (appendix D) and Hydrostatic Test Plan (appendix G). These measures include screening intake hoses to prevent the entrainment of fish and other aquatic organisms, placing water pumps in containment devices to minimize the potential for fuel spills or leaks, and limiting water withdrawal rates to 1,500 gpm or less, which is less than one percent of the river's average flow over the past four years as measured at the Fort Lupton gauging station during the months when appropriation is anticipated.

Most of the water taken from the South Platte River would be used for hydrostatic testing in accordance with CIG's Hydrostatic Test Plan (see appendix G). After testing, CIG plans to discharge used water at various locations along its right-of-way (see table 4.3.2-2). These discharges could cause soil erosion. Where discharges are proposed, CIG has indicated it would pump water into sediment filtration/energy dissipation devices located in well-vegetated upland areas. CIG has specified in its Procedures that it would dewater in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any wetland or waterbody. CIG would minimize the potential for contamination by testing only new pipe and not chemically altering the test water. CIG would be required to obtain the necessary permits from the state before discharging water to the ground. In Colorado, such permits typically require discharge water be tested for total suspended solids, total iron, pH and oil and grease.

Table 4.3.2-2 – Hydrostatic Test Water Discharge Locations

Pipeline Segment / MP	Expected Discharge Volume (gallons)	Expected Discharge Volume (acre-feet)
LINE 250A		
7.3	1,648,800	5.1
14.8	1,713,600	5.3
22.4	1,713,600	5.3
29.5	1,596,000	4.9
41.2	2,644,800	8.1
54.8	3,073,200	9.4
62.5	1,724,400	5.3
66.0	520,800	1.6
84.8	2,720,400	8.4
	17,355,600	53.3
LINE 251A		
0.0	1,072,800	3.3
7.5	2,028,000	6.2
21.5	1,357,200	4.2
30.9	1,699,200	5.2
42.6	1,390,800	4.3
52.2	828,000	2.5
	8,376,000	25.7
LINE 252A		
7.4	1,670,400	5.1
9.3	429,600	1.3
14.9	1,240,800	3.8
	3,340,800	10.3

Table 4.3.2-2 (cont.) – Hydrostatic Test Water Discharge Locations

Pipeline Segment / MP	Expected Discharge Volume (gallons)	Expected Discharge Volume (acre-feet)
LINE 253A		
6.1	871,200	2.7
	871,200	2.7
	29,943,600	92.0

Note: additional discharge location could include MLV sites.

4.3.3 Wetlands

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation typically adapted for life in saturated soil conditions (USACE 1987). Wetlands can be a source of substantial biodiversity and serve a variety of functions. These functions include: providing wildlife habitat and recreational opportunities, naturally improving water quality, and providing flood control. Wetland vegetation anchors soil and prevents erosion. The USACE wetlands delineation manual (USACE 1987), which contains the current federal methodology for delineating wetlands, was used to identify and delineate wetlands crossed by the proposed Project. Wetland surveys along the proposed pipeline routes and aboveground facility sites were conducted in the summer of 2006. The boundaries of all wetlands were mapped using a Global Positioning System (GPS). The pipeline routes would cross 42 wetlands. Of the wetlands crossed by the pipeline route, 37 are classified as palustrine emergent (PEM) and 5 are classified as palustrine scrub-shrub (PSS) or scrub-shrub with an emergent component. In addition, CIG indicated that one existing dirt proposed access road passes through an emergent wetland. No forested wetlands would be crossed by the proposed Project. Table 4.3.3-1 lists the wetlands crossed by the proposed Project along with pipeline segment and MP location, Cowardin classification, length of crossing, and approximate acreage affected by construction and operation of the pipeline facilities.

Table 4.3.3-1 – Wetlands Within the Construction Work Area

Line / MP	Wetland ID	Cowardin Classification	Length Crossed (ft)	Temp. Construction Impacts (acres)	Perm. Operational Impacts (acres)
LINE 250A					
5.5	W250A-1	PEM	21	0.01	0.01
12.8	W250A-2	PEM	38	0.06	0.04
29.6	W250A-3	PEM	30	0.04	0.03
29.7	W250A-4	PEM	14	0.02	0.02
29.8	W250A-5	PEM	28	0.02	0.02
36.5	W250A-6	PEM	21	0.03	0.02
36.7	W250A-7	PEM/PSS	11	0.02	0.01
36.7	W250A-8	PEM	21	0.03	0.02
41.2	W250A-9	PEM/PSS	118	0.17	0.02
41.3	W250A-10	PEM	162	0.76	0.17
41.3	W250A-11	PSS	52	0.10	0.01
41.4	W250A-12	PEM	43	0.03	0.00
41.5	W250A-13	PEM	41	0.08	0.01

Table 4.3.3-1 (cont.) – Wetlands Within the Construction Work Area

Line / MP	Wetland ID	Cowardin Classification	Length Crossed (ft)	Temp. Construction Impacts (acres)	Perm. Operational Impacts (acres)
41.6	W250A-14	PEM	52	0.16	0.04
41.8	W250A-15	PEM	117	0.20	0.002
41.9	W250A-16	PEM	242	0.42	0.28
44.5	W250A-17	PEM	129	0.17	0.11
45.3	W250A-18	PSS	10	0.01	0.01
45.4	W250A-19	PEM	33	0.06	0.04
46.0	W250A-20	PEM	26	0.03	0.02
46.1	W250A-21	PEM	28	0.05	0.03
47.5	W250A-22	PEM	62	0.08	0.05
55.1	W250A-24	PEM	39	0.05	0.03
55.3	W250A-25	PEM	40	0.06	0.04
62.4	W250A-26	PEM	546	0.72	0.45
62.7	W250A-27	PEM	101	0.13	0.10
63.4	W250A-28	PEM	47	0.08	0.05
Access Rd.	W250A-29	PEM	130	0.09	0.00
66.0	W250A-30	PEM	39	0.07	0.04
72.8	W250A-31	PEM	65	0.10	0.07
			2,176	3.85	1.742
LINE 251A					
28.1	W251A-1	PEM	83	0.13	0.04
31.3	W251A-2	PEM	55	0.06	0.02
57.1	W251A-3	PEM	15	0.03	0.01
			153	0.22	0.07
LINE 252A					
0.2	W252A-1	PEM	415	0.62	0.40
2.9	W252A-2	PEM	53	0.09	0.06
10.1	W252A-3	PEM	200	0.34	0.23
10.4	W252A-4	PEM	426	0.62	0.36
11.6	W252A-5	PEM	37	0.20	0.04
11.6	W252A-6	PEM	111	0.14	0.02
11.7	W252A-7	PEM	64	0.18	0.02
11.8	W252A-8	PEM/PSS	30	0.14	0.02
			1,336	2.33	1.15
LINE 253A					
5.8	W253A-2	PEM	104	0.12	0.03
5.9	W253A-3	PEM	346	0.35	0.04
			450	0.47	0.07
			4,245	6.87	3.03

PEM – Palustrine Emergent; PSS – Palustrine Scrub-Shrub

Emergent wetlands are dominated by perennial grass-like plants, such as sedges, spikerushes, little barley, dock, and other hydrophytic grasses and forbs. Of the 37 emergent wetlands that would be crossed by the pipeline routes, 25 are considered riparian wetlands (associated with waterbody features), 4 are associated with seeps, and 8 are associated with old river channels and oxbows. Seven of the emergent wetlands are identified as marshes, which generally have a perennial or persistent source of water. The marsh wetlands are typically dominated by cattails and bulrushes.

Five of the wetlands that would be crossed by the construction right-of-way are classified as scrub-shrub wetland or have a scrub-shrub component within the wetland. Scrub-shrub wetlands are seasonally and/or temporarily flooded areas with woody shrubs dominating the vegetation. Typical shrub species found within PSS wetlands include sandbar willow and young eastern cottonwood trees.

Eight wetlands were identified within a 100-foot-wide survey corridor around access roads (50 feet on either side of the centerline of each access road). Of the eight wetlands, one would be impacted by construction (Wetland 250A-29, Line 250A at about MP 64.7). CIG's Procedures require that the only access roads, other than the construction right-of-way, that can be used in wetlands without approval are those existing roads that could be used with no modification and no impact on wetlands. CIG stated that it would install a temporary rock-flume bridge across the wetland on the access road to prevent rutting and other disturbance during construction. CIG would remove the bridge and restore the wetland to its original condition after construction. By removing the bridge and restoring the wetland, we believe impacts on the wetland would be adequately mitigated and/or minimized. CIG would be required to obtain all necessary federal and state permits to place the temporary bridge in the wetland, including, but not limited to, permits from the USACE and Colorado Department of Public Health and Environment. We note that the USACE may have additional requirements about wetland impacts in its permit.

All contractor and pipe yards identified in appendix L were surveyed for wetlands and no wetlands were identified.

All but one of the proposed aboveground facilities sites were inspected for wetlands. The only site not inspected was the proposed site for a MLV on Line 250A at MP 70.6, for which landowner permission for access had not been granted. No wetlands have been identified within any of the surveyed sites for aboveground facilities.

The primary impact of pipeline construction and right-of-way maintenance activities on wetlands would be the temporary and permanent alteration of wetland vegetation. These effects would be greatest during and immediately following construction. Generally, the wetland vegetation community would eventually transition back into a community with functionality similar to that of the wetland before construction. In the emergent and scrub-shrub wetlands crossed by the proposed Project, the herbaceous and shrub vegetation would regenerate quickly (typically within 1 to 3 years). Once revegetation is successful, there would be little permanent impact on emergent wetland vegetation in the maintained right-of-way because these areas naturally consist of and remain as an open and herbaceous community and herbaceous wetland vegetation in the pipeline right-of-way is not generally mowed or otherwise maintained. Our Plan allows maintenance clearing to be conducted not more than once every three years. Scrub-shrub wetlands currently located within proposed permanent pipeline right-of-way would likely be maintained as an herbaceous community.

Other types of impacts associated with construction of the pipeline could include temporary changes in wetland hydrology and water quality. During construction, failure to segregate topsoil over the trench line in non-saturated wetlands could result in the mixing of the topsoil with the subsoil. This disturbance could result in altered biological activities and chemical conditions in wetland soils and could affect the reestablishment and natural recruitment of native wetland vegetation after restoration. In

addition, inadvertent compaction and rutting of soils during construction could result from the movement of heavy machinery and the transport of pipe sections. The resulting alteration of the natural hydrologic patterns of the wetlands could inhibit seed germination or increase the potential for siltation. Construction clearing activities and disturbance of wetland vegetation could also temporarily affect the wetland's capacity to buffer flood flows and/or control erosion.

Construction would disturb about 6.34 acres of emergent wetland. No permanent impacts would be expected on emergent wetlands. About 0.44 acre of scrub-shrub wetlands would be disturbed during construction, less than half of which would be maintained within the permanent pipeline right-of-way. No wetlands would be permanently filled or drained as a result of the proposed Project.

Typical wetland construction methods are described in section 2.3.2. Most of the wetlands in the proposed Project area are only intermittently saturated and construction during dry conditions would reduce the potential for rutting, soil compaction, topsoil mixing, and siltation.

The majority of the wetlands that would be crossed by the pipeline routes fall under the jurisdiction of the USACE. CIG would minimize impacts on these wetlands by complying with the USACE's Section 404 permit conditions. CIG would further minimize impacts on wetlands by complying with state-issued Section 401 water quality certifications or waivers. Additionally, CIG's Procedures describe the measures to minimize the potential effects of the proposed Project. Some of the relevant mitigation measures specified in CIG's Procedures regarding wetland construction are described below.

- Limit the width of the construction right-of-way to 75 feet, unless a wider right-of-way is requested on a site-specific basis and an alternative measure is approved.

- Limit the operation of construction equipment within wetlands to that equipment essential for clearing, excavation, pipe installation, backfilling, and restoration.

- Segregate topsoil from the trench line in non-saturated wetlands.

- Limit grading in wetlands to directly over the trench line, except where necessary to ensure safety.

- Limit grading by using low ground weight construction equipment, or operating equipment from prefabricated timber mats or geotextile fabric overlain with gravel in saturated or standing water wetlands.

- Install trench breakers at the boundaries of wetlands as needed to prevent draining of a wetland and to maintain original wetland hydrology.

- Prohibit storage of hazardous materials, chemicals, fuels, and lubricating oils within a wetland or within 100 feet of a wetland boundary.

- Consult with the appropriate land management or state agencies to develop plans for revegetating wetlands, and, where necessary, preventing the invasion or spread of undesirable exotic and invasive vegetation.

- Monitor the success of wetland revegetation annually for a period of 3 years after construction, or until the wetland is successfully revegetated.

Temporary extra workspaces would be required on both sides of most wetland crossings to stage construction, fabricate the pipeline, and store materials. Temporary extra workspaces would be located a minimum of 50 feet from the wetlands' edge, except for wetlands at the South Platte River or where adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. CIG proposes to locate temporary extra workspaces up to the edge and through wetlands at both crossings of the South Platte River. CIG indicated that it would generally locate is proposed pipelines 35 feet from existing pipelines. Our Procedures required that new pipelines be located no more than 25 feet away from existing pipelines in wetlands unless site-specific constraints would adversely affect the stability of the existing pipelines. CIG indicated that a 35-foot separation would be necessary because existing pipelines may deviate up to three feet from their generally accepted centerlines. CIG also stated that a minimum 35-foot separation would be required at tie-in locations to existing pipelines to maintain the stability of the existing pipelines as well as to meet OSHA ditch safety standards. The offset would also facilitate future maintenance inspections of the pipeline where excavation could require safe ditches and could affect the integrity of the adjacent pipelines. For the reasons CIG identified, we believe this is reasonable.

4.4 VEGETATION

The proposed Project would occur within the Central Shortgrass Prairie Ecoregion of the North American Great Plains (Neely, *et. al.* 2006). The Ecoregion encompasses about 55.7 million acres, and stretches across all of eastern Colorado, portions of southeastern Wyoming, western Kansas and Nebraska, the panhandles of Oklahoma and Texas, and northeastern New Mexico. This region lies in the rain shadow of the Rocky Mountains and receives 10 to 25 inches of annual precipitation. The elevation ranges from about 2,500 to 7,000 feet. (Neely, *et al.* 2006). In Colorado, about 67 percent of the historical shortgrass prairie still exists, although some sources suggest that only 20 percent of the original shortgrass prairie exists in an unaltered state, the rest having been converted to cropland and urban development or degraded by overgrazing. Much of Central Shortgrass Prairie Ecoregion has been converted to agricultural land or grazed by livestock.

4.4.1 Upland Vegetation

Pipeline Facilities

Seven upland vegetative cover types would be crossed by the proposed Project including; agriculture, pasture, short grass prairie, CRP land, sand sagebrush shrubland, mixed grass prairie, and riparian forest. Table 4.4.1-1 summarizes the extent of vegetative cover types that would be crossed by each of the four proposed pipeline routes. Vegetative cover was based on field surveys conducted in July and August 2006, and March 2007.

Agricultural Land – Agricultural land comprises about 59 percent of the linear distance crossed by the proposed pipeline routes. This type is routinely planted with grain crops that are grown under either dry or irrigated conditions, including, sunflowers (*Helianthus spp*.), sorghum (*Sorghum bicolor*), corn (*Zea mays*), and wheat (*Triticum aestivum*), as well as fodder crop such as alfalfa (*Medicago sativa*). Agricultural land can harbor a populations of weedy plant species such as cheatgrass (*Bromus tectorum*), musk thistle (*Carduus nutans*), dandelion (*Taraxacum officinale*), field bindweed (*Convolvulus arvensis*), bull and Canada thistle (*Cirsium vulgare* and *C. arvense*, respectively), sand bur (*Cenchrus longispinus*), foxtail barley (*Hordeum jubatum*), puncture vine (*Tribulus terrestris*), and cocklebur (*Xanthium strumarium*).

Table 4.4.1-1 – Vegetation Cover Types Crossed by Pipeline Routes

Vegetation Type	Line 250A (miles)	Line 251A (miles)	Line 252A (miles)	Line 253A (miles)	TOTAL (miles)
Agricultural	46.3	42.1	6.5	2.2	97.0
Pasture	11.5	1.9	4.0	3.2	20.7
Short Grass Prairie	13.8	0.7	3.5	0.0	18.1
CRP	11.5	1.8	0.0	0.0	13.3
Sand Sagebrush Shrubland	0.0	9.8	0.0	0.0	9.8
Mixed Grass Prairie	0.7	1.4	0.2	0.0	2.3
Riparian Forest	0.6	0.0	0.3	0.0	0.8
Industrial[a]	0.1	0.1	0.2	0.6	1.0
Wetland[b]	0.4	0.0	0.2	0.1	0.7
	84.9	57.9	14.9	6.1	163.7

[a] Although industrial land is included here, it does not support a vegetative cover type and is not discussed further in this section.

[b] Wetland vegetation is discussed in Section 4.4.2.

Pasture – Pasture land comprises about 13 percent of the linear distance crossed by the proposed pipeline routes. It is dominated by planted herbaceous species that are used as livestock forage, such as, smooth brome (*Bromus inermis*), western wheatgrass (*Pascopyrum smithii*), and red clover (*Trifolium pratense*). Many weedy plant species that occur in agricultural land can also occur in the pasture land.

Shortgrass Prairie – The shortgrass prairie type comprises about 11 percent of the linear distance crossed by the proposed pipeline routes. Low stature sod forming drought resistant grasses such as blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*) are typically dominant in this type (Sims, P. L. 1988; in Barbour and Billings 1988). Additional herbaceous species documented in this type in the proposed Project area include, side-oats grama (*Bouteloua curtipendula*), little bluestem (*Andropogon scoparius*), three-awn grass (*Aristida purpurea*), Kentucky bluegrass (*Poa pratensis*), sandberg bluegrass (*Poa secunda*), alkali sacton (*Sporobolus airoides*), sand dropseed (*Sporobolus cryptandrus*), needle-and-thread (*Stipa comata*), Junegrass grass (*Koeleria macrantha*), false buffalo grass (*Munroa squarrosa*), and western wheatgrass (*Pascopyrum smithii*). Some forbs common to the type include sand verbena, prickly poppy (*Argemone hispida*), ironweed (*Bassia sieversiana*), Rocky mountain bee plant (*Cleome serrulata*), buckwheat (*Eriogonum annuum*), golden aster (*Heterotheca canescens*), curlycup gumweed (*Grindelia squarrosa*), gayfeather (*Liatris punctata*), hoary aster (*Machaeranthera canescens*), copper mallow (*Sphaeralcea coccinea*), and vervain (*Verbena bracteata*). Shrubs include fringed sagebrush (*Artemisisa frigida*), four-winged saltbush (*Atriplex canescens*), and prickly-pear cactus (*Opuntia polacantha*). The 2006 field investigations catalogued numerous weedy plant species in this type including cheatgrass, sandbur (*Cenchrus* sp.), yellow thistle (*Centaurea solstitialis*), bull thistle, and puncture vine; however, the extent of occurrence was not been documented.

CRP – The CRP is a voluntary program for agricultural landowners designed to enhance the environment. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover. The CRP protects groundwater and helps improve the condition of lakes, rivers, ponds, and streams by reducing water runoff and sedimentation. Land enrolled in the CRP is planted to resource-conserving vegetative covers, making the program a major contributor to increased wildlife populations in many parts of the country. Plant species typical of CRP land is similar in nature to those described for the short grass prairie type. Table 4.4.1-2 summarizes the locations and amounts of CRP land crossed by the pipelines.

Table 4.4.1-2 – CRP Lands

Pipeline Segment / MPs	Approximate Distance (miles)
LINE 250A	
8.9 – 10.4	1.5
13.5 – 13.9	0.4
14.0 – 15.8	1.8
16.3 – 17.4	1.1
17.6 – 19.2	1.6
19.7 – 22.2	2.5
30.2 – 30.6	0.4
30.9 – 31.0	0.04
31.3 – 32.0	0.7
46.5 – 47.5	1.0
53.6 – 54.1	0.5
77.7 – 78.0	0.3
	11.84
LINE 251A	
29.6 – 29.6	0.04
39.4 – 41.0	1.6
43.6 – 43.8	0.2
	1.84
LINES 252A & 253A	
None	
	13.68

About 13.7 miles (8 percent) of CRP land would be crossed by the pipeline routes. The primary potential impact on CRP land resulting from a construction project is that the land may be taken out of its existing use and used in a manner that is inconsistent with the CRP. In that case, the land could potentially become disqualified from the CRP. After construction, CIG would restore CRP land in a manner that is consistent with the existing use of the land. Therefore, no CRP land would be permanently affected by the proposed Project or disqualified from the CRP.

Sand Sagebrush Shrubland – The sand sagebrush shrubland type comprises about six percent of the linear distance that would be crossed by the proposed pipeline routes. It occurs on sandy rolling hill terrain in Morgan County. This land type is found on somewhat excessively to excessively well-drained, deep sandy soils that are often associated with dune systems and adjacent floodplains. This system often intergrades closely with shortgrass prairie forming a locally patchy sandsage/shortgrass matrix, limiting accurate demarcation of the two types (Colorado Natural Heritage Program (CNHP) 2007). Throughout its range, it is characterized by a sparse to moderately dense woody layer dominated by sand sagebrush (*Artemisia filifolia*). These shrubs usually do not grow as clumps but as individuals, and the intervening ground is most often dominated by a sparse to moderately dense layer of tall, mid, or short grasses. In the sand hills of Colorado, sand sagebrush forms a "subclimax" community with sand sagebrush as a dominant shrub.

In addition to sand sagebrush, soapwood (*Yucca glauca*) and sandhill plum (*Prunus angustifolia*) are present in the shrub layer of this type. Species along the proposed Project route in the herbaceous layer include sand dropseed, prairie and big sandreed (*Calamovilfa longifolia* and *C. gigantea*, respectively), sandbur, sand lovegrass (*Eragrostis trichodes*), switchgrass (*Panicum virgatum*), blowout grass (*Muhlenbergia pungens*), sand paspalum (*Paspalum setaceum*). Forb species include annual eriogonum (*Eriogonum annuum*), sand verbena (*Abronia fragrans*), western ragweed (*Ambrosia psilostachya*), narrow beardtongue (*Penstemon angustifolius*), scurf pea (*Psoralidium tenuiflorum*), prairie coneflower (*Ratibida columnifera*), copper mallow, wild gourd (*Cucurbita foetidissima*), curly cup gumweed, and rusty lupine (*Lupinus pusillus*). Sandbur is the only plant occurring in the list of species documented in this vegetation type that is considered to be weedy in nature. CIG has indicated this vegetation type has been subject to livestock grazing.

Mixed Grass Prairie – Mixed grass prairie type would comprise less than one percent of the linear distance crossed by the proposed pipeline routes. This system historically dominated large areas of the sandhills of eastern Colorado in the early 1900s but by the late 1940s, most of these communities had been replaced by shortgrass or sandsage communities due to the effects of grazing and drought (McGinnies, *et al.* 1991; in CNHP 2007). The mixed grass prairie type is characterized by a canopy which supports a mixture of short-grass and mid-grass prairie species, occurring on relatively flat undisturbed terrain. Plant species catalogued during CIG's 2006 field investigations include, blue grama, side-oats grama, three-awn (*Aristida purpurea*), little bluestem, western wheatgrass (*Agropyron smithii or Pascopyrum smithii*), green needle grass (*Stipa viridula*), switchgrass (*Panicum virgatum*), golden prairie clover (*Dalea aurea*), copper mallow, and woolly verbena (*Verbena stricta*). Mesic and/or saline areas in the mixed grass prairie type may support inland saltgrass (*Distichlis spicata*), prairie cordgrass (*Spartina pectinata*), Illinois bundleflower (*Desmanthus cooleyi*), American licorice (*Glycyrrhiza lepidota*), alkali scaton, and four-wing saltbush. The native mixed grass prairie type is generally subject to livestock grazing in the proposed Project area except where designated as CRP. The 2006 field investigations also catalogued several weedy plant species, including cheatgrass, wooly mullein (*Verbascum thapsus*), and thistles (*Cirsium spp.*). The extent of occurrence of these plants was not documented.

Riparian Forest – Riparian forest type would comprise less than one percent of the linear distance crossed by proposed pipeline routes and primarily occurs at the two South Platte River crossings. Typical vegetation at these sites include narrow leaf and eastern cottonwood (*Populus angustifolia* and *P. deltoides*, respectively), peach-leaf willow (*Salix amygdaloides*), green ash (*Fraxinus pennsylvanica*), and elm (*Ulmus sp.*). The understory supports varying vegetative cover including short and mixed grass prairie and occasionally wet meadow.

CIG's proposed pipeline construction right-of-way, temporary extra workspaces, access roads, and contractor yards would directly impact a total of 2,635.5 acres of land. About 57 percent of the land would be of agricultural type, while about 21 percent would be of mixed grass prairie, short grass prairie, sand sagebrush shrubland, and riparian forest types, and 21 percent would be of pasture and CRP types. The remaining land supports either wetland or industrial land types. Table 4.4.1-3 identifies acreages of the vegetation types that would be directly affected by construction and operation of pipeline facilities.

The primary direct impact from pipeline construction is the initial clearing of the vegetative layer on the ground within an approximate 100-foot-wide construction right-of-way and associated additional temporary workspaces. CIG indicated that the extent of clearing and grading within this 100-foot-wide corridor would vary depending upon topographic conditions.

The impacts of clearing can be effectively minimized through the use of special construction techniques and through proper mitigation and post-construction monitoring. CIG developed a set of measures it would use during and after the proposed construction activates in upland vegetation types.

These measures are fully detailed in CIG's Plan, Reclamation Plan, and Invasive Species Plan (see appendices D, H and I, respectively). In relatively level terrain, CIG would attempt to limit grading, topsoil segregation, and ditch line excavation to an approximate 14- to 18-foot-wide pipeline trench, while in uneven terrain, the entire proposed 100-foot-wide construction corridor may be subject to clearing and grading for safety and construction needs. By limiting grading and topsoil segregation, CIG would leave as much sod and root layer intact as practical increasing the probability that post-construction revegetation would be successful. Further, it would reduce the potential for weedy native and nonnative plant species to become a dominant component. In the sand sagebrush shrubland type, the shrub layer throughout the entire construction right-of-way likely would be removed for construction accessibility and safety reasons, changing the dominant overstory component from a shrub layer to an herbaceous layer. Disturbance of this type could result in the development of a weedy plant component.

Table 4.4.1-3 – Vegetation Cover Types Affected by Pipeline Facilities

Vegetation Cover Type	Line 250A (acres)		Line 251A (acres)		Line 252A (acres)		Line 253A (acres)		TOTAL (acres)	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
Agricultural	680.2	280.4	540.8	254.8	112.7	39.3	61.7	13.1	1395.5	587.6
Pasture	186.0	69.5	28.8	11.8	62.0	24.1	60.4	19.5	337.2	124.9
Short Grass Prairie	185.4	83.4	24.9	4.4	50.7	21.5	0.0	0.0	261.0	109.2
Sand Sagebrush Shrubland	0.0	0.0	179.1	59.6	0.0	0.0	0.0	0.0	179.1	59.6
CRP	150.0	71.5	22.7	11.1	0.0	0.0	0.0	0.0	172.7	82.7
Mixed Grass Prairie	9.9	4.2	19.8	8.4	2.4	1.2	0.0	0.0	32.0	13.8
Riparian Forest	22.1	3.1	0.0	0.0	8.6	1.6	0.0	0.0	30.7	4.7
Industrial[a]	1.5	0.7	1.6	1.5	1.8	0.9	7.3	3.7	12.1	6.8
Wetland[b]	3.9	1.7	0.2	0.1	2.3	1.2	0.5	0.1	6.9	3.0
	1,238.8	514.6	818.0	351.7	240.5	89.7	129.9	36.3	2,427.3	992.3

[a] Although industrial land is included here, it does not support a vegetative cover type and is not discussed further in this section.

[b] Wetland vegetation is discussed in Section 4.4.2

To enhance revegetation of disturbed portions of the construction right-of-way, CIG would strip topsoil over the trench line only. The working and spoil sides of the right-of-way would be mowed to promote equipment passage. The topsoil from the trench would be placed immediately next to the trench on the working side where the pipeline would be strung and welded and would remain there until after the trench is backfilled. The segregated topsoil would then be spread over the trench line. CIG states that storing topsoil in this manner would result in less ground disturbance, preserve existing root stock, and reduce the potential for wind erosion than other topsoil stripping and storage methods. The existing seedbank within the replaced topsoil should provide increased revegetation success. However, the results of this process can be less than favorable. Weedy species are among the largest component of grassland seed banks (Rice 1989; in Leck, *et al.* 1989). The documented presence of numerous weedy species within all the vegetative types inventoried in 2006 indicates that some degree of colonization of all disturbed sites is likely to occur. Disturbed sites often experience bursts of weedy annuals in response to disturbance. However, after each isolated episode of rapid growth, the population of weedy species decline as vegetation slowly recovers from disturbance (Rice 1989; in Leck *et al.* 1989).

In order to expedite revegetation and reduce the potential for soil erosion, CIG would reseed the disturbed sites as specified in its Reclamation Plan (see appendix H). The native seed mix specified in CIG's Reclamation Plan includes species similar to those presiding in the natural plant communities and would facilitate the recovery of the preconstruction plant community. Actively reseeding the area also

would help reduce the development of weedy plant species in the disturbed sites. CIG stated in its Reclamation Plan that it would monitor the success of seeding operations for three growing seasons following construction. Revegetation would be considered successful when the density of vegetative cover within the construction right-of-way is similar to the adjacent undisturbed land. Agriculture areas, unless specified by the landowner, would not be reseeded.

Direct impact on agriculture land from the proposed Project would be short term, given that this type of land is routinely disturbed during normal crop rotation. The development of weeds in agricultural land following construction would be a concern. Crop seeds deposited on the disturbed soils of arable land comprise a small portion of the seedbank. The vast majority (over 95 percent) of seeds entering the seed bank come from annual weeds growing on that land (Roberts 1891; Hume and Archibold 1986; in Cavers and Benoit 1989; in Leck *et al.* 1989).

The spread of weeds or noxious seed from agriculture land to any adjacent natural vegetative community disturbed during construction is also a concern. The pattern of seed distribution within a field generally follows the direction of the crop rows (Benoit 1986; McCanny and Cavers 1988; in Cavers and Benoit 1989; in Leck *et al*. 1989) and the greatest diversity of weed species is found at the edges (Cavers and Benoit 1989; in Leck *et al*. 1989) due in part to the characteristics of weed seed dispersal and farm machinery movement. The extent of weed seeds present in the soil depends on numerous factors including, crop rotations, fallowing, and cultivation cycles (Schweizer and Zimdahl 1984; in Cavers and Benoit 1989; in Leck *et al.* 1989).

CIG developed an Invasive Species Plan (see appendix I) which identifies the locations of specific State of Colorado-listed A, B, and C plant species occurring along the proposed pipeline routes and addresses mitigation and monitoring to be utilized to control the spread of weeds present in the Project area. Examples of mitigation measures include cleaning equipment before arrival at the work site and establishing cleaning sites at known noxious weed infestation locations on the right-of-way. Although arable land provides ideal habitat for the development of weed seedbanks and it is likely that weed species would still be an important component of the agriculture land following construction, mitigation measures employed by CIG should reduce the spread of weeds from cultivated lands to adjoining natural communities. A more detailed discussion of weeds and undesirable vegetation is included in section 4.4.4.

Direct impacts on the pasture land would be short term, as it typically supports a high percentage of planted forage crop and would be reseeded with a seed mix that is compatible with current conditions following construction. Pasture would be susceptible to an increase in weed species similar to agricultural land; however mitigation measures proposed by CIG should minimize the colonization of weed species. A commenter expressed concern that the proposed project would negatively impact natural grass pasture on their property and inquired how CIG proposes to restore natural grass pasture to its pre-construction state. CIG indicated that it would replant native grass pastures in accordance with NRCS or landowner recommendations. CIG would conduct follow-up inspections of all disturbed areas the first and second growing seasons to determine the success of revegetation. Revegetation in natural grass prairies would be considered successful, if upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed areas. In accordance with CIG's Plan, revegetation efforts would continue until revegetation is successful.

Much of the mixed and short grass prairie types that would be crossed by the Project occur as patches in a landscape that has been highly fragmented by the historic development of agriculture land. Based on a review of vegetation maps developed from CIG's 2006 field assessments and conversations with field biologists (Moholt 2007), the highest frequency of occurrence of relatively intact natural short grass prairie type is between MPs 0 and 14 on Line 250A, while frequent patches of the mixed grass

prairie type occur along the same route between MPs 0 and 22. The majority of sites supporting these vegetation types in the proposed Project area have been degraded as a result of the development of a suite of non-native plants.

The recovery of vegetation in the mixed and short grass prairie types is a long-term process. Though a substantial group of native plant species may be present in seedbank of the reclaimed segregated topsoil, the dry to xeric conditions typical of the proposed Project area may greatly reduce the germination and establishment of the seedlings. It may take greater than 20 years for the prairie plant community to reestablish itself following the disturbance of the sod layer (Moholt 2007).

Although disturbance to mixed and short grass prairie could initiate an increase in plant species diversity, many of these species may be annual weeds. With time, however, the native perennial species present prior to construction should become dominant again. CIG would implement its Invasive Species Plan in an attempt to curb the frequency of occurrence of weedy and noxious plant species. One of the most beneficial mitigation measures that CIG would employ to restore the plant community and reduce occurrence of weed species would be to minimize the amount of clearing and grading in the proposed right-of-way by restricting topsoil segregation to the trench line only.

The clearest direct effect to the sand sagebrush shrubland type from construction is the removal of the overstory shrub component. The recovery of this plant community is likely a long-term process. Initially, there would be an increase in herbaceous cover with many of the plants being weed species. Over time, native species diversity would increase.

The principal direct long-term to permanent effect of construction through riparian forest types and associated wetlands is the removal of the tree, shrub, and herbaceous layers. The function of riparian areas varies with vegetation structure, composition, and abundance; ecological diversity; and landscape position. Western riparian ecosystems provide several ecological services including stabilizing streambanks, trapping sediment, improving water quality, and controlling or modulating hydrologic processes (Patten 1998). CIG stated that riparian canopy or stabilizing vegetation would not be removed if possible. To the extent practicable, no cottonwood trees over 12 inches in diameter at breast height (dbh) would be removed from the right-of-way, except at the two South Platte River crossings where CIG would need to remove cottonwoods greater than that size. Trees and shrubs within temporary workspaces would be allowed to regenerate. The rate of regrowth would depend on the type and age of vegetation cleared and the fertility of the soil. But, regrowth of mature trees would probably take more than 20 years and would be considered a long-term impact. The removal of the vegetative layer can result in increased potential for erosion and sediment deposition into the adjoining water body. As well, the disturbed soils can promote the development of native and/or nonnative weedy invasive species.

The potential occurrence of salt cedar (*Tamarix ramosissima*) and the documented presence of Russian olive (*Elaeagnus angustifolia*) at the two crossings of the South Platte River (Line 250A- MP 41.3 and Line 252A-MP 11.6) pose a concern in the proposed Project area. Salt cedar's success in riparian environments in the southwest appears to be a function of its phenomenal reproductive output and its greater drought and flood tolerance, as compared to sandbar willow (*Salix exigua*) (Colorado Plateau – Land Use History of North America 2007). Russian olive can spread prolifically through dispersal of seed by songbirds.

Herbaceous exotics are also becoming prevalent in many riparian understory communities (Stromberg and Chew, 1997; in Patten 1998). The riparian areas in the proposed Project area support a significant amount of weedy exotic plant species. Field surveys conducted in 2006 indicate that the riparian forest type in the proposed Project area have come under heavy grazing pressure and currently support limited understory woody plants and a large diversity of invasive and noxious weeds. Regardless

of the control measures employed, it is likely that these opportunistic species would influence the post-construction vegetative conditions.

Aboveground Facilities

Aboveground facilities would consist of 10 meter stations, 12 pig launchers/receivers, and 19 MLVs, all of which would be installed at 18 separate sites. Five of the sites would be within existing CIG compressor or meter stations; eight would be within the permanent pipeline right-of-way; and the remaining five would be new sites that either straddle or would be adjacent to the permanent right-of-way. Aboveground facility sites would be graveled and fenced.

The construction of aboveground facilities would cause temporary and permanent impacts on vegetation communities. About 47.6 acres of land would be used during construction of aboveground facilities. Excluding facilities within existing CIG compressor or meter stations where vegetation cover is not supported, about 19.0 acres of vegetation would be affected during construction. After construction, 10.7 acres would be permanently lost because these sites would be graveled. Table 4.4.1-4 provides a summary of temporary and permanent impacts on vegetation due to construction and operation of the aboveground facilities.

Table 4.4.1-4 – Vegetation Cover Types Affected by Aboveground Facilities

Associated Pipeline / Aboveground Facilities	MP	Collocated with Existing Facility[a]	Vegetation Cover	Temporary Impacts (acres)	Permanent Impacts (acres)
LINE 250A					
2 Meter Stations, 1 Launcher, 1 MLV	0.0	Cheyenne CS	Industrial[b]	5.9	0.9
1 MLV	15.7		Agricultural	< 0.1	< 0.1
1 MLV	30.8		CRP	< 0.1	< 0.1
1 MLV	42.4		Agricultural	< 0.1	< 0.1
1 MLV	50.4		Pasture	< 0.1	< 0.1
1 Launcher, 1 Receiver, 1 MLV	62.5		Short Grass Prairie	3.7	0.9
1 Meter Station	64.5		Pasture	3.7	0.9
1 MLV	70.6		Agricultural	< 0.1	< 0.1
1 Meter Station, 1 Receiver, 1 MLV	84.8		Agricultural	3.7	3.7
LINE 251A					
1 Meter Station, 1 Launcher, 1 MLV	0.0	Watkins CS	Industrial[b]	8.7	0.9
1 MLV	7.4		Agricultural	< 0.1	< 0.1
1 Launcher, 1 Receiver, 3 MLVs	21.5		Agricultural	0.0[c]	0.0[c]
1 MLV	38.5		Agricultural	< 0.1	< 0.1
2 Meter Stations, 1 Receiver, 1 MLV	57.9		Agricultural	3.7	3.7
LINE 252A					
1 Launcher	0.0		Short Grass Prairie	0.0[d]	0.0[d]
1 MLV	8.3		Agricultural	< 0.1	< 0.1
1 Meter Station, 1 Receiver, 1 MLV	14.9		Pasture	3.7	0.9
LINE 253A					
1 Launcher, 1 MLV	0.0	Watkins CS	Industrial[b]	6.7	0.9
1 Meter Station, 1 Receiver, 1 MLV	6.0	East Denver MS	Industrial[b]	6.7	0.9
EXISTING LINES 2A & 2B					
1 Meter Station	228.8	Watkins CS	Industrial[b]	0.7	0.1

Table 4.4.1-4 (cont.) – Vegetation Cover Types Affected by Aboveground Facilities

Associated Pipeline / Aboveground Facilities	MP	Collocated with Existing Facility[a]	Vegetation Cover	Temporary Impacts (acres)	Permanent Impacts (acres)
SUBTOTALS			Agricultural	7.7	7.9
			Pasture	7.4	1.9
			Short Grass Prairie	3.7	0.9
			CRP	<0.1	<0.1
			Mixed Grass Prairie	-	-
			Industrial[b]	28.7	3.7
				47.6	14.5

[a] CS = Compressor Station; MS = Meter Station

[b] Vegetative impacts would not occur because industrial land does not support a vegetative cover type.

[c] These aboveground facilities would be installed at the same site as the aboveground facilities on Line 250A at MP 84.8.

[d] These aboveground facilities would be installed at the same site as the aboveground facilities on Line 250A at MP 62.5.

4.4.2 Wetland Vegetation

Forty-two (42) jurisdictional wetlands were delineated along the proposed pipeline routes and one wetland was delineated along a temporary access road. No wetland resources would be affected by the construction or operation of the aboveground facilities associated with the proposed Project. Over 88 percent of the wetlands delineated were classified as PEM systems, with the remaining supporting either PSS or a combination of PEM and PSS. Wetland impacts and mitigation are discussed in further detail in section 4.3.3.

PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years and is typically perennial in nature. These systems are commonly called a marsh, meadow, fen, prairie pothole, and slough (Cowardin, *et al.* 1979). The wetlands delineated within the proposed pipeline routes support a variety of native hydrophytes and nonnative species that are not typical hydrophytes but often colonize wetland sites. Native herbaceous hydrophytes observed include; water, Nebraska, clustered field, and beak sedge (*Carex aquatilis*, *C. nebrascensis*, *C. praegracilis*, and *C. rotrata*, respectively), saltgrass (*Distichlis spicata*), Baltic rush (*Juncus articus*), nuttall alkaligrass (*Puccinellia nuttallina*), hardstem and three-square bulrush (*Schoenoplectus acutus* and *S. pungens*, respectively), alkali bulrush (*Bolboschenus maritimus*), broad-leaved cattail (*Typha latifolia*), lady's thumb (*Persicaria maculata*), pale dock (*Rumex altissimus*), and celery-leaf buttercup (*Ranunculus sceleratus*). Nonnative, often weedy, species observed include quackgrass (*Elymus repens*), red-root amaranth (*Amaranthus retroflexa*), giant ragweed (*Ambrosia trifida*), two-seed orache (*Atriplex heterosperma*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), prickly lettuce (*Lactuca serriola*), common plantain (*Plantago major*), narrow-leaf dock (*Rumex stenophyllus*), Russian thistle (*Salsola kali*), sow thistle (*Sonchus sp.*), dandelion (*Taraxacum officinale*), cocklebur (*Xanthium strumarium*), and reed canary grass (*Phalaris arundinacea*).

The PSS wetlands include areas dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. The woody species observed in the PSS system within the proposed pipeline routes include sandbar willow and crack willow (*Salix fragilis*), eastern cottonwood, and Russian olive. Both crack willow and Russian olive are naturalized species. Russian olive is considered an invasive species. The extent of occurrence of this species in the PSS wetlands is not known. In the proposed

Project area the PSS wetlands typically support an understory herbaceous layer similar to the PEM systems.

No forested wetlands were delineated during the field investigations; however, riparian forest type is reported along the South Platte River. CIG's proposed mitigation of riparian forest impacts is addressed in section 4.4.1.

All disturbed wetlands would be allowed to revegetate naturally. CIG plans to remove and store topsoil separately from subsoil in unsaturated wetlands in an attempt to facilitate the germination of any existing seed bank. The presence of a seed bank does not guarantee seed germination and seedling survival. The success would be dictated in part by the species that comprise the seed bank, environmental influences such as hydrological cycle, soil compaction, soil chemistry, seed viability, light, and resource competition within the species that develop. The surface layer disturbance in wetlands can serve to stimulate the germination and development of a suite of native and non-native wetland species.

Weedy native and non native species could pose an initial threat to the success of the natural restoration process; however, if the seed bank has a significant number of native species and hydrologic and soil conditions are restored to near normal, it is likely that most wetlands would develop a vegetative community similar to preconstruction conditions.

Salt cedar and purple loosestrife (*Lythrum salicaria*) were reported on CIG's observed plant list, but were not identified as occurring in delineated wetlands for the proposed Project. Purple loosestrife, observed at MP 20.81 on Line 251A, is an A List Noxious weed in Colorado. Salt cedar, observed near MP 41.29 on Line 250A, is an B List Noxious weed in Colorado. These areas would be monitored following construction to ensure they do not spread into disturbed wetland areas. CIG would implement the procedures described in its Invasive Species Plan to minimize the spread of noxious weeds due to construction activities (see section 4.4.4).

In PSS wetlands, the clearing of woody plants during construction would result in an obvious change in the structure of the wetland. It is likely that disturbed areas would be colonized and dominated, at least in the short term, by herbaceous species present in the seed bank. In the long-term, the disturbed areas should recolonize with shrub species, in particular, sandbar willow, which can be a prolific colonizer of sites via vegetative propagation.

Wetlands would undergo a limited amount of routine maintenance following construction and restoration. CIG would limit annual maintenance to clearing a 10-foot-wide strip centered over the pipeline. Trees and shrubs within 15 feet of the pipeline centerline, that are greater than 15 feet tall, may be selectively cut and removed. These activities would alter the long-term structural character of wetlands. However, this alteration has been minimized to the greatest extent practicable by minimizing the construction right-of-way width through wetlands, avoiding construction within wetlands where alternative routes are feasible, not placing any aboveground facilities in wetlands, minimizing right-of-way maintenance activities, and by restoring the disturbed wetland areas following construction.

4.4.3 Vegetation Communities of Special Concern or Value

There are no vegetation community types in the proposed Project area that are legally protected. The CNHP does, however, track many of the naturally occurring systems and has assigned a conservation rank to them. The Central Shortgrass Prairie Initiative (Neely, *et al.* 2006) conducted a comprehensive assessment of areas within the Central Shortgrass Prairie Ecoregion that are deemed as important places for conserving a long-term representative functional diversity of the Central Shortgrass Prairie Ecoregion. Portions of Lines 250A and 251A would cross proposed Conservation Areas within the Central

Shortgrass Prairie Ecoregion. Line 250A would cross about eight miles (MP 0 to MP 8) of the Greater Pawnee Conservation Area that supports relatively contiguous short grass prairie type. Line 251A would cross about 10 miles (MP 47 to MP 57) of the South Platte Sandhills Conservation Area which supports relatively contiguous sand sagebrush shrubland type. Sand sagebrush shrubland occur in other locations along the proposed pipeline routes outside of the designated Conservation Areas, such as along Line 250A from MP 59.5 to 62.2 and Line 252A from MP 0 to 3 and MP 6 to 7. These sites occur as generally isolated patches in a rather fragmented landscape. The short grass prairie and sand sagebrush shrubland types within the aforementioned Conservation Areas support the highest quality upland vegetative communities observed along the proposed pipeline routes, and although they have undergone grazing, have not had significant disturbance to the soil layer (Moholt 2007). Mitigation and reclamation procedures through Conservation Areas would be similar to those described for upland and wetland vegetation communities.

The short grass prairie type is conservation ranked as G2G4; S3 (CNHP 2007). The G ranking is regarded as a "global status", and in this case, the variant rank of G2G4 indicates a range of uncertainty in the status of the community, that ranges from being imperiled (G2) to apparently secure (G4). The S3 is a State of Colorado ranking that indicates the community is considered to be vulnerable and at moderate risk. This system can support keystone wildlife species, several associated with prairie dog colonies. The wildlife present in these types is detailed in section 4.5 of this document.

The sand sagebrush shrubland type is assigned a conservation rank of G3?; S2, indicating the vegetation type is thought to be to globally vulnerable but that the ranking is inexact (?), while in the State of Colorado the type is vulnerable to extirpation or extinction.

The mixed grass prairie occurs largely as patches within a fragmented landscape dominated by agriculture type. Natural mixed grass prairie type is conservation ranked G1G2; S1S2. The variant rank of G1G2 indicates a range of uncertainty in the global status of the community that ranges from critically imperiled (G1) to imperiled (G2). The S1S2 ranking indicates that the community type is critically imperiled (S1) to imperiled (S2) in the State of Colorado. The largest contiguous mixed grass prairie mapped along the proposed pipeline routes occurs along Line 250A between MP 15.5 and MP 22. Other occurrences include those along Line 251A at MP 15 to MP 16; MP 29.5; and MP 31.5.

Wetlands occurring along the proposed pipeline routes consist primarily of wet meadow systems, with some Great Plains marsh systems. The wet meadow community type is ranked G4; S3. The Great Plains marsh community type is conservation ranked as G4; S2S3. The riparian type crossed by the proposed Project is ranked a G3G4; S3.

No agency has recommended any special construction or restoration procedures or measures for construction through these vegetation types. Implementing CIG's Plan and Procedures as modified in this document would minimize impacts on all vegetation types affected by construction and operation of the Project.

4.4.4 Noxious Weeds and Other Invasive Plants

When weeds become so wide-spread that they threaten crops, livestock, or native species, they are often put on state list of plants to be attacked in a methodical manner. According to the 6th edition of Troublesome Weeds of the Rocky Mountain West, prepared by the Colorado Weed Management Association, "Biodiversity and ecosystem stability are threatened by noxious weeds. A common characteristic of all noxious weeds is their aggressive, competitive behavior. Typically, they steal precious moisture, nutrients, and sunlight from the surrounding plants. Noxious weeds also alter soil

properties and the composition of plant communities and change the structure of animal communities" (Southwest Colorado Wildflowers, Ferns, and Trees 2007).

The 1974 Federal Noxious Weed Act defines a noxious weed as any living stage, such as seeds and reproductive parts, of any parasitic or other plant of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of Agriculture, including irrigation, or navigation, or the fish or wildlife resources of the United States or the public health (USGS 2007c). Executive Order 13112 (February 1999) directs federal agencies to prevent the introduction of noxious or invasive species; provide for their control; and minimize the economic, ecological, and human health impacts that they cause. The order further specifies that federal agencies shall not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless it has determined that the benefits of such actions outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize risk of harm would be taken in conjunction with the actions.

The Colorado Noxious Weed Act Title 35 Article 5.5, enacted 1996 defines a Noxious Weed as a plant species that is not indigenous (non-native) to the state of Colorado and meets at least one of several criteria regarding their negative impacts upon crops, native plant communities, livestock, and the management of natural or agriculture systems. This definition applies to species listed by the state and local governing bodies. Native plant species, those species that are indigenous to the state of Colorado, may not be designated as noxious weeds by either state or local governments. Invasive plant species, on the other hand, can be weedy in nature, can be either native or nonnative, and are generally considered to be troublesome for many of the same reasons as noxious weeds.

A complete list of noxious and invasive weed species identified within the proposed Project right-of-way is provided in CIG's Invasive Species Plan located in appendix I.

CIG's Invasive Species Plan identifies the methods it would use to reduce the potential spread of weed species. Given the high potential for noxious and invasive species to be present in most seedbanks, it is likely that noxious and invasive species would germinate after construction. Measures taken prior to, during, and after construction to minimize the spread of invasive and noxious species include:

- All Contractor vehicles and equipment would be cleaned prior to arrival at the work site using power or high pressure equipment. The washdown would concentrate on tracks, feet, or tires and on the undercarriage, with special emphasis on axles, frame, cross members, motor mounts, and on underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs would be swept out and refuse would be disposed of in waste receptacles. The Contractor, with EI oversight, would ensure that vehicles and equipment are free of soil and debris capable of transporting noxious weed seeds, roots, or rhizomes before the vehicles and equipment leave the contractor's yard and are allowed use of access roads and the right-of-way.

- In areas where noxious weed infestations have been identified or are noted in the field, the Contractor would stockpile cleared vegetation and salvaged topsoil adjacent to the area from which they are stripped to eliminate the transport of soil-borne noxious weed seeds, roots, or rhizomes. These stockpiled materials would be treated as contaminated and no construction equipment would be allowed to work in or on them. During reclamation, the Contractor would return topsoil and vegetative material from infestation sites to the areas from which they were stripped.

- The Contractor would use water or compressed air and hand tool if needed to remove seeds, roots, and rhizomes from clearing and reclamation equipment used to move vegetation and topsoil before the equipment is moved out of the noxious weed area. Cleaning sites would be recorded using GPS equipment and this information would be reported to the local contact person or agency.

- The Contractor would ensure that all straw or hay bales used for sediment barrier installations or mulch distribution are obtained from state-cleared sources that are free of primary noxious weeds.

- The Contractor would implement the reclamation of disturbed lands immediately following construction as outlined in CIG's Reclamation Plan. Continuing revegetation efforts would ensure adequate vegetative cover to prevent the invasion of noxious weeds.

- The Contractor would apply fertilizer to reclaimed areas according to CIG's Reclamation Plan and as directed by the jurisdictional land management agency, property owner, or EI.

- Before construction, appropriate action, which may include application of herbicides, would be taken on identified weed infestations to reduce the spread or proliferation of weeds. Applications would be controlled to minimize the impacts on the surrounding vegetation. In areas of dense infestation, a broader application would be used and a follow-up seeding program implemented. Treatment methods would be based on species-specific and area-specific conditions (*e.g.*, proximity to water or riparian areas, or agricultural land, and time of year) and would be coordinated with the local regulatory offices.

Reclamation and monitoring of the pipeline right-of-way would begin in the summer of 2009 following 2008 construction. According to CIG's Invasive Species Plan, noxious weed monitoring would be conducted annually for about three years or until control is achieved. We believe that if CIG implements the procedures identified in its Invasive Species Plan, the spread of noxious weeds would be minimized to the greatest extent practicable.

4.5 WILDLIFE AND AQUATIC RESOURCES

4.5.1 Wildlife Resources

The type of wildlife inhabiting an area is directly related to the critical needs of the species to survive and reproduce. The vegetative characteristics (*i.e.*, height, type, and extent of coverage) are a most important cue for many species in determining presence or absence from a particular site. Many species are clearly habitat generalists and adapt to the available habitat. The proposed pipeline route and aboveground facilities traverse a geographic landscape that has been highly fragmented following European settlement. The majority of the current landscape is under cultivation, with the most remaining natural vegetative community types coming under grazing pressure from livestock.

Table 4.5.1-1 provides a partial list of animals that are known to or may occur in the vegetative community types that would be crossed by the proposed Project. Several of the species listed are decidedly opportunistic, and have expanded their range as a result of landscape fragmentation and land use change following European settlement.

Table 4.5.1-1 – Wildlife Typically Found in the Project Area

BIRDS	Savannah sparrow, grasshopper sparrow, vesper sparrow, lark sparrow, Baird's sparrow, Cassin's sparrow, McCown's longspur, chestnut-collared longspur, horned lark, mountain plover, long-billed curlew, burrowing owl, Western meadowlark, ferruginous hawk, red-tailed hawk, prairie falcon, Swainson's hawk, American kestrel, Eastern screech owl, Western screech owl, great horned owl, Northern flicker, Western wood-pewee, Western kingbird, black-billed magpie, blue grosbeak, bald eagle, golden eagle, short eared owl, loggerhead shrike, Northern harrier, European starling, house sparrow, common grackle
MAMMALS	White-tailed jackrabbit, black-tailed jackrabbit, Plains pocket gopher, Northern pocket gopher, olive-backed pocket mouse, Plains pocket mouse, silky pocket mouse, Western harvest mouse, prairie vole, Preble's meadow jumping mouse, meadow jumping mouse, thirteen lined ground squirrel, black-tailed prairie dog, swift fox, white-tailed deer, pronghorn antelope, Plains harvest mouse, deer mouse, ferrel cat, striped skunk, Virginia possum, coyote, red fox, raccoon
REPTILES AND AMPHIBIANS	Orante box turtle, Great Plains skink, Plains spadefoot toad, short-horned lizard, Western terrestrial garter snake, prairie rattlesnake, woodhouse toad, six-lined racerunner, common kingsnake, long-nosed snake, round-tailed horned lizard, Texas blind snake, Northern leopard frog, Plains leopard frog, wood frog

The Central Shortgrass Prairie Ecoregion (see section 4.4.3) supports a significant terrestrial insect/invertebrate component. Some of the butterflies whose range encompasses the proposed Project area include regal fritillary (*Speyeria idalia*), variegated fritillary (*Euptoieta claudia*), monarch (*Danaus plexippus*), queen (*Danaus gilippus*), American lady (*Vanessa virginiensis*), common buckeye (*Junonia coenia*), file crescent (*Phyciodes pulchella*), gorgone checkerspot (*Chlosyne gorgone*), painted creasent (*Phyciodes picta*), painted lady (*Vanessa cardui*), peral creascent (*Phyciodes tharos*), rhesus skipper (*Atrytone arogos*), two-spotted skipper (*Euphyes bimacula*), and Colorado blue (*Euphilotes rita coloradensis*).

Pipeline Facilities

The eight vegetative cover types crossed by the proposed Project all, to some degree, provide habitat for wildlife. Over 59 percent of the proposed pipeline routes would cross agricultural land. Although many species would utilize agricultural land for food and cover, it generally does not provide optimal habitat for most wildlife whose life histories evolved with natural vegetation community types. Within the proposed Project area the short grass prairie, mixed grass prairie, sand sagebrush, riparian forest, and wetland types most closely represent pre-European settlement conditions for wildlife. In general, the highest quality wildlife habitat typically occurs in areas that have undergone the least anthropogenic disturbance.

The proposed pipelines would cross about 34 miles (21 percent) of pasture and CRP land. About 32 miles (19 percent) of the pipeline routes would cross short and mixed grass prairie, sand sagebrush shrubland, riparian forest, and wetland. These vegetative types provide suitable wildlife habitat for many species, including some listed species.

The highest quality prairie occurs at the north end of proposed Line 250A. Several of the prairie sites along the proposed pipeline routes harbor black-tailed prairie dog (*Cynomys ludovicianus*) colonies which are considered a keystone species in the Central Shortgrass Prairie Ecoregion. A keystone species is one whose presence is often associated with the presence of numerous other species, in this case, species of conservation concern in Colorado such as, burrowing owl (*Athene cunicularia*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), and swift fox (*Vulpes velox*). Although these species are not entirely dependent upon black-tailed prairie dogs for completion of their life cycle, they tend to be associated with prairie dog colonies to varying degrees (Grunau, *et al.* 2006).

Riparian forest systems comprise less than 3 percent of the total landscape in the Central Shortgrass Prairie Ecoregion, but up to 80 percent of the resident bird species use them for some part of

their life cycles. This system has the richest avian species component of any of Colorado's habitats (South Platte Wetland Focus Area Committee and Centennial Land Trust (South) 2002). It provides an important corridor for movement of birds that would not typically venture into open grassland systems. Common species in the riparian forest type include American kestrel (*Falco sparverius*), Eastern and Western screech owls (*Otus asio* and *O. kennicotti*, respectively), great horned owl (*Bubo virginianus*), mourning dove (*Zenaida macroura*), Northern flicker (*Colaptes auratus*), Western wood-pewee (*Contopus virens*), Western kingbird (*Tyrannus verticalis*), house wren (*Troglodytes aedon*), black-billed magpie (*Pica pica*), and blue grosbeak (*Guiracea caerulea*).

The most significant riparian system in the proposed Project area occurs along the two proposed crossings of the South Plate River. Hydrologic alterations as the result of large scale anthropogenic activities have altered the historic natural condition along the river corridor. Today, grazing practices and a lack of disturbance by flood events has led to even age stands of mature cottonwoods, decreasing population and community diversity and perhaps causing population declines in many species dependent on these diverse habitats (South 2002).

The South Platte River and the associated wetland complexes are an important migration stopover for waterfowl, shorebirds, and migratory wetland-dependent bird species, particularly during the spring and fall migratory seasons (South 2002). Some of the bird species that are known to utilize river and wetland complexes include bald eagle (*Haliaeetus leucocephalus*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), long-billed curlew (*Numenius americanus*), spotted sandpiper (*Actitis macularia*), Northern pintail (*Anas acuta*), white-faced ibis (*Plegadis chihi*), greater sandhill crane (*Grus canadensis tabida*), eared grebe (*Podiceps nigricollis*), forester's tern (*Sterna forsteri*), lesser scaup (*Aythya affinis*), Wilson's phalarope (*Phalaropus tricolor*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), wood duck (*Aix sponsa*), common goldeneye (*Bucephala albeola*), common merganser (*Mergus merganser*), red heads (*Aythya americana*), blue-winged teal (*Anas discors*), Northern shoveler (*Anas clypeata*), American white pelican (*Pelecanus erythrorhynchos*), Western grebe (*Aechmorphorus occidentalis*), and American coot (*Fulica caribaea*).

The fragmentation of the landscape and continued development of urban and suburban systems in the proposed Project area have provided more suitable habitat for opportunistic species and subsequently their populations have increased. The opportunistic species common in the proposed Project area include striped skunk (*Mephitus mephitus*), Virginia possum (*Didelphis virginiana*), coyote (*Canis latrans*), red fox (*Vulpes fulvus*), raccoon (*Procyon lotor*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and common grackle (*Quiscalus quiscala*). Many of these species are known to add significant stress to populations of native species from factors such as predation or competitive exclusion from available habitat

The potential direct and indirect impact of the proposed pipeline facilities on wildlife is dependent upon numerous factors, including; mobility of the species in question, the extent of available suitable habitat immediately adjacent the proposed pipeline corridor, the habitat spatial requirement, the ability of preconstruction vegetative type to recover following construction, the life history of the species affected, and ability of the affected species to adapt or tolerate disturbed site conditions.

Some species with limited mobility (*i.e.*, rodents, reptiles, amphibians, and insects) would likely be taken during the initial clearing and grading phase of the pipeline construction. More mobile species would be directly displaced from the construction corridor and move into optimal or suboptimal habitat adjacent to or in the general vicinity of the construction area. The type of available habitat, the time of year in which the displacement occurs, and the special requirements of the displaced species would determine to what extent any inter or intra specific competition occurs with the species. Some may experience a reduction in reproductive success during the year of construction. Some species are more

tolerant than others of "packing" into available habitat and may simply assume the role of "floaters" in the colonized habitat.

The cutting, clearing, and/or removal of existing vegetation in the pipeline construction right-of-way would reduce available habitat. The time required for the disturbed area to return to preconstruction conditions can determine the long-term effects on a particular species. In general, most of the herbaceous dominated habitats along the proposed pipeline routes should be restored to, at minimum, a structural condition similar to preconstruction in a relatively short time (*i.e.*, 3 to 5 years). This would be facilitated by reseeding disturbed areas and by minimizing the disturbance to the sod layer in the right-of-way. Although reseeding can aid in restoring the structural character of a site, if the plant species are different than those occurring prior to construction there is potential for some wildlife that are dependent upon the preconstruction variety of plant species to be indirectly impacted.

Fragmented landscapes clearly contribute to avian and mammalian species declines; however, many native species have adapted to habitat changes. For example, research on the mountain plover (Mettenbrink, *et al*. 2006) indicated that anthropogenic edges developed by agriculture practices in a fragmented landscape did not result in a significant reduction in nest success. However, this research did suggest that anthropogenic edges may indirectly affect population through reduction of the quantity of available habitat and an increase in predator pressure on nesting sites.

Removal of the woody plant layer in the sand sagebrush shrubland and riparian forest types crossed by the proposed Project would result in a long-term alteration to the structural layer of these systems. Depending on site and climatic conditions, it may take many decades before these sites support a woody plant community. A shrub component would likely develop much faster in the riparian areas. Limiting the routine right-of-way maintenance to a narrow area over the pipeline would promote the development of the shrub and tree structural components.

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 USC 703-711) and Executive Order 13186 (66 FR 3853), which serve to protect migratory birds from adverse impacts. The executive order was enacted, in part, to ensure that environmental analyses of federal actions evaluate the impacts of actions and agency plans on migratory birds. It also states that emphasis should be placed on species of concern, priority habitats, and key risk factor and it prohibits the take of any migratory bird without authorization from the USFWS. The destruction or disturbance of a migratory bird nest that results in the loss of eggs or young is also a violation of the MBTA.

A variety of migratory bird species, including both songbirds and raptors, are associated with the habitats identified along the Project (see Table 4.5.1-1). CIG's proposed construction schedule would overlap the nesting season for many migratory bird species in the Project area. Construction activity near active raptor nests during incubation or brood rearing could result in nest abandonment; overheating, chilling, or desiccation of unattended eggs; increased competition and mortality of young; premature fledging; and ejection of eggs or young from the nest. Indirect effects are associated with increased human presence and noise from construction activity near enough to active nests to disturb the birds. We do not believe that such effects would be significant for non-nesting birds, as individuals temporarily relocating to avoid construction activity is a minor impact of limited duration.

CIG conducted field investigations for raptors within and up to 0.5 mile on either side of the proposed construction right-of-way in 2006 and 2007. A total of 26 raptor and 5 burrowing owl nests were identified during the 2006 field work. A Swainson's hawk and great horned owl nest were active in 2006. Three burrowing owl nests were active in 2006. Other species likely to utilize nest sites in the area surveyed include the ferruginous and red-tailed hawk.

CIG would contract a qualified biologist to conduct breeding raptor surveys within one-half mile of proposed surface disturbance activities that would occur within the 2008 breeding season from April 1 through July 31. If active nests are identified during these surveys, CIG would follow CDOW recommendations (Craig 2001) for establishing a buffer zone between the construction zone and the nest site, unless site-specific treatment of a nest is approved by the CDOW taking into account the status of the nest, the proposed construction schedule, and the location of the nest. CIG has proposed to conduct behavior monitoring of active raptor nests within 0.5 miles of the proposed construction area to determine if construction activities are affecting nesting raptors. This proposed behavioral assessment assumes that the regulatory agencies would approve construction within 0.5 mile of an active raptor nest. CIG would consult with the CDOW to determine the need to conduct any behavioral studies.

CIG would also conduct surveys for all other breeding birds (*i.e.*, songbirds, shorebirds, grouse, *etc*.) between April 1 and July 31, 2008 to determine if any active nests are present in the construction right-of-way or within 330 feet of proposed surface disturbance activates. In the event that active nests are found, CIG would coordinate with the USFWS and CDOW to determine if any specific mitigation measures would be required.

In general, the proposed Project would result in a short-term loss of available habitat for birds within the construction right-of-way. CIG's proposed plan to restore disturbed areas following construction should adequately mitigate the issue and provide suitable habitat for birds utilizing the right-of-way. The number of trees and shrubs affected by the proposed pipeline construction should not result in a long-term adverse affect on wildlife populations utilizing this habitat. Conducting consultation with agencies and following appropriate guidelines should adequately mitigate impacts on raptors and songbirds occurring in or near the proposed Project area. CIG plans to employ EIs and subcontract biologists to conduct searches of the proposed construction areas just prior to construction activity to remove any reptiles or amphibians that may be present. By implementing the mitigation measures described by CIG, we have determined that impacts to migratory birds would be minimized to the maximum extent practicable. The potential impacts on federal and state listed species as the result of the proposed Project is addressed in detail in section 4.6.

Aboveground Facilities

Construction and operation of the proposed aboveground pipeline facilities (*i.e.*, meter stations, launchers, receivers, and MLVs) would have minimal impact on total available wildlife habitat. Five aboveground facilities would be constructed within existing facility sites and would not result in the loss of wildlife habitat. Of the remaining sites, six would be in agricultural land, three in pasture, one in CRP land, two in short grass prairie, one in mixed grass prairie; resulting in a total permanent loss of 10.7 acres of available wildlife habitat (see table 4.4.1-4). None of the areas proposed for aboveground facilities are known to harbor critical habitat for federal-listed species or species of critical concern.

4.5.2 Aquatic Resources

The proposed Project would cross one waterbody at two locations, the South Platte River, capable of supporting a warmwater or non-game fishery. The remaining waterbodies that would be crossed are intermittent in nature and are not classified as fishery streams, but may support some aquatic invertebrates. None of these waterbodies are coldwater fisheries.

No waterbodies affected by the proposed Project contain or have the potential to contain species managed by National Marine Fisheries Service, nor do they support Essential Fish Habitat (EFH) as defined under the MSFCMA (Public Law 94-265 as amended through October 11, 1996). Therefore, no EFH would be affected by the proposed Project.

Representative fish species that are known to occur in warmwater fisheries in eastern Colorado include bass, crappie, sunfish, bluegill, catfish, and perch. The South Platte River is also known to contain federal- and state-listed species. These species are discussed in section 4.6.

There are no surface waters within or immediately adjacent to the boundaries of aboveground facility sites, thus no fishery resources or other aquatic resources would be affected by the construction or operation of the aboveground facilities. The nearest waterbody to any above ground facility is Box Elder Creek, which is about 200 feet from the construction workspace of a MLV on Line 252A at MP 6.1.

Potential impacts on waterbodies from construction of the proposed Project include sedimentation and turbidity of the water, stream bank erosion, potential fuel and chemical spills, reduction in water volume for HDD operations, dust control, hydrostatic testing, and trench packing. The degree of impact on the waterbody depends largely on the crossing method employed, the conditions at each crossing location, the mitigation measures employed, and the timing of construction. The potential impacts on aquatic resources in the proposed Project area would be limited because many of the systems crossed are likely to have little or no flow at the time of construction.

Sedimentation can adversely affect fish eggs and juvenile fish survival, benthic community diversity and health, and spawning habitat. CIG proposes to install the pipeline across all waterbodies using the open-cut method (except canals in some instances). Because the open-cut method is a wet trench method, it has a higher potential for sedimentation and turbidity than other crossing methods. However, the open-cut method is also the quickest crossing method. CIG has stated the South Platte River crossing would be completed within 36 hours. Because the effects of increased sedimentation and turbidity are generally limited only to the period of in-stream work, the duration of these effects would be relatively short. The substrate at the proposed South Platte River crossings is very sandy. Coarse textured substrates such as sand settle out of the water column at a much faster rate than fine textured substrates such as silt and clay. This should reduce downstream sedimentation and turbidity, keeping these impacts more localized to the proposed Project area.

The clearing and grading of vegetation during construction could increase erosion along streambanks and turbidity levels in the waterbodies. Alteration of the natural drainage ways or compaction of soils by heavy equipment near streambanks during construction may accelerate erosion of the banks, runoff, and the transportation of sediment into waterbodies. The degree of impact on aquatic organisms due to erosion would depend on sediment loads, stream velocity, turbulence, stream bank composition, and sediment particle size. To minimize these impacts, CIG would use equipment bridges, mats, and pads to support equipment that must cross the waterbody or work in saturated soils adjacent to the waterbody. In accordance with its Procedures, CIG would preserve a minimum of 10 feet of vegetation along the waterbody banks during clearing and grading and locate temporary extra workspaces back from the edge of perennial and intermittent waterbodies to minimize the disturbance of riparian vegetation (except at the South Platte River where temporary extra workspaces would be located up to the edge and through the river). However, we have included a recommendation for CIG to maintain a 50-foot-long herbaceous strip on the right-of-way approaches to waterbodies until just before constructing the waterbody crossing to provide a natural sediment filter and minimize the potential for erosion of waterbody banks and sedimentation into the waterbodies. Initial grading of this herbaceous strip would be limited to the extent needed to install equipment bridges.

CIG would minimize impacts on surface waters by implementing its Procedures and BMPs and complying with all necessary permits obtained from appropriate agencies. A detailed discussion on CIG's waterbody mitigation is provided in section 4.3.2., and the additional measures to protect surface water resources were developed in section 2.3.2.

For any large construction project, there is the potential for spills of fuel or other hazardous liquids from storage containers, equipment working in or near streams, and fuel transfers. Any spill of fuel or other hazardous liquid that reaches a waterbody would be detrimental to water quality. The chemicals released during spills could have acute, direct effects on fish, or could have indirect effects such as altered behavior, changes in physiological processes, or changes in food sources. Fish could also be killed if a large volume of hazardous liquid is spilled into a waterbody. Ingestion of large numbers of contaminated fish could affect primary and secondary fish predators in the food chain.

CIG has prepared a Spill Plan to minimize the potential for spills and reduce impacts should a spill occur. Specific measures in this plan include a prohibition on storing fuels or refueling equipment within 100 feet of a waterbody as well as specific steps to be followed to control, contain, and clean up any spill that occurs. CIG's implementation of this Spill Plan would minimize the potential for and the impact of any spill near surface water. We have reviewed CIG's Spill Plan and find it adequate.

If a pipeline rupture were to occur beneath a waterbody crossing after pipeline operation has begun, natural gas would percolate through the soil and sediments underlying the waterbody, rise through the water column, and rapidly dissipate into the atmosphere. The potential outcome would depend on the volume of natural gas released and whether an ignition source is available. A pipeline break could result in soil, sediment, and debris being thrown from the area of the break, destruction of stream bank vegetation, and, in the case of ignition, explosion or fire potentially resulting in destruction of nearby fisheries. For a less severe release, natural gas would displace oxygen within the interstitial water of the sediments, resulting in temporary hypoxia within the sediments. As natural gas ascended through the water column, it would displace oxygen, possibly producing hypoxic conditions in the immediate vicinity of the release and for some distance downstream. Fish in the vicinity of a natural gas release could be impacted by temporary hypoxia. Considering the narrow width of the majority of the waterbodies that would be crossed and their relatively shallow depth, most of the natural gas would be rapidly released to the atmosphere and any change in water chemistry or quality would be minor. Because fish are mobile, they would have the ability to avoid or leave the areas with unfavorable environmental conditions resulting from such a release.

CIG indicated it would require about 29.9 million gallons (92 acre-feet) of water for HDD operations, dust control, trench compaction, and hydrostatically testing the proposed pipelines. CIG would obtain nearly all of the water from the South Platte River. The appropriation of large volumes of surface waters from the South Platte River could temporarily affect aquatic resources if the diversions constitute a large percentage of the river's total flow or volume. The diversion of large volumes of water could result in the temporary loss of habitat, changes in water temperature and dissolved oxygen levels, and entrainment or impingement of fish or other aquatic organisms.

CIG would be required to obtain necessary permits from the state before withdrawing the water. The potential effects of water withdrawals would be minimized by adhering to the measures in CIG's Procedures and Hydrostatic Test Plan (see appendix G). These measures include screening intake hoses to prevent the entrainment of fish and other aquatic organisms, placing water pumps in containment devices to minimize the potential for fuel spills or leaks, and limiting water withdrawal rates to 1,500 gpm or less, which is less than one percent of the river's average flow as measured at the Fort Lupton gauging station during the months when appropriation is anticipated.

The South Platte River is known to contain state-listed endangered and threatened species. In addition, federal-listed species are known to occur downstream in Nebraska. We are conducting consultations with the USFWS regarding potential impacts of water depletions on downstream federal-listed species (see section 4.6).

Most of the water taken from the South Platte River would be used for hydrostatic testing. After testing, CIG plans to discharge used water at various locations along its right-of-way (see table 4.3.2-2). These discharges could cause erosion. Where discharges are proposed, CIG would pump discharged water into sediment filtration/energy dissipation devices located in well vegetated upland areas. CIG would minimize the potential for contamination by hydrostatically testing only new pipe and not chemically altering the test water. CIG would be required to obtain the necessary permits from the state before discharging water to the ground. In Colorado, such permits typically require sampling of discharge water for total suspended solids, total iron, pH and oil and grease.

4.6 THREATENED AND ENDANGERED SPECIES

Federal agencies are required by Section 7 of the ESA (Title 19 USC Part 1536(c)), as amended (1978, 1979, and 1982), to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of a federal-listed endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat of a federal-listed species. A federal "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future. Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA.

As the lead action agency for the proposed Project, the FERC is required to consult with the USFWS to determine whether federal-listed endangered or threatened species or designated critical habitat are found in the vicinity of the proposed Project, and to determine the proposed action's potential effects on those species or critical habitats. For actions involving major construction activities with the potential to affect listed species or designated critical habitat, the federal agency must prepare a BA for those species that may be affected. The action agency must submit its BA to the USFWS and, if it is determined that the action may adversely affect a listed species, the federal agency must submit a request for formal consultation to comply with Section 7 of the ESA. In response, the USFWS would issue a Biological Opinion (BO) as to whether or not the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat. We have determined that the proposed Project may adversely affect federal species and their designated critical habitat because of the water withdrawals proposed at the South Platte River, and have prepared a BA for submittal to the USFWS (see appendix N).

CIG informally consulted with the USFWS and the CDOW to determine if federal-listed endangered, threatened, or candidate species and State of Colorado listed threatened, endangered, special concern or sensitive species could potentially occur in the proposed Project area. The USFWS identified 13 federal-listed species, including 6 endangered species and 7 threatened species. Additionally, the USFWS identified 6 federal-listed species and critical habitat for one species in Nebraska that could be affected by water withdrawals from the South Platte River, including 3 endangered species and 3 threatened species and critical habitat for 1 endangered species. The State of Colorado identified 34 listed species including 7 endangered, 7 threatened, 10 special concern species, and 10 sensitive species. Eight of the State of Colorado listed species were also federal-listed. Colorado does not currently have a law that specifically protects listed species. The special status species potentially occurring in the Project area are listed in table 4.6-1. The special status species occurring in Nebraska are listed table 4.6-2.

CIG conducted habitat evaluations and surveys for listed species in 2006 and early 2007. Additional surveys would be conducted in 2007 and prior to proposed construction in 2008. Field survey

methodologies were based on established protocols as well as those developed during consultation with biologists from the USFWS and the CDOW.

Table 4.6-1 – Special Status Species Potentially Occurring in the Project Area

Common Name	Scientific Name	Status[a]
Black-footed ferret	*Mustela nigripes*	FE, SE
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	FT, ST
Whooping crane	*Grus americana*	FE, SE
Bald eagle	*Haliaeetus leucocephalus*	FT[b], ST
Interior least tern	*Sterna antillarum*	FE, SE
Piping plover	*Charadrius melodus*	FT, ST
Eskimos curlew	*Numenius borealis*	FE
Mexican spotted owl	*Strix occidentalis lucida*	FT
Pallid sturgeon	*Scaphirhynchus albus*	FE
American burying beetle	*Nicrophorus americanus*	FE
Colorado butterfly plant	*Gaura neomeximcana ssp. coloradensis*	FT, ST
Ute ladies' tresses	*Spiranthes diluvialis*	FT, ST
Western prairie fringed orchid	*Platanthera praeclara*	FT
Swift fox	*Vulpes velox*	SC
Black-tailed prairie dog	*Cynomys ludovicianus*	SC
Eastern spotted skunk	*Spilogale putorius*	SS
White-faced ibis	*Plegadis chihi*	SS
Golden eagle	*Aquila chrysaetos*	SS
Ferruginous hawk	*Buteo regalis*	SC
Peregrine falcon	*Falco peregrinus*	SC
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesi*	SE
Long-billed curlew	*Numenius americanus*	SC
Mountain plover	*Charadrius montanus*	SC
Burrowing owl	*Athene cunicularia*	ST
McCown's Longspur	*Calcarius mccownii*	SS
Chestnut-collared Longspur	*Calcarius ornatus*	SS
Hornyhead Chub	*Nocomis biguttatus*	SS
Northern Redbelly Dace	*Phoxinus eos*	SE
Brassy Minnow	*Hybognathus hankinsoni*	ST
Plains Minnow	*Hybognathus placitus*	SE
Suckermouth Minnow	*Phenacobius mirabalis*	SE
Iowa Darter	*Etheostoma exile*	SC
Plains Topminnow	*Fundulus sciadicus*	SS
Stonecat	*Noturus flavus*	SC
Colorado Blue	*Euphilotes rita coloradensis*	SC
Two-spotted Skipper	*Euphyes bimacula*	SS
Giant Floater	*Pyganodon grandis* (*Anodonta grandis*)	SS
Cylindrical papershell	*Anodontoides ferussacianus*	SC
Wyoming Feverfew	*Parthenium alpinum* (*Bolophyta alpine*)	SS

[a] FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; SC=State Special Concern; SS=State Sensitive

[b] Federally delisted on June 28, 2007

Table 4.6-2 – Special Status Species Potentially Occurring in Nebraska

Common Name	Scientific Name	Status[a]
Whooping crane (including critical habitat)	*Grus americana*	FE
Bald eagle	*Haliaeetus leucocephalus*	FT[b]
Interior least tern	*Sterna antillarum*	FE
Piping plover	*Charadrius melodus*	FT
Pallid sturgeon	*Scaphirhynchus albus*	FE
Western prairie fringed orchid	*Platanthera praeclara*	FT

[a] FE=Federal Endangered; FT=Federal Threatened

[b] Federally delisted on June 28, 2007

4.6.1 Federal-listed Species

South Platte River Water Depletions

For its size, the Platte River system is one of the most highly developed river basins in the United States. It provides municipal and industrial water supplies for about 3.5 million people, irrigates millions of acres of farmland, and generates millions of dollars of hydroelectric power. It also provides important habitat for fish and wildlife of national and international significance. Development and water use along the system has changed the river from a broad, braided waterway subject to high spring floods and great loads of sediment to become narrower, stable, heavily vegetated river. Habitat for many of the original fish and wildlife inhabitants of the river basin is disappearing.

According to the USFWS, new and/or continued water depletions in the Platte River basin, which includes the South Platte River, are contributing factors toward jeopardizing the continued existence of certain of species. Since the late 1970s, the USFWS has issued jeopardy BOs for virtually all federal actions that deplete water in the basin. Significant time and money have been expended during the ESA consultation processes and in developing alternatives to avoid jeopardizing the continued existence of certain species. The requirements in the vast majority of consultations have entailed time-intensive negotiations and mitigation, typically requiring that water users replace individual project depletions on a one-for-one basis.

In an effort to address the issues raised in these jeopardy BOs, and provide greater certainty for water users in the basin, the U.S. Department of the Interior and the States of Wyoming, Colorado, and Nebraska signed a Cooperative Agreement for Platte River research and other efforts relating to endangered species and habitats. This agreement, in turn, resulted in the Platte River Recovery Implementation Program (PRRIP). The program allows for existing and future water uses while assisting in the recovery of the target species. It also provides streamlined ESA compliance procedures. Individual water users need to decide whether to rely on the new program for purpose of ESA compliance or to pursue stand-alone ESA consultation and project-specific mitigation. Under the new program, individual projects are asked to contribute money, not water, to address their depletive impacts on target species. Individual projects then rely on the program's offsetting measures as their means to avoid jeopardy to the species and adverse modification of critical habitat.

The PRRIP Final EIS and its related programmatic BO serve as the description of the environmental baseline and environmental consequences for the effects of the federal actions on the species and their habitat. The programmatic BO contains a list of species and critical habitat in the action

area, their status, and the USFWS's determination of the effects of the PRRIP on the listed species and critical habitat. The USFWS determined in the programmatic BO that the continued operation of existing and certain new water-related activities may adversely affect but would not likely jeopardize the continued existence of the endangered whooping crane, interior least tern, and pallid sturgeon, or the threatened northern Great Plains population of the piping plover. Further, the USFWS found that the continued operation of existing and certain new water-related activities may adversely affect but would not likely jeopardize the threatened bald eagle and western prairie fringed orchid associated with the central and lower reaches of the Platte River in Nebraska, and was not likely to destroy or adversely modify designated critical habitat for the whooping crane.

Although the USFWS has issued a programmatic BO for these species, the USFWS also has stated that any withdrawal of more than 32,585 gallons (0.1 acre-feet) from the river system would affect the river flow quantity and/or timing and must be reviewed on an individual basis. CIG stated that it would require about 29.9 million gallons (92 acre-feet) of water from the South Platte River for HDD operations, dust control, trench compaction, and hydrostatically testing the proposed pipelines. Since water would be withdrawn from the South Platte River, the proposed Project *may adversely affect* the whooping crane (including its critical habitat), interior least tern, piping plover, pallid sturgeon, bald eagle, and western prairie fringed orchid. Thus, we request that the USFWS consider the draft EIS as our initiation of formal consultation under Section 7 of the ESA for these six species. CIG would not be authorized to begin construction until formal consultation is completed.

Within the proposed Project area, Colorado has set up the SPWRAP as a quasi-regulatory, non-profit agency for implementing the PRRIP program. SPWRAP serves as the vehicle by which Colorado water users may participate in the program, and obtain regulatory benefits provided by that program. Through membership fees, SPWRAP generates the funds necessary to provide human resources and assist the State of Colorado in achieving the required river flows and fulfilling reporting requirements. One-time uses covered by SPWRAP, such as the appropriation of water for hydrostatic testing, cost the water user a one-time flat-rate fee for each increment of 100 acre-feet provided water is returned to the river. Uses that do not return water to the river, such as CIG's proposal to use water for horizontal directional drill operations, dust control, trench compaction, and discharging the hydrostatic test water to various locations along the pipeline routes, are assessed fees on a case-by-case basis.

CIG has indicated that it plans to use the SPWRAP program to obtain authorization to appropriate water from the South Platte River. Therefore, we are able to utilize the USFWS's streamlined process under the PRRIP for formal consultations. We have prepared a BA for the project (see appendix N) and would incorporate the USFWS's template BA for the portion of the project relating water appropriations and impacts on the six species. To continue formal consultations with the USFWS using the streamlined process, CIG would fulfill the responsibilities required in the PRRIP.

Species Potentially Occurring in the Vicinity of the Project

In addition to the South Platte River water withdrawals, we evaluated the effects of the proposed pipeline construction and operation on federal-listed species likely to occur in the Project area. During informal consultations with the USFWS a total of 13 federal-listed species were identified as potentially occurring in CIG's proposed Project area. These included the black-footed ferret (*Mustela nigripes*), Preble's meadow jumping mouse (PMJM) (*Zapus hudsonius preblei*), whooping crane (*Grus americana*), bald eagle (*Haliaeetus leucocephalus*), least tern (*Sterna antillarum*), piping plover (*Charadius melodus*), Eskimo curlew (*Numenius borealis*), Mexican spotted owl (*Strix occidentalis lucida*), pallid sturgeon (*Scaphirynchus albus*), American burying beetle (*Nicrophorus americanus*), Colorado butterfly plant (*Gaura neomexicana ssp. coloradensis*), Ute's ladies tresses (*Spiranthes diluvialis*), and western prairie fringed orchid (*Platanthera praeclara*).

Black-footed Ferret

The black-footed ferret is a federal- and state-listed endangered species. The last official record of a black-footed ferret in Colorado was near Buena Vista in 1943 (South 2002). Since 2001, however, state and federal wildlife biologists have established two major black-footed ferret colonies; one at Coyote Basin, which straddles the Colorado-Utah border west of Rangely, and another at the Bureau of Land Management's (BLM) Wolf Creek Management Area southeast of Dinosaur National Monument. In late-summer 2004, state and federal wildlife biologists confirmed that the ferrets are persisting at the Wolf Creek site.

Historically this species inhabited short grass prairie and rolling hills, depending almost exclusively on prairie dog colonies for food, cover, and breeding habitat (South 2002). Black-footed ferrets once ranged throughout the Great Plains, extending from the Rocky Mountains east through the Dakotas, and south through Nebraska, Kansas, Oklahoma, Texas, New Mexico, and Arizona. The range of the ferret coincides with that of prairie dogs, and ferrets with young have been documented only in the vicinity of active prairie dog colonies (South 2002). Drastic reductions in prairie dog numbers and distribution occurred during the last century due to widespread poisoning of prairie dogs, the conversion of native prairie to farmlands, and outbreaks of sylvatic plague; particularly in the southern portions of their range.

CIG's 2006 field surveys identified 23 black-tailed prairie dog colonies within or adjacent to the proposed pipeline routes. The size and location of each prairie dog colony is provided with our review of black-tailed prairie dogs in section 4.6.2. The USFWS Black-footed Ferret 1989 Survey Guidelines (USFWS 1989) indicate that colonies must be a minimum of 80 acres in size and contain greater than eight burrows per acre in order to potentially support black-footed ferrets. Three colonies met the minimum size criteria. Of those three, only one met the minimum size criteria and burrow density. No scat or tracks of the black-footed ferret were observed at this or other colonies during the 2006 field investigations, though no focused surveys were conducted.

There are currently no known occurrences of the black-footed ferret in the proposed Project area. Until the black-footed ferret was reintroduced it was considered extirpated in Colorado. Given the historic susceptibility of this species to anthropogenic induced impacts, it is highly improbable that there is any relic population within the highly fragmented landscape of the proposed Project area. Therefore, the proposed Project is *not likely to adversely affect* the black-footed ferret.

PMJM

The PMJM is a federal- and state-listed threatened species. This historically rare mammal has declined as a result of human induced modification or destruction of existing habitat. It currently occurs in only a few watersheds along Colorado's Front Range and in southeastern Wyoming. In Colorado, the PMJM is currently documented from seven counties (Weld, Larimer, Boulder, Jefferson, Douglas, Elbert, and El Paso) (Grunau, *et al.* 1999). The largest and most stable populations occur in East and West Plum Creeks in Douglas County, and in Monument Creek on the U.S. Air Force Academy in El Paso County (Grunau, *et al.* 1999).

PMJM are typically found in dense riparian vegetation with a tree overstory, a well-developed shrub layer, and a thick herbaceous layer. Most often the shrub cover typically consists of willow species (*Salix*), but the species composition seems to be secondary to the overall presence of a mature shrub component. What seems universally true for PMJM habitat is the presence of ground cover immediately adjacent to surface water. Numbers of PMJM captures appear to decrease the further one moves from this characteristic habitat (Corn, *et al*. 1995; Meaney, *et al*. 1996; in Grunau *et al*. 1999). Based on a study of

kidney structure, it is believed that PMJM are dependent upon open water (Wunder 1998; in Grunau, *et al.* 1999), which may explain their close association to these habitats. Preliminary estimates of habitat use in Colorado indicate that PMJM spend 70% of their time in riparian shrub communities and 30% in upland grasslands (Schorr 2001). Upland use has occurred during the day as well as at night. Studies in Douglas County, Colorado suggest that upland grasslands may serve as feeding "hotspots" (Shenk 1998; in Grunau, *et al.* 1999).

Armstrong, *et al*. (1997; in Grunau, *et al.* 1999) suggested that exotic, invasive plant species do not appear to conflict with PMJM habitat needs. Presence of non-native plants such as Canada thistle, toadflax (*Linaria* spp.), and smooth brome do not appear to prohibit PMJM from occupying an area. PMJM have been captured in the center of large Canada thistle stands on Warren Air Force Base in the recent past (Beauvais 1998; in Grunau, *et al.* 1999). However, the long-term impact of monocultures of these and other invasive weeds on PMJM population viability has not been investigated.

CIG conducted habitat assessments for the PMJM at 76 sites along the proposed pipeline routes in July, August, October, and December 2006, and March 2007 in accordance with USFWS Survey Guidelines (USFWS 2004). Based on this review it was determined that a total of 16 sites support habitat characteristic required by the PMJM, and warrant trapping surveys in 2007 to determine the presence of the species. To date, no trapping has been completed.

CIG has developed a mitigation plan for the PMJM. This plan would be used whenever the pipeline contractor encounters a crossing where the PMJM has been located. The plan is detailed below.

- No equipment would be parked overnight closer than 300 feet from the stream crossing that support habitat characteristics required by the PMJM.

- No individual associated with the construction proposed Project would be allowed to have pets, including dogs or cats, on the right-of-way, except for service animals like seeing eye or hearing ear dogs.

- The contractor would notify the EI when the crossing would be made.

- The EI would notify a biologist to clear the area of mice. The biologist would then search the area and trap it for one night prior to construction initiation. Twenty Sherman live traps would be set (10 traps on either side of the crossing) five meters apart, in two rows, covering the 75-foot width of the proposed right-of-way. Any PMJM captured would be moved upstream or downstream, at least 100 feet away from centerline. Since any mice captured at a crossing prior to construction may have young in a nest, the adult would be released at the trap site and followed to try and determine where a nest is located wherever work occurs from June through July. Should the nest be in the right-of-way, a decision would be made to move the right-of-way and avoid the nest or delay the crossing until late July when the young should be mobile. When work occurs from August through September, the mice would be in adult and sub-adult age classes, mobile and able to avoid activity at the crossing (*i.e.*, leave the immediate area).

- Whenever a piece of equipment needs to cross the area, the EI would walk in front of the equipment to clear the area. The first dozer or backhoe would contour the creek banks and remove trees and large shrubs only to the extent necessary to insure a safe crossing. The objective is a simple two-track path across the creek.

- The EI would walk in front of each subsequent piece of equipment to make ensure no mice have returned to the right-of-way.

- All construction equipment would cross streams at which PMJM are present by using equipment bridges according to CIG's Procedures. Three-inch gaps would be left between mats to allow any mice a path. Should wetlands adjacent to the stream require mats, similar gaps would be left between mats.

- No right-of-way would be cut for a distance of 50 feet before or after the stream crossing beyond that necessary for a safe equipment crossing.

- If an existing creek crossing is within half a mile of the proposed crossing, and the crossing has been approved as access, no rubber-tired vehicles with the exception of stringing trucks would be allowed to cross in the PMJM area.

- Pipe stringing would stop about 100 feet back from the crossing and start 100 feet beyond the crossing.

- Tracked equipment would be allowed to cross provided an EI would walk in front of the equipment to clear the area.

- Welding trucks would not be allowed to cross if an approved alternate access is available.

- A pipe section about 160 to 240 feet long would be welded for the crossing.

- Contractor shall utilize a brush hog-type mower to mow a strip 40 to 50 feet wide through the riparian area and out beyond the perpendicular movement area, typically 100 feet. The mowing height shall be about two inches. This mowed area shall have all large debris removed on the day of crossing installation.

- On the day of the crossing installation, silt fence would be placed at all edges of the mowed area. This would be used to prevent mouse access to the work area.

- One or two backhoes would be used to strip topsoil, remove trees and large shrubs, and dig the ditch. A winch tractor or the backhoes would pull or place the precoated pipe in the ditch and backfill. In areas where solid rock is not encountered, this installation must be done within a 12-hour period. In areas of solid rock, the installation must be accomplished within a 72-hour period.

- After backfill and removal of any equipment from the immediate area, the silt fence would be removed from along the edges and placed parallel to the stream for sediment control.

- An EI would be present for the entire duration of cleanup in the area of the crossing.

- With landowner approval, an area measuring about 3 x 50 feet to 9 x 50 feet would be fenced within two days of cleanup. A pass-through area would remain until seeding is complete. The fence would be in place for three years unless revegetation meets the 80 percent criteria regarding cover and species richness.

By incorporating the mitigation methods described above, it is our determination the proposed Project *is not likely to adversely affect* the PMJM.

Whooping Crane

The whooping crane is federal- and state-listed endangered species. It is considered a casual migrant in eastern Colorado, where it is usually seen around farm ponds during spring and fall migrations. Wild populations of whooping cranes utilize the Texas Gulf coast, including Aransas National Wildlife Refuge (NWR), Texas, and Bosque del Apache NWR, New Mexico, and migration and staging areas through northeastern Montana, the western half of North Dakota, central South Dakota, Nebraska, Oklahoma, and east-central Texas, and the non-migratory population in Florida. There are five areas of Critical Habitat designated for the whooping crane, located in Idaho, Kansas, Nebraska, Oklahoma, and Texas, primarily on federal and state wildlife management lands. These areas provide roosting, resting, and foraging habitat to the whoopers as they migrate between their breeding and wintering grounds. A Rocky Mountain population consisting of a male and two female adult cranes winter in the middle Rio Grande Valley of New Mexico at Casa Colorado State Game Refuge and Bosque Del Apache NWR from November–February. They then migrate north in February– March to south-central Colorado where they spend 4 to 6 weeks in the San Luis Valley (DOI 1997).

Whooping cranes generally arrive at their Canadian breeding grounds during late April and conduct their southward migration from the breeding grounds from mid September to mid October. They are normally on their wintering grounds in the southern United States by mid November. They use a variety of habitats during migration including croplands for feeding and large palustrine wetlands for roosting. They also are known to roost in riverine habitat, most notably the Platte River, Middle Loup River, and Niobrara River in Nebraska; Cimarron River in Oklahoma; and the Red River in Texas. Cranes also roost on submerged sandbars in wide unobstructed channels that are isolated from human disturbance.

Should migrant whooping cranes be identified within eyesight of construction activities, CIG indicated it would cease work until the crane vacates the area. CIG would report any occurrence to the USFWS. Given its mobility, and the fact that any bird occurring in the proposed Project area would be a migrant, the proposed Project *is not likely to adversely affect* the whooping crane.

Bald Eagle

On June 28, 2007, the USFWS announced the removal of the bald eagle from the list of federal-listed species, and is currently seeking public comment (USFWS 2007d). Although the bald eagle would no longer be afforded protection under the ESA, the bald eagle is afforded protection under the MBTA and the Bald and Golden Eagle Protection Act. These Acts require some measures to continue to prevent bald eagle "take" resulting from human activities. Therefore, we have kept the bald eagle in our analysis. The bald eagle is a state listed threatened species.

The breeding bald eagle population has increased substantially over the last 30 years, with roughly one-third of the breeding sites found east of the Continental Divide within the South Platte River watershed. Other breeding concentrations include the Yampa River upstream of Craig, the White River in the vicinity of Meeker, the Colorado River upstream of Kremmling, and La Plata and Montezuma Counties (CDOW 2007f).

Bald eagles generally nest in tall trees near large lakes, rivers, reservoirs, and coastal areas. Perches include, stout-limbed trees, snags, broken-topped trees, or rocks near water that provide access to hunting areas. Bald eagles have benefited from an increase in forest vegetation along the Platte River, particularly in areas where the forest borders open river channel. They are primarily dependent on fish and waterfowl as a food source while they are in the Platte River Valley. A transitional habitat of 50%

trees and 50% open river channel is more valuable to bald eagles than a channel almost entirely covered by mature forest trees (USGS 2007a).

Colorado is a very popular wintering area for bald eagles. The annual midwinter count shows a stable population of up to 800 eagles. The San Luis Valley in the southern part of the state is one of their favorite places because of its supply of fish and waterfowl from open water as well as its high population of rodents and rabbits (CDOW 2007a). In winter, they may also occur locally in semi deserts and grasslands, especially near prairie dog towns (CDOW 2007a).

According to CIG's survey information, no designated critical habitat or known bald eagle nest sites occur within the proposed Project area. Winter roost surveys conducted by CIG in December 2006 within 0.5 miles upstream and downstream of the proposed South Platte River crossings did not reveal any roost sites. Noise from construction activities could alter roosting and/or predatory behavior in the immediate vicinity of the proposed river crossings; however, the construction is rather short duration and would not result in a long-term displacement. The proposed corridor is relatively narrow and would impact a limited number of potential roost and/or nest trees. Given the extent of riparian forest type up and downstream of the proposed crossing point the proposed corridor would not result in a adverse long-term alteration of potential suitable bald eagle habitat along the river. Depending upon the time of year that the crossing would occur, an additional assessment for nesting birds and/or winter roosting birds should be conducted in 2008. If either of these bird activities are observed, CIG would be required to enter formal consultation with the USFWS. Birds foraging near prairie dog colonies may be displaced during construction; however, it is unlikely this displacement would result in overt stress to this highly mobile species. Therefore, we have determined the proposed Project *is not likely to adversely affect* the bald eagle.

Least Tern (interior population)

The least tern is a federal- and state-listed endangered species. It is an uncommon summer resident on southeastern plains in the Arkansas River Valley of Colorado. Migrants or non breeding individuals occur as casual summer visitors on northeastern plains (Janos 1985b; in USFWS 2007b). The least tern currently only nests on reservoirs in the vicinity of the Arkansas River, between Las Animas and Lamar in the southeastern part of the state (USFWS 2007b). There are less than 50 breeding pairs in Colorado. The preferred nesting habitat is on sandy or pebbly beaches, well above the water line, around lakes and reservoirs or on sandy soil sandbars in river channels. The least tern forages in shallow waters where small fish constitute the principal food source.

The very restricted nesting distribution of this species in Colorado suggests that it is very unlikely that this species would nest in the vicinity of the proposed Project. Surveys conducted by CIG in 2006 indicated that no suitable nesting sites were present at the proposed crossing points of the South Platte River. Given the mobility of the species, and the relatively restricted area in which construction would occur, it is unlikely that the proposed river crossings would result in an adverse impact on any least terns potentially foraging along the river corridor. As well, it is unlikely that any added short-term turbidity to the water column as the result of construction would adversely reduce foraging potential. Therefore, we have determined that the proposed Project *is not likely to adversely affect* the least tern.

Piping Plover

The piping plover is federal- and state-listed threatened species. It is considered to be a rare occurrence in the plains of Colorado. Nesting was first observed in Colorado in 1949 and a few reports of non-nesting birds occurred during the 1950s and 1960s. There are no reports of nesting between 1949 and 1989. A census conducted in 1991 recorded 19 piping plovers, and during an extensive North

American breeding census in 1996, fewer than 20 piping plovers were found in Colorado, and many of them were unpaired males (CDOW 2007g).

In Colorado, nesting has been observed on various reservoirs of the Arkansas River. Six different reservoirs (Neenoshe, Neegrande, Neeskah, John Martin, Adobe Creek, and Verhoeff) have been monitored in Colorado for 10 years (1990–2000). There have been as many as nine nesting pairs in 1994 and 1995, and as few as four pairs in 2000. However, these sites have not been able to sustain a stable population of piping plovers and have not contributed significantly to the species population (DOI 2002). Nesting habitat in Colorado is on sandy lakeshore beaches, sandbars within riverbeds or even sandy wetland pastures. An important aspect of this habitat is that of sparse vegetation. Piping plovers also forage in shallow waters where small fishes and invertebrates are present. The primary areas of potential use by the piping plover in the proposed Project area are the sandbars in and along the South Platte River.

Given the primary nesting locations for piping plover in Colorado have been associated with reservoirs on the Arkansas River it is doubtful that this species would nest in the South Platte River near the proposed Project area. Surveys conducted by CIG in 2006 indicated that no suitable nesting sites were present at the proposed crossing points of the South Platte River. Given the mobility of the species, and the relatively restricted area in which construction would occur, it is unlikely that the proposed South Platte River pipeline crossing would result in an adverse impact on any piping plovers potentially foraging along the river corridor. As well, it is unlikely that any added short-term turbidity to the water column as the result of construction would adversely reduce foraging potential. Therefore, we have determined that the proposed Project *is not likely to adversely affect* the piping plover.

Eskimo Curlew

The Eskimo curlew is a federal-listed endangered species. It migrates north from South America in late February or March, through the central plains of North America in late March to mid May and on to its nesting grounds in the Alaskan and Canadian Arctic. The species favors burned-over prairies and marshes during migration. This species has not been recorded in Colorado near the proposed Project area since 1882. The Eskimo curlew is not expected to occur in the proposed Project vicinity during construction of the proposed Project and, therefore, the proposed Project would have *no effect* on this species.

According to the USFWS, water depletion associated with appropriating water from the South Platte River for horizontal directional drill operations, dust control, trench compaction, and hydrostatically testing the pipeline could have an effect on water levels downstream of the proposed Project, but that these changes in water levels would have *no effect* on the Eskimo curlew.

Mexican Spotted Owl

The Mexican spotted owl is a federal- and state-threatened species. It is one of three subspecies of spotted owls in the United States and has the largest range, extending from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah, southward through Arizona and New Mexico (DOI 1993). There have been 13 valid nesting occurrences in Colorado and current records total 2 pairs and 10 single birds.

Johnson (1997) indicates that breeding habitat in Colorado consists of deep, sheer-walled sandstone or rocky canyons from about 6,000 to 9,400 feet in elevation. Johnsgard (1988b) describes habitat in eastern Utah and southwestern Colorado as moist and cool canyon bottoms of canyon-mesa topography, where perhaps shady microclimatic conditions prevent possible heat stress in other wise

relatively hot environments. The proposed Project area does not support suitable habitat for the Mexican spotted owl. Therefore, the proposed Project would have *no effect* on the Mexican spotted owl.

Pallid Sturgeon

The pallid sturgeon is a federally endangered species. The historic range of the pallid sturgeon, as described by Bailey and Cross (1954; in USFWS 1993), encompassed the middle and lower Mississippi River, Missouri river, and the lower reaches of the Platte, Kansas, and Yellowstone Rivers. The pallid sturgeon is adapted to habitat conditions that existed in these large rivers before human activity changed the river's natural, free-flowing, warmwater, and turbid characteristics.

Based on the historic and currently recognized distribution of this species it is unlikely that it occurs in the South Platte River near the proposed Project area. Therefore, we have determined that the proposed Project *is not likely to adversely affect* the pallid sturgeon.

American Burying Beetle

The American burying beetle is federally endangered species. It currently occurs in six states including, Nebraska, Rhode Island, Oklahoma, South Dakota, Kansas, and Arkansas (UNSM 2007). The westernmost North American record for the American burying beetle is near North Platte, Nebraska. In Nebraska, habitats that harbor this species include grassland prairie, forest edge, and scrubland (Nebraska Parks and Game Commission 1995). This beetle seems to be largely restricted to areas most undisturbed by human influence. Numerous factors have led to the decline of this species but the foremost factors seem to be the fragmentation of the landscape and the various negative repercussions that coincide with it. Although there is potentially available habitat in the some of the natural short grass prairie and sand sagebrush shrubland types within the proposed Project area, based on current understanding of the distribution of this beetle it is highly unlikely that it occurs there. Therefore, the proposed Project *is not likely to adversely affect* the American burying beetle.

According to the USFWS, water depletion associated with appropriating water from the South Platte River for horizontal directional drill operations, dust control, trench compaction, and hydrostatically testing the pipeline could have an effect on water levels downstream of the proposed Project, but that these changes in water levels *is not likely to adversely affect* the American burying beetle.

Colorado Butterfly Plant

The Colorado butterfly plant is a federal- and state-listed threatened species. It grows in the wet meadow zone associated with high plains riparian habitat, on mesic soils that occur on a gradient between the saturated soils along streams and the dry soils of surrounding mixed-grass or shortgrass prairie (Grunau, *et al*. 2004). The plant appears to have definite moisture requirements, and may require shallow subsurface water (MOU 1992; in Grunau, *et al*. 2004). Most populations occur on level or gently sloping sites that are close to streams, springs, and seeps. Colonies may be found on stream banks or in old, dry streambeds near the existing channel (Marriott 1987, Fertig 1994, 1998a, 2000; in Grunau, *et al*. 2004) at elevation ranging from 5,000 to 6,400 feet (Fertig 1998a; in Grunau, *et al*. 2004). Populations are best developed in unshaded areas with sparse vegetation (Fertig 1994; in Grunau, *et al*. 2004). Plants are not typically found in areas dominated by woody vegetation such as willow, or in areas of dense vegetation except at the margins of such habitat (Fertig 1994, 2000, Heidel 2004a; in Grunau, *et al*. 2004).

Colorado butterfly plant is restricted to 23 occurrences over about 1,700 acres of habitat (Jennings, *et al.* 1997; Fertig 1998b; in Grunau, *et al*. 2004) in Laramie and Platte Counties, Wyoming;

western Kimball County, Nebraska; and Weld and Boulder Counties in Colorado (the Boulder County population is introduced). Historic native populations from Larimer, Douglas, and Boulder Counties in Colorado have been extirpated (Marriott 1987, O'Kane 1988, Fertig 1994, Spackman, *et al*. 1997; in Grunau *et al*. 2004). One known population of this species occurs less than one mile north of the Cheyenne Compressor Station (Line No. 250A at MP 0.0) in Weld County, Colorado.

Surveys of all potential habitats in 2006 did not reveal the presence of this species. The Lone Tree Creek (Line 250A at MP 12.8) stream crossing site is considered to have the best available habitat for the Colorado butterfly plant; however, no plants were discovered. CIG would conduct an additional survey of this site in July or August of 2007. CIG stated that if the Colorado butterfly plant is identified within the construction corridor, they would locate the species via GPS, and fence and/or avoid the area if possible during construction. If avoidance is impossible, CIG would then remove the plants in a sod plug using a large track hoe to remove the largest plug possible. The plug would then be watered as necessary to facilitate survival of the plants. Following construction, the plug would be returned to the preconstruction location. This technique was successfully implemented during the Medicine Bow Lateral Loop Natural Gas Pipeline Project in Wyoming (Grant *et al*. 2003).

Based on 2006 botanical survey results it is doubtful the Colorado butterfly plant occurs within the proposed construction corridor. Based on the unlikely occurrence of this species within the construction corridor and by implementing the mitigation measures above if the species is found within the construction corridor, we have determined the proposed Project *is not likely to adversely affect* the Colorado butterfly plant.

Ute Ladies'-tresses

Ute ladies'-tresses is a federal- and state-listed threatened species. At the time the species was listed in 1992, a total of 10 populations with about 10,000 plants were known from Colorado, Nevada, and Utah (Fertig, *et al*. 2005). Since 1992, the number of extant populations has increased to over 50 and its known range has expanded to Idaho, Montana, Nebraska, Washington, and Wyoming. Survey work and monitoring studies suggest that the global population may be over 83,000 individuals.

Prior to 1992, the extant populations of Ute ladies'-tresses in Colorado were known from Jefferson and Boulder Counties along Clear, Boulder, and South Boulder creeks within the Clear and St. Vrain watersheds. Historical (and presumed extirpated) occurrences were also known from Weld and El Paso Counties (Jennings 1989; in Fertig, *et al*. 2005) in the Middle South Platte, Cherry Creek, and Fountain watersheds. Since 1992, additional populations have been recorded from St. Vrain and Left Hand creeks in Boulder County (St. Vrain watershed), Claymore Lake near Fort Collins in Larimer County (Cache La Poudre watershed), and along the Green River from Browns Park through Lodore Canyon in Moffatt County (Upper Green-Flaming Gorge Reservoir watershed) (CNHP EOR data, Ward and Naumann 1998; in Fertig *et al*. 2005).

Ute ladies'-tresses occurs in moist meadows associated with perennial stream terraces, floodplains, oxbows, seasonally flooded river terraces, sub irrigated or spring-fed abandoned stream channels and valleys, and lakeshores at elevations between 720 - 7000 feet. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human modified wetlands (Franklin 1993, Heidel 1998, Murphy 2001a, 2004a, 2004b; in Fertig, *et al*. 2005). Ute ladies'-tresses populations may persist for a short time in the grassy understory of woody riparian shrublands, but do not appear to thrive under these conditions (Ward and Naumann 1998; in Fertig, *et al*. 2005).

Botanical surveys conducted in 2006 in all potential habitats along the proposed pipeline routes did not reveal the presence of the Ute ladies'-tresses. All locations surveyed were considered to be of low quality due to hydrology and/or disturbance. Habitat at the proposed South Platte River crossings were disturbed and heavily invaded by noxious weeds. CIG stated that if the Ute ladies'-tress is identified within the construction corridor, they would use similar mitigation as described for the Colorado butterfly plant above. Based on the unlikely occurrence of this species within the construction corridor and by implementing the mitigation measures above if the species is found within the construction corridor, we have determined the proposed Project *is not likely to adversely affect* the Ute ladies'-tress.

Western Prairie Fringed Orchid

The western prairie fringed orchid is a federal threatened species. The western prairie fringed orchid distribution extends westward from the Mississippi River to the Sandhills of Nebraska. This orchid has not been recorded in Colorado. Its principal habitat is the moist tall grass prairie community. No western fringed orchids were observed during surveys along the proposed pipeline routes.

The proposed pipeline routes do not cross the preferred habitat of this orchid, thus it is very unlikely that this species would occur in the proposed Project area. Therefore, we have determined the proposed Project *is not likely to adversely affect* the Western prairie fringed orchid.

4.6.2 State of Colorado Listed Species

Swift Fox

The swift fox is a state listed special concern species. It is native to the short- and mixed-grass prairies of the Great Plains Region (NRCS 2005). They prefer flat to gently rolling terrain and low-growing sparse vegetation that allows for good mobility and visibility. Although swift fox use prairie dog colonies, and may benefit from conservation of prairie dogs, they do not require them.

Dens are usually located in short-grass and mixed-grass prairie, but have been found in cultivated dryland wheat fields or other human-made habitats. They are built on sloping plains, hilltops, or other well-drained sites. Swift foxes prefer sites with loamy soils, where dens are easily dug. Swift foxes begin their breeding season in late December or early January in the southern portion of their range, and as late as March in the northern portion of their range. Pups live in the pup-rearing den until late May/early June, after which they frequent temporary dens in the immediate vicinity, but return to the pup-rearing den every 4 to 5 days. Young foxes typically disperse in autumn when they are 4 to 6 months old.

About 45 percent of the swift fox's habitat has been lost as a result of prairie conversion to cropland. Even where natural prairies remain, they are often fragmented and isolated, reducing habitat and prey while increasing predation and competition. Predation by and interspecific competition with coyotes and the expansion of red fox populations are the two most serious limiting factors to swift fox populations. More swift foxes are killed by coyotes than by any other means.

Surveys conducted in 2006 by CIG did not identify any burrows showing signs of past or present use by swift foxes. CIG would conduct additional searches for active dens prior to pipeline construction. Assuming an active swift fox den is found in the right-of-way, the den would be revisited one week prior to any ground breaking activity to determine its activity. If foxes are present, the den would be monitored for two days to determine use pattern. Should no other den be near (within 0.25 miles) or be used by the foxes (*i.e.*, they persist at said den), the area around the den would be marked with fence posts and, if need be, the pipe routed around the den within the right-of-way boundaries (50 feet). Construction equipment would be given a one-time pass through the area with a qualified EI or biological monitor

present to monitor fox response. A distance of 100 yards on either side of the den would be avoided prior to construction. When construction is imminent, it would be completed within 24 hours with a biological monitor on site if a fox is present. CIG would consult with the CDOW if active dens are identified during surveys and implement all or an appropriate combination of the conservation measures discussed above. If dens are inactive during the preconstruction surveys, construction would be allowed to proceed through the area without restrictions.

Although construction could disturb individual swift foxes, implementation of CIG's proposed conservation measures would limit the extent of potential impacts. Therefore, the proposed Project *may affect individuals, but is not likely to result in a loss of viability rangewide, nor cause a trend to federal listing of the species*.

Black-tailed Prairie Dog

The black-tailed prairie dog is a state listed special concern species. This species occupies dry, flat, open grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle. Black-tailed prairie dogs generally occupy fine- to medium-textured soils; however, encroachment into sandy soils occurs if the habitat is needed for colony expansion. Proximity to free water is not an important factor for prairie dog colonies because water is obtained from green grass and forb shoots. Breeding occurs in late January, February, and early March. Gestation averages 28 to 35 days. Young are born in March and April (CDOW 2007b).

Twenty-five prairie dog colonies were identified during surveys conducted within and immediately adjacent the proposed pipeline routes in 2006 and 2007. The location and potential disturbance associated with each town is provided in table 4.6.2-1. Three of the towns occur outside the proposed pipeline right-of-way. Twenty-one of the colonies were located in Weld County, primarily in the Greater Pawnee Conservation Area. Three colonies were located in Adams County and one was in Morgan. The colonies totaled 911.1 acres in size, of which 56.03 acres would be disturbed by pipeline construction activities. The impact on each specific town is directly related to its position in the proposed corridor. The direct impact on the 22 towns that occur within the proposed right-of-way ranges from as little as 0.007 percent of a town to as much as 50 percent of a town.

Prairie dog towns would be disrupted for about two weeks during construction activities. The potential effects of construction through a prairie dog colony include temporary loss of forage and shelter due to vegetation clearing, collapsing of burrows, and temporary disruption of foraging and resting activities due to disturbance associated with construction equipment. Direct mortality of prairie dogs could also result if active burrows are occupied at the time of construction. Since this species is mobile, most prairie dogs would likely be able to avoid the ditching machines as well as construction traffic. Based on reported colony sizes, many would have a relatively significant portion disturbed during construction. There is potential that the impact on colonies would also affect associate species (*i.e.*, burrowing owl, mountain plover, and ferruginous hawk), but to what extent is not known (Assal and Sovell 2004).

Potential mitigation measures include reducing the area to be disturbed by grading prior to construction and conducting the construction outside of the critical pup rearing phase. The restored right-of-way would likely be utilized by extant prairie dogs. The reseeding of disturbed areas would promote the reestablishment of forage for this species. An initial reduction in the amount of sod disturbed during grading should serve to facilitate the revegetation of the right-of-way to preferred native plant species that were utilized by the prairie dogs prior to construction.

Table 4.6.2-1 – Prairie Dog Towns

Pipeline Segment / MP	Prairie Dog Town	Total Town Size (acres)	Area Disturbed by Construction (acres)	Length along Pipeline (feet)
LINE 250A				
8.3 - 8.6	1	24.1	3.5	1,844
11.3 - 11.7	2	37.2	4.5	2,362
11.9 - 12.2	3	18.5	2.5	1,299
13.5 - 14.0	4	88.1	5.1	2,654
18.0 - 18.1	5	64.6	1.1	558
22.2 - 22.8	6	49.8	5.8	2,999
25.6 - 25.6	7	0.1	<0.1	13
31.0 - 31.2	8	57.6	1.4	751
36.3 - 36.5	9	44.2	2.4	1,230
NA[a]	10	5.3	NA[a]	NA[a]
47.6 - 47.8	11	38.6	1.9	968
52.4 - 52.5	12	99.0	0.7	367
60.2 - 60.3	13	23.6	1.2	623
61.3 - 61.5	14	33.9	2.2	1,148
61.6 - 62.0	15	58.8	3.7	1,906
64.8 - 64.9	19	0.7	0.3	138
LINE 251A				
NA[a]	24	0.1	NA[a]	NA[a]
LINE 252A				
10.5 - 10.7	25	44.0	2.5	1,073
11.8 - 11.8	16	0.9	0.5	272
13.2 - 13.4	17	136.3	2.9	1,247
13.9 - 14.2	18	14.6	3.5	1,837
LIINE 253A				
1.7 - 1.8	23	1.7	0.7	374
3.1 - 4.0	22	65.3	9.3	4,849
5.0 - 5.1	21	2.3	0.4	226
		911.1	56.0	28,740 (5.4 miles)

[a] Prairie Dog Towns 10 and 24 are adjacent to proposed construction workspace, but would not be directly impacted by construction..

Following construction and restoration, the revegetated right-of-way would provide high quality foraging habitat for prairie dogs and the unconsolidated soils along the trench would likely provide a good substrate for burrowing. Although some individual black-tailed prairie dogs may be injured or killed during construction, the impact on these individuals *would not be expected to influence prairie dog populations nor lead to a trend towards federal listing*, and thus, would *not likely adversely affect* this species.

Eastern Spotted Skunk

The Eastern spotted skunk is state listed sensitive species. Spotted skunks seem to prefer forest edges and upland prairie grasslands, especially where rock outcrops and shrub clumps are present. In western Counties of Kansas it relies heavily on riparian corridors where woody shrubs and woodland

edges are present. Woody fencerows, odd areas, and abandoned farm buildings are also important habitat.

A June 2006 Colorado Wildlife Commission report on the Analysis of Furbearer Seasons indicates that in Colorado, the eastern spotted skunk is extremely rare or could be extirpated (CDOW 2006b). Its distribution in Colorado is known from only a few specimens collected along the eastern border.

It appears as though the eastern portion of Colorado is the western most portion of the range of the Eastern spotted skunk. Therefore, the proposed Project *may affect, but is not likely to adversely affect the Eastern spotted skunk or cause a trend towards federal listing*.

White-faced Ibis

The white-faced ibis is a state listed sensitive species. Its breeding habitat is typically freshwater wetlands, including ponds, swamps, and marshes with pockets of emergent vegetation. They also use flooded hay meadows and agricultural fields as feeding locations. Ibises nest in areas where water surrounds emergent vegetation, bushes, shrubs, or low trees (Montana 2007). CIG's biological evaluation (Bio-Resources 2007) indicates that suitable breeding habitat is generally lacking along the route; although flood irrigated pastures are present and may be used as foraging habitat by this species. The construction activities could temporarily displace the white-faced ibis from these foraging areas but, given it is a highly mobile species; birds *should not be adversely affected* by the proposed Project.

Ferruginous Hawk

The ferruginous hawk is a state listed special concern species. In Colorado, they are found primarily on the eastern plains in grassland and lowland riparian habitat types (USFWS 2007b). Small numbers of these hawks nest in northwestern Colorado and the San Luis Valley. Ferruginous hawks nest in isolated trees, small groves of trees, or on other elevated sites such as rock outcrops, buttes, large shrubs, haystacks, and low cliffs. Nests are situated adjacent to open areas such as grassland or shrub steppe. These hawks are closely associated with prairie dog colonies, especially in winter. In Colorado, nesting is initiated as early as mid March, and young fledge during late June and July. Although they do breed in Colorado, ferruginous hawks are more common during winter (November to March). Rabbits are the most important prey items by biomass, but prairie dogs and ground squirrels are the most important numerically.

CIG conducted raptor surveys within 0.5 miles of the proposed pipeline routes in 2006 and 2007. These surveys located 26 raptor nests; however, none were identified as active ferruginous hawk nests. The table 4.6.2-2 identifies the location of these nests.

CIG would contract a qualified biologist to conduct breeding raptor surveys within one-half mile of proposed surface disturbance activities that would occur within the 2008 breeding season from April 1 through July 31. If active raptor nests are located during breeding bird surveys, CIG would coordinate with the appropriate agency biologists (USFWS and/or CDOW) to determine what protection measures would be required. At a minimum, active nests within 0.5 mile of the proposed Project corridor would be biologically monitored prior to construction to establish baseline behavioral data. This would allow monitoring during construction to determine if construction activities are having any effect on incubation, feeding of young, or other nesting behavior. Any documentation of negative effects on nesting would result in an immediate ceasing of construction activities (*i.e.*, ground disturbing activities) within a specified buffer zone around the nest until the birds have fledged or are no longer using the nest site. Buffer zones would be determined by the CDOW-recommended mitigation measures (Craig 2001). If a

travel lane for vehicles and/or heavy equipment is needed to pass through a designated protection zone for nesting birds, CIG would coordinate with agency biologists for approval. Prior to the commencement of activities, construction personnel would be trained to minimize disturbance to actively nesting birds when traveling through these protection zones (*e.g.*, remain inside the vehicle, stay on the identified travel lane, maintain slow speeds, minimize noise disturbances, be aware of wildlife using the construction corridor).

Most raptor nesting is anticipated to be completed by early July; however, depending on weather conditions during construction, some nesting may be delayed. In that case, construction would have to avoid nests until young have fledged, which may be as late as August.

Because proposed Project activities could temporarily affect foraging habitat, the proposed Project *may affect individuals, but is not likely to result in a loss of viability rangewide, nor cause a trend to federal listing* for the ferruginous hawk.

Table 4.6.2-2 – Raptor Nest Sites

MP	Species	Nest No.	Nest Size / Condition	Distance to Pipeline (feet)	Active or Inactive	Location
LINE 250A						
7.4	Raptor Nest	30	Medium/Good	4,337	Inactive	Tree
18.4	Possible Swainson's Hawk	1	Medium/Good	591	Unknown	Tree
22.7	Burrowing Owl	2	Burrow	154	Active	Ground
31.0	Burrowing Owl	3	Burrow	20	Active	Ground
32.1	Possible Swainson's Hawk	4	Medium/Good	315	Unknown	Tree
41.7	Raptor Nest	31	Medium/Good	2,100	Inactive	Tree
49.0	Possible Great Horned Owl	5	Medium/Good	351	Unknown	Tree
52.4	Burrowing Owl	6	Burrow	210	Active	Ground
56.2	Raptor Nest	7	Medium/Good	2,106	Inactive	Tree
59.5	Raptor Nest	8	Medium/Good	308	Inactive	Tree
68.1	Raptor Nest	9	Medium/Good	1,171	Inactive	Tree
LINE 251A						
7.8	Raptor Nest	10	Medium/Good	328	Inactive	Tree
12.2	Swainson's Hawk	11	Med./Excellent	184	Active	Tree
54.9	Burrowing Owl	12	Burrow	1,194	Unknown	Ground
LINE 252A						
0.2	Raptor Nest	13	Medium/Good	361	Inactive	Tree
0.2	Raptor Nest	14	Medium/Good	1,178	Inactive	Tree
9.3	Raptor Nest	15	Medium/Good	125	Inactive	Tree
9.4	Raptor Nest	16	Medium/Good	295	Inactive	Tree
11.6	Raptor Nest	17	Medium/Good	210	Inactive	Tree
13.9	Raptor Nest	18	Medium/Good	282	Inactive	Tree
14.2	Raptor Nest	19	Medium/Good	167	Inactive	Tree
13.1	Raptor Nest	20	Medium/Good	528	Inactive	Tree
13.6	Burrowing Owl	21	Burrow	850	Unknown	Ground
67.8	Raptor Nest	23	Medium/Good	213	Inactive	Tree
67.8	Raptor Nest	24	Medium/Good	1,198	Inactive	Tree
46.9	Raptor Nest	25	Medium/Good	213	Inactive	Tree
10.3	Raptor Nest	26	Medium/Good	2,572	Inactive	Tree
13.6	Raptor Nest	27	Medium/Good	558	Inactive	Tree

Table 4.6.2-2 (cont.) – Raptor Nest Sites

MP	Species	Nest No.	Nest Size / Condition	Distance to Pipeline (feet)	Active or Inactive	Location
12.8	Raptor Nest	28	Medium/Good	2,648	Inactive	Tree
YARDS						
Carr Pipe Yard	Raptor Nest	29	Medium/Good	2,139 fr. Yard	Inactive	Tree
Hudson Pipe Yard	Great Horned Owl	22	Med./Excellent	In yard	Active	Tree

Burrowing Owl

The burrowing owl is a state listed threatened species. Andrews and Righter (CDOW 2007c) report the species declining in Colorado, with complete or near extirpation in some areas. Along the front range of Colorado, burrowing owls have largely disappeared from much of their historic range. Workers for the Colorado Breeding Bird Atlas found breeding burrowing owls almost exclusively in eastern Colorado, despite once having been more widespread throughout the state (CDOW 2007c).

In Colorado the burrowing owl is closely associated with the black tailed prairie dog colonies which provide burrows for nesting and perching mounds, and the low vegetation structure provides a clear view of terrestrial predators. Owl densities appear to be highest in the eastern grasslands, particularly in the southeast corner of the state (CDOW 2007e).

The relationship between size of prairie dog colonies and abundance of owls is unclear, but is probably not linear. Prairie dog colonies smaller than 10 acres in size are as likely to harbor breeding pairs of owls as colonies that are 100 acres or greater in size. Studies have found that owls inhabiting larger colonies with higher densities of prairie dogs are more likely to return to nest in subsequent years, and have higher rates of nest success and lower rates of nest depredation than owls inhabiting smaller colonies or colonies with fewer prairie dogs (CDOW 2007c). Burrowing owls do show some site fidelity nesting in the same prairie dog colony and often in the same burrow. The owls arrive in Colorado at the end of March and early April, and probably initiate nesting by early May. Fledged young appear at the burrow opening from May through July. The birds leave for their wintering grounds in the Southwest, Mexico, and Central America by mid October (USFWS 2007b).

Loss of native grassland by conversion to agriculture results in loss of foraging and nesting habitat and increases disturbances such as noise, harassment by pets, and collisions with vehicles.

Surveys conducted in 2006 reveled three active burrowing owl nest sites and two potential nest sites at Line 250A - MP 22.7, 31.0 and 52.4, Line 251A - MP 54.9, and Line 252A - MP 13.6. It appears that all the nests are associated with natural community types. The nest site on Line 250A-MP 31.0 is the only one that occurs within the proposed construction right-of-way, at about 20 feet from the proposed pipeline centerline. The other nest sites are 154, 209, 1193, and 849 feet from the proposed pipeline centerline.

Assuming no additional nest sites are discovered in the proposed right-of-way during future surveys for raptors, the proposed Project would directly impact one burrowing owl nest. This nest is very close to the proposed centerline and would likely be destroyed. Surveys conducted prior to the 2008 construction would determine if this nest is active. There is potential for the owls nesting close to the proposed right-of-way, in particular those at 154 and 209 feet from centerline, to be indirectly impacted during the nesting phase from noise associated with construction.

CIG would contract a qualified biologist to conduct breeding raptor surveys within one-half mile of proposed surface disturbance activities that would occur within the 2008 breeding season from April 1 through July 31. If active raptor nests are located during breeding bird surveys, CIG would coordinate with the appropriate agency biologists (USFWS and/or CDOW) to determine what protection measures would be required. At a minimum, active nests within 0.5 mile of the proposed Project corridor would be biologically monitored prior to construction to establish baseline behavioral data. This would allow monitoring during construction to determine if construction activities are having any effect on incubation, feeding of young, or other nesting behavior. Any documentation of negative effects on nesting would result in an immediate ceasing of construction activities (*i.e.*, ground disturbing activities) within a specified buffer zone around the nest until the owls have fledged or are no longer using the nest site. Buffer zones would be determined by the CDOW in accordance with the guidelines in *Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors* (CDOW 2001). If a travel lane for vehicles and/or heavy equipment is needed to pass through a designated protection zone for nesting birds, CIG would coordinate with agency biologists for approval. Prior to the commencement of activities, construction personnel would be trained to minimize disturbance to actively nesting birds when traveling through these protection zones (*e.g.*, remain inside the vehicle, stay on the identified travel lane, maintain slow speeds, minimize noise disturbances, be aware of wildlife using the construction corridor).

Based on CIG's proposed conservation measures and their proposed consultation with the USFWS and CDOW if nest are discovered prior to construction, the proposed Project *would not likely affect the species, result in a loss of viability rangewide, or cause a trend to federal listing*.

Peregrine Falcon

The peregrine falcon is a state listed special concern species. Peregrine falcons breed throughout the Colorado Plateau and Southern Rocky Mountain ecological provinces of Colorado; however, nesting does not occur on the eastern plains. In Colorado it typically nests on cliffs and forages over adjacent coniferous and riparian forests. Migrants and winter residents occur mostly around reservoirs, rivers, and marshes, but may also be seen in grasslands and agricultural areas. It is a rare spring and fall migrant in western valleys, foothills, lower mountains, mountain parks, and on eastern plains. It has been introduced to downtown Denver (USFWS 2007b).

No peregrine falcons were observed during CIG's 2006 and 2007 field biological surveys. This species is most likely to occur in the proposed Project area during migration. Migrants or downtown Denver birds may occasionally hunt and roost in the proposed Project area; however, it is highly unlikely that the proposed Project could result in either a direct or indirect impact on this species. Therefore, the proposed Project *is not likely to result in a loss of viability rangewide, nor cause a trend to federal listing* for the peregrine falcon.

Golden Eagle

The golden eagle is a state listed sensitive species. The golden eagle has a very large home range and occurs in nearly all habitats of the western states, from desert grasslands to above timberlines, perhaps avoiding only densely forested areas were hunting is impossible (Johnsgard 1988a). Pairs typically nest on select cliffs, steep rock faces with overhangs, or large trees. Optimal nesting habitat is generally lacking in the proposed Project area and these birds are considered a rare to uncommon summer resident in Colorado's eastern plains. No eagles were observed in 2006 or 2007 during CIG's biological surveys. There is potential for this species to forage in the proposed Project area for black-tailed prairie dog and other mammals; however, given the mobility of this species and large home range it is very *unlikely that the proposed Project would adversely affect this species or cause a trend towards federal listing*.

Plains Sharp-tailed Grouse

The plains sharp-tailed grouse is a state listed endangered species. It formerly nested over much of the northern two-thirds of the eastern prairie. The CDOW cites the Colorado population as consisting of only a few hundred birds in Douglas County. Partners in Flight website indicates this species occurs in northern Weld and Logan Counties.

Plains sharp-tailed grouse inhabit a mix of tall and short grasses interspersed with stands of shrubs, including Gambel oak, three leaf sumac, willows, and sand sagebrush, especially where the shrubs form a dense cover with a relatively open understory. The woody cover is especially important for brood cover. In Weld County, populations occupy CRP land where tall grasses mix with shorter native species and agricultural fields.

CIG would conduct plains sharp-tailed grouse lek searches along Line 250A - MP 0 to 72 during the lekking season (April-May). Lek searches in all potential habitats (*i.e.*, CRP lands where tall grasses mix with shorter native species and agricultural fields) would be initiated in the second half of April unless construction is expected earlier. In this case, lek searches would be conducted in March when males start to frequent leks (Andrews and Righter 1992; Braun, *et al*. 1992; Connelly *et al*. 1998). If any plains sharp-tailed grouse are documented in the proposed Project area, CIG would coordinate with the CDOW to determine if protection measures would be required. Appropriate protection measures, including establishment of buffer areas, biological monitoring, and constraint periods, would be implemented on a case-by-case basis.

Sharp-tailed grouse leks have been known to be associated with disturbed ground and sites with less vegetation than surrounding areas (Hart *et al*. 1950, Kobriger 1965, Sisson 1976, Baydack 1988; in Bio Resources 2007). Therefore, construction activities may have a small positive effect on future lekking activity due to ground disturbance and a temporary reduction in vegetation. This proposed Project may affect the sharp-tailed grouse, but implementing the outlined mitigation procedures should result in *no adverse affect upon this species or cause a trend towards federal listing*.

Long-billed Curlew

The long-billed curlew is a state listed special concern species. In Colorado, the birds breed throughout the eastern plains with the population concentrated in the southeast. Ideal long-billed curlew breeding habitat consists of a complex of short-growth grasslands, agricultural fields, wet and dry meadows and prairies, and grazed mixed-grass and scrub communities (NRCS 2000). Curlews breed in shortgrass and mixed-grass habitats, and occasionally in idle cropland. They prefer short vegetation, generally <30 cm (12 in) and often <10 cm (4 in). After hatching, the adults move the chicks to areas of taller grasses and scattered forbs and shrubs for protection from predators and weather extremes; dense forbs or shrubs are avoided due to low visibility and difficulty of travel for chicks. Curlews arrive in Colorado in April, lay eggs in May, and fledge young by mid June. Most of Colorado's adult birds have left the state by mid-July, while young and migrants from the north leave the state by the end of August (USFWS 2007b).

The proposed Project area supports a significant amount of long-billed curlew habitat. The proposed Project could result in a displacement of some breeding and solitary birds during the construction phase and destruction of nest and young from April to May, depending on what time of season the construction occurs. Based on available habitat in the proposed Project area the proposed Project *may affect the long-billed curlew but should not result in an adverse affect to the population of this species or cause a trend towards federal listing*.

Lesser Prairie Chicken

The lesser prairie chicken is a state listed threatened species, and is currently designated as a candidate species by the USFWS. Lesser prairie chickens reside from southeastern Colorado east to southwestern Kansas, south through western Oklahoma and the Texas panhandle, and west to southeastern New Mexico. Within Colorado, they occupy the grassland habitat type, primarily in Baca County, with some birds residing in Kiowa and Prowers Counties (USFWS 2007b). Colorado's population currently numbers 1,200 to 1,600 breeding birds, with most birds located on the Comanche National Grassland near Campo in southeastern Colorado. Lesser prairie chickens prefer grasslands with some shrubs and will also use CRP land. Vegetation found in a suitable habitat includes sand sagebrush and shinnery oak with mixed grasses including sand dropseed, side-oats grama, three-awn, blue grama, or bluestem. Leks are located in areas of sparse vegetation, typically on knolls or ridges. The birds usually nest within 3 km (2 mi) of the lek, usually in grasses and forbs of comparatively high density and height, often on north- or northeast-facing slopes (<6% slope), presumably for protection from sunlight. Taller, woody vegetation provides shade for nests and for adults and broods in summer (USFWS 2007b).

The proposed Project area does not support optimal habitat for this species. As well, the proposed Project area is well outside of the known range of the lesser prairie chicken in Colorado. Therefore, the proposed Project *is not likely to adversely affect the lesser prairie chicken or cause a trend towards federal listing.*

Mountain Plover

The mountain plover is a state listed special concern species. Mountain Plovers breed from southern Alberta south through western Oklahoma and western Texas, and west through central New Mexico. In Colorado, populations are concentrated in and around the Pawnee and Comanche National Grasslands and in South Park (USFWS 2007b). The PNG's population represents 10 to 20 percent of the total breeding population while the southeastern Colorado population represents 40-50 percent (South 2002).

Mountain plovers will breed in shortgrass prairie where the topography is fairly flat (slopes <6) with very short (5 cm; 2 in) and sparse vegetation. They are often found where vegetation height and density have been reduced through grazing by livestock or prairie dogs. Average bare ground cover in studies of plover territories ranged from 17% to 100%. They will also nest in areas with low, sparse shrubs. Plovers will forage and nest in agricultural fields that are bare or contain short vegetation, but will abandon the nests if the vegetation grows too tall (*i.e.*, above about 5 cm; 2 in). Birds arrive in Colorado in March, and young fledge in June and July; most birds have left the state by the end of September (USFWS 2007b).

Based on a review of mountain plover distribution maps developed by the Central Shortgrass Prairie Partnership (Neely, *et al.* 2006), the northernmost portion (approximate MP 0-14) of the proposed pipeline Line 250A crosses low, moderate, and high mountain plover density areas.

CIG plans to conduct mountain plover surveys in appropriate habitat prior to construction in mid-March in accordance with the USFWS Mountain Plover Survey Guidelines (USFWS 2002). The guidelines reviewed for this document suggest that surveys to determine courtship and territorial establishment should occur from mid-April through early July. Citing pipeline construction specifically, the guidelines suggest that surveys for nesting birds be conducted April 10 through July 10 and that a plover survey would need to be completed 1- 3 days prior to any construction activity, including initial brush clearing, to avoid direct take of mountain plovers. The survey should include the route and a 0.25-mile buffer on either of the proposed Project corridor. If there is a break in construction activity in these

areas of more than 3 days (*e.g.*, between pipe stringing, trenching, or welding), an additional plover survey is necessary before construction activity can resume after that break in activity. After July 10, most mountain plover chicks are sufficiently mobile to reduce the risk of direct take.

CIG indicates that if plover nesting behavior is detected during spring surveys, construction would skip this area until the young have hatched and are capable of dispersing, usually sometime in late June or early July.

The proposed Project may temporarily decrease the amount of nesting habitat available for the mountain plover but would not likely contribute to the declining population. By following a mitigation plan that avoids nesting birds the proposed Project *should not adversely impact the population in the proposed Project area nor cause a trend to federal listing or a loss of species viability rangewide*.

McCown's Longspur

The McCown's longspur is a state listed sensitive species. This species breeds in sparse shortgrass and grazed mixed-grass prairies, primarily in northern Weld and northeastern Larimer Counties. It prefers the shortgrass systems, especially where vegetation cover is sparse due to low soil moisture or grazing, or is interspersed with shrubs or taller grasses. They also nest in grazed mixed-grass prairies. Individuals often use sparsely-vegetated hilltops for displaying and nesting. They require areas of bare soil and often place nests on barren hillsides. Territories in Colorado averaged 45-79% shortgrass and 13-23% bare ground, with little or no forb or cactus cover and few woody plants (although nests initiated late in the season are more likely to be near shrub cover, perhaps for protection from solar radiation). Longspurs breed in loose colonies arriving in Colorado in late March, and often linger into November. They initiate nesting by mid May, and most young fledge by mid July. Attempts to produce second broods may account for their extended residence in Colorado.

CIG proposes to conduct a breeding bird survey within 330 feet (100 meters) of proposed surface disturbance activities to document the presence of active breeding pairs during the nesting season that occurs from roughly April 1 through July 31. If an active nest is documented CIG would coordinate with the CDOW to determine appropriate protection measures. These may include establishing buffer areas or restricting construction during a specific time period. CIG proposes as an alternative, to restrict vegetation clearing outside of the breeding season (April 1 through July 31). This would not preclude the possibility of the bird nesting within or immediately adjacent the proposed right-of-way. Thus, surveys prior to the construction period are warranted.

Based on the abundance of habitat adjacent to the proposed Project and the above mitigation measures, the proposed Project *may affect, but is not likely to adversely affect the McCown's longspur or cause a trend to federal listing or a loss of species viability of the species*.

Chestnut-collared Longspur

The chestnut-collared longspur is a state sensitive species. It prefers shortgrass or grazed mixed-grass prairie with scattered shrubs. In dry areas with sparse vegetation, they seek out wet meadows and other low, moist areas where the vegetation is taller and denser. They appear to prefer a mix of short and tall grasses, especially bunchgrasses, and usually avoid the tall dense cover common to some CRP lands. They will nest in mowed hayfields and grazed pastures, provided some vegetation is 8–12 inches tall, but they avoid cultivated fields for nesting. Birds arrive in mid-April and begin nesting in May, with most young out of their nests by mid-June. Because some pairs nest a second time, young can be found in nests as late as mid-August.

CIG proposes to conduct a breeding bird survey within 330 feet (100 meters) of proposed surface disturbance activities to document the presence of active breeding pairs during the nesting season that occurs from roughly April 1 through July 31. If an active nest is documented CIG would coordinate with the CDOW to determine if protection measures that would be required. Appropriate protection measures may include establishing buffer areas or restricting construction during a specific time period. CIG proposes as an alternative, to restrict vegetation clearing outside of the breeding season (April 1 through July 31). This would not preclude the possibility of the bird nesting within or immediately adjacent the proposed right-of-way. Thus, surveys prior to the construction period are warranted.

Based on the abundance of habitat adjacent to the proposed Project and the above mitigation measures, the proposed Project *may affect, but is not likely to adversely affect the chestnut-collared longspur or cause a trend to federal listing or a loss of species viability of the species*.

Brassy Minnow, Plains Minnow, Suckermouth Minnow, Hornyhead Chub, Northern Redbelly Dace, Iowa Darter, Plains Top Monnow, and Stonecat

The brassy minnow is a state listed threatened species native to the South Platte River and its tributaries. Suitable habitat for this species includes cool, clear creeks with a sand to gravel substrate and aquatic vegetation. This species persists through periods of low flow and high water temperature by remaining in deeper pools within streams. Brassy minnows spawn in the spring and usually deposit eggs in vegetated areas. Although no populations of brassy minnow have been recently recorded in the South Platte River, that river is believed to be a conduit for connecting tributary stream populations.

The plains minnow is a state listed endangered species that inhabits large streams and rivers over beds of sand and silt with some current. This species can be found in clear to highly turbid waters with high levels of dissolved solids and slightly too moderately erratic flows. The plains minnow spawns with high and receding spring flows, usually under turbid conditions. Although formerly known to occur in most of the rivers of the eastern plains, this species now only persists in the South Platte River, including the area of the proposed crossing.

The suckermouth minnow is a state listed endangered species that is tolerant of moderate turbidity and inhabits runs and riffles of freshwater creeks and small to medium rivers with substrates ranging from sand and gravel to large boulders. The suckermouth minnow spawns in the spring and summer, presumably over gravelly riffles. This species is now extremely uncommon in Colorado and, based on recent inventory efforts, is thought to be limited to only a very small population in the Lodgepole Creek drainage of the South Platte River.

The hornyhead chub is a state listed sensitive species. This species is found near riffles in clear streams with permanent flows. This species is likely extirpated from Colorado (Propst and Carlson 1986).

The Northern redbelly dace is state listed endangered species. It occurred historically in the St. Vrain River, Boulder Creek, and West Plum Creek drainages. Recent sampling has shown only one population remaining in the West Plum Creek drainage near Castle Rock, Colorado. These dace are known to inhabit slow-moving, spring-fed, cool water streams or ponds with aquatic vegetation and sandy bottoms (CDOW 2007e).

The Iowa darter is a state listed special concern species. It prefers clear, vegetated sluggishly flowing streams and weedy portions of marshes and ponds. It spawns in April and May in sandy areas or beneath stream banks on the South Platte River (Woodling 1985).

The plains topminnow is a Colorado sensitive species. It prefers clear water in a quiet pool of small creeks and in backwater areas of large rivers that have submergent vegetation. This species probably spawns in early summer, and is known to occur in the South Platte River (Woodling 1985).

The stonecat is a Colorado species of special concern. It inhabits riffle areas composed of gravel, cobble, and bedrock. They are intolerant of excessive current and current slow enough to silt in riffles. Spawning is in spring and early summer. They have been found in the South Platte River (Woodling 1985).

Construction in waterbodies containing sensitive species could result in impacts on habitat, individuals, or populations of these species including disruption of spawning and foraging behavior, injury or direct mortality of individuals from construction equipment, and injury or direct mortality of individuals due to downstream sedimentation.

CIG proposes to minimize impacts on river species by completing each South Platte River crossing within a 36 hour period. CIG would seine and release any fish that become isolated in pools during construction. CIG would maintain a continuous flow in the river during construction. This crossing plan should reduce the potential affects on these species. Given the relatively short duration of the crossing and the limited area of disturbance, construction of the pipeline across the South Platte River *may affect, but is not likely to adversely affect these fish species*.

Colorado Blue and Two-spotted Skipper

The Colorado blue is a state listed special concern species. This species of butterfly uses wild buckwheat (*Eriogonum sp*.) as a host plant in grassland areas (CDOW 2006a). It is found in undisturbed prairie sites where the food plant, *Eriogonum effusum* Nutt. is abundant. Habitats require light to moderate grazing by wildlife or cattle. It has one flight mostly in August (Scott 1986 cf. Nature Serve 2007) coinciding with blooming period of host plant.

The two-spotted skipper is a state listed sensitive species. In Colorado it occurs in Boulder, Kit Carson, Larimer, and Morgan Counties (Nature Serve 2007). It is known from the vicinity of the South Platte River (CDOW 2006a). The habitat for this species includes, marshes, bogs, wet streamsides, and wet sedge meadows. The caterpillar host is hairyfruit sedge (*Carex trichocarpa*) while the adults nectar from flowers including pickerelweed, sweet pepperbush, blue flag, common milkweed, and spiraea. It has one brood in the north from June-July; two broods in the south from May-August.

No specific surveys were conducted for listed butterflies; however, field studies did not reveal the presence of the host plant for either species. It is not known if any optimal habitat is crossed by the proposed Project for these species. However, the proposed Project should not result in a long-term adverse impact on any potential habitat for this species that may occur. Thus, the proposed Project *may affect, but is unlikely to adversely affect or cause a trend toward federal listing of the Colorado blue butterfly or the two spotted Skipper*.

Giant Floater

The giant floater is a state listed sensitive mollusk. In Colorado, this species still maintains steady populations on the eastern plains but no longer occurs in stream habitats (Nature Serve 2007). Some declines have occurred in Colorado streams at the edge of its western range, but reservoir populations are widespread, though uncommon (Nature Serve 2007). This species is apparently tolerant of a fairly wide range of habitats. The adults are essentially sessile and the only voluntary movement they

make is to burrow deeper into the substrate. Some passive movement downstream may occur during high flows. Dispersal occurs while the glochidia are encysted on their host (probably a fish).

No specific survey for mollusks were conducted at waterbodies crossed. Based on the current understanding that stream populations have declined in Colorado it is unlikely that the proposed pipeline crossing of the South Platte or any other waterbody would impact this species. This species appears secure in reservoirs in the state. The proposed Project *is not likely to adversely affect the population of this species*.

Cylindrical Papershell

The cylindrical papershell is a Colorado special concern species. This mollusk is distributed in the Mississippi River system from Pennsylvania and Tennessee west to Minnesota and Colorado; St. Lawrence River system and the Great Lakes (Nature Serve 2007). In Colorado it is known from Boulder County. This species reaches the edge of its western range and has declined to just two or three sites in the South Platte River drainage (Nature Serve 2007) from over two dozen sites across the eastern part of the state historically.

No specific survey for mollusks were conducted at waterbodies crossed. This species is known to occur in the South Platte; however, the relatively minor impact on the overall river bottom sediment should not result in an impact on this species. This project *may affect, but is not likely to adversely impact the population of this species*.

Wyoming Feverfew

The Wyoming feverfew plant is a Colorado sensitive species. It occurs along ridges, road cuts and low hills, and in areas devoid of vegetation in Weld County (Dorn 1992, cf. 2007). There are currently four populations known to occur in Colorado. It flowers in the end of April and early May.

Surveys conducted by CIG in 2006 along the proposed pipeline right-of-way did not reveal any suitable habitat for the Wyoming feverfew. It is unlikely that this species occurs in the proposed Project area. This proposed Project *is not likely to adversely impact the population of this species*.

4.6.3 Determination of Effect for Federal- and State-Listed Species

CIG, acting as the FERC's non-federal representatives for purposes of complying with Section 7 of the ESA, consulted with the USFWS regarding the presence of federal-listed or proposed listed species in the proposed Project area. Based on these consultations, 13 federal-listed species were determined to potentially occur in the general vicinity of (within the counties crossed by) the proposed Project. CIG conducted biological surveys of the proposed pipeline routes in 2006 and 2007 to determine the presence/absence of listed species and available habitat in the proposed Project area. The design and methodology of surveys were based on established protocols and/or developed in consultation with biologists from the USFWS and the CDOW. CIG has submitted preliminary reports of findings and specific mitigation plans to the FERC and the USFWS for review. These reports and available literature supported this assessment of the potential effects of the proposed action for each species (see table 4.6.3-1). It has been determined that the proposed Project will not affect or is not likely to adversely affect the 13 federal-listed species potentially occurring in the vicinity of the proposed Project.

In addition to the 13 federal-listed species potentially occurring in the vicinity of the proposed Project, the USFWS identified 6 federal-listed species and critical habitat for one species in Nebraska that that the Project may adversely affect as a result of water withdrawals from the South Platte River (see

table 4.6.3-2). We have initiated consultations with the USFWS regarding these water withdrawals and their potential impacts on the six species. A copy of our BA is provided in appendix N.

CIG informally consulted with the CDOW to determine if any State of Colorado species of concern could potentially occur in the proposed Project area. Based on these consultations, 34 listed species including, 7 endangered, 7 threatened, 10 special concerns, and 10 sensitive species were identified. These species included 9 of the federal-listed species. Based on initial biological survey reports and available literature it has been determined that the proposed Project is not likely to adversely affect nor cause a trend towards federal listing of any sensitive species in the State of Colorado.

We and CIG are continuing to consult with agencies overseeing this proposed Project to develop the most appropriate conservation measures to minimize the potential impacts on species and habitat within the proposed Project areas. CIG would conduct additional biological surveys in 2007 and 2008 to further assess the presence/absence of listed species. Detailed reports presenting the results of the special status species surveys would be provided to other agencies as appropriate.

Since consultation with the FWS is not complete, **we recommend that:**

- **CIG not begin construction activities until:**

  a. staff has completed necessary consultations with the FWS; and

  b. CIG has received written notification from the Director of OEP that construction and/or use of mitigation may begin.

Further, project construction may be delayed by unforeseen events or the FWS may have modified its recommendations. Therefore, **we recommend that:**

- **If construction of the pipeline system has not begun within 1 year from the date of FERC approval of the Project, CIG consult with the appropriate office of the FWS to update the species list and to verify that previous consultations and determinations of effect are still current. Documentation of these consultations, and additional surveys and survey reports (if required), and FWS comments on the survey and its conclusions, shall be filed with the Secretary prior to construction.**

Table 4.6.3-1 – Determination of Effect for Federal- and State-Listed Species in the Vicinity of the Proposed Project

Species	Status[a]	Determination[b]	Justification
Black-footed ferret	FE, SE	Not likely to Adversely Affect	Naturally occurring populations of this species are probably extirpated from the State of Colorado.
Preble's meadow jumping mouse	FT, ST	Not Likely to Adversely Affect	There are several sites that support suitable habitat. Trapping surveys would be conducted in 2007, and, if present, appropriate mitigation measures would be employed.
Whooping crane	FE, SE	Not likely to Adversely Affect	This is a highly mobile and casual migrant in proposed Project area and would not be adversely affected by construction activities.
Bald eagle	FT[c], ST	Not Likely to Adversely Affect	To date no known nesting or winter roosting sites occur in the proposed Project area. This is a highly mobile, reasonably tolerant species.
Eskimos curlew	FE	No Effect	Not recorded in Colorado in the proposed Project area since 1882.
Least tern	FE, SE	Not likely to Adversely Affect	There is not suitable nesting habitat at proposed Project waterbody crossing points. The pipeline would impact a limited area for a short amount of time, and should not affect birds that may utilize that the river corridor for foraging.

Table 4.6.3-1 (cont.) – Determination of Effect for Federal- and State-Listed Species in the Vicinity of the Proposed Project

Species	Status[a]	Determination[b]	Justification
Piping plover	FT, ST	Not likely to Adversely Affect	There is not suitable nesting habitat at proposed Project waterbody crossing points. The pipeline would impact a limited area for a short amount of time, and should not affect birds that may utilize that the river corridor for foraging.
Mexican spotted owl	FT	No Effect	The proposed Project area does not support habitat utilized by this species.
Pallid sturgeon	FE	Not Likely to Adversely Affect	This species probably does not occur in the proposed Project area. The use of water for hydrostatic testing, and the turbidity associated with construction would be unlikely to affect downstream habitat or the species.
American burying beetle	FE	Not likely to Adversely Affect	The western most distribution in of this species occurs in the sandhills of Nebraska. It is very unlikely that this species occurs in the proposed Project area.
Colorado butterfly plant	FT, ST	Not Likely to Adversely Affect	The 2006 surveys did not discover species. Additional presence/absence surveys would be conducted in 2007; however, it is doubtful this species occurs in proposed Project area.
Ute ladies' tresses	FT, ST	Not Likely to Adversely Affect	The 2006 surveys did not discover this species and the available habitat were classified as being of low quality due to hydrology and disturbed conditions.
Western prairie fringed orchid	FT	Not likely to Adversely Affect	The proposed Project area is west of known range and optimal habitat does not occur.
Swift fox	SC	May Affect but Not Likely to Adversely Affect	The 2006 surveys did not discover any fox denning sites or fox. Additional surveys would be conducted in 2007 and if active dens are found appropriate mitigation measures would be employed.
Black-tailed prairie dog	SC	Not Likely to Adversely Affect	The proposed Project would directly impact 18 prairie dog colonies which could result in a direct take and/or displacement of prairie dogs. The construction activities would likely induce some stress to members of the colony stressed, but colonies would be affected for a short duration. Habitat conditions should recover with time.
Eastern spotted skunk	SS	Not likely to Adversely Affect	This species is likely extirpated from Colorado which is in the western most part of its range.
White-faced ibis	SS	May Affect but Not Likely to Adversely Affect	Suitable habitat is generally lacking although this species may use the proposed Project area to forage. Foraging birds may be displaced but they are highly mobile and should not be adversely affected.
Golden eagle	SS	Not likely to Adversely Affect	This bird may frequent the proposed Project area to hunt but it has a very large range and is highly mobile and should not be affected.
Ferruginous hawk	SC	May Affect but Not Likely to Adversely Affect	This bird is a likely nester in proposed Project area. Additional surveys would be conducted in 2007 and 2008 to determine if active nests do occur and if necessary appropriate mitigation measures would be employed.
Peregrine falcon	SC	Not likely to Adversely Affect	This bird was not observed during 2006-2007 surveys. It does not naturally nest on the eastern plains and may be a casual migrant to the proposed Project area. This mobile species should not be affected by this proposed Project.
Plains sharp-tailed grouse	SE	May Affect but Not Likely to Adversely Affect	This species may occur in proposed Project area, primarily in Weld County. Surveys for lekking birds would be conducted in 2007 and if birds are present appropriate mitigation measures would be employed.
Long-billed curlew	SC	May Affect but Not Likely to Adversely Affect	The proposed Project area supports large amount of suitable habitat. Breeding and/or solitary birds may be displaced during construction, depending on time of year, and some suitable habitat would be altered, however, the proposed Project should not adversely affect this species.
Mountain plover	SC	May Affect but Not Likely to Adversely Affect	The proposed Project area supports suitable habitat for this species. Breeding and/or solitary birds may be displaced during construction, depending on time of year, and some suitable habitat would be altered, however, the proposed Project should not adversely affect this species.
Burrowing owl	ST	May Affect but Not Likely to Adversely Affect	This proposed Project may directly impact one nest site within the proposed construction right-of-way. Two additional nests and two potential nests are also located near the construction tight-of-way. Surveys conducted in 2008 would determine if these nests are active. Birds potentially utilizing nests located relatively close to the proposed right-of-way may be disturbed if construction occurs during the nesting season.

Table 4.6.3-1 (cont.) – Determination of Effect for Federal- and State-Listed Species in the Vicinity of the Proposed Project

Species	Status[a]	Determination[b]	Justification
McCown's Longspur	SS	May Affect but Not Likely to Adversely Affect	The proposed Project area supports suitable habitat for this species. Breeding and/or solitary birds may be displaced during construction, depending on time of year, and some suitable habitat would be altered, however, the proposed Project should not adversely affect this species.
Chestnut-collared Longspur	SS	May Affect but Not Likely to Adversely Affect	The proposed Project area supports suitable habitat for this species. Breeding and/or solitary birds may be displaced during construction, depending on time of year, and some suitable habitat would be altered, however, the proposed Project should not adversely affect this species.
Hornyhead Chub	SS	May Affect but Not Likely to Adversely Affect	No specific surveys were conducted for this species at the proposed crossing points of the South Platte River. Some direct impact on individuals and habitat could occur, and depending on the time of year the crossing is conducted there could be a disruption to spawning activities. However, it is unlikely that any significant disturbance would occur to this fish given the relatively short duration of the crossing operation and the limited area that would be affected. Appropriate mitigation measures would be employed to reduce impact on this species.
Northern Redbelly Dace	SE	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Brassy Minnow	ST	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Plains Minnow	SE	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Suckermouth Minnow	SE	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Iowa Darter	SC	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Plains Topminnow	SS	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Stonecat	SC	May Affect but Not Likely to Adversely Affect	Assessment same as that of Horneyhead Chub
Colorado Blue	SC	Not likely to Adversely Affect	No specific surveys for this species were conducted; however, field studies did not reveal the presence of the host food plant.
Two-spotted Skipper	SS	May Affect but Not Likely to Adversely Affect	No specific surveys for this species were conducted. This species is known from around the vicinity of the South Platte. It is currently no known if any wetlands crossed by the proposed Project support the host sedge species. In general the area impacted in wetlands would be limited and these sites should be restored to preconstruction conditions.
Giant Floater	SS	Not likely to Adversely Affect	No specific surveys for mollusks were conducted. This species population remains stable in Colorado, mostly relegated to reservoirs. The proposed crossing points of the South Platte disturbs only a limited amount of area for a short duration of time and would be unlikely to adversely affect this species.
Cylindrical papershell	SC	May Affect but Not Likely to Adversely Affect	No specific surveys for mollusks were conducted. This species is at its western most portion of its range. The proposed crossing points of the South Platte disturbs only a limited amount of area for a short duration of time and be unlikely to adversely affect this species.
Wyoming Feverfew	SS	Not likely to Adversely Affect	Surveys conducted along the proposed pipeline routes did not reveal any suitable habitat for this species.

[a] FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; SC=State Special Concern; SS=State Sensitive Species

[b] Not likely to Adversely Affect = Individuals and Population as a whole would not be impacted by the proposed Project.

May Affect but Not likely to Adversely Affect = Individuals may be impacted by proposed Project but population as a whole would not;

No effect = The proposed Project will not affect listed species or critical habitat.

[c] Federally delisted on June 28, 2007

Table 4.6.3-2 – Determination of Effect for Federal- and State-Listed Species in Nebraska

Species	Status[a]	Determination[b]	Justification
Whooping crane (including critical habitat)	FE	May Adversely Affect	Water depletion in the Platte River system greater than 0.1 acre-foot.
Bald eagle	FT[c]	May Adversely Affect	Water depletion in the Platte River system greater than 0.1 acre-foot.
Interior least tern	FE	May Adversely Affect	Water depletion in the Platte River system greater than 0.1 acre-foot.
Piping plover	FT	May Adversely Affect	Water depletion in the Platte River system greater than 0.1 acre-foot.
Pallid sturgeon	FE	May Adversely Affect	Water depletion in the Platte River system greater than 0.1 acre-foot.
Western prairie fringed orchid	FT	May Adversely Affect	Water depletion in the Platte River system greater than 0.1 acre-foot.

[a] FE=Federal Endangered; FT=Federal Threatened

[b] May Adversely Affect = Individuals and Population may be adversely impacted by the proposed Project.

[c] Federally delisted on June 28, 2007.

4.7 LAND USE, RECREATION, AND VISUAL RESOURCES

4.7.1 Land Use

Pipeline Facilities

CIG proposes to expand its existing pipeline system in Weld, Adams, and Morgan Counties, Colorado. The system would consist of about 163.7 miles of new pipeline built in four segments. The segments would include:

- Line 250A, 84.8 miles of 24- and 30-inch diameter pipeline in Weld and Adams Counties;
- Line 251A, 57.9 miles of 24-inch-diameter pipeline in Weld, Adams, and Morgan Counties;
- Line 252A, 14.9 miles of 30-inch-diameter pipeline in Weld County; and
- Line 253A, 6.1 miles of 24-inch-diameter pipeline in Adams County.

Table 4.7.1-1 lists the land uses that would be crossed by the proposed pipeline routes. Agriculture is the most prevalent land use along the proposed routes, comprising about 97.0 miles (59 percent) of the Project. Open range is the second most prevalent land use, comprising 64.2 miles (39 percent) of the Project. Industrial/commercial, forested, and wetland/waterbody comprise the remaining 2.6 miles (1.6 percent) of the Project.

CIG would use a 100-foot-wide construction right-of-way for the majority of the pipeline route, with 50 feet retained as permanent right-of-way during operation of the new facilities. The new pipeline would be centered within the 50-foot-wide permanent easement. A 75-foot-wide construction right-of-way would be used in non-agricultural wetlands, with 50 feet retained as permanent right-of-way. Figures 2A through 2E in appendix C illustrate typical right-of-way layouts. The actual workspace configuration within the construction right-of-way (*e.g.*, spoil storage areas, equipment travel lanes, *etc.*) would vary depending on site-specific conditions.

Table 4.7.1-1 – Land Uses Crossed by the Proposed Pipelines (in miles)

Pipeline / County	Agricultural	Open Range	Industrial/ Commercial	Forested	Wetland/ Waterbody	Total
LINE 250A						
Weld	33.8	37.2	0.1	0.6	0.4	72.0
Adams	12.5	0.3	0.0	0.0	0.0	12.8
	46.3	37.5	0.1	0.6	0.4	84.8
LINE 251A						
Adams	32.2	1.7	0.1	0.0	0.0	34.0
Weld	4.9	0.0	0.0	0.0	0.0	4.9
Morgan	5.0	14.0	0.0	0.0	0.0	19.1
	42.1	15.7	0.1	0.0	0.0	57.9
LINE 252A						
Weld	6.5	7.8	0.2	0.3	0.2	14.9
	6.5	7.8	0.2	0.3	0.2	14.9
LINE 253A						
Adams	2.2	3.2	0.6	0.0	0.1	6.1
	2.2	3.2	0.6	0.0	0.1	6.1
	97.0 (59%)	64.2 (39%)	1.0 (<1%)	0.8 (<1%)	0.7 (<1%)	163.7 (100%)

In addition to the construction right-of-way, CIG identified temporary extra workspaces that would be required for staging construction at the beginning and end of each pipeline; at wetland, waterbody, road, and railroad crossings; and in areas of rocky soils, steep slopes, and rugged terrain. The approximate locations and sizes of temporary extra workspaces are listed in appendix K.

To support construction activities, CIG would use six contractor, pipe storage, and offloading yards on a temporary basis. The names and locations of yards identified by CIG are listed in appendix L. Additionally, CIG would use existing roads to provide access to the construction right-of-way. In many cases, the roads are paved or graveled public roads that would not require modification. Some of the roads, however, are dirt roads, such as farm or ranch roads or two-track trails. CIG indicated that road maintenance, such as grading, filling, and widening, may be required to make the roads passable or to maintain them in a drivable condition during construction, particularly if a rain event occurs and deteriorates the roads' condition. The locations of dirt access roads are listed appendix M.

Construction of the proposed pipelines would affect a total of about 2,635.5 acres of land, consisting of 1,984.1 acres for the construction right-of-way, 297.8 acres for temporary extra workspace, 208.2 acres for access roads, and 145.4 acres for contractor/pipe storage/offloading yards. CIG indicated that most access roads would not need modification for use during construction.

Agriculture would be the main land use affected by the proposed Project, followed by open range, industrial/commercial, forested, and wetland/waterbody. Table 4.7.1-2 summarizes the acres of each land use that would be affected by construction and operation of the proposed pipeline facilities.

Table 4.7.1-2 - Land Affected by Construction and Operation of the Proposed Pipeline Facilities (in acres)

Pipeline / Facility	Agricultural		Open Range		Industrial/Commercial		Forested		Wetland/Waterbody		TOTAL	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
LINE 250A												
Right-of-Way	561.1	280.0	454.8	229.5	1.5	0.7	7.7	3.1	3.8	1.7	1,028.9	515.1
Extra Workspace	45.2	-	66.4	-	-	-	14.4	-	-	-	126.0	-
Access Roads	17.3	-	92.3	-	-	-	5.6	-	0.1	-	115.3	-
Yards	72.6	-	15.0	-	-	-	-	-	-	-	87.6	-
	696.2	280.0	628.5	229.5	1.5	0.7	27.7	3.1	3.9	1.7	1,357.7	515.1
LINE 251A												
Right-of-Way	510.0	255.0	190.4	95.2	1.6	1.5	-	-	0.2	0.1	702.2	351.7
Extra Workspace	31.0	-	70.3	-	-	-	-	-	-	-	101.3	-
Access Roads	55.6	-	10.3	-	1.6	-	-	-	-	-	67.5	-
Yards	-	-	10.8	-	-	-	-	-	-	-	10.8	-
	596.5	255.0	281.9	95.2	3.2	1.5	-	-	0.2	0.1	881.8	351.7
LINE 252A												
Right-of-Way	78.8	39.4	94.0	47.0	1.8	0.9	3.2	1.6	2.3	1.2	180.0	90.0
Extra Workspace	14.1	-	21.1	-	-	-	5.5	-	-	-	40.6	-
Access Roads	8.7	-	13.9	-	0.8	-	2.0	-	-	-	25.4	-
Yards	20.0	-	-	-	-	-	-	-	-	-	20.0	-
	121.5	39.4	129.0	47.0	2.5	0.9	1037	1.6	2.3	1.2	266.0	90.0
LINE 253A												
Right-of-Way	26.2	13.1	39.0	19.5	7.4	3.7	-	-	0.5	0.1	73.0	36.3
Extra Workspace	8.6	-	21.4	-	-	-	-	-	-	-	30.0	-
Access Roads	-	-	-	-	-	-	-	-	-	-	-	-
Yards	27.0	-	-	-	-	-	-	-	-	-	27.0	-
	61.7	13.1	60.4	19.5	7.4	3.7	-	-	1.5	0.1	130.0	36.3
SUBTOTALS												
Right-of-Way	1,176.0	587.4	778.3	391.2	12.2	6.8	10.9	4.7	6.8	3.0	1,984.1	993.2
Extra Workspace	98.9	-	179.1	-	-	-	19.9	-	-	-	297.8	-
Access Roads	81.6	-	115.8	-	2.4	-	7.6	-	0.1	-	208.2	-
Yards	119.6	-	25.8	-	-	-	-	-	-	-	145.4	-
	1,476.0	587.4	1,099.7	391.2	14.6	6.8	38.4	4.7	6.9	3.0	2,635.5	993.2

Of the 2,635.5 acres of land affected by construction, 993.2 acres would be retained as permanent pipeline right-of-way. The land retained as permanent right-of-way generally would be allowed to revert to former use; however, certain activities, such as the construction of aboveground structures, including houses, house additions, garages, patios, pools, or any other object not easily removable, or the planting and cultivating of trees or orchards, would be prohibited within the permanent right-of-way. The remaining land not retained as permanent pipeline right-of-way would have been used temporarily for construction and would be allowed to revert to prior land uses following construction with no restrictions.

Agricultural Land – The proposed pipeline routes would cross about 97.0 miles (59 percent) of agricultural land. Construction and operation impact acreages of the proposed Project on agricultural land are provided in table 4.7.1-2. Short-term impacts could include the loss of standing crops within the construction work area and disruption of farming operations in the vicinity of construction for the growing season during the year of construction. Installation of the proposed pipeline would take row crops out of production for one growing season. Hay and pasture fields could take several years to return to previous production levels. To minimize impacts on agricultural land use, CIG would compensate landowners for crop loss and other associated damages. Loss of future crop productivity as a result of soil disturbance would be minimized with the successful implementation of the mitigation measures contained in CIG's Plan (see appendix C). CIG would coordinate with landowners to assess crop productivity for a period of at least 2 years and would provide compensation where crop yields show decline. After construction, agricultural areas, including the permanent right-of-way, would be allowed to revert to former agricultural use.

Of the 97.0 miles of affected agricultural land, about 15.3 miles would be pivot-irrigated crop land. Additional acreage would be surface-irrigated crop land served by a network of canals and ditches. Table 4.7.1-3 summarizes the locations and amounts of pivot-irrigated crop land that would be crossed by the pipeline route.

Table 4.7.1-3 – Pivot Irrigated Lands

Pipeline Segment / MPs	Approximate Distance (miles)
LINE 250A	
23.3 – 23.7	0.4
28.3 – 28.5	0.2
32.5 – 33.2	0.7
33.3 – 33.7	0.4
33.7 – 34.3	0.6
34.3 – 35.3	1.0
35.4 – 35.8	0.4
36.7 – 37.3	0.6
37.7 – 38.3	0.6
38.4 – 38.6	0.2
39.6 – 40.3	0.7
40.4 – 40.6	0.2
44.4 – 45.3	0.9
45.5 – 45.8	0.3
48.1 – 48.4	0.3
49.5 – 49.8	0.3
49.9 – 50.4	0.5

Table 4.7.1-3 (cont.) – Pivot Irrigated Lands

Pipeline Segment / MPs	Approximate Distance (miles)
53.1 – 53.4	0.3
56.5 – 57.0	0.5
57.0 – 57.5	0.5
57.5 – 58.0	0.5
58.0 – 58.5	0.5
58.5 – 59.0	0.5
59.0 – 59.4	0.4
62.5 – 62.6	0.1
63.8 – 64.5	0.7
65.7 – 66.1	0.4
	12.7
LINE 251A	
25.4 – 25.7	0.3
26.7 – 26.9	0.2
27.2 – 27.5	0.3
45.2 – 45.6	0.4
45.7 – 45.9	0.2
45.9 – 46.3	0.4
	1.8
LINE 252A	
3.7 – 3.75	0.05
3.8 – 4.2	0.4
4.5 – 4.7	0.2
5.5 – 5.65	0.15
	0.8
LINE 253A	
None	
	15.3

Several construction-related activities may damage or interrupt irrigation during construction, including trenching, grading, stringing, welding, and backfilling. Several commenters expressed concern about the potential for soil subsidence in the trench after construction to interfere the movement of center-pivot irrigation equipment. If the flow of irrigation water is disrupted for a prolonged period, crops may be damaged and crop yields reduced. To address this issue, CIG would "water pack" the trench during backfilling in agricultural land to minimize the likelihood of subsidence and interruption to irrigation after construction. A more detailed description of water packing is provided in section 4.2.3. Additionally, CIG would coordinate disruption of irrigation systems with each landowner and compensate the landowner for damages and lost production due to construction. After construction, CIG would repair damaged irrigation systems and coordinate with the landowner to assess crop productivity for a period of at least 2 years. Compensation would be provided where crop yields show decline and would be site specific based on agreements and/or easement conditions with the affected landowners or tenants.

Construction activities also could affect drainage patterns of agricultural lands, which could, in turn, disrupt surface irrigation. Grading, trenching, and heavy equipment use could alter local topography and compact or rut soils. Subsurface water flow and soil subsidence in the trench could alter local drainage. However, CIG would implement several measures to minimize the potential for altering surface drainage, including alleviating compaction, repairing ruts, restoring pre-construction contours, installing trench breakers, and water packing the trench. As with center-pivot irrigation, CIG would coordinate disruption of irrigation systems with each landowner and compensate the landowner for damages and lost production due to construction. After construction, CIG would repair damaged irrigation systems and coordinate with the landowner to assess crop productivity for a period of at least 2 years. Compensation would be provided where crop yields show decline. Compensation would be provided where crop yields show decline and would be site specific based on agreements and/or easement conditions with the affected landowners or tenants.

Open Range – Open range is the second most common land use on the proposed Project, comprising about 64.2 miles (39 percent) of the pipeline routes. Construction and operation impact acreages of the proposed Project on open range are provided in table 4.7.1-2. The major use of range land is livestock (*e.g.*, cattle, sheep) grazing. Open range, which includes CRP land, is also managed as a natural ecosystem for wildlife, including waterfowl, raptors, passerine seed-eaters, mule deer, whitetailed deer, pronghorn, swift fox, prairie dogs, and ground squirrels. CRP land and the potential impacts and mitigation associated with the proposed Project are addressed in section 4.4.1. Potential impacts on wildlife and mitigation are addressed in section 4.5.1.

Construction of the proposed Project could affect grazing by removing vegetation and reducing the carrying capacity of the area, damaging or removing fences or other natural barriers used for livestock control, cutting water lines used to supply watering holes, or trapping or harming livestock that enter the construction work area. To minimize the potential for these impacts, CIG would install temporary fences and/or gates along the right-of-way to contain livestock where necessary. CIG would permanently repair fences to preconstruction or better condition once construction is completed.

After construction, open range lands would be restored and seeded with seed mixes recommended by the local soil conservation authorities, land management agency, or landowner to enhance the reestablishment of vegetation on the disturbed right-of-way.

Commercial/Industrial – The pipeline routes would cross about 1.0 mile (less than 1 percent) of commercial/industrial land. Construction and operation impact acreages of the proposed Project on commercial/industrial land are provided in table 4.7.1-2. Commercial/industrial land includes warehouses, parking lots, and office buildings. In general, CIG sought to avoid developed areas because construction activities could inconvenience people, remove or damage landscaping, and potentially damage structures. For example, operation of large construction equipment in the immediate vicinity of buildings can create dust, noise, and/or muddy conditions. Also, precautions must be taken to protect the public. Measures to mitigate impacts on commercial/industrial areas are addressed in section 4.7.3.

Forest Land – The pipeline routes would cross about 0.8 mile (less than 1 percent) of forest land. Construction and operation impact acreages of the proposed Project on forest land are provided in table 4.7.1-2. Forest land in the proposed Project area is generally limited to riparian areas along rivers and streams. The primary impact of construction on forested areas would be the removal of trees and shrubs from the construction work area. Trees and shrubs within temporary workspaces would regenerate. The rate of regrowth would depend on the type and age of vegetation cleared and the fertility of the soil. But, regrowth of mature trees would probably take more than 20 years and would be considered a permanent impact (see section 4.4.1). The permanent right-of-way would be maintained as described in CIG's Plan (see appendix C) and would support primarily herbaceous or shrub communities.

CIG stated that riparian canopy or stabilizing vegetation would not be removed if possible. To the extent practicable, no cottonwood trees over 12 inches dbh would be removed from the right-of-way, except at the two South Platte River crossings where CIG would need to remove cottonwoods greater than that size. Areas where vegetation is removed in conjunction with stream crossings would be stabilized immediately following the completion of the crossing.

Wetlands/Waterbodies – The pipeline routes would cross about 0.7 mile (less than 1 percent) of wetlands/waterbodies. Construction and operation impact acreages of the proposed Project on wetlands/waterbodies are provided in table 4.7.1-2. Impacts on and mitigation for wetlands and waterbodies are addressed in detail in sections 4.3.3 and 4.3.2, respectively.

Aboveground Facilities

Aboveground facilities would consist of 10 meter stations, 12 pig launchers/receivers, and 19 MLVs, all of which would be installed across 18 separate sites (see table 2.1.2-1 in section 2). Five of the sites would be within existing CIG compressor or meter stations; eight would be within the permanent pipeline right-of-way; and the remaining five would be new sites that either straddle, or are adjacent to the permanent right-of-way.

About 47.6 acres of land would be used during construction of the aboveground facilities. About 14.5 acres would be required for operation. Excluding facilities within existing CIG compressor or meter stations, about 10.6 acres would be required for operation and would permanently convert agricultural and open range land uses to industrial use. Aboveground facility sites would be graveled and fenced. Access would be via existing roads or by driving down the proposed permanent right-of-way. Table 4.7.1-4 summarizes land use requirements for the proposed aboveground facilities.

Table 4.7.1-4 – Land Use Affected by Aboveground Facilities

Associated Pipeline / Aboveground Facilities	MP	Collocated with Existing Facility[a]	Land Use	Temporary Impacts (acres)	Permanent Impacts (acres)
LINE 250A					
2 Meter Stations, 1 Launcher, 1 MLV	0.0	Cheyenne CS	Commercial/Ind.	5.9	0.9
1 MLV	15.7		Open Range	< 0.1	< 0.1
1 MLV	30.8		Open Range	< 0.1	< 0.1
1 MLV	42.4		Agricultural	< 0.1	< 0.1
1 MLV	50.4		Open Range	< 0.1	< 0.1
1 Launcher, 1 Receiver, 1 MLV	62.5		Open Range	3.7	0.9
1 Meter Station	64.5		Open Range	3.7	0.9
1 MLV	70.6		Agricultural	< 0.1	< 0.1
1 Meter Station, 1 Receiver, 1 MLV	84.8		Agricultural	3.7	3.7
LINE 251A					
1 Meter Station, 1 Launcher, 1 MLV	0.0	Watkins CS	Commercial/Ind.	8.7	0.9
1 MLV	7.4		Agricultural	< 0.1	< 0.1
1 Launcher, 1 Receiver, 3 MLVs	21.5		Agricultural	0.0[b]	0.0[b]
1 MLV	38.5		Agricultural	< 0.1	< 0.1
2 Meter Stations, 1 Receiver, 1 MLV	57.9		Agricultural	3.7	3.7
LINE 252A					
1 Launcher	0.0		Open Range	0.0[c]	0.0[c]
1 MLV	8.3		Open Range	< 0.1	< 0.1
1 Meter Station, 1 Receiver, 1 MLV	14.9		Open Range	3.7	0.9

Table 4.7.1-4 (cont.) – Land Use Affected by Aboveground Facilities

Associated Pipeline / Aboveground Facilities	MP	Collocated with Existing Facility[a]	Land Use	Temporary Impacts (acres)	Permanent Impacts (acres)
LINE 253A					
1 Launcher, 1 MLV	0.0	Watkins CS	Commercial/Ind.	6.7	0.9
1 Meter Station, 1 Receiver, 1 MLV	6.0	East Denver MS	Commercial/Ind.	6.7	0.9
EXISTING LINES 2A & 2B					
1 Meter Station	228.8	Watkins CS	Commercial/Ind.	0.7	0.1
SUBTOTALS			Agricultural	7.7	7.7
			Open Range	11.3	3.0
			Commercial/Ind.	28.6	3.8
				47.6	14.5

[a] CS = Compressor Station; MS = Meter Station

[b] These aboveground facilities would be installed at the same site as the aboveground facilities on Line 250A at MP 84.8.

[c] These aboveground facilities would be installed at the same site as the aboveground facilities on Line 250A at MP 62.5.

4.7.2 Land Ownership and Easement Rights

About 156.2 miles (95 percent) of the land that would be affected by the pipelines is privately owned. The remaining 7.4 miles (5 percent) is public land managed by a variety of state and local agencies. All aboveground facilities would be located on private land. Table 4.7.2-1 summarizes land ownership along the proposed pipeline routes.

Table 4.7.2-1 – Land Ownership Affected by Pipeline Facilities

Pipeline Segment	Private (miles)	State (miles)	Local (miles)	TOTAL (miles)
Line 250A	79.0	2.1	3.7	84.8
Line 251A	56.4	1.5	-	57.9
Line 252A	14.8	0.0	-	14.9
Line 253A	6.0	0.1	-	6.1
	156.2 (95%)	3.7 (>2%)	3.7 (>2%)	163.7 (100%)

Prior to initiating construction, CIG would secure an easement to convey both temporary (for construction) and permanent (for operation) rights-of-way. Pipeline easements typically convey certain property rights to the pipeline company, such as the right to construction, operate, maintain, protect, repair, replace, alter, remove, and access the pipeline. Some easements also explicitly indemnify landowners from liability associated with the pipeline. The specific details of CIG's easement agreements with landowners affected by the proposed Project would be negotiated between CIG and the landowner.

The easement acquisition process is designed to provide fair compensation to the landowners for the right to use the property for pipeline construction and operation. During the easement acquisition process, CIG would compensate landowners for loss of value to specific parcels. The easement agreement between the company and landowner typically specifies compensation for loss of use during construction, loss of nonrenewable or other resources, damage to property during construction, and

allowable uses of the permanent right-of-way after construction. During negotiations, CIG and affected landowners would address the following:

- allowable uses within the right-of-way;
- mechanisms required to allow the pipeline to be traversed by heavy equipment such as log skidders; and
- minor route adjustments to accommodate landowner needs (provided that the route adjustments do not affect environmentally sensitive areas or other non-consenting landowners).

If an easement cannot be negotiated with a landowner and the proposed Project has been certificated by the FERC, CIG could use the right of eminent domain granted to it under Section 7(h) of the NGA and the procedure set forth under the Federal Rules of Civil Procedure (Rule 71A) to obtain the right-of-way and additional temporary workspaces. Although CIG would compensate the landowner for the right-of-way and for any damages incurred during construction, a court would determine the level of compensation if a Certificate was issued. In either case, the landowner would be compensated for the use of the land. Eminent domain does not apply to lands under federal ownership, although there are no federal lands on this proposed Project.

4.7.3 Residences and Businesses

The proposed pipeline would traverse primarily rural areas, thereby avoiding most residences and businesses. However, three residential structures (Line 250A at MP 50.4, Line 251A at MP 15.1, and Line 252A at MP 9.2) would be located within 50 feet of proposed construction work areas. Additionally, the construction would occur within 25 feet of one restaurant (Line 252A at MP 11.2) and cross two heavily developed commercial/industrial areas (Line 253A from MPs 0.6 to 1.1 and MPs 2.6 to 3.1) consisting of several warehouses, parking lots, and office building.

The general impacts of construction and operation of the proposed Project on residences and businesses would result from construction-related disturbances, limitation of land use type within the permanent pipeline right-of-way, and alteration of future development patterns. Specifically, potential construction-related disturbances include inconvenience caused by limited access, increased congestion, and noise and dust generated by construction; locally increased traffic; effects on landscaping (including alteration and loss of plantings), wells, and septic systems; and removal of objects such as sheds and trailers from the construction right-of-way. Certain uses and structures would be prohibited on the permanent pipeline right-of-way after construction, including construction of aboveground structures not associated with the proposed Project, construction of septic system leach fields, and planting or cultivation of trees or orchards.

To minimize disruptions to the two heavily developed commercial/industrial areas on Line 253A, CIG would install its pipeline by HDD (see section 2.3.2). Drilling would minimize disruption to these areas by avoiding trenching and minimizing the related equipment movement, dust, and noise.

Pipeline construction can be disruptive to business and residential activities. Communicating information about project schedules, employing appropriate safety procedures, and restoring affected areas would minimize project impacts during construction. We believe CIG should develop and implement a plan that would provide for these issues. Therefore, **we recommend that:**

- **CIG develop a R&BCM Plan to be implemented as-needed during construction. The R&BCM Plan should be filed with the Secretary for the review and written approval by the Director of OEP prior to construction. It should include provisions for:**

  a. coordinating construction work schedules with affected landowners prior to starting construction;

  b. maintaining access to all businesses during business hours, and maintaining access to all residences except for brief periods essential to pipe-laying activities;

  c. where necessary, installing temporary safety fencing to control access and minimize the hazards associated with an open trench;

  d. notifying affected residents and businesses in advance of any scheduled disruption of utilities and limit the duration of any interruption to the smallest time possible;

  e. repairing any damages to property that result from construction activities; and

  f. restoring all areas disturbed by construction work areas to "as before or better" conditions.

Additionally, we are interested in ensuring that landowner issues are resolved in an effective and timely manner. Therefore, we have recommended that CIG develop and implement an environmental complaint resolution procedure that provides landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the proposed Project and restoration of the right-of-way. Section 2.5 describes the requirements of the complaint resolution procedure in more detail.

Commenters indicated that the proposed Project could interfere with future development plans for construction of homes or other structures on their properties. Further, CIG consulted with county planning agencies and reviewed development plans to identify currently filed proposals for residential or commercial developments within 0.25 mile of the proposed construction right-of-way or associated aboveground facilities during project development. Five proposed residential developments were identified. These developments are summarized in table 4.7.3-1.

Table 4.7.3-1 – Planned Developments

	County	Length (miles)	Development Name or Owner	Plans on File with County	Comments
LINE 250A					
29.5 – 29.8	Weld	0.3	Owl Creek	Yes	Minor route variation (see section 3.6.2)
29.8 – 31.0	Weld	1.2	Robert Burroughs	No	
45.4 - 45.6	Weld	1.2	Ridgeview	Yes	Near, but not crossed by the Project
60.6 - 62.0	Weld	1.4	Pioneer	Yes	Minor route variation (see section 3.6.2)
LINE 251A					
43.8 - 44.1	Morgan	0.4	Prairie View Ranch	Yes	Install proposed pipeline within "no build zone" of CIG's existing 52A and B corridor

In section 3.6, we evaluated several route variations that were developed in response to specific landowner requests and have recommended the Owl Creek and Pioneer Route Variations. During the

easement negotiation process, CIG may develop minor route variations to the proposed pipeline alignment in response to landowner requests. If they do not impact sensitive environmental resources or other landowners, they may be incorporated into the Project.

4.7.4 Recreation and Special Interest Areas

The pipelines do not cross any national or state designated Wild and Scenic Rivers, state forest land, national or state parks, Indian reservations, or designated coastal zone management areas. The majority of public lands are transportation corridors or are leased for farming or grazing. The only public recreational land that would be crossed by the proposed Project is the Mitani-Tokuyasu State Wildlife Area (Line 250A at MP 41.1 to 41.3). The Colorado Department of Natural Resources, Division of Wildlife maintains easements on this land from private landowners to provide hunting (squirrel, dove, and waterfowl) and wildlife viewing opportunities for the public. The area is open to hunting and wildlife viewing from mid-August to the end of February. Hunting and wildlife viewing in the Project area would be prohibited during construction, and the hunting and wildlife viewing experience in adjacent areas would likely be diminished during construction. After construction, hunting and wildlife viewing would be allowed to continue in the same manner as prior to construction.

In addition to recreational land, the proposed Project would cross two areas mapped by the Nature Conservancy as important for conserving Colorado's prairie: the Greater Pawnee Conservation Area (Line 250A from about MP 0 to 8) and the South Platte Sandhills Conservation Area (Line 251A from about MP 47 to 57). Impacts on vegetation and wildlife habitats supported in these conservation areas (*i.e.*, shortgrass prairie and sand sagebrush shrubland) are discussed in section 4.4.3.

Additionally, the proposed project would cross two area mapped by the CNHP as Potential Conservation Areas (PCA). PCAs are areas designated by the CNHP as important to the protection of Colorado's rare or imperiled species. Both areas crossed by the proposed Project are associated with the South Platte River crossings (Line 250A from MPs 40.7 to 42.1 and Line 252A from MPs 11.2 to 12.5). Impacts on state rare and imperiled species for the Project, including the crossings of the South Platte River, are discussed in sections 4.6.2 and 4.6.3.

4.7.5 Visual Resources

Pipeline Facilities

Visual resources along the pipeline routes are a function of geology, climate, and historical processes and include topographic relief, vegetation, water, wildlife, land use, and human uses and development that include domestic animals. The vegetation along the pipeline routes consists largely of range land and agricultural land on mostly flat to rolling topography that ranges in elevations between 4,340 and 5,920 feet above mean sea level. Agricultural land includes pasture and both dry-farm and irrigated crop land. Forest land is limited to riparian areas along waterbodies.

CIG would use a 100-foot-wide construction right-of-way for the majority of the pipeline route, which would be widened by an additional 50 to 200 feet at some locations for temporary extra workspaces and would be reduced to 75 feet in wetlands. Visual impacts associated with the construction right-of-way and temporary extra workspaces would include the removal of existing vegetation and the exposure of bare soils within construction workspaces, as well as earthwork and grading scars, trenching, potential blasting, rock formation alteration or removal, and storage of machinery, tools, and pipe. Other visual effects could result from the removal of large individual trees that have intrinsic aesthetic value; the removal or alteration of vegetation that may currently provide a visual barrier; or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture.

Visual impacts would be greatest where the pipeline facilities parallel or cross roads, trails, or prominent observation points, and where the pipeline right-of-way may be seen by passing motorists or other recreationists. Most paved roads would be bored or directionally drilled, and no direct visual impacts are anticipated at the road crossing. However, active construction in the adjacent right-of-way areas would be visible to parties using the roads and trails for a period of about 2 to 5 weeks. The short-term visual changes to vegetation near roads would probably be noticeable for 3 to 5 years. Long-term visual changes would be minor and limited to permanent pipeline markers that may be visible at the crossing locations.

The duration of visual impacts would depend on the type of vegetation or land formation that is cleared or altered. The impact of vegetation clearing would be shortest in agricultural crop lands, where the reestablishment of vegetation following construction would be relatively fast (generally less than 3 years). The impact on vegetation in range land may last 10 or more years. The impact in shrub land areas may take several years to regenerate. CIG would implement the mitigation measures described in its Reclamation Plan (appendix H) to minimize this impact and to restore disturbed areas. The Reclamation Plan includes procedures for soil management, decompaction, seeding methods and mixes, and monitoring revegetation.

The greatest potential visual impact would result from the removal of large trees, which would take longer than other vegetation types to regenerate and would be prevented from reestablishing on the permanent right-of-way. Topographic alterations such as sidehill cuts that are necessary to construct the pipeline would be restored during right-of-way restoration. The visibility of such alterations would diminish over time as the affected areas age and begin to blend with the surrounding landscape.

Most of the forest land associated with the Project would be in riparian areas, and mainly at the two crossings of the South Platte River. CIG would limit tree clearing at these crossings to that needed to establish a 75-foot-wide corridor centered on the proposed pipeline, and would minimize tree clearing within the extra work space to that needed for safety reasons or to provide spaces necessary for construction.

CIG would conduct right-of-way maintenance with periodic mowing and clearing. This would be completed in a manner consistent with our Plan and Procedures. Our Plan limits the timing of mowing the full 50-foot-wide right-of-way to once every three years; but, a 10-foot-wide corridor centered over the pipeline may be mowed annually. Our Procedures limit right-of-way maintenance in wetlands to annual mowing of a 10-foot-wide corridor centered over the pipeline and to clearing selectively trees greater than 15 feet in height from a 30-foot-wide corridor centered over the pipeline.

We believe that successful implementation of the measures in our Plan and Procedures, and CIG's Reclamation Plan would minimize impacts on visual resources due to construction and operation of the proposed pipeline facilities. Construction work areas would be restored as near as possible to preconstruction contours and revegetated. Once revegetation is complete, there would be no significant alteration to the landscape of the region.

Aboveground Facilities

The proposed aboveground facilities would be new features in the landscape. The visual impact of these facilities would depend on the condition and visibility of the proposed sites, and the mitigation proposed by CIG to reduce their visibility. Five of the proposed 18 sites would be within or adjacent to existing CIG facilities, which would minimize their visual impact since they would not create new visual elements in the landscape. The remaining aboveground facilities would be at new sites in open agricultural fields and open range. These facilities would be new visual elements and would have a minor

effect on the surrounding visual landscape. Eight would be enclosed within 45-foot by 75-foot graveled, fenced enclosure within the permanent pipeline right-of-way. Three would be enclosed within 200-foot by 200-foot graveled, fenced enclosures. Two would be enclosed within a 400-foot by 400-foot graveled, fenced enclosure. Temporary and permanent impacts associated with the aboveground facilities are presented in table 4.4.1-4. Access to each site would be via existing roads or the permanent right-of-way. CIG stated that it would paint its aboveground facilities to match natural landscape and surroundings and/or would landscape the areas with trees and shrubs.

Construction and operation of the MLVs, pig launchers/receivers, and meter stations would result in minor permanent visual impact. However, they would be within or immediately adjacent to existing aboveground facilities or the proposed pipeline right-of-way and would be similar to other pipeline facilities in the area. Therefore, while the additional aboveground facilities would be added to the visual environment, these facilities would be small and similar in nature to existing pipeline infrastructure in the Project area.

4.8 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires the FERC to take into account the effect of its undertakings (including the issuance of Certificates) on any properties listed on, or eligible for listing on, the NRHP and to provide the ACHP an opportunity to comment on the undertaking. CIG, as a non-federal party, is assisting the FERC in meeting its obligation under Section 106 of the NHPA by conducting the field surveys and evaluations required by ACHP regulations in Title 36 CFR Part 800.

4.8.1 Cultural Resource Surveys

CIG conducted literature reviews, site file searches, and cultural resources surveys of the proposed construction and operation rights-of-way, temporary extra workspaces, contractor/pipe storage/offloading yards, access roads, and aboveground facility sites. Surveys were conducted in the summer and fall of 2006. Surveys of the proposed pipelines encompassed a 200-foot-wide survey corridor and included the construction and permanent rights-of-way, most temporary extra workspaces, and some aboveground facility sites. Additional surveys were conducted where temporary extra workspaces and aboveground facility sites fell outside the 200-foot-wide survey corridor, and at pipe storage/offloading yards and access roads. According to CIG, all proposed Project areas were surveyed, except about 2.5 miles of the pipeline route and two access roads where landowner permission was denied.

4.8.2 Native American Consultations

In addition to surveys, CIG contacted 12 Native American groups regarding the proposed Project. The groups included: Apache Tribe of Oklahoma; Southern Cheyenne Tribe; Cheyenne River Sioux Tribe; Comanche Tribe of Oklahoma; Crow Creek Sioux Tribe; Kiowa Tribe of Oklahoma; Mescalero Apache Tribe; Northern Arapaho Tribe; Northern Cheyenne Tribe; Pawnee Nation of Oklahoma; Shoshone Tribe of Wind River; and Shoshone-Bannock Tribes of Fort Hall. Consultation letters were sent to representatives of each tribe on February 16, 2007, requesting identification of any historic or traditional cultural properties. CIG received a telephone call on April 17, 2007, from the Northern Arapaho Tribe in response to the letter. The Northern Arapaho Tribe requested a copy of the cultural resource report and a site visit. CIG indicated it would send the tribe a copy of the report as soon as it became available, and would arrange for a site visit.

4.8.3 Impacts and Mitigation

Project impacts or effects include not only the physical disturbance of a cultural resource site, but may also include the introduction, removal, or alteration of various visual or auditory elements, which could alter the traditional setting or ambience of the property. In consultation with the Colorado SHPO, we would determine whether construction of the proposed Project would affect any properties listed on, or eligible for listing on, the NRHP. For affected traditional cultural properties, the appropriate Native American tribes would also be consulted.

If a property would be affected, mitigation would be proposed. Mitigation may include, but not be limited to, one or more of the following measures: 1) avoidance through the use of realignment of the pipeline route, relocation of temporary extra workspace, or changes in the construction and/or operational design; 2) data recovery, which may include the systematic professional excavation of an archaeological site or the preparation of photographic and/or measured drawings documenting standing structures; and 3) the use of landscaping or other techniques that would minimize or eliminate effects on the historic setting or ambience of standing structures.

During cultural resource surveys, CIG identified 59 sites (or segments of sites) and 31 isolated finds in the proposed Project vicinity. Isolated finds, by definition, are not eligible for inclusion on the NRHP. Of the 59 sites, 51 are in the area of potential effect (APE) of the proposed Project, including 20 sites that were previously known. Of the 51 sites within the APE, 27 would be eligible or potential eligibility for listing on the NRHP, including eight canals, eight ditches, seven railroads, two electric transmission lines, and two farmsteads. The remaining sites were assessed as not eligible for listing on the NRHP.

CIG proposes avoiding or mitigating impacts on historic canals and ditches by boring (see section 2.3.2) under the canals and ditches during construction, or by restoring the canals and ditches to their preconstruction appearance if they are open cut (see section 2.3.2). Likewise, CIG would avoid impacts on historic railroads by boring under the railroads. CIG would avoid impacts on historic electric transmission lines by prohibiting construction activities within 80 feet of the lines. CIG is proposing no avoidance or mitigation at the two farmsteads, except to restrict the use of one access road to like-kind use within the existing road footprint.

CIG submitted its recommendations to the Colorado SHPO, and the SHPO concurred with CIG's recommendations and concluded that there would be no adverse effects on historic properties. The SHPO also stated that, should unidentified archaeological resources be discovered in the course of the proposed Project, work should stop until the resources have been evaluated and the SHPO's office consulted. CIG has filed a plan for the unanticipated discovery of cultural resources with the FERC and SHPO. The unanticipated discovery plan is adequate; SHPO concurrence is pending.

Currently, we know of no sites in the APE that would be adversely impacted by the proposed Project provided CIG follows its proposed avoidance and mitigation measures. CIG has not completed it traditional cultural property consultations with Native American groups, which may result in the identification of additional eligible properties. Additionally, CIG has not reviewed or surveyed some Project areas due to lack of landowner permission. Review and/or survey of these Project areas could result in the identification of additional eligible properties.

The FERC, in consultation with the SHPO, will make final determinations of NRHP eligibility and proposed Project effects. The FERC, as the lead federal agency, will comply with Section 106 of the NHPA and the implementing regulations in Title 36 CFR Part 800 by notifying the ACHP of any adverse

effects to afford it an opportunity to participate in consultation. To ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met, **we recommended that:**

- **CIG shall implementation of any treatment plan/measures (including archeological data recovery); construction of facilities; and use of all staging, or temporary work areas and new or to-be-improved roads until:**

  a. CIG files with the Secretary cultural resources survey and evaluation reports; any necessary treatment plans; Native American consultations; and the Colorado SHPO comments on the reports and plans; and

  b. the Director of OEP reviews and approves all cultural resources survey reports and plans, and notifies CIG in writing that treatment plans/procedures may be implemented and/or construction may proceed.

  All material filed with the Secretary containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE."

4.9 SOCIOECONOMICS

4.9.1 Population, Economy, and Employment

The proposed Project would involve construction and operation of about 163.7 miles of pipeline, 10 meter stations, 12 pig launchers/receivers, and 19 MLVs. The proposed facilities would cross Weld, Adams, and Morgan Counties, Colorado. Table 4.9.1-1 provides a summary of selected socioeconomic statistics for the counties in the Project area.

Table 4.9.1-1 – Existing Socioeconomic Conditions for Counties in the Project Area

County	Population	Population Density (people/square mile[a])	Per Capita Income (dollars)	Civilian Labor Force (persons)	Unemploy-ment Rate (percent)	Major Industry
Adams	363,857	305.3	19,944	190,587	3.3	Education, health and social services
Morgan	27,171	21.1	15,492	12,414	2.6	Education, health and social services
Weld	180,936	45.3	21,981	92,683	3.7	Education, health and social services
State-wide	4,301,261	41.5	24,049	2,304,454	3.0	Education, health and social services

Sources: U.S. Census Bureau 2005a, 2005b, 2005c.

[a] Average number of individuals living within one square mile of land.

The counties that would be crossed by the proposed Project are sparsely to moderately populated.[8] The least densely populated county crossed by the proposed Project is Morgan County, which has a population density of 21.1 people per square mile, or about half of the average density on a state-wide basis. The most densely populated county crossed by the proposed Project is Adams County, which has a population density of 305.3 people per square mile, or about seven times the average density

[8] By way of comparison, heavily populated counties in Colorado, such as Denver County, have population densities in excess of 1,000 people per square mile.

on a state-wide basis. Populations in the proposed Project area range from about 27,171 to 363,857 persons county-wide. The smallest town in the Project vicinity is Gilcrest, which has a population of about 1,162. The largest city in the Project vicinity is Denver, Colorado, which has a population of about 554,636. The other cities and towns in the proposed Project vicinity include: Cheyenne, Wellington, Ault, Eaton, Fort Collins, Windsor, Greeley, Platteville, Fort Lupton, Hudson, Brighton, Aurora, Bennett, and Fort Morgan. Statistics for cities and towns near the proposed Project area are provided in table 4.9.1-2.

The main industries in the proposed Project area are education, health, and social services. The county-wide per capita income for counties affected by the Project is lower than the state average of $24,049. The per capita income of cities and towns also tends to be lower than the state average. The unemployment rate for counties within the Project area is higher than the state average of 3.0 percent, except for Morgan County. The unemployment rate of cities and towns near the proposed Project area also tends to be higher than the state average.

CIG estimates that construction of the pipelines would require a peak workforce of about 800 workers and an average workforce of about 600 workers. Both local and non-local workers would be employed on the proposed Project. Workers would be dispersed about evenly across the two construction spreads, with one spread headquartered in Weld County and the other headquartered in Adams County. Construction would start in January 2008 and be complete by October 2008.

The communities most affected by the proposed Project would be those identified in table 4.9.1-2. While each of the communities could be impacted to some degree, the impacts are expected to be temporary and proportionally small. The total population change would equal the total number of non-local construction workers, plus any family members accompanying them. Assuming 80 percent of the construction workforce is non-local, and 20 percent of these bring three other family members with them, the total increase in population at the peak of construction would be 1,024 persons. This equates to about

Table 4.9.1-2 – Existing Socioeconomic Conditions for Cities and Towns Near the Project Area

City or Town	Population	Population Density (people/mi^2)	Per Capita Income (dollars)	Civilian Labor Force (persons)	Unemploy-ment Rate (percent)	Major Industry
Cheyenne, WY	81,607	2,822	19,634	38,864	3.0	Education, health and social services
Wellington	2,672	1,510	17,783	1,482	3.3	Construction
Ault	1,432	2,124	15,570	708	3.6	Manufacturing
Eaton	2,690	1,404	20,816	1,367	2.5	Education, health and social services
Fort Collins	118,652	2,767	22,133	69,280	3.8	Education, health and social services
Windsor	9,896	877	23,957	5,540	1.2	Education, health and social services
Greeley	76,930	2,887	17,775	39,165	4.8	Education, health and social services
Gilcrest	1,162	1,560	12,862	564	5.1	Manufacturing
Platteville	2,370	1,607	15,802	1,128	4.4	Construction and manufacturing
Fort Lupton	6,787	1,707	15,649	3,226	2.8	Education, health and social services
Hudson	1,565	674	15,613	731	2.6	Retail trade
Brighton	20,905	1,324	17,927	10,211	4.5	Education, health and social services
Denver	554,636	3,617	24,101	301,434	3.8	Education, health and social services
Aurora	276,393	4,567	21,095	149,755	3.0	Education, health and social services
Bennett	2,021	969	17,905	1,022	2.8	Construction
Fort Morgan	11,034	2,472	15,024	4,886	3.1	Manufacturing

Sources: U.S. Census Bureau 2000a, 2000b, 2000c.

512 persons for each construction spread. If all non-local persons on each spread were to temporarily reside in the county of their respective spread headquarters, Weld County would experience a population increase of about 0.3 percent and Adams County would experience a population increase of about 0.1 percent. No additional permanent employees would be required to operate the additional pipelines, so the influx of workers would not have a permanent impact on population.

A brief decrease in unemployment could occur as a result of hiring local workers for construction and the increased demands on the local economy. However, given the relatively small size of the Project and short construction period, impacts on the economy and employment as a whole would be temporary and minimal.

4.9.2 Housing

Temporary housing varies seasonally and geographically within the counties and communities near the pipeline route. Temporary housing is available in the form of daily, weekly, and monthly rentals in motels, hotels, campgrounds, recreation vehicle (RV) parks, apartments, and houses. Based on 2000 and 2002 census data, temporary housing is relatively abundant in the vicinity of the proposed Project (see tables 4.9.2-1 and 4.9.2-2).

Table 4.9.2-1 – Vacant Housing Units by County

County	Rental Vacancy Rate (percent)	Vacant Rental Homes	Hotels and Motels	RV Parks and Campgrounds	Rooming and Boarding Houses
Adams	4.4	1,720	39	2	0
Morgan	5.5	174	12	0	0
Weld	4.0	837	20	0	3
State-wide	5.5	31,852	1,293	231	45

Source: U.S. Census Bureau 2000d, 2002

Table 4.9.2-2 – Vacant Housing Units by City or Town

City or Town	Rental Vacancy Rate (percent)	Vacant Rental Homes	Hotels and Motels	RV Parks and Campgrounds	Rooming and Boarding Houses
Cheyenne, WY	7.9	648	25	1	0
Wellington	4.7	8	0	0	0
Ault	4.8	8	0	0	0
Eaton	3.7	10	0	0	0
Fort Collins	4.1	849	15	2	9
Windsor	2.8	21	2	0	0
Greeley	4.8	579	11	1	3
Gilcrest	9.8	5	0	0	0
Platteville	3.4	6	0	0	0
Fort Lupton	1.2	8	2	0	0
Hudson	1.9	2	0	0	0
Brighton	4.6	93	1	0	0
Denver	4.5	5,321	115	6	7
Aurora	3.5	1,396	35	0	1
Bennett	1.2	2	0	0	0
Fort Morgan	6.1	84	7	0	0

Source: U.S. Census Bureau 2000d, 2002

The estimated areas in highest demand for housing would be the cities and towns in closest proximity to the headquarters for the two construction spreads. Construction could affect the availability of housing in these areas. Assuming that local construction workers do not require housing, up to 640 temporary housing units would be required for non-local workers and their family members during the peak of construction. This equates to about 320 housing units for each construction spread. Given the number of available units, existing temporary housing should be sufficient to meet the demand for short-term housing required by the construction workforce. Depending on actual availability at the time of construction, workers may have to find accommodations farther away from the proposed Project site.

No additional permanent employees would be required to operate the proposed Project facilities; therefore, there would be no impact on long-term housing within the proposed Project area.

4.9.3 Public Services

A wide range of public services and facilities are offered within the proposed Project area, with concentrations in Cheyenne, Wyoming and Fort Collins, Greeley, Denver, and Aurora, Colorado. Where services are not available at the local level, they are available from the county. Services and facilities include law enforcement agencies, fire departments, medical facilities (including hospitals and emergency services), and schools.

Because the non-local workforce would be small relative to the current population, construction of the pipeline would result in minor, temporary, or no impact on local community facilities and services, such as police, fire, medical, and waste management. The counties, cities, and towns in the Project vicinity presently have adequate infrastructure and services to meet the needs of the non-local workers.

Other construction-related demands on local services would include increased demand for permits for vehicle load and width limits, local police assistance during construction at road crossings to facilitate traffic flow, and emergency medical services to treat injuries resulting from construction accidents. CIG would work with the local law enforcement, fire departments, and emergency medical services to coordinate for effective emergency response. The degree of impact would vary from community to community depending on the number of non-local workers and accompanying family members that temporarily reside in each community, the duration of their stay, and the size of the community. Although these factors are too indeterminate and variable to accurately predict the magnitude of impact, the effects would be short term and, therefore, not expected to be significant.

Because no permanent employees would be associated with the proposed Project, there would be no long-term impacts on public services.

4.9.4 Transportation

The proposed Project would cross three interstate highways (I-70, I-76, and E-470); one U.S. highway (US-34); five state highways (14, 52, 79, 263 and 392), and various smaller roads and railroads. Construction across roads, highways, and railroads would result in short-term impacts on public transportation while construction activities pass through the Project area. Paved roads and railroads would generally be crossed by a bore or HDD beneath them. These crossing methods typically require temporary extra workspace on both sides of the crossing, but there would be little or no disruption of traffic at road or railroad crossings completed by using these techniques.

Most smaller, unpaved roads and driveways would be open cut where permitted by local authorities and landowners. The open-cut method would require temporary closure of the road to traffic and the establishment of detours. If no reasonable detour is feasible, at least one lane of the road being

crossed would be kept open to traffic, except for brief periods when it is essential to close the road to install the pipeline. Most open-cut crossings would be completed and the road resurfaced in 1 or 2 days.

The movement of construction equipment, materials, and crew members would result in an additional short-term impact on the transportation network. The proposed Project area is readily accessible by interstate highways, U.S. highways, state highways, secondary state highways, county roads, and private roads. Impacts on local traffic levels are not expected to be significant because construction would move sequentially along the pipeline route and only one or two crews would need to be in a particular area at a particular time. Additionally, the relatively rural location of the proposed Project and the fact that the pipeline work day typically starts before and ends after the average work day would minimize traffic-related impacts.

No substantial impacts would be expected during operation of the proposed Project because there would be only minimal traffic associated with operation and maintenance of the new pipeline.

4.9.5 Property Values

Comments were received during CIG'S open house regarding property devaluation caused by damage from construction and a permanent pipeline easement. An easement would be used to convey both temporary (for construction) and permanent rights-of-way to CIG. The easement would give CIG the right to construct, operate, and maintain the pipeline, and establish a permanent right-of-way. In return, CIG would compensate the landowner for use of the land. The easement agreement between CIG and the landowner would specify compensation for damage to property during construction, loss of use during construction, loss of renewable and nonrenewable or other resources, and allowable uses of the permanent right-of-way after construction. If an easement cannot he negotiated with the landowner and the Project becomes certificated, the easement may be obtained by use of eminent domain. In this case, the property owner would still be compensated by CIG, but the amount of compensation would be determined by the courts.

The effect that a pipeline easement may have on property values is a damage-related issue that would be negotiated between the parties during the easement acquisition process. The easement acquisition process is designed to provide fair compensation to the landowner for the right to use the property for pipeline construction and operation. Appraisal methods used to value land are based on objective characteristics of the property and any improvements. The impact a pipeline may have on the value of a tract of land depends on many factors, including the size of the tract, the values of adjacent properties, the presence of other utilities, the current value of the land, and the current land use. Subjective valuation is generally not considered in appraisals. This is not to say that the pipeline would not affect resale values. A potential purchaser of property may make a decision to purchase land based on his or her planned use. An industrial user might find the pipeline (*i.e.*, a potential source of energy for an industrial plant) preferable, whereas a farmer or resident might find it objectionable. If the presence of a pipeline renders the planned use infeasible, it is possible that a potential purchaser would decide not to purchase the property. However, each potential purchaser has different criteria and differing capabilities to purchase land.

Property taxes for a piece of property are generally based on the actual use of the land. Construction of the pipeline would not change the general use of the land, but would preclude construction of aboveground structures on the permanent right-of-way. If a landowner feels that the presence of a pipeline easement reduces the value of his or her land, resulting in an overpayment of property taxes, he or she may appeal the issue of the assessment and subsequent property taxation to the local property tax agency.

4.9.6 Tax Revenues

Construction and operation of the proposed Project would have beneficial impacts on local sales tax revenue. The anticipated revenue from sales tax is estimated at about $2.4 million. This additional revenue would have a beneficial effect on the local economies. An unspecified amount of additional sales tax revenue also would be generated by the temporary influx of workers who would purchase local goods and services and rent temporary housing.

Payroll taxes would also be collected from the workers employed on the proposed Project. CIG anticipates that total payroll for the proposed Project would be $90 million. This would temporarily increase the tax revenue for the state. However, on a state-wide basis, the increase would be minimal. No permanent payroll taxes would be generated by the proposed Project.

Once the pipeline is in service, operation of the proposed pipeline would result in long-term *ad valorem* tax revenues paid to the state by CIG. The state government would then distribute taxes to each county according to a formula based upon total pipeline miles within each county. The total estimated *ad valorem* tax would be about $3.2 million per year. Table 4.9.6-1 provides an estimated *ad valorem* tax by county.

Table 4.9.6-1 – Estimated Annual *Ad Valorem* Tax

County	Estimated *Ad Valorem* Tax (dollars)
Adams	1,337,708
Morgan	396,265
Weld	1,495,742
	3,229,715

4.10 AIR QUALITY AND NOISE

4.10.1 Air Quality

Air quality is protected by federal and state laws. On the federal level, the CAA designates seven pollutants as criteria pollutants for which the National Ambient Air Quality Standards (NAAQS) are set. These criteria pollutants are: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), carbon monoxide (CO), ozone (O_3), and lead (Pb). In Colorado, the state standards are the same for all pollutants except SO_2 and $PM_{2.5}$. The state standards for SO_2 are more stringent than the federal standards, and the state does not have standards for $PM_{2.5}$. Table 4.10.1-1 identifies the national and state ambient air quality standards.

Areas within Colorado are designated as "attainment," "nonattainment," "maintenance," or "unclassifiable," on a pollutant-by-pollutant basis. Attainment areas are areas where the concentrations of a pollutant meet the applicable ambient air quality standards. Nonattainment areas are areas that do not meet the standards. Maintenance areas are areas that were once designated nonattainment, but have since demonstrated compliance with the standards. Unclassifiable areas are areas where no data is available.

The areas that would be crossed by the proposed Project are designated attainment, maintenance, or unclassifiable. Colorado has entered into an Early Action Compact (EAC) agreement with the USEPA and has established new regulatory requirements to help maintain and reduce ozone levels in the state.

The EAC allows for a postponement of the nonattainment designation as the state implements its plan to reduce ozone formation.

Table 4.10.1-1 – National and State Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS	State Standard
PM_{10}	24-hour	150 µg/m³	150 µg/m³
	Annual	NA	50 µg/m³
$PM_{2.5}$	24-hour	35 µg/m³	NA
	Annual	15 µg/m³	NA
O_3	1-hour	0.12 (235 µg/m³)	0.12 (235 µg/m³)
SO_2	3-hour	0.5 (1,300 µg/m³)	0.27 (700 µg/m³)
	24-hour	0.14 ppm (365 µg/m³)	NA
	Annual	0.03 ppm (80 µg/m³)	NA
NO_2	Annual	0.053 ppm (100 µg/m³)	0.053 ppm (100 µg/m³)
CO	1-hour	35 ppm (40,000 µg/m³)	35 ppm (40,000 µg/m³)
	8-hour	9 ppm (10,000 µg/m+)	9 ppm (10,000 µg/m³)
Pb	Quarterly	1.5 µg/m³	1.5 µg/m³

ppm = parts per million
µg/m³ = micrograms per cubic meter

The proposed Project would involve construction and operation of about 163.7 miles of pipeline, 10 meter stations, 12 pig launchers/receivers, and 19 MLVs. No new or modified compressor facilities or other sources of long-term emissions would be constructed as part of the proposed Project. Compression required to transport the 899,000 Dth/d of natural gas would be provided by existing permitted facilities on CIG system. CIG would be required to operate its existing facilities within the limits of its existing air permits and could not cause or significantly contribute to a violation of an applicable ambient air quality standard.

Although no long-term sources of emissions would be installed as part of the proposed Project, construction of the proposed facilities would result in intermittent and short-term fugitive emissions. Construction of the proposed facilities would cause a temporary reduction in local ambient air quality as a result of fugitive dust and emissions generated by construction equipment. Fugitive dust emissions would be generated by soil disruption by activities such as grading, trenching, backfilling, and vehicle traffic. The fugitive dust emissions (PM_{10}) would depend on moisture content and texture of the soils that would be disturbed. CIG would control dust by watering disturbed areas or by other means (*e.g.*, applying a tackifier) where dust is causing a nuisance condition. Exhaust from trucks, dozers, trenchers, side booms, and other miscellaneous equipment and vehicles would emit NO_2, $S0_2$, CO, PM_{10}, $PM_{2.5}$ and volatile organic compounds. Operation of this equipment would comply with applicable USEPA mobile emission regulations (40 CFR Part 85), and would be mitigated by proper maintenance (*e.g.*, engine tune-ups).

These emissions would be short-term and localized and would not be expected to cause or significantly contribute to a violation of an applicable ambient air quality standard. Construction emissions would occur at a particular location for only a limited period and would have an insignificant impact on air quality in the region. These emissions would be restricted to the period of construction and would terminate upon its completion.

There would be minimal emissions associated with operating the proposed pipeline. Therefore, pipeline operation is not expected to have a significant impact on air quality.

4.10.2 Noise

Construction of the proposed Project would temporarily impact the local noise environment. The ambient sound level of a region is defined by the total noise generated within the specific environment, and is usually comprised of sounds emanating from natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions and the effect of seasonal vegetation cover.

Two measurements commonly used by federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the $L_{eq(24)}$ and L_{dn}. The $L_{eq(24)}$ is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} utilizes the $L_{eg(24)}$ but takes into account the duration and time the noise is encountered. Late night and early morning (10:00 p.m. to 7:00 a.m.) noise exposures are penalized +10 decibels, to account for people's greater sensitivity to sound during the nighttime hours.

In 1974, the USEPA published its Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (USEPA 1974). This document provides information for state and local governments to use in developing their own ambient noise standards. The USEPA has indicated that an L_{dn} of 55 decibels of the A-weighted scale protects the public from indoor and outdoor activity interference. We have adopted this criterion and have used it to evaluate the potential noise impact from operation of pipeline facilities (mainly compressor stations).

The state of Colorado regulates noise pollution at the state level under Colorado Statute Title 25, Article 12. An exemption exists under the state law for any facility that is permitted under a federal action.

Individuals in the immediate vicinity of construction of the proposed Project would experience a local, temporary increase in noise levels. Normally, construction occurs during the daylight hours (*i.e.*, 7 a.m. to 7 p.m.) and as such, would occur when residents would be awake and active. Nighttime sound levels would generally be unaffected by normal construction activities. Activities requiring 24-hour construction, such as hydrostatic testing and HDDs, would be isolated. Noise associated with hydrostatic testing is similar to noise generated from typical farming, ranching, and mining operations. No noise sensitive areas would be within 0.25 mile of the proposed HDDs.

No new or modified compressor facilities or other facilities capable of producing noise in excess of 55dBA would be constructed as part of the proposed Project. Therefore, there would be no long-term impacts on the local noise environment.

4.11 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

Methane has an ignition temperature of 1,166 degrees Fahrenheit (°F) and is flammable at concentrations between 5 percent and 15 percent in air. Unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

4.11.1 Safety Standards

The USDOT is mandated to provide for pipeline safety under Title 49 USC 601. The USDOT's Pipeline and Hazardous Materials Safety Administration's (PHMSA's) OPS administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, and maintenance of, and emergency response to pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level. Section 5(a) of the Natural Gas Pipeline Safety Act (NGPSA) provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as USDOT's agent to inspect interstate facilities within its boundaries; however, the USDOT is responsible for enforcement action. The majority of the states have either 5(a) certifications or 5(b) agreements, while nine states act as interstate agents.

The USDOT pipeline standards are published in Title 49 CFR Parts 190-199. Title 49 CFR Part 192 specifically addresses natural gas pipeline safety issues.

Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993 between USDOT and FERC, the USDOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it will design, install, inspect, test, construct, operate, replace, and maintain the facility for which a certificate is requested in accordance with federal safety standards and plans for maintenance and inspection or shall certify that it has been granted a waiver of the requirements of the safety standards by the USDOT in accordance with Section 3(e) of the NGPSA. The FERC accepts this certification and does not impose additional safety standards other than the USDOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the Memorandum to promptly alert USDOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipeline under the Commission's jurisdiction.

The FERC also participates as a member of the USDOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The proposed facilities would be designed and constructed to meet or exceed the safety standards established by the USDOT in Title 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The proposed Project would be built in accordance with regulations that govern material selection and qualification, minimum design requirements, location adjacent to roads and railroads, and protection from internal, external, and atmospheric corrosion.

Title 49 CFR Part 192 also defines area classifications based on population density near the pipeline, and specifies more rigorous safety requirements for more populated areas. The class location

unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined as follows:

- Class 1: ten or fewer buildings intended for human occupancy;
- Class 2: more than 10, but less than 46 buildings intended for human occupancy;
- Class 3: 46 or more buildings intended for human occupancy, or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days per week for 10 weeks in any 12-month period; and
- Class 4: a prevalence of buildings with four or more stories aboveground.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. In accordance with USDOT requirements, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Pipelines in Class 2, 3, and 4 locations, as well as under drainage ditches of public roads and railroad crossings, must be installed with a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing MLV (*e.g.*, 10 miles in Class 1, 7.5 miles in Class 2, 4 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, MAOP, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Table 4.11.1-1 identifies the class locations for the proposed Project.

Table 4.11.1-1 – Pipeline Facilities

Facility	MP Range	Length (miles)	MAOP (psig)	Pipe Diameter (inches)	Pipe Wall Thickness (inches)	Class Location
Line 250A	0.0 – 64.5	64.5	1,200	30	0.358	1
	64.5 – 84.8	20.3	1,200	24	0.288	1
Line 251A	0.0 – 57.9	57.9	1,200	24	0.288	1
Line 252A	0.0 – 7.6	7.6	1,200	30	0.358	1
	7.6 – 9.5	1.9	1,200	30	0.515	3
	9.5 – 11.1	1.6	1,200	30	0.358	1
	11.1 – 11.4	0.3	1,200	30	0.515	3
	11.4 – 14.9	3.5	1,200	30	0.358	1
Line 253A	0.0 – 0.5	0.5	1,000	24	0.344[a]	1
	0.5 – 1.2	0.7	1,000	24	0.344	3
	1.2 – 2.4	1.2	1,000	24	0.344[a]	1
	2.4 – 6.1	3.7	1,000	24	0.344	3

[a] CIG indicated it would build the entire Line 253A to accommodate Class 3 standards due to anticipated future development.

About 157.1 miles of the Project would be within Class 1 locations, and the remaining 6.6 miles would be within Class 3 locations. The MAOP of the proposed facilities would be 1,200 psig, except for Line 253A, which would be operated at a MAOP of 1,000 psig. The pipe wall thickness would range from 0.288 inch to 0.515 inch, with thicker-walled pipe being used at road and waterbody crossings. CIG stated that it would order a quantity of Class 2 pipe in anticipation that some locations along lines 250A, 251A, and 252A might change from Class 1 to Class 2 in the near future. CIG also indicated it would

build the entire Line 253A to accommodate Class 3 standards due to anticipated future development. If a subsequent increase in population density adjacent to the right-of-way changes the class location and thereby changes the pipeline design requirements, CIG would be required to reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness to comply with the USDOT regulations for the new class location.

In addition to the traditional class location design standards, pipeline safety regulations set forth in the Pipeline Safety Improvement Act of 2002 also use the concept of high consequence areas (HCAs) to identify specific locales where pipeline operators must take specific steps to ensure the integrity of pipeline. An HCA is defined as an area where a pipeline release could have greater than average consequences to health and safety or the environment. Examples of HCAs might include housing developments, business establishments, or mobile home parks. According to USDOT regulations, an HCA may be established by one of two methods. In the first method, an HCA includes:

- Class 3 and 4 locations;
- any area in a Class 1 or 2 location where the potential impact radius[9] is greater than 660 ft and there are 20 or more buildings intended for human occupancy within the potential impact circle[10]; or
- any area in a Class 1 or 2 location where the potential impact circle includes an identified site[11].

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

CIG would be required to identify HCAs on its pipeline and to apply the elements of its integrity management program to those segments of the pipeline. Additionally, CIG would be required to inspect the entire proposed Project area for new HCAs at least every 7 years.

Title 49 CFR Part 192 prescribes minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Under Section 192.615, each pipeline operator must also establish an emergency plan that includes procedures to minimize the hazards in a pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;

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[9] The potential impact radius is calculated as the product of 0.69 and the square root of the MAOP of the pipeline in psi multiplied by the pipeline diameter in inches.

[10] The potential impact circle is a circle of radius equal to the potential impact radius.

[11] An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

- establishing and maintaining communications with local fire, police, and public officials and coordinating emergency response;
- initiating the emergency shutdown of system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property and making them safe from actual or potential hazards.

Title 49 CFR Part 192 requires that each operator must establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. CIG would provide the appropriate training to local emergency service personnel before the pipeline is placed in service. No additional specialized local fire protection equipment would be required to handle pipeline emergencies.

During the scoping process, we received comments regarding the location of the proposed pipeline and safe setback distances for living or working near the pipeline. USDOT regulations do not specify safe setback distances for living or working near a pipeline, just that pipeline operators implement higher safety standards for pipeline design, testing, and operation in more populated areas; and that pipeline operators take specific steps to ensure the integrity of pipeline in areas where a pipeline release could have greater than average consequences to health and safety or the environment. Some local governments have laws that prohibit building structures within certain distances of pipelines. However, the FERC has exclusive federal authority for siting interstate natural gas and could approve construction of the proposed Project within these setback distances. After the pipeline is constructed (assuming it is approved by the FERC), CIG's easement agreements with landowners would preclude most types of development within the permanent right-of-way. Additionally, local governments could prohibit other development under its jurisdiction within specified setbacks.

One commenter inquired about inspection of the contractors' work during construction. CIG would use a team of environmental and craft inspectors to observe contractor personnel performing selected tasks to be sure that work is performed in accordance with applicable environmental and safety requirements. CIG's inspections may involve material and component design specifications; welding procedures and welder qualifications; non-destructive testing results; corrosion protection; installation; post-construction testing; and environmental mitigation. Additionally, the USDOT and FERC perform inspection on pipeline construction projects to ensure they are in compliance with applicable regulations.

4.11.2 Pipeline Accident Data

Since February 9, 1970, Title 49 CFR Part 191 has required all operators of transmission and gathering systems to notify the USDOT of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization;
- required taking any segment of transmission line out of service;
- resulted in gas ignition;

- caused estimated damage to the property of the operator, or others, or both, of a mud of $5,000 or more;
- required immediate repair of a transmission line;
- occurred while testing with gas or another medium; or
- in the judgment of the operator was significant, even though it did not meet the above criteria.

The USDOT changed reporting requirements after June 1984 to reduce the amount of data collected. Since that date, operators must only report incidents that involve property damage of more than $50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. Table 4.11.2-1 presents a summary of incident data for the 1970 to mid-1984 period, as well as more recent incident data for mid-1984 through 2006, recognizing the difference in reporting requirements.

Table 4.11.2-1 – Natural Gas Service Incidents by Cause per 1,000 miles/year (percentage)

Cause	1970 to mid-1984		mid-1984 to 2006	
Outside Forces	0.70	(54%)	0.12	(40%)
Corrosion	0.22	(17%)	0.07	(23%)
Construction or Material Defect	0.27	(21%)	0.05	(17%)
Other	0.11	(8%)	0.06	(20%)
	1.30		0.30	

During the 14.5-year period from 1970 to mid-1984, about 5,862 service incidents were reported over more than 300,000 total miles of natural gas transmission and gathering systems nationwide. Service incidents, defined as failures that occur during pipeline operation, remained fairly constant over this period with no clear upward or downward trend in annual totals. During the 22.5-year period from mid-1984 to 2006, about 2,126 service incident were reported over about the same miles of pipeline (understanding that reporting requirements changed since the previous period). Again, service incidents remained fairly constant over this period, except for an upward trend in the last three years averaging about 75 percent.

The dominant incident cause is outside forces, constituting between 40 and 54 percent of all service incidents, depending on the reporting period. Outside forces incidents result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table 4.11.2-2 shows that human error in equipment usage was responsible for between 61 and 74 percent of outside forces incidents. Since April 1982, operators have been required to participate in one-call public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The "one-call" program is a service used by public utilities and some private sector companies (*e.g.,* oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. The 2002 through 2006 data show that the portion of incidents caused by third-party damage has decreased to about 49 percent. Data for the period from mid-1984 to 2001 is not provided due to the lack of reporting consistency for natural forces.

Table 4.11.2-2 – Outside Forces Incidents by Cause

Cause	1970 to mid-1984	2002 to 2006
Third-Party Damage	67%	49%
Natural Forces (Weather or Earth Movement)	24%	35%
Pipeline Operator Damage	7%	12%
Other or Unknown	2%	3%

The pipelines included in the data set in table 4.11.2-2 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

The frequency of service incidents is strongly dependent on pipeline age. While pipelines installed since 1950 exhibit a fairly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, because corrosion is a time-dependent process. Further, new pipe generally uses more advanced coatings and cathodic protection to reduce corrosion potential.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

Table 4.11.2-3 demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The data shows that the rate of incidents has decreased about 96 percent from the earlier period to the current period. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduced the rate of failure. However, the data also shows that coated and cathodically protected pipe now have a higher incident rate than unprotected pipe. This anomaly reflects the retrofitting old pipe with cathodic protection and fewer total miles of unprotected pipe in the U.S.

Table 4.11.2-3 – Corrosion-related Incidents per 1,000 miles/year (percentage)

Cause	1970 to mid-1984		mid-1984 to 2006	
None (Bare Pipe)	0.42	(22%)	0.003	(5%)
Cathodic Protection Only	0.97	(51%)	0.006	(9%)
Coated Only	0.40	(21%)	0.004	(6%)
Coated and Cathodic Protection	0.11	(6%)	0.054	(81%)
	1.90		0.067	

A commenter expressed concern about potential natural hazards to natural gas pipelines, including wildfires. Potential geologic hazards to pipelines are discussed in detail in section 4.1.3. Other causes of pipeline incidents are discussed in various parts of this section. Wildfires in particular would not pose a threat to the buried pipeline because the soil overburden would insulate the pipeline from radiant heat and fire damage from the wildfire. During a wildfire, temperatures in the burning canopy can reach around 2,000°F, and temperatures at the soil surface can reach close to 1,650°F (DeBano 1981). However, soil is a poor conductor of heat. At about 2 inches below the surface the temperature is not

likely to exceed about 300°F (DeBano 1981). The pipeline would be buried a minimum of 30 inches below the ground surface in most areas.

Aboveground facilities would be installed on gravel pads, which would provide an intrinsic, albeit vulnerable barrier to wildfires. Aboveground facilities would not be entirely insulated from radiant heat. During the period from 2002 through 2006, six pipeline incidents were reported to the USDOT as a result of fires or explosions, including wildfires. Five of the six occurred at aboveground facilities, and only one was the result of a naturally occurring fire. In accordance with Title 40 CFR Part 192.703, CIG would be required to replace, repair, or remove from service any part of its system that would become unsafe as a result of a wildfire.

4.11.3 Impact on Public Safety

The service incident data summarized in table 4.11.2-1 include pipeline failures of all magnitudes with widely varying consequences. About two-thirds of the incidents were classified as leaks, and the remaining third classified as raptures, implying a more serious failure.

From 1970 to mid-1984, the average annual fatalities that occurred on natural gas transmission and gathering was 5.0 fatalities per year. The total annual average for the period from mid-1984 to 2006 decreased to 3.3 fatalities per year. The nationwide totals of accidental fatalities from various hazards in 2004 are listed in table 4.11.3-1 in order to provide a relative measure of the industry-wide safety of natural gas pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Nevertheless, the average of 3.3 fatalities per year is relative small considering the approximate 325,000 miles of transmission and gathering lines in service nationwide. Furthermore, the fatality rate is between two and four orders of magnitude (100 to 10,000 times) lower than the fatalities from other accidental causes.

The available data show that natural gas pipelines continue to be a safe, reliable means of energy transportation. Based on about 325,000 miles of pipe in service, the rate of public fatalities for the nationwide mix of transmission and gathering lines in service is 0.01 per year per 1,000 miles of pipeline. Using this rate, the proposed Project might result in one fatality every 589 years. This would represent a slight increase in risk to the nearby public.

Table 4.11.3-1 – Accidental Deaths in 2004

Cause	Fatalities	
Motor Vehicle Traffic	43,947	(40%)
Poisoning	19,250	(18%)
Fall	18,535	(17%)
Fire and Smoke	3,223	(3%)
Drowning	3,180	(3%)
Firearm	661	(1%)
Other[a]	19,898	(18%)
	108,694	

[a] There were no natural gas transmission or gathering pipeline accidental deaths in 2004.

4.11.4 Terrorism and Security Issues

In the aftermath of the terrorist attacks that occurred on September 11, 2001, terrorism has become a very real issue for the facilities under the Commission's jurisdiction. The FERC, like other federal agencies, is faced with a dilemma in how much information can be offered to the public while still providing a significant level of protection to energy facilities. Consequently, the FERC has removed energy facility design plans and location information from its Internet website to ensure that sensitive information is not readily available (RM02-4-000 and PL02-1-000 issued February 20, 2003).

Since September 11, 2001, the FERC has been involved with other federal agencies in developing a coordinated approach to protecting the energy facilities of the United States, and continues to coordinate with these agencies to address this issue. A Security Task Force has been created and is addressing ways to improve pipeline security practices, strengthen communication within the industry and the interface with government, and extend public outreach efforts.

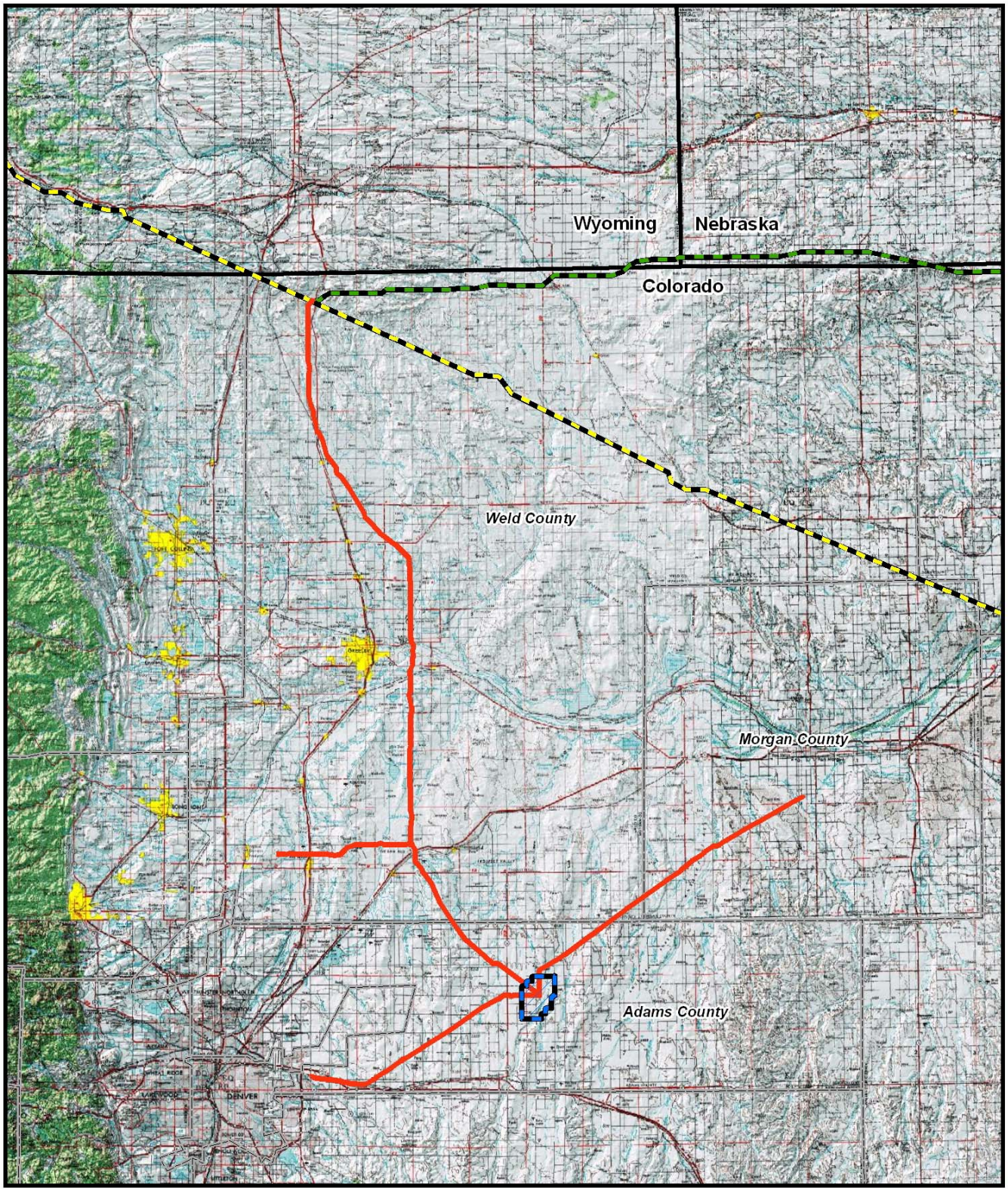
Increased security awareness has occurred throughout the industry and the nation. The Office of Homeland Security was established with the mission of coordinating the efforts of all executive departments and agencies to detect, prepare for, prevent, protect against, respond to, and recover from terrorist attacks within the United States. The FERC, in cooperation with other federal agencies and industry trade groups, has joined in the efforts to protect the energy infrastructure, including the approximate 325,000 miles of interstate natural gas transmission and gathering pipelines.

Safety and security are important considerations in any Commission action. The attacks of September 11, 2001 have changed the way pipeline operators as well as regulators must consider terrorism, both in approving new projects and in operating existing facilities. However, the likelihood of future attacks of terrorism or sabotage occurring along the proposed pipeline, or at any of the myriad natural gas pipeline or energy facilities throughout the United States, is unpredictable given the desperate motives and abilities of terrorist groups. The continuing need to construct facilities to support the future natural gas pipeline infrastructure is not diminished from the threat of any such future acts. Moreover, the unpredictable possibility of such acts does not support a finding that this particular proposed Project should not be constructed.

4.12 CUMULATIVE IMPACTS

In accordance with NEPA and FERC policy, we considered the cumulative impacts of the proposed Project and other projects in the general proposed Project area. Cumulative impacts are the incremental impacts of the proposed action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result when the environmental effects associated with a project are added to either temporary (construction related) or permanent (operation related) impacts associated with recent past, present, or reasonably foreseeable future projects. Although the individual impact of each separate project might not be significant, the additive or synergistic effects of multiple projects could be significant. NEPA requires the lead federal agency to consider the cumulative impacts of proposals under their review.

Table 4.12-1 lists present or reasonably foreseeable future projects or activities that may cumulatively or additively impact resources that would be affected by construction and operation of the proposed Project. These projects are also presented in figure 4.12-1. Resources used to identify proposed and foreseeable projects include FERC, Forest Service, USDOT, Colorado Wind Energy, and Bureau of Reclamation websites, local news articles, and information provided by regulatory agencies through correspondence. While we have identified the tentative construction schedule of these projects where the information was available, the actual construction schedules of these projects depend on factors such as


Wyoming
Nebraska
Colorado
Weld County
Morgan County
Adams County
DENVER
N
0 5 10 15
Miles
High Plains Expansion Project
REX-West Project
Overland Pass Project
Totem Storage Field Project
Prepared By:
Present and Forseeable Projects
High Plains Expansion Project
Figure 4.12-1

economic conditions, the availability of funds, and political considerations. Projects and activities included in this analysis are generally those located within the same counties directly affected by construction of the proposed Project. More distant projects are not assessed because their impact would generally be localized and therefore would not contribute significantly to cumulative impacts in the proposed Project area. However, the air quality study area consists of the regional air sheds.

Table 4.12-1 – Existing or Proposed Activities Cumulatively Affecting Resources of Concern

Activity	County	Description	Anticipated Construction Date
REX-West Project	Weld	Construction of new 42-inch-diameter natural gas pipeline	Construction began in May 2007
Overland Pass Project	Weld	Construction of new 16-inch-diameter natural gas liquids pipeline	Summer 2007
Totem Storage Field Project	Adams	Natural gas storage field	2009

Rockies Express Western Phase Project (REX-West Project)

The REX-West Project[12] was approved by the Commission on April 19, 2007, and includes facilities that will be built by each of the project sponsors to provide up to 1.5 million Dth/d of transportation capacity. As its part of the REX-West Project, Rockies Express Pipeline LLC (Rockies Express) will construct and operate about 712.7 miles of 42-inch-diameter natural gas pipeline beginning at its new Cheyenne Compressor Station in Weld County and extending eastward through portions of Wyoming, Colorado, Nebraska, Kansas, and Missouri. Rockies Express received approval to begin construction of the Cheyenne Compressor Station on May 24, 2007, and to begin construction of the pipeline on June 14, 2007. It is anticipated that the REX-West Project will be in service in 2008.

The Rex-West Project will cross about 34.6 miles of northern Weld County, Colorado and will use generally a nominal 125-foot-wide temporary right-of-way for construction and a permanent 50-foot-wide right-of-way for operation. The REX-West Project and the High Plains Expansion Project would both begin at the Cheyenne Compressor Station in Weld County. However, these pipelines have different end points and do not cross or share similar construction rights-of-way. Construction of the REX-West Project in Weld County may be completed prior to the January 2008 when CIG proposes beginning construction of the High Plains Expansion Project.

Overland Pass Project

During the spring of 2006, Williams Field Services Company (Williams) filed an application for a Right-of-Way Grant with the BLM's Rawlins Field Office for its Overland Pass Liquid Petroleum Pipeline Project (Overland Pass).[13] The Overland Pass pipeline would transport liquid petroleum products (*i.e.*, ethane, propane, and butane) from an existing Williams' facility in Opal, Wyoming, to an existing processing and storage facility in Conway, Kansas (McPherson County).

[12] The REX-West Project was proposed by Rockies Express Pipeline, LLC, TransColorado Gas Transmission Company, and Questar Overthrust Pipeline Company in Docket Nos. CP06-354-000, CP06-401-000, and CP06-423-000, respectively. The final EIS for the REX-West Project was issued in March 2007.

[13] The Overland Pass Project is presently being reviewed by the BLM under file number WY-030-07-5101-ER-K087; WYW-166510.

The Overland Pass Project pipeline would be about 750 miles in length and would be constructed in two counties that would also be crossed by the High Plains Expansion Project. Williams' pipeline would cross about 75 miles in Weld County and about 8 miles in Morgan County. Although the projects cross, they do not share similar destinations or, consequently, construction rights-of-way. Overland Pass would be constructed using a 75-foot-wide right-of-way for construction and a 50-foot-wide right-of-way for operation.

Totem Storage Field Project

CIG is developing a gas storage project called the Totem Storage Field Project[14] (Totem Project) by which it would convert a depleted natural gas production field in eastern Adams County, Colorado to an underground natural gas storage facility. The natural gas storage field would be developed under about 8,360 acres. Based on preliminary modeling design data, the storage field would have a total gas inventory of about 10.7 Bcf, comprised of 7.0 Bcf of working gas and 3.7 Bcf of base gas. The Totem Project would require reworking existing production wells (reconditioning for use as observation wells or plugging), horizontally drilling eight wells, drilling a salt water disposal well, and constructing about 3 miles of 6-inch-diameter gathering pipeline and 1.5 miles of 4-inch-diameter saltwater pipeline. CIG would also construct a 9,400 horsepower compressor station to inject and withdraw the natural gas. Construction of the proposed facilities would require about 442.5 acres of land. Following construction, about 29.9 acres would be maintained as permanent pipeline right-of-way, well sites, or new aboveground facility sites. The remaining 412.6 acres of land would be restored and allowed to revert to its former use.

Several miles of the proposed 251A Line would cross the Totem Project area. It is anticipated that, if approved by the FERC, construction of the High Plains Expansion Project would be completed and in service prior to the proposed in-service date of the Totem Project. CIG anticipates filing its certificate application with the FERC for this storage facility in September 2007, and, if the project is approved by the FERC, beginning construction in May 2008 with a proposed in-service date of June 2009.

4.12.1 Geology and Soils

CIG's facilities are expected to have a temporary impact on near-surface geology and soils. Because these effects would be highly localized and limited primarily to the period of construction, cumulative impacts on geology and soils would only occur if other projects are constructed at the same time and place as the facilities proposed by CIG.

CIG anticipates beginning construction of the Totem Project after beginning construction of the proposed High Plains Expansion Project. It is possible gathering lines could be constructed across the same construction workspace as the proposed Project. If this occurs, some cumulative impact on soils could result. It may be that areas affected by construction of the High Plains Expansion Project would be subsequently disturbed by construction of gathering lines or the salt water pipeline that would be constructed for the Totem Project. Re-disturbance of areas previously affected by pipeline construction would minimize new disturbance. The cumulative impact of erosion and sedimentation would be minimized, however, by implementation of appropriate erosion control and restoration measures during the construction and restoration of both projects.

[14] The Totem Project is presently being reviewed by the FERC staff under its pre-filing process. CIG's Totem Project has been given pre-filing Docket No. PF07-6-000.

The construction of the pipeline facilities for these projects would preclude extraction of gravel and other minerals such as coal from within and near the pipeline permanent rights-of-way. Oil and gas production could be accomplished through well pad offsets and directional drilling. Oil and gas exploration and development would be limited, however, within and near the proposed Totem Storage Field in order to protect its integrity. Therefore, potential cumulative impacts on geological, mineral, and soil resources would be minor as a result of construction or operation of the proposed Project.

4.12.2 Water Resources

The proposed Project would contribute to the cumulative effects on surface water resources primarily to waterbodies that would be affected by other projects within the same watershed as CIG's proposed facilities. Direct in-stream effects associated with open-cut crossings would result in the greatest impact on surface water resources. This would be due to stream bed disturbance and resultant downstream sediment transport. Runoff from construction activities near waterbodies could also result in cumulative impacts due to erosion from adjacent disturbed areas and sediment transport into affected waterbodies. This effect should be relatively minor and controlled by implementation of erosion and sediment control measures and by compliance with federal, state, and local requirements. CIG would use about 29.9 million gallons of surface water from the South Platte River for hydrostatic testing, dust control, and trench compaction techniques. This volume, along with other water appropriations from the South Platte River for municipal and agricultural use can contribute significantly to downstream water depletions. To reduce downstream water depletions, CIG has become a participating member of the SPWRAP. SPWRAP was developed in conjunction with the PRRIP. These cooperative programs sets goals to reduce water depletions and achieve target flows in the Platte River Basin and allow water use and development activities in Colorado, Wyoming and Nebraska to continue in compliance with the ESA and state water laws. By participating in these programs, CIG would ensure its water withdrawls from the South Platte River are managed and conditioned to prevent negative cumulative impacts within the South Platte River basin.

Cumulative impacts on wetlands would occur where wetlands are converted to a different wetland type (*e.g.*, PFO to PEM) or are lost due to draining and filling. None of the wetlands crossed by the Project would be permanently filled or drained. Therefore, there would be no cumulative effects to wetlands as a result of construction or operation of the Project.

4.12.3 Vegetation

The proposed Project would have a direct effect upon vegetative communities and wildlife species associated with them. The total amount of vegetation that may be affected by all of the proposed projects is substantial, but still relatively small compared to the abundance of similar habitat in the proposed Project area. While utility projects could potentially fragment vegetation habitat, this effect would be minimal because fragmentation is most consequential in forested areas. The Overland Pass, REX-West, and the proposed Project would permanently impact about 0.2, 0.0, and 4.7 acres of forest in Colorado, respectively. Therefore, construction and operation of the Project would have minimal cumulative impact on forested areas. Most of the natural community types have been converted to agricultural and pasture use or altered via the establishment of both native and nonnative weedy plant species. Some of these species are considered noxious and are being dealt with on a state and national scale. These invasive and noxious weeds would continue to be a problem regardless if this proposed Project is undertaken; however, CIG has designed specific measures to reduce their occurrence within areas affected by this proposed Project. All of the projects regulated by federal agencies would have mitigation measures designed to minimize the potential for long-term erosion, increase the stabilization of site conditions, and in many cases control the spread of noxious weeds, thereby minimizing the degree and duration of the cumulative impact on vegetation due to project construction and operation.

4.12.4 Fish and Wildlife

Cumulative impacts on fish are expected to be minor and reflect the anticipated cumulative impacts on surface water resources. Direct impacts on local fish and invertebrate populations would likely occur from various proposed projects, but these impacts would be short-term and would occur over a relatively large area within the South Platte River basin. Localized impacts on aquatic resources would likely recover quickly and would not result in an overall effect to the river basins aquatic composition.

Right-of-way clearing and grading and other construction activities associated with the proposed construction projects would result in the removal of vegetation, alteration of wildlife habitat, displacement of wildlife, and other secondary effects such as increased population stress, predation, and establishment of invasive plant species. These effects would be greatest where other projects are constructed within the same time frame and area as the proposed Project. The magnitude of the effects of the proposed projects upon wildlife and sensitive species and their habitat is predicated in part by the amount of available habitat in the general vicinity of the proposed Project, the species demographics on a regional scale, the assessed tolerances and/or recovery ability of the species or habitat of concern, and the extent of disturbance from the specific project relative to that occurring in the landscape as a whole.

For the proposed Project, most of the disturbance to wildlife and habitat would be on a small scale, relative to amount of habitat present, and of a rather short duration. Conservation measures specific to sensitive species would likely be required for all proposed projects by the jurisdictional agencies to minimize potential impacts on wildlife. Conservation measures would be project specific and would be expected to reduce impacts such that sensitive species would not be adversely affected by project activities. Based on condition of the fragmented landscape and current land use practices, the proposed Project should provide a minor, temporary contribution to cumulative impacts on wildlife.

We believe that the threatened or endangered species discussed in section 4.6 of this EIS have the potential to be affected by construction and operation of all the projects. Each pipeline project would be required to consult with federal, state, and local agencies to determine which species may occur within its project area, evaluate potential impacts on those species as a result of construction and operation, and implement measures to avoid, minimize, or mitigate impacts on special status species and their habitats. Since all applicants would be required to restore their respective construction rights-of-way and adhere to all applicable laws and regulations regarding special status species and habitats, we believe that the cumulative impacts on special status species and their habitats would not be significant. Depletion effects on federal-listed species from hydrostatic test water withdrawals from the South Platte River would be covered under separate consultations with the USFWS and CIG's participation in SPWRAP. Therefore, cumulative impacts on threatened or endangered species due to construction of the proposed Project would be mitigated by CIG's participation in the SPWRAP, and operation of the Project is expected to have minimal cumulative impact.

4.12.5 Land Use

The proposed Project and several of the other foreseeable future projects could result in both temporary and permanent changes to current land uses. Much of the land that would be disturbed by construction is presently agricultural and range land. The proposed Project would temporarily disturb about 1,383.4 acres of agricultural land, 517.3 acres of pasture and CRP land, and 510.0 acres of grassland, shrubland, riparian forest, and wetland. Other proposed projects would disturb additional acres; however, the total amount of disturbance would be relatively small compared to the large project area.

One commenter expressed concern about the potential for cumulative impacts on land use from siting numerous utilities within the same corridor. Each utility within a corridor requires space for operation and maintenance. As more utilities are placed within a corridor, additional space is needed for the new utilities and the corridor gets wider. Many land uses, such as crop farming and cattle ranching, are allowed to continue within the corridor; however, some land uses, such as residential or commercial development, are prohibited. A corridor could conceivably grow wide enough to make development on a single parcel of land infeasible. In general, CIG sought to avoid existing and planned residential and commercial developments (see section 4.7.3). CIG has refined its proposed route to accommodate planned residential developments and we are recommending two route variations that would minimize impacts on two planned development (see section 3.6.2).

Residential or commercial development adjacent to a utility corridor could also make placement of additional utilities in an existing corridor infeasible. CIG considered an alternative route for Line 250A (see section 3.5.1) which would have followed an existing pipeline corridor for its entire route. However, that corridor was congested with residential and commercial subdivisions along much of its route (*e.g.*, Hunter's Cove, Country Club West, Highland Hills, T-bone Ranch, Arrowhead, and Dos Rios) and there would be minimal space in or immediately adjacent to the existing utilities for another line.

When utilities are not able to be sited within existing corridors, new corridors are created, and new corridors can result an ecological effect known as land fragmentation. Land fragmentation occurs when large, continuous blocks of land are divided into smaller blocks, usually by human development. Fragmentation can have impacts on the native vegetation and wildlife communities. Some species require large, uniform blocks of land in order to breed and raise young successfully. These animals are called area-sensitive species. Fragmenting land into smaller blocks of land ultimately forces out area-sensitive species and decreases the overall plant and animal diversity. The effects of fragmentation are generally considered to be greatest in forested environments where the number and type area-sensitive species is largest. Less than one percent of the land that would be crossed by the Project is forested. Much of the native habitats in the Project area have been fragmented by agriculture land use (about 59 percent). About 80.1 miles (49 percent) of CIG's proposed pipeline would be constructed on new right-of-way. The remaining 83.6 miles (51 percent) would be constructed adjacent to existing pipeline, powerline, fiber optic line, road, and railroad rights-of-way.

The majority of impacts associated with the proposed Project would be temporary, as most land uses would be allowed to revert to prior uses following construction. Permanent impacts on land use would be small and would be related to the permanent change in land use due to the operation of aboveground facilities. But, many of the new aboveground facilities that would be constructed and operated for the Project would be within existing aboveground facility sites or would be small in size Therefore, cumulative impacts on land use due to construction and operation of the proposed Project would be minimal.

4.12.6 Visual Resources

The visual character of the existing landscape is defined by historic and current land uses such as agricultural, recreation, conservation, and development. The visual qualities of the landscape are further influenced by existing linear installations such as highways, railroads, pipelines, and electrical transmission and distribution lines. Within this context, proposed aboveground facilities would have the most visual impact, while the underground utility portion of the proposed Project would be visually subordinate to the existing landscape character and would contribute only incrementally to overall visual conditions, particularly after completion of reclamation and the reestablishment of vegetation in 3 to 5 years. Aboveground facilities would be either relatively small (*e.g.*, meter stations, MLVs, and pig

launchers/receivers) or would be located within or adjacent to existing industrial sites where they would be viewed in the context of other buildings and facilities in the immediate area. Overall, the total number of proposed aboveground facilities is relatively small and widely distributed and generally would only add marginally to the effect of existing structures in the area. Therefore, the proposed Project would not significantly contribute to cumulative effects on visual resources.

4.12.7 Cultural Resources

The proposed Project would add incrementally to the cumulative effects of the other projects on cultural resources in the area. Increased access by rights-of-way and service roads would increase the potential for trespass or vandalism at previously inaccessible sites. Past disturbances to cultural resources in the proposed Project area have been related to agricultural practices; intentional destruction or vandalism; and construction and maintenance operations associated with existing roads, railroads, and fiber optic and transmission lines. The currently proposed projects listed in table 4.12-1 that are defined as federal actions would include mitigation measures designed to avoid or minimize additional direct impacts on cultural resources. Where direct impacts on significant cultural resources are unavoidable, mitigation (*e.g.*, recovery and curation of materials) would occur before construction of the Project. Non-federal actions would need to comply with any mitigation measures required by the state.

4.12.8 Socioeconomics

Present and reasonably foreseeable future projects could cumulatively impact socioeconomic conditions in the proposed Project area. Employment, housing, infrastructure and public services, and traffic could experience beneficial and detrimental effects.

Employment – The projects considered in this section would have cumulative effects on employment during construction if more than one project is built at a time. For example, the proposed Project expects to employ a peak workforce of 800 people. It is estimated that 20 percent of the construction workforce would be local hires. If the larger projects are built simultaneously, the demand for workers could exceed the local supply of appropriately skilled labor. On the beneficial side, the increased demand for workers could reduce current unemployment and perhaps lead to higher wages for the duration of the project. Other indirect employment benefits would include temporary service jobs in the local area (*e.g.*, restaurants and gas stations).

The proposed Project is not expected to add permanent employees to its staff. Therefore, it would not contribute to cumulative impact on permanent employment.

Housing – Given the vacancy rates in the area and the number of hotel/motel rooms and camp sites, construction workers should not encounter difficulty in finding temporary housing. The degree of cumulative impact on the housing resources would depend upon the season of project construction and the number of projects being constructed simultaneously. If construction occurs concurrently with other projects, temporary housing would still be available but may be slightly more difficult to find and/or more expensive to secure. Regardless, these effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative effect on housing.

Traffic – Where installation of the proposed pipeline occurs at road crossings, road traffic could be temporarily disrupted or delayed. Indirectly, workers' vehicles and construction trucks and equipment added to the existing traffic levels could contribute to increased traffic congestion during construction. Traffic congestion, however, is not expected to be a major problem in the proposed Project area even if several projects are being constructed at once. Because most of the roads in the proposed Project area currently have little or no congestion, construction workers frequently share rides and travel to and from

work during off-peak hours, and the projects are spread out over a large area with the traffic going to different destinations, potential cumulative impacts on traffic are expected to be temporary and short term.

Infrastructure and Public Services – The cumulative impact of the proposed Project and other projects and activities on infrastructure and public services would depend on the number of projects under construction at one time. The small incremental demands of several projects occurring at the same time could become difficult for police, fire, and emergency service personnel to address. This problem would be temporary, occur only for the length of construction, and could be mitigated by the various project sponsors providing their own personnel to augment the local capability or by providing additional funds or training for local personnel. No long-term cumulative effect on infrastructure and public services is anticipated.

4.12.9 Air Quality and Noise

Construction of most of the reasonably foreseeable future projects and activities listed in table 4.12-1 would involve the use of heavy equipment that produces noise, air contaminants, and dust. Operation of the wind farm would also contribute cumulatively to noise. These effects could add to the ongoing air and noise impacts in the proposed Project area. The majority of these effects would be mitigated by the large geographical area over which the various projects are located. Noise impacts are particularly localized and attenuate quickly as the distance from the noise source increases. Therefore, cumulative noise impacts associated with construction and operation would be unlikely.

Air impacts, although less localized than noise impacts, would also tend to be regional and confined primarily to the airsheds in which the projects occur. Cumulative impact on air quality, therefore, would be limited primarily to areas where more than one project is proposed within the same airshed. Because no new sources of air pollution would be constructed as part of the proposed Project and because the projects listed in table 4.12-1 are located over a large area, have varying construction schedules, and must adhere to federal, state, and local regulations for the protection of ambient air quality, cumulative impacts on air quality are not anticipated.

4.12.10 Reliability and Safety

Impact on reliability and public safety would be mitigated through the use of the USDOT Minimum Federal Safety Standards in Title 49 CFR Part 192, which are intended to protect the public and to prevent natural gas facility accidents and failures. No cumulative impacts would be anticipated to occur.

4.12.11 Conclusions

Due in part to the regulatory review processes that are required for the projects considered, we believe that the cumulative environmental impacts of these projects would not be unacceptably adverse. In addition, we believe that some of the cumulative project effects (*e.g.*, employment during construction, long-term payment of local property taxes, injection and circulation of money into the local economy, and provision of energy) could be beneficial to the regions in which these projects are proposed.