

5.0 Cumulative Impacts

5.0 Introduction

NEPA requires an assessment of potential cumulative impacts. Federal regulations (40 CFR 1500-1508) define cumulative impacts as:

“...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

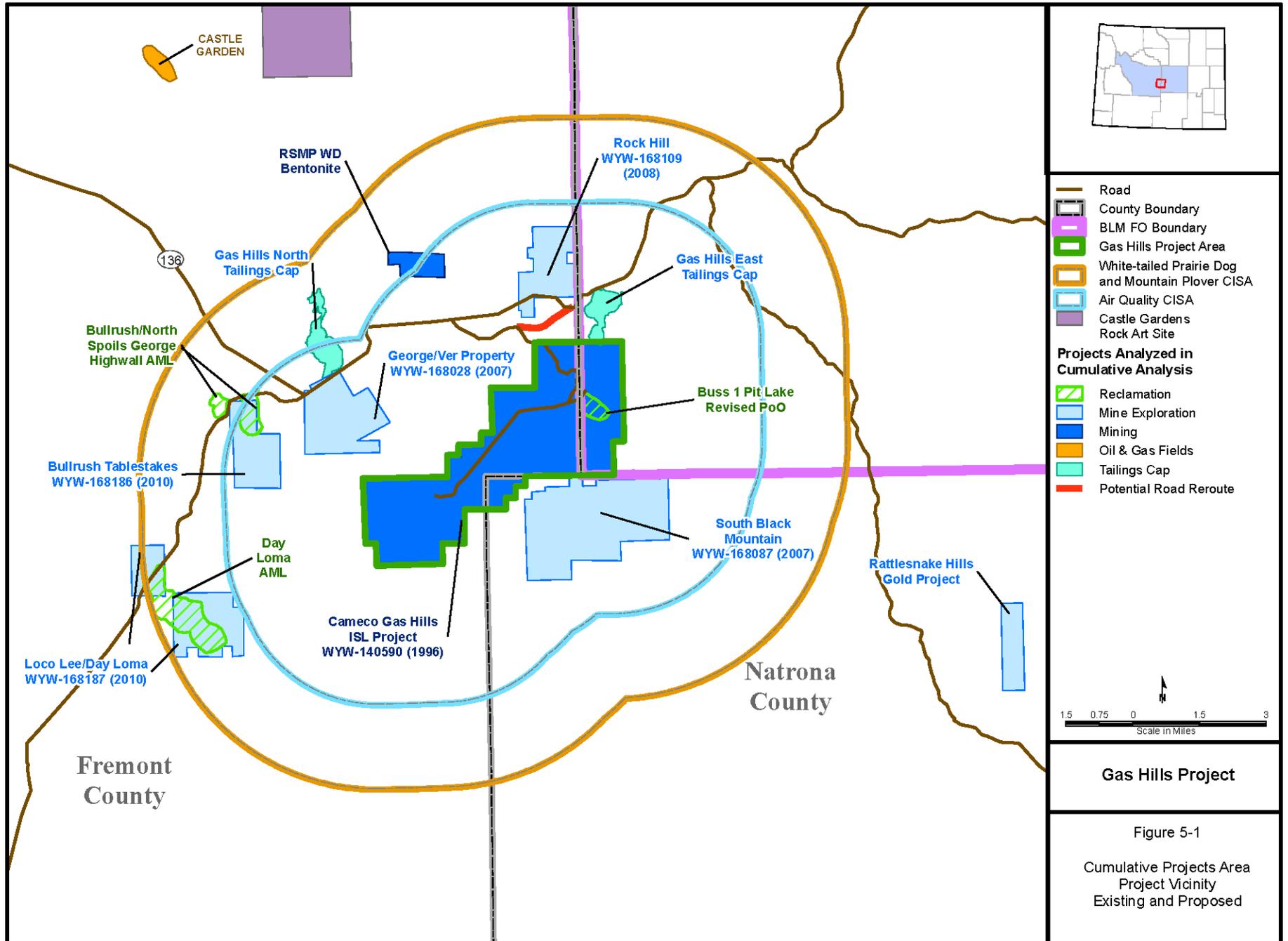
Potential cumulative impacts are assessed at the resource level. The area of the CISA for past, present, and reasonably foreseeable future actions (RFFAs) that may generate cumulative impacts varies depending on the resource under consideration. RFFAs are defined as those projects within the geographic scope and timeframe of the Project, and were not considered to be speculative. Projects were considered non-speculative if there were: existing proposals, such as the submission of permit applications; a commitment of resources or funding; or for which the NEPA process has begun. The assessments assume the successful implementation of the environmental protection and mitigation measures, as well as compliance with applicable RMP restrictions and federal, state, and local regulations and permit requirements. The analysis includes both potential negative and positive impacts and is applicable to all action alternatives.

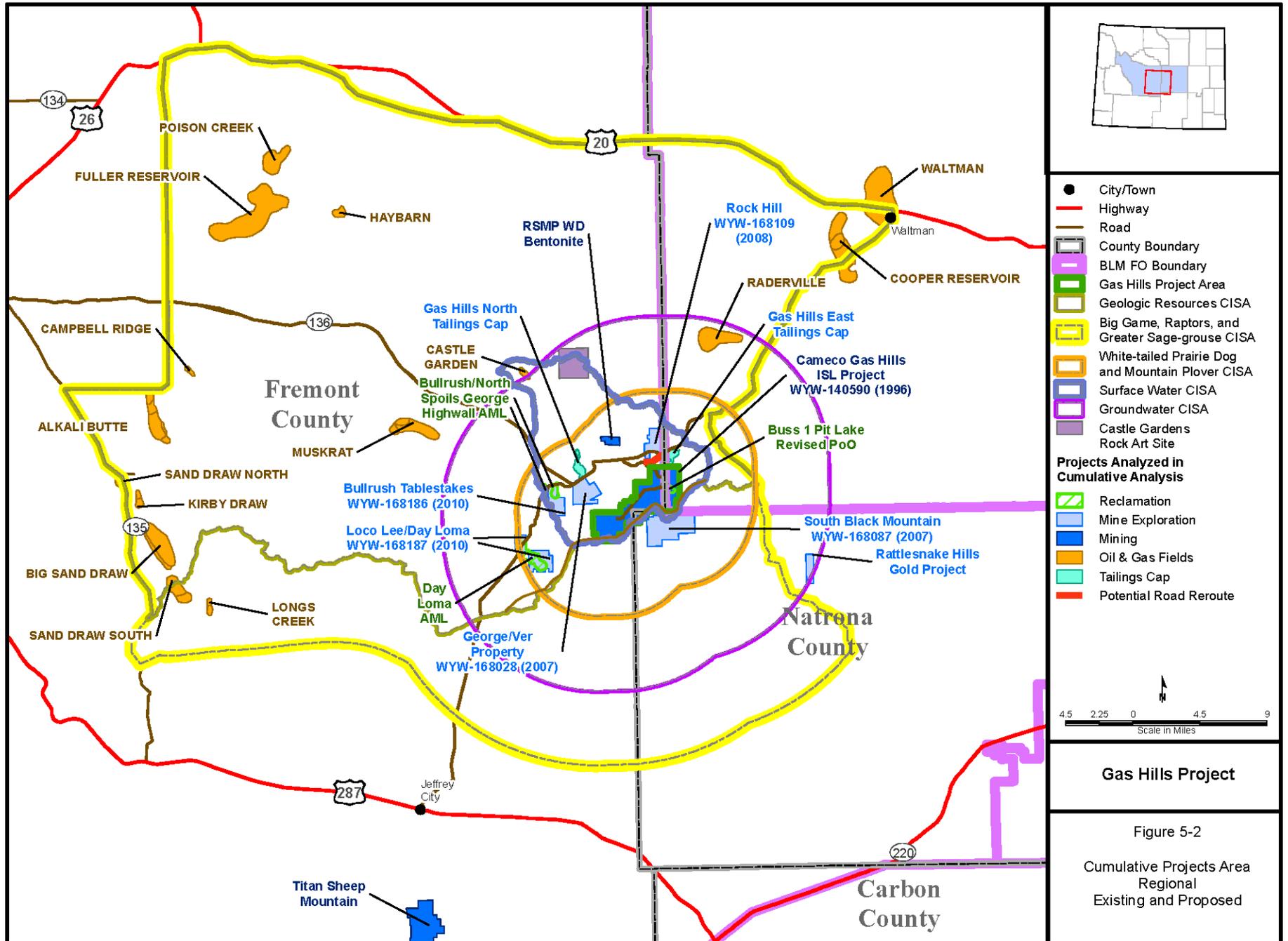
5.0.1 Types of Past, Present, and Reasonably Foreseeable Actions

Past disturbance within the GHPA and the surrounding area is primarily associated with historic uranium mining activities. This is discussed in more detail for the GHPA in Section 2.1.2, Existing Disturbance; Section 3.13, Vegetation; and Section 3.15, Water Resources (**Figure 3.15-4**). **Figure 3.13-1** depicts areas outside of the GHPA where past mining occurred. Much of the areas disturbed by past mining have been reclaimed. Present disturbance and RFFAs shown in **Figures 5-1** and **5-2** are organized by the type of activity and include the following:

- Within the GHPA:
 - Reclamation of the Buss 1 Pit Lake (Revised Plan of Operations);
- Within the CISA, outside of the GHPA:
 - Mining exploration;
 - Mining operations;
 - Long-term management of uranium tailings (Gas Hills East and Gas Hills North tailings cap);
 - Reclamation of previous mining under the Wyoming AML program;
 - Oil and gas development; and
 - Potential road construction/relocation.

The area associated with the Buss Pit includes a groundwater fed impoundment, the Buss 1 Pit Lake. Reclamation of the Buss Pit most recently occurred in 1994 and 1995; currently, water volume and quality of the Buss 1 Pit Lake has stabilized, and vegetation has re-established over the site. The water quality at the Buss 1 Pit Lake does not meet the WDEQ-WQD Class III livestock standards due to a





Gas Hills Project

Figure 5-2
Cumulative Projects Area
Regional
Existing and Proposed

low pH (3.8) and elevated aluminum concentrations. BLM considers the Buss 1 Pit Lake an acid lake, and as such has determined it requires remediation due to potential adverse impacts to the environment with the potential to adversely affect wildlife and groundwater.

Cameco has submitted a Revised PoO to the BLM Casper FO (PRI 2011a) outlining plans to mitigate the acid conditions at the Buss 1 Pit Lake. Cameco proposes to pump and treat the low pH water with lime to achieve a pH above 7.0 s.u. and monitor water level and water quality of the Buss 1 Pit Lake over the subsequent 15-year period. If within that 15-year period, the lake pH drops below 6.5 s.u. for 3 successive years, Cameco will commit to the Alternate Plan to backfill the Buss 1 Pit Lake with existing stockpiled overburden and topsoil. For the purposes of this analysis, the maximum potential disturbance of approximately 153 acres is assumed.

Disturbance associated with mining exploration (exploratory drilling) is assumed to cause less than 5 acres of disturbance per year, with all disturbances being reclaimed within the same year as it occurs. The exception to this is the Rattlesnake Hills Gold Project, which is authorized to disturb up to 40 acres through exploratory drilling. The remaining mining operations identified within the CISA use conventional mining methods.

Existing hazards or environmental damage from abandoned historic mining activities are identified and remediated by the WYDEQ AML division. The goal of AML activities is “to mitigate safety hazards and repair environmental damage from past mining activities, and to assist communities impacted by mining”, and reclamation efforts can result in re-disturbance of the entire area being reclaimed. Therefore, this analysis assumes 100 percent disturbance within boundaries identified for reclamation by this program.

Oil and gas activities require development of roads, pipelines, power distribution, well pads, and wells, which disturb only a portion of the surface area encompassed by each development. For the purposes of this analysis, 15 percent of the area within the boundary of each development is assumed to be disturbed.

Fremont County is planning to upgrade the Dry Creek Road and to potentially relocate approximately 1.4 miles of the road as shown in **Figure 5-1**. Assuming a conservative construction disturbance width of 150 feet, the new disturbance associated with relocation and construction of the Dry Creek Road would be 25 acres. With a running surface of 24 feet in width, the long-term disturbance associated with the road relocation would be approximately 4 acres.

5.0.2 Historic Land Use

Historic and existing land uses within the area surrounding the Project include private and commercial activities, such as:

- Grazing;
- Hunting and recreation (e.g., OHV use);
- Uranium exploration and extraction; and
- Oil and gas exploration and production.

As discussed in Section 2.1.2, Existing Disturbance, and Section 3.4, Land Use, these land use activities have resulted in the disturbance of approximately 15 percent of the GHPA or about 1,300 acres. Areas outside of the GHPA within the CISA have been disturbed by past mining for uranium, mining exploration, and ongoing oil and gas development activity.

5.0.3 Physical and Temporal Boundaries for Cumulative Impacts

The definition of the CISA is different for each resource because the physical boundaries are established to encompass the anticipated lateral extent of impacts for each resource. For example, the air quality effects are anticipated to extend beyond the Project boundary resulting in a CISA defined beyond the GHPA (**Figure 5-1**). Soil impacts are not anticipated to extend beyond the GHPA; therefore, the GHPA is defined as the CISA and the scope of potential cumulative activities is narrower. **Table 5-1** provides a description of the CISA for each resource.

Table 5-1 Cumulative Impact Study Areas

Resource	Cumulative Impact Study Area
Air Quality	GHPA and the area within 5-km of the Project boundary.
Cultural Resources and Native American Traditional Cultural Properties	GHPA and the following additional study areas: Castle Gardens Rock Art site; Gas Hills Mining District; and Casper to Lander Road.
Geology	From the Beaver Rim north and west to Highway 20/26 and Road 135 near Moneta.
Land Use	No impacts to land use are anticipated from the Project; therefore, no cumulative impacts are anticipated and no CISA is defined.
Livestock Grazing	Portions of the Matador, Blackjack, and Diamond Springs grazing allotments within the GHPA, as well as the entire Gas Hills grazing allotment.
Noise	No impacts from noise are anticipated from the Project; therefore, no cumulative impacts are anticipated and no CISA is defined.
Paleontological Resources	GHPA.
Public Health and Safety	The impact area for radiation includes the GHPA and the communities of Jeffrey City and Waltman. The impact area for the storage of hazardous materials is the GHPA. The impact area for transportation of hazardous materials includes the GHPA and designated transportation routes to the Smith Ranch-Highland facility.
Recreation	GHPA and immediate surrounding area within approximately 2 miles of the boundary for recreation.
Socioeconomics	Fremont and Natrona counties with additional attention to Converse County to the extent warranted to include potential effects of processing Project-related ore at the existing Smith Ranch-Highland facility.
Soils	GHPA.
Transportation	GHPA and designated transportation routes to the Smith Ranch-Highland facility, as well as the primary access roads approaching the GHPA.
Vegetation	The portions of the Matador, Blackjack, and Diamond Springs grazing allotments that are within the GHPA, as well as the entire Gas Hills grazing allotment.
Visual Resources	The GHPA and areas from which the Project would be visible (Figure 4.14-1)

Table 5-1 Cumulative Impact Study Areas

Resource	Cumulative Impact Study Area
Water Resources-Surface Water	Upper Canyon Creek-Deer Creek and Fraser Draw subwatersheds, which contain all Project disturbance in the GHPA.
Water Resources-Groundwater	GHPA and the area within 10 miles of the GHPA, corresponding to the area where groundwater drawdown impacts could occur.
Wild Horses	No impacts to wild horses are anticipated from the Project; therefore, no cumulative impacts are anticipated and no CISA is defined.
Wildlife and Fisheries Resources	GHPA and beyond as defined by big game, raptors, and special status wildlife species distribution and/or sensitive habitat.

5.0.4 Current and Planned Project

Tables 5-2 and 5-3 detail the past, present, and RFFA projects considered in the cumulative analysis. These projects are shown in Figures 5-1 and 5-2.

Table 5-2 Current Projects within the Gas Hills Project CISA

Project	Owner/Proponent	Type	Project Disturbance (size) (acres) ^a	County
Mine Exploration				
George/Ver Property	Strathmore Resources Inc.	Uranium Mine (exploration)	5 (1,631)	Fremont
Loco Lee/Day Loma	Strathmore Resources Inc.	Uranium Mine (exploration)	5 (1,876)	Fremont
Rock Hill	Strathmore Resources Inc.	Uranium Mine (exploration)	5 (1,211)	Fremont
Bullrush Table Stakes	Strathmore Resources Inc.	Uranium Mine (exploration)	5 (1,105)	Natrona
South Black Mountain	Strathmore Resources Inc.	Uranium Mine (exploration)	5 (3,567)	Natrona
Mining				
RSMP WD Bentonite	US Bentonite	Bentonite	120 (386)	Fremont
Long-term Land Management				
Gas Hills East Tailings Cap	Umetco/DOE	Tailings Cap	331 (331)	Fremont/Natrona
Gas Hills North Tailings Cap	Pathfinder Mines Corp/ DOE	Tailings Cap	347 (347)	Fremont
Oil and Gas Fields				
Alkali Butte	Legacy Reserves Operating, SM Energy Company, Texaco	Oil	238 (1,590)	Fremont

Table 5-2 Current Projects within the Gas Hills Project CISA

Project	Owner/Proponent	Type	Project Disturbance (size) (acres)^a	County
Big Sand Draw	BP America Production Co, Howell Petroleum, Legacy Reserves, Texaco	Oil	338 (2,254)	Fremont
Campbell Ridge	Black Bear Oil Corp, Mosbacher Production Co	Oil	19 (129)	Fremont
Castle Garden	Atlantic Richfield Co, Richardson Operating Co.	Oil	30 (198)	Fremont
Cooper Reservoir	Bill Barrett Corp, Chevron USA Inc., Integrity Oil and Gas, Intoil Inc.	Oil	525 (3,499)	Natrona
Fuller Reservoir	Ambrit Energy Corp, ANR Production Co, Boyd Exploration, Delta Exploration Co, Marathon Corp, Nortex Gas & Oil Co, Petroleum Resource Management Corp, Richardson Operating Co.	Oil	788 (5,252)	Fremont
Haybarn	Coastal Oil & Gas Corp, Gas Ventures LLC	Oil	45 (298)	Fremont
Kirby Draw	Brower Oil & Gas inc, Sinclair Oil, True Oil LLC	Oil	42 (277)	Fremont
Longs Creek	Atlantic Richfield Co, Legacy Reserves Operating LP	Oil	32 (213)	Fremont
Muskrat	Atlantic Richfield Co, Legacy Reserves Operating LP, MKM Oil Co, Shannon Oil, Wold Oil	Oil	235 (1,565)	Fremont
Poison Creek	Encana Oil and Gas USA Inc, Huber JM Corp, Richardson Operating Co.	Oil	194 (1,295)	Fremont
Raderville	Bummer Bruce L, Butler Oil Co, LOCO, M-3 Industries, Nucor Oil & Gas Inc, USA Exploration & Production LLC	Oil	274 (1,829)	Natrona
Sand Draw North	BP America Production Co, Legacy Reserves Operating LP, Thorofare Resources, Inc.	Oil	60 (403)	Fremont
Sand Draw South	BP Exploration Inc, First Energy Properties, Mar/Reg Investments, Shannon Oil, Thorofare Resources Inc, WESCO Operating Inc	Oil	156 (1,037)	Fremont

Table 5-2 Current Projects within the Gas Hills Project CISA

Project	Owner/Proponent	Type	Project Disturbance (size) (acres) ^a	County
Waltman	Bill Barrett Corp, Chevron USA Inc, Coastal Oil & Gas Corp, Double Eagle Petroleum Co, Jo Scott Enterprises Inc, Lario Oil & Gas Co, Moncrief WA JR, Petro-Canada Resources USA Inc, Williams Production RMP Co LLC	Oil	649 (4,328)	Natrona

^a For the purposes of cumulative analysis, oil and gas activities were assumed to disturb, a maximum of 15 percent of the area within the project boundaries, based on an average number of wells at the end of 2007 per development (BLM 2011b; WOGCC 2011a), and an average disturbance for each well of 6 acres (BLM 2011b).

Table 5-3 Planned Projects within the Gas Hills Project CISA

Project	Owner/Proponent	Type	Project Disturbance (acres)	County
Mining				
Gas Hills In-situ Recovery (ISR) Uranium Mine Project	Cameco Resources	Proposed Uranium Mine	1,315 (8,518b ^a)	Fremont/Natrona
Reclamation				
Buss 1 Pit Lake Revised PoO ^b	Cameco/Power Resources, Inc.	Uranium Mine Pit Lake Reclamation	153	Natrona
Bullrush/North Spoils/George Highwall	AML Division	Uranium Mine Reclamation	318	Fremont
Day Loma	AML Division	Uranium Mine Reclamation	1,333	Fremont
Road Construction				
Dry Creek Road	Fremont County	Road Relocation	25	Fremont

^a Total area within the Project boundary (GHPA).

^b Located within the GHPA boundary. Cameco acquired the Buss Pit property (WDEQ-LQD Permit No. 438) from the TVA. Cameco reclaimed the Buss open pits area from 1994 through 1995 in accordance with an approved WDEQ-LQD reclamation plan. Cameco has submitted a Plan of Operations to the BLM (Casper FO) to address impacted water quality within the Buss 1 Pit Lake.

5.0.5 Actions Not Included in the Cumulative Analysis

Projects identified in the vicinity of the GHPA, but not considered in the cumulative analysis include the following:

- Titan Uranium Inc. Sheep Mountain underground and open-pit uranium mine utilizing heap leaching and solvent extraction, located 8 miles south of Jeffrey City, Wyoming in Sections 17, 20, 21, 22, 27, 28, 29, 32, and 33 of T28N, R92W;
- UR Energy, Lost Creek ISR uranium mine, located in Sections 17 to 20 and 29 to 31, T25N, R92W and Sections 13, 24 and 25 of T25N, R93W;
- Evolving Gold, Rattlesnake Hills Gold Exploration Project, located in Section 24 and 25 of T32N, R88W; and
- Strathmore Resources, Gas Hills Project, located in T33N R89W and T33N R90W.

Sheep Mountain and Lost Creek are proposed uranium mines located south of U.S. 287 and south of Jeffrey City. The Rattlesnake Hills Exploration Project is located to the east of the Project. These activities are not within the geographic scope of the area analyzed for cumulative impacts.

Strathmore Resources Inc. has filed a Letter of Intent with U.S. NRC stating intent to file a PoO for a heap leach operation in the Gas Hills area during the first quarter of 2013. Because the project has not yet been fully defined to the U.S. NRC and a PoO has not been submitted to the BLM, the Project is considered speculative and is not included in the analysis of cumulative impacts.

The BLM has approved installation of meteorological towers for collection of site-specific wind energy data for 2 possible projects within the vicinity of the GHPA. However, since no plans have been submitted to the BLM for implementation of wind farms, these projects are considered speculative and are not included in the cumulative impact analysis.

5.1 Air Quality

The CISA for air quality encompasses the GHPA and the area within 5 km of the Project boundary based on the estimated maximum extent of impacts from emissions of the primary pollutant, PM. The projects within the CISA considered in the analysis of cumulative impacts to air quality include mining exploration projects, Cameco's Revised PoO for reclamation of the Buss 1 Pit Lake, 2 DOE long-term management projects, and 2 AML projects (see **Figures 5-1** and **5-2**).

5.1.1 Pollutant Emissions

As discussed in Section 4.1.2.1, Pollutant Emissions, impacts to air quality from the Proposed Action would result in concentrations of priority pollutants that are no more than one-third of the allowable concentrations under the NAAQS. The projects within the CISA would consist of construction activities similar to the Project that, when added to the emissions from the Project, could result in a doubling of impacts to air quality. A doubling of impacts would still result in concentrations of pollutants below the NAAQS. Impacts to air quality from the RPA would be slightly less than for the Proposed Action, and much less under the No Action Alternative. Therefore, cumulative air quality impacts would not be anticipated under any Project alternative, especially given the distance between the projects within the CISA and the localized nature of impacts from emission sources.

5.1.2 Greenhouse Gases

GHG emissions resulting from combustion of fossil fuels from Project-related activities under the Proposed Action would be approximately 222,000 tpy CO₂e, as shown in **Table 4.1-9**. In addition, indirect emissions of GHGs resulting from generation of electric power purchased for the Project would be approximately 4,200 tpy CO₂e for a total of approximately 226,000 tpy CO₂e of GHG emissions. This

total is about 0.003 percent (3 thousandths of 1 percent) of total annual U.S. emissions of GHGs. An equivalency calculation indicates that the total CO₂e emissions from the Project would release about the same amount of GHGs as the energy use for approximately 1,000 average households in the U.S. Impacts of other projects within the CISA to air quality would involve similar types of construction activity as the Project but over a shorter time frame, likely contributing a lower level of GHG emissions. GHG emissions would be reduced by approximately 2 percent under the RPA and by 90 percent under the No Action Alternative.

The cumulative effects generally attributed to increased atmospheric GHG levels include, but are not limited to, melting permafrost, sea level rise, changing global climate patterns, redistribution of plant and animal species, redistribution of disease vectors, and altered precipitation regimes, both spatially and temporally. Current state of the science does not have the ability to link any particular instance of GHG emissions or sequestration to any specific climate-related environmental effects.

5.2 Cultural Resources and Native American Concerns

The CISA encompasses the GHPA, as well as the Gas Hills Mining District, portions of the Casper to Lander Road (generally along the upper, north facing slopes of the Beaver Divide), and Castle Gardens Rock Art Site. Activities within this area include mine exploration and reclamation, mining, oil and gas development, and potential road construction or relocation. Following Native American consultation, the CISA may be expanded to include additional study areas outside of the GHPA.

From the 1950s to the early 1980s, much of the surface area within and adjacent to the CISA was extensively mined for uranium, employing both underground and surface mining methods. Approximately 15 percent of the land surface within the GHPA has been disturbed by previous conventional mining and 10 percent of the land surface has undergone subsequent reclamation. Additionally, exploration drilling and associated access road construction completed since the 1950s has disturbed portions of the GHPA. Federally mandated protection of historic properties came into place after 1966; therefore, it is assumed that disturbance prior to this time was likely to have damaged or destroyed historic properties within the GHPA at least in the 15 percent of lands that had been disturbed. Subsequent to federal historic preservation mandates, cultural resources inventories have been conducted for any actions involving federal lands, and adverse effects to historic properties avoided or mitigated as appropriate. Improvements to inventory procedures were made in 1981, leading to more reliable inventories. However, earlier surveys may be repeated or checked to ensure compliance with more current views of appropriate inventories and mitigation. Avoidance through project redesign is the preferred method of mitigation; however, when avoidance was not feasible, data recovery or other forms of mitigation were implemented prior to ground-disturbing activities.

Unavoidable adverse effects to known historic properties located in proposed disturbance areas associated with any Project alternative would be mitigated in accordance with the PA and approved treatment. In addition, any previously unknown historic properties potentially discovered during surface disturbance activities would be mitigated per the PA. However, if data recovery is necessary to mitigate unavoidable adverse effects to 3 historic properties described in Section 4.2.2.1, Impacts on Cultural Resources and Native American Traditional Values, the process would recover a substantial amount of data but ultimately the site would be destroyed by the undertaking. This would constitute an impact from the Project which, when combined with past actions, would represent a cumulative impact. Because the amount of disturbance that would occur is greatest under the Proposed Action, it would have the highest potential for an impact.

Portions of the GHPA are visible from a segment of the historic Casper to Lander Road. Recent archaeological investigations (Larson et al. 2012) of the Casper to Lander Road found that the segment had been destroyed by previous disturbance; therefore, no impacts to the road from the Project are anticipated under any alternative and no cumulative effects to the road would occur.

The Castle Gardens Rock Art Site, which is considered sacred by Native American groups, is located approximately 8 miles north of the GHPA. Although the site would not be physically or visually impacted by the Project, there is concern that an increase in the numbers of people in the area may increase visitation to the site and consequently increase the potential for vandalism. However, since Project employees would not be living in the Gas Hills area and the Castle Gardens Road is not proposed as a primary or alternative access route, no vandalism as a result of any Project alternative is anticipated. Therefore, it is not necessary to analyze the cumulative effects of other projects within the CISA on the Castle Gardens Rock Art Site.

5.3 Geology

The CISA for geology and mineral resources encompasses the GHPA, and extends from the Beaver Rim to the (south), to Highway 20/26 (north), and from Road 135 north to Moneta (west) (**Figure 5-2**). This designation is based on regional geology and transportation corridors. Projects considered in the analysis include ongoing mining exploration 2 DOE long-term management projects, AML reclamation projects, oil and gas exploration and development, and other mining projects.

5.3.1 Geologic Hazards

Projects within the CISA for geology and mineral resources are not located on steep slopes near Beaver Rim, but are located in other areas with steep slopes prone to landsliding. However, given appropriate design or avoidance, no Project alternative is expected to contribute to cumulative impacts to landslides in the CISA. Oil and gas projects in the CISA could include deep wastewater disposal wells with the remote potential to induce an increase in seismic activity similar to those described for the Project (Section 4.3.2.1, Geologic Hazards).

5.3.2 Mineral Resources

During construction, operation, and reclamation under the Proposed Action and the RPA, access to minerals such as oil, gas, coal, or sand and gravel within the GHPA would be limited; however, there is little potential for development of these minerals (Section 4.3.2, Proposed Action Alternative). Historic mining within the CISA limits the development of mineral resources to the extent that uranium ore has been removed from the subsurface within areas of past mining and is no longer available for extraction. Ongoing projects within the CISA also limit access to mineral resources within their project boundaries which, along with the Project, would result in a cumulative impact to mineral resources. However, this limitation would have no cumulative impact on access to regional mineral resources outside of the Project development boundaries. Under the No Action Alternative, mineral extraction within the GHPA would not contribute to cumulative impacts.

5.4 Land Use

No Project alternative is anticipated to impact land ownership, special management areas, or areas with special designations. Cumulative impacts to mineral development, grazing, and recreation are described in Sections 5.2, 5.5, and 5.9, respectively. Therefore, it is not necessary to analyze cumulative impacts to land use from other activities within and adjacent to the GHPA.

5.5 Livestock Grazing

The CISA for livestock grazing resources encompasses portions of the Matador, Blackjack, and Diamond Springs grazing allotments within the GHPA, as well as the entire Gas Hills grazing allotment (**Figure 5-3**). Existing projects and RFFAs that would be expected to produce incremental and cumulative impacts within the CISA include historic uranium mines that have been or are in the process of being reclaimed (including the Buss 1 Pit Lake), 2 DOE long-term management projects, existing mining exploration, a bentonite mine, and a potential road relocation. The existing projects and RFFAs in

the vegetation CISA are shown in **Figure 5-3** and the projects and associated detail are summarized in **Tables 5-2** and **5-3**. **Table 3.5-1** summarizes the livestock type, livestock number, season of use and active AUMs for each grazing allotment in the CISA.

The CISA encompasses approximately 59,050 acres. Existing projects and RFFAs in the vegetation CISA are found in the Gas Hills grazing allotment. Projects other than the Gas Hills Project have a total approved surface disturbance of approximately 2,159 acres, which at an average stocking rate of 30 acres per AUM currently impacts approximately 72 AUMs. Approval of the Proposed Action would add approximately 1,315 acres of disturbance, corresponding to impacts to 61 AUMs for a total of 3,474 disturbed acres impacting 133 AUMs within the CISA. This disturbance represents approximately 5.9 percent of all lands within the CISA. The Project would contribute less than half of the surface disturbance due to existing and RFFAs in the CISA during the life of the Project, equivalent to approximately 2.2 percent of the area within the CISA. Approval of the RPA would result in less surface disturbance within mine units; however, because mine units would remain fenced during construction, operation, and reclamation cumulative impacts to livestock grazing from the RPA

would be the same as for the Proposed Action. Livestock grazing would not be impacted under the No Action Alternative; therefore, the Project would not contribute to cumulative impacts.

The past, present, and reasonably foreseeable future projects would cumulatively reduce available acres from active grazing. This would reduce the associated available active AUMs for the lifetime of mine operations until such time that reclamation is deemed successful (approximately 3 to 15 years depending on the vegetation cover type). If impoundments or other permanent features are developed during reclamation of the historic mine areas that prevent the restoration of native vegetation, these areas would represent a permanent loss of forage within the CISA.

5.6 Noise

The Project is not anticipated to result in noise impacts. Therefore, it is not necessary to analyze cumulative impacts from noise.

5.7 Paleontological Resources

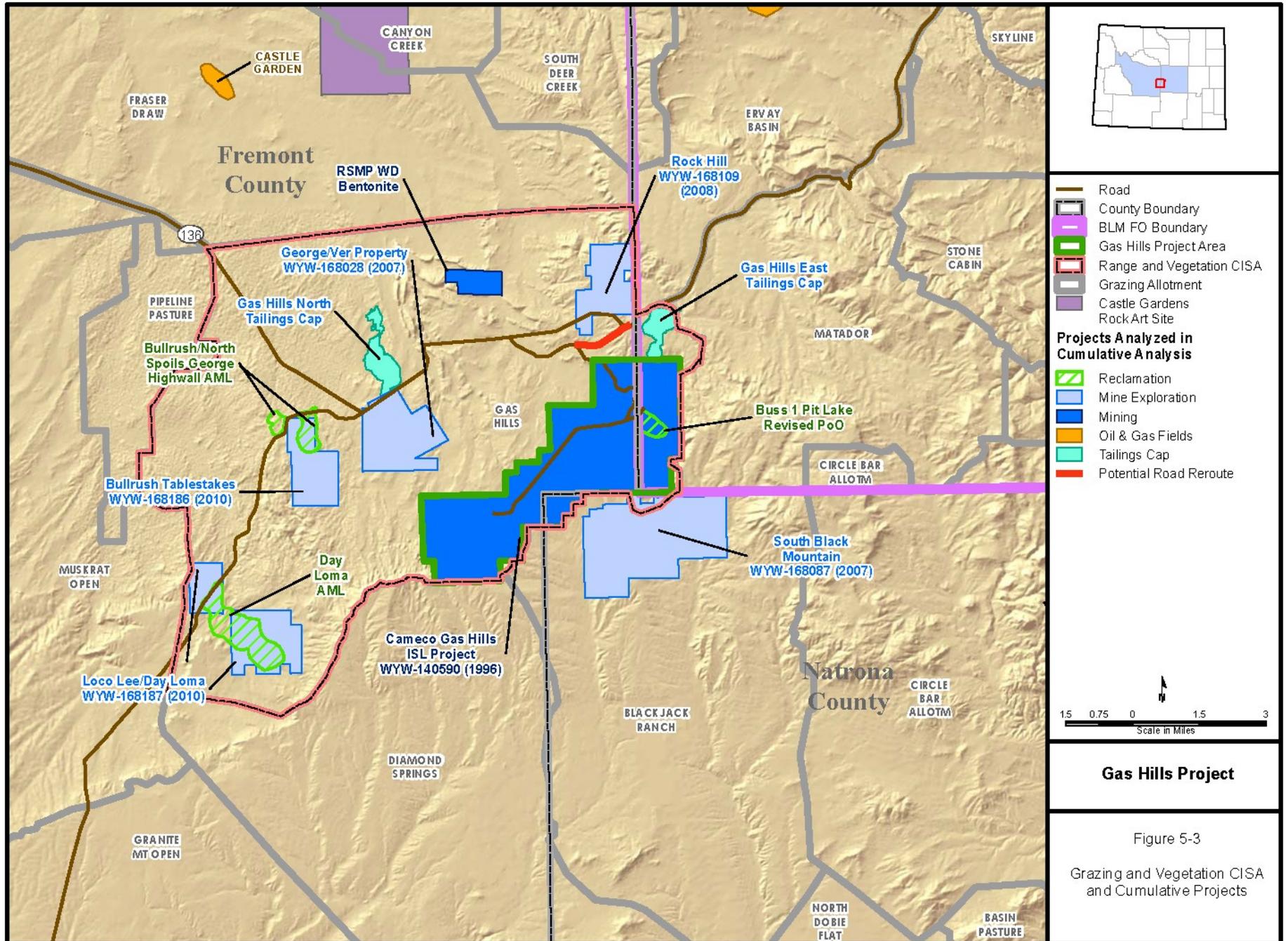
The CISA for paleontological resources is the GHPA. Cumulative impacts to paleontological resources could result from surface disturbance related to the Proposed Action or the RPA, reclamation of the Buss 1 Pit Lake, unauthorized collection, and natural erosion processes in the CISA. Mining reclamation projects are not likely to result in impacts to paleontological resources because these projects involve re-disturbance of areas disturbed by past mining activity. With the implementation of the recommended mitigation measures (Section 4.7.2, Proposed Action Alternative), approval of the Proposed Action or RPA, when added to past, present, and RFFAs would not be anticipated to result in cumulative impacts to paleontological resources. Approval of the No Action Alternative would not result in impacts to paleontological resources, and therefore no cumulative impacts would occur.

5.8 Public Health and Safety

The CISA for radiation includes the area within 50 miles of the GHPA; specifically including the communities of Jeffrey City and Waltman (U.S. NRC 2004). The CISA for the storage of hazardous materials includes the GHPA. The CISA for transportation of hazardous materials includes the GHPA and designated transportation routes to the Smith Ranch-Highland facility.

5.8.1 Exposure to Radioactive Materials

Since impacts from radiation exposure under any action alternative are expected to be negligible (U.S. NRC 2004) within the CISA, it is not necessary to analyze cumulative impacts from radiation.



5.8.2 Hazardous Materials and Solid Waste

Hazardous materials transported to and stored within the GHPA under the Proposed Action are listed in **Table 4.8-1**, and are listed in **Table 4.8-3** for the RPA. Materials transported or stored within the GHPA under the No Action Alternative would be limited to fuel. In addition to these materials, reclamation of the Buss 1 Pit Lake would require transport, storage, and use of an estimated 60 to 80 tons of concentrated lime (100 percent pure) (PRI 2011a). Based on delivery of 20 tons per truck, this would represent 4 deliveries of a hazardous substance to the reclamation site. Any spill prevention or emergency response plans would be implemented under permits associated with reclamation of the Buss 1 Pit Lake, but are likely to be similar to those implemented under all Project alternatives. With proper implementation of spill prevention and/or emergency response plans, cumulative impacts associated with the storage and use of hazardous substances would not be anticipated.

Under the Proposed Action or RPA, the Project would contribute to a small increase in the amount of non-radioactive solid waste and radioactive waste that would be generated in the area. Since the Project would be the only uranium mining operation in the CISA, the amount of waste generated by the Project would represent the cumulative amount of waste generated in the CISA. Although the No Action Alternative would be anticipated to generate less waste than the action alternatives, this also would represent the total cumulative amount within the CISA. Since the impacts would be expected to be minimal due to the disposal of waste in existing off-site repositories, it is not necessary to analyze cumulative impacts from waste generation in the CISA.

5.8.3 Transportation of Materials

The Proposed Action and RPA would result in a very small increase in the annual amount of hazardous materials shipped along the identified transportation routes; no increase in the amount of hazardous materials shipped would be anticipated from the No Action Alternative. Reclamation of the Buss 1 Pit Lake would contribute an additional estimated 4 shipments of hazardous material to the GHPA. Based on the anticipated number of trips for the Project (**Table 4.8-3**), transportation of materials for reclamation of the Buss 1 Pit Lake would represent a maximum 1 percent increase in the number of trips, if all shipments for the reclamation occurred within 1 year. On I-25 and the major federal highways, the transportation of hazardous materials to the GHPA would represent a very small increase over existing conditions due to the existing high truck transport volume. On Wyoming State Route 136, this increase would represent a proportionately larger increase in traffic and a small increase in the risk of a spill during transport. Although it is not anticipated that the identified past and present actions and RFFAs would use Wyoming State Route 136 for transport of materials, oil and gas activities in the region would be anticipated to have a cumulative interaction with hazardous materials transport on Wyoming State Route 136. Based on the projected low probability of an accident resulting in a release under the Proposed Action and the RPA, the impact of the increase in hazardous materials transportation is anticipated to be small. With proper implementation of spill prevention and/or emergency response plans, cumulative impacts associated with the transport of hazardous substances are not anticipated.

5.9 Recreation

The CISA for recreation resources is defined as the GHPA and immediate surrounding area within approximately 2 miles of the Project boundary. Adverse cumulative impacts to recreational resources within the CISA would include both closures and restrictions from activities associated with the Proposed Action or RPA and Buss 1 Pit Lake reclamation, reduced quality of recreational experiences due to noise and activity, and a reduction in recreational opportunities as a result of less available acreage. Restrictions and closures during construction and operation would impact recreationists in the short term, while the need for recreational users, such as hunters, to avoid areas that have been heavily developed would continue in the long term.

5.10 Socioeconomics

The CISA for social and economic resources is the same 3-county area as the direct effects study area discussed in Section 3.10, Socioeconomics. The past and present actions and RFFAs are identified in **Tables 5-2** and **5-3**, and their locations shown in **Figures 5-1** and **5-2**. Social and economic effects of past and present actions are reflected in the affected environment information presented in Section 3.10, Socioeconomics. As a result, any potential cumulative effects for past and present actions are included in the discussion of environmental consequences in Section 4.10.1, No Action Alternative.

As noted in **Tables 5-2** and **5-3**, all of the oil and gas fields have been operating and are considered past and present actions. Most of the mining projects are either reclamation projects, which require small numbers of employees, or projects in the exploration/development stages, which currently have small work forces with uncertain future employment and production levels. Employment levels for these projects currently have been estimated at fewer than 75 workers. The Sheep Mountain Uranium Project in southern Fremont County is in the early stages of a BLM NEPA review, and anticipates employment of 210 full-time workers and 40 contractors (BRS 2011). Combined with the 85 to 96 workers required for the Proposed Action or the RPA, the total anticipated employment required for all of the RFFAs would range from 410 to 421 direct employees, plus approximately 275 workers in indirect positions. With more than 4,000 unemployed individuals in the 3-county CISA, most, if not all, of the jobs would be expected to be filled locally, and any cumulative population increase would be expected to be minor, distributed among Lander, Riverton, Casper, and the surrounding smaller communities. Under these circumstances, the existing housing and community facilities and services resources would be sufficient to accommodate the cumulative effects of the projects.

Because no adverse social or economic effects have been identified for the Proposed Action or the RPA, and because the cumulative employment and population effects would be minor, no cumulative adverse social or economic effects would be anticipated for these alternatives. Under the No Action Alternative, there would be no change from current conditions for employment or rent by Cameco; therefore, no positive or adverse cumulative impacts would occur.

5.11 Soils

The CISA for soil resources consists of the GHPA. Past, present, and RFFAs that contribute to impacts to soil resources in the study area include the Buss 1 Pit Lake remediation, and existing 2-track, natural surface, graveled, and paved roads. Historic impacts to soil resources also include activities such as wildfire, recreation, grazing, and other natural and anthropogenic activities within the analysis area.

The Buss 1 Pit Lake remediation work could involve minimal surface disturbance to soil resources if water treatment in the pit lake is successful, or 153 acres additional acres of surface disturbance if the Buss I Pit Lake water pH dips below 6.5 during the monitoring period for 3 successive years. The additional disturbance for reclamation of the Buss 1 Pit Lake would involve backfilling with stockpiled spoil followed by topsoiling with available stockpiled topsoil and suitable subsoils. If backfilled, bare soils would be subject to wind and water erosion until successful reclamation and revegetation was achieved.

Reasonably foreseeable projects in the soil CISA have a total approved surface disturbance of approximately 153 acres. In addition, approximately 409 acres of land is currently disturbed by previous activities in the CISA (**Table 3.13-1**). Approval of the Proposed Action would add approximately 1,315 acres to the disturbance for a total of 1,877 acres. The Proposed Action would represent approximately 70 percent of the total cumulative disturbance from existing and reasonably foreseeable project disturbance. Approval of the RPA would add approximately 783 acres of disturbance, representing approximately 58 percent of the total cumulative disturbance of 1,345 acres. The additional impacts to soils as a result of the Proposed Action or RPA would be long-term during the life of the Project, but would be reclaimed at the end of the life of the Project. These disturbances could result in significant impacts to soil resources if successful interim and final reclamation was not achieved. Existing

disturbances within the CISA would be reclaimed under the No Action Alternative which would result in reducing cumulative disturbances by 40 acres.

5.12 Transportation

The CISA for transportation is the GHPA and designated transportation routes to the Smith Ranch-Highland facility, as well as the primary access roads approaching the GHPA. Past, present, and RFFAs that could contribute to impacts to transportation in this study area include the potential relocation of Dry Creek Road by Fremont County. Adverse impacts associated with the Proposed Action and RPA would include an increase in Project-related traffic and accidents within the CISA, as well as greater maintenance needs on new and existing roads as heavy truck traffic increases. A potential benefit would be an improved and regularly maintained road network that could provide access for recreationists and RFFA's. With increased access and use comes an increased probability of accidents with passenger vehicles and trucks that are utilizing the same roads. No impacts would be anticipated from the No Action Alternative, therefore, cumulative impacts were not analyzed.

5.13 Vegetation

The CISA for vegetation resources encompasses the Gas Hills grazing allotment, and the portions of the Diamond Springs, Matador, and Blackjack Ranch grazing allotments found in the GHPA (**Figure 5-3**). Existing and reasonably foreseeable projects that would be expected to produce incremental and cumulative impacts within the CISA include historic uranium mines that have been or are in the process of being reclaimed, mine exploration, and an existing bentonite mine. The existing and reasonably foreseeable projects in the vegetation CISA are shown in **Figure 5-3** and the projects and associated detail are summarized in **Tables 5-2** and **5-3**.

Existing and reasonably foreseeable projects in the vegetation CISA, other than the Project, have a total approved surface disturbance of approximately 2,159 acres. Approval of the Proposed Action would add approximately 1,315 acres to the disturbance for a total of 3,474 acres; the Project would represent approximately 38 percent of the total cumulative disturbance from existing and reasonably foreseeable project disturbance. Approval of the RPA would add approximately 783 acres to the cumulative disturbance, for a total of 2,595 acres (approximately 27 percent of the total cumulative disturbance). The additional impacts to vegetation as a result of the Proposed Action or RPA would be long-term during the life of the Project, but would be reclaimed at the end of the Project.

Past and present actions and RFFAs would cumulatively and incrementally reduce vegetation cover types until such time that reclamation is deemed successful and native plants are re-established. As several of the past projects are in reclamation, many of these impacts would be reduced as these historic mines are successfully reclaimed. If impoundments or other permanent features are developed during reclamation of the historic mine areas that prevent the restoration of native vegetation, these areas would represent a permanent loss of vegetation in the CISA. Impacts to vegetation associated with the uranium and bentonite mines would be similar, as described in Chapter 4.0.

Cumulative losses for vegetation resources potentially would include the reduction of native ecosystem functions such as soil stability, erosion control, livestock and wildlife forage, and wildlife habitat. The removal of shrub species from these areas would result in a long-term change in vegetation structure since it would take up to 10 to 15 years for shrub species of similar stature to become re-established in these areas. Indirect impacts to vegetation resources associated with surface disturbance-related activities would include fugitive dust accumulation, fragmentation, and introduction and/or spread of noxious weeds and invasive species. Fugitive dust from development activities can adversely impact native vegetation communities and alter vegetative composition (USEPA 2008; USFWS 2008). Livestock grazing has and would continue to influence vegetation composition and structure in the CISA. Potential for overgrazing may increase as land is converted to mining and transportation uses. Fragmentation of the landscape by the cumulative impact of multiple linear and localized surface disturbances can impact native vegetative communities and native plant species. Impacts from fragmentation could include the

loss of suitable habitat, more exposure to disturbances, increased competition, and decreased pollination.

Approval of the No Action Alternative would result in reclamation of approximately 40 acres, or 2 percent of the cumulative disturbance. Successful reclamation incrementally would reduce impacts to vegetation within the defined CISA; however, challenges to reclamation would be the same as described for the Proposed Action and RPA.

5.13.1 Noxious and Invasive Weed Species

Surface disturbance activities from implementation of the Proposed Action or RPA, combination with reclamation of the historic mines within the vegetation CISA (**Figure 5-3**) could further spread noxious weed and invasive species into previously undisturbed areas, and may increase the acreage and population numbers of currently established noxious weed and invasive species. Surface-disturbing activities would be greatly reduced under the No Action Alternative. The combined impacts associated with surface-disturbing activities resulting from past and present actions and RFFAs likely would result in increased landscape fragmentation which could increase the potential for noxious weed and invasive species to spread and establish proportional to the amount of surface disturbance.

Implementation of noxious weed management techniques such as minimizing surface disturbance activities, herbicide spraying of known populations, and the reclamation of disturbed areas associated with past and present projects and RFFAs would minimize the potential for noxious weed and invasive species to spread or establish. Additionally, the majority of the surface disturbance-related impacts within the CISA would be reclaimed, minimizing the introduction and/or spread of noxious weeds and invasive species resulting from the Project.

5.13.2 Special Status Plant Species

Cumulative impacts to special status plant species would be increased for cedar rim thistle and rocky mountain twinpod due to Project alternatives, and past, present, and RFFA projects within the vegetation CISA.

5.13.2.1 Cedar Rim Thistle

Within the vegetation CISA, potential habitat for the Cedar Rim thistle is found in the following existing and reasonably foreseeable projects: the Project, Day Loma, and South Black Mountain. Within the existing and foreseeable projects other than the Gas Hills Project, there are 13 acres of potential habitat as identified by WYND D distributional modeling for this species (HWA 2011a). Approval of the Proposed Action would add approximately 587 acres to the disturbance for a total of 600 acres of cumulative disturbance in potential habitat for this species, representing approximately 98 percent of the cumulative disturbance for this species. The RPA would add approximately 294 acres of cumulative disturbance in potential habitat for this species, representing approximately 96 percent of the total of 307 acres. No additional disturbance to Cedar Rim thistle habitat would occur under the No Action Alternative.

Direct impacts to habitat from the Proposed Action or RPA would be minimized through the proposed mitigation described in Section 4.13.2.3, Special Status Plant Species. Cumulative indirect impacts, including effects from the spread of noxious and invasive weed species and fugitive dust, would be minimized through the implementation of applicant-committed environmental protection measures, (Section 2.3.9, Applicant-committed Environmental Protection Measures). However, these impacts could increase slightly as a result of the Project, and other past, present, and RFFAs.

5.13.2.2 Rocky Mountain Twinpod

Within the vegetation CISA, potential habitat for the Rocky Mountain twinpod is found in the following existing and reasonably foreseeable projects: the Project and the Buss 1 Pit Lake reclamation. Within the existing and foreseeable projects other than the Gas Hills Project, there are 52 acres of potential

habitat as identified by WYNDD distributional modeling for this species (HWA 2011b). Approval of the Proposed Action would add approximately 464 acres to the disturbance for a total of 516 acres of disturbance in potential habitat for this species; the Project would represent approximately 90 percent of the total of existing and reasonably foreseeable project disturbance for this species. Approval of the RPA would add approximately 232 acres of disturbance, for a total of 284 acres of cumulative disturbance; the RPA would represent approximately 82 percent of the total. No additional disturbance to Rocky Mountain twinpod habitat would occur under the No Action Alternative.

Direct impacts to habitat from the Proposed Action or RPA would be minimized through the proposed mitigation described in Section 4.13.2.3, Special Status Plant Species. Cumulative indirect impacts, including effects from the spread of noxious and invasive weed species and fugitive dust, would be minimized through the implementation of applicant-committed environmental protection measures (Section 2.3.9, Applicant-committed Environmental Protection Measures). However, these impacts could increase slightly as a result of the Proposed Action or RPA, and other past, present, and RFFAs.

5.14 Visual Resources

There has been considerable prior disturbance to the characteristic landscape in the viewshed of the Project from past and present activities, particularly previous surface mining for uranium. Some of the disturbance still exists in the area, which has led to designation of a portion of the westerly extent of the GHPA as being in need of visual rehabilitation. Section 3.14, Visual Resources, explains the “rehabilitation” designation in greater detail.

The Proposed Action or the RPA would have low to moderate adverse visual effects for short-term (1- to 3-year) periods in limited locations, throughout the duration of construction activities for each of the 5 mine units. There would be similar effects during decommissioning. The cumulative effects would be of similar low significance. After completion of the active life of the Project, there would be little or no residual visual effects; similarly, there would be minimal cumulative visual effects. There would be minor, positive cumulative visual effects after successful reclamation of the portion of Mine Unit 3 that is located in the area indicated as being in need of visual rehabilitation from prior mining activities. Under the No Action Alternative, reclamation of 1 linear feature and the Carol Shop would provide minor positive cumulative visual effects after successful reclamation.

5.15 Water Resources

5.15.1 Surface Water Resources

The CISA for surface water resources consists of the Upper Canyon Creek-Deer Creek and Fraser Draw subwatersheds. Surface water resources could be impacted from the cumulative ground disturbance from the Project and the projects listed in **Table 5-2** and **Table 5-3** that are located within the surface water resources CISA, including the Rock Hill, RSMP WD Bentonite, Bullrush/Tablestakes, and George/Ver projects, the majority of the Bullrush/North Spoils/George Highwall AML projects, a small portion of the South Black Mountain project, 2 DOE long-term management projects, 1 potential road relocation, and the Castle Garden Oil and Gas Field, each of which contribute to the total surface disturbance in the area.

Existing and proposed disturbance in the surface water resources CISA, not including the Project, totals 1,191 acres. This existing disturbance represents less than 1 percent of the surface water resources CISA. Construction disturbance under the Proposed Action would add 1,315 acres, or approximately 52 percent of the cumulative disturbance in the surface water resources CISA. Construction of the RPA would add 783 acres of disturbance, or approximately 40 percent of cumulative disturbance in the surface water CISA.

Increased ground disturbance due to development of future projects, including further expansion of the road network to accommodate additional resource development, may have adverse impacts similar to

those discussed in Section 4.15, Water Resources. These impacts could include temporary increases in storm-water runoff and increases in suspended and dissolved solids concentrations in runoff when ground disturbance is occurring, generally during construction and reclamation. Each new project disturbing more than 1 acre would be required to obtain a construction storm water discharge permit, and to prepare and adhere to an approved SWPPP. Once successful reclamation of disturbed ground is complete, the effects to surface water resources are expected to be minimal.

5.15.2 Groundwater Resources

The CISA for cumulative impacts for groundwater resources is the GHPA and the area within 10 miles of the GHPA. Projects within the CISA include mining reclamation, mining exploration, ongoing oil and gas production, long-term management of uranium tailings, and a bentonite mine. These projects are not anticipated to have an impact on groundwater quantity or quality. Groundwater quality impacts from the Proposed Action or RPA during mine construction and operation would be limited to mine units through monitoring and groundwater management, as described in Section 4.15.2.2, Proposed Action Alternative. Final locations of these wells would be determined through future hydrological investigations, but impacts would not be expected to extend beyond the GHPA boundary.

Groundwater quality in each mineable unit would be restored either to pre-mining baseline water quality, or to the pre-mining Wyoming Class of Use for the groundwater if the pre-mining baseline water quality cannot be achieved for 1 or more constituents. In the event that only pre-mining Wyoming Class of Use can be achieved for some constituents in 1 or more of the mineable units, groundwater quality in the GHPA would be impacted and there would be a cumulative impact to water quality in the area in that water quality could be degraded for one or more constituents due to the Project.

During groundwater restoration, impacts to groundwater levels would extend beyond mine units and potentially beyond the boundaries of the GHPA. Under WDEQ guidelines, Cameco would be required to restore water levels to pre-mining groundwater flow patterns, thus restoring baseline groundwater flow patterns. Therefore, cumulative impacts to groundwater would be the same as for the Proposed Action and RPA. Impacts associated with deep disposal of Project wastewater are not anticipated under any Project alternative. Therefore, cumulative impacts from deep disposal do not need to be analyzed. No impacts to groundwater from the No Action Alternative are anticipated; therefore, no cumulative impacts would occur.

5.15.3 Water Use

The CISA for cumulative impacts to water use is the GHPA and the area within 10 miles of the GHPA. As noted above in the discussion of groundwater quantity impacts, the projects that occur within the CISA include reclamation of historic mining activity, mining exploration, ongoing oil and gas production, and long-term management of uranium tailings. These projects are not anticipated to have an impact on water use. A bentonite mining project also is located within the CISA but this project is not anticipated to have an impact on water use. Therefore, the only project that could potentially contribute to cumulative impacts to water use would be Cameco's proposed Project.

The administration of water rights by the WSEO dictates which water rights take precedence over others, and new water use would not be allowed to impact current water users or interstate agreements. Therefore, the Proposed Action or the RPA, along with other activities within the CISA would not be allowed to impact other water users within the CISA and no cumulative impacts would be anticipated. No impacts to water use would be anticipated under the No Action Alternative; therefore no cumulative impacts would occur.

5.16 Wild Horses

No Project alternative is anticipated to cause impacts to wild horses (Section 4.16, Wild Horses). The nearest wild horse herd management area is 5 miles from the GHPA. Therefore, it is not necessary to analyze cumulative impacts to wild horses. Wildlife and Fisheries

The CISAs for wildlife resources encompass important wildlife habitat surrounding the GHPA (**Figures 5-1** and **5-2**). The big game, raptors, and greater sage-grouse CISAs include portions of Mule Deer Herd Unit 646 (Sweetwater) buffered 15 miles from the GHPA and all of Mule Deer Herd Unit 648 (Beaver Rim). For the white-tailed prairie dog and mountain plover CISAs, a 5-mile buffer of the GHPA was determined to be adequate, as it covers previous mining reclamation in the region, which is potentially mountain plover and white-tailed prairie dog habitat. The white-tailed prairie dog and mountain plover CISAs also include small game (other than greater sage-grouse), migratory birds, reptiles, and amphibians.

As with all other resources, the cumulative analysis for wildlife resources focuses on past, present, and RFFAs presented in **Table 5-2**. Each Project alternative assumes that: 1) human use of the CISAs would increase with the implementation of the Project alternative; 2) wildlife habitats currently are at their respective carrying capacities in and adjacent to the GHPA; and 3) the overall region has been previously impacted by at least some level of historic and current development activities and will be impacted by RFFAs. As described in Section 4.17, Impacts to Wildlife and Fisheries, fisheries resources are not impacted by any project alternative; therefore, cumulative impacts were not analyzed.

5.17 Terrestrial Wildlife

Cumulative impacts to wildlife resources would be directly related to habitat loss, habitat fragmentation, animal displacement, and direct mortalities. Past, present, and RFFAs for activities in the wildlife CISAs have resulted, or would result, in the direct disturbance of habitat (**Table 5-4**). A portion of the cumulative disturbance surface area has been, or would be, reclaimed. The reclaimed areas and areas associated

Table 5-4 Cumulative Wildlife Habitat Disturbance

CISA	Total Acres of Habitat	Acres Disturbed by the Proposed Action (percent of total habitat area)	Acres of Habitat Disturbed by Past, Present, and RFFAs ^a (percent of total habitat area)	Total Acres of Habitat Disturbed (percent of total habitat area)
Proposed Action				
Big Game, Raptors, and Greater Sage-grouse	1,099,534	1,315 (<1 percent)	4,878 (<1 percent)	6,189 (<1 percent)
White-tailed Prairie Dog and Mountain Plover ^b	118,129	1,315 (1.5 percent)	1,790 (1.2 percent)	3,101 (2.6 percent)
Resource Protection Alternative				
Big Game, Raptors, and Greater Sage-grouse	1,099,534	783 (<1 percent)	4,878 (<1 percent)	5,657 (<1 percent)
White-tailed Prairie Dog and Mountain Plover ^b	118,129	783 (<1 percent)	1,790 (1.5 percent)	2,569 (2.2 percent)

^a See **Tables 5-2** and **5-3** for a breakdown of cumulative projects.

^b The white-tailed prairie dog and mountain plover CISAs also cover small game (excluding greater sage-grouse) migratory birds, reptiles, amphibians, pygmy rabbit, special status bat species, special status migratory bird species, and special status amphibian species.

with habitat conversion would be capable of supporting wildlife use; however, species composition and densities likely would change.

In general, cumulative impacts from the Proposed Action or RPA would increase in the CISAs during the life of the Project but would gradually decrease upon completion of the Project as final reclamation occurs. Cumulative impacts from past, present, and RFFAs within the CISA for the Proposed Action or RPA would include:

- Reduction of suitable habitat/habitat fragmentation. While surface disturbance generally corresponds to associated wildlife habitat loss, accurate calculations of cumulative wildlife habitat loss cannot be determined because the direct impacts of habitat disturbance are species-specific and dependent upon: 1) the status and condition of the population(s) or individual animals being affected; 2) seasonal timing of the disturbances; 3) value or quality of the disturbed sites; 4) physical parameters of the affected and nearby habitats (e.g., extent of topographical relief and vegetative cover); 5) value or quality of adjacent habitats; 6) the type of surface disturbance; and 7) other variables that are difficult to quantify (e.g., increased noise and human presence). However, estimated surface disturbance calculations (**Table 5-4**) are still a useful indicator of habitat loss because as forage, foraging and/or hunting habitats, and breeding, nesting, and rearing habitats are removed, overall quality of wildlife habitat also will decrease. In areas where development has occurred, habitat fragmentation may have resulted in the disruption of seasonal patterns or migration routes. Historic, current, and future developments in the CISAs have resulted, or would result, in the reduction of carrying capacities as characterized by the amount of available cover, forage, and breeding areas for wildlife species. Current or previous surface disturbance in the CISAs primarily results from mining exploration and reclamation as well as oil and gas development. Other activities such as livestock grazing also contribute to cumulative impacts on wildlife habitat (e.g., reduction of biomass).
- Animal displacement. Displaced individuals of any species could be forced into less suitable habitats, possibly resulting in subsequent effects of deteriorated physical condition, reproductive failure, mortality, and general distress as important habitat is reduced and animals are displaced. Loss of habitat/forage consequently could result in increased competition between and among species for available resources. Some wildlife species, such as raptors, would be susceptible to these cumulative impacts since encroaching human activities in the CISAs have resulted, or would result, in animal displacement in areas that may be at their relative carrying capacity for these resident species. Many of the local wildlife populations (e.g., small game, migratory birds) that occur in the CISAs likely would continue to occupy their respective ranges and breed successfully, although population numbers may decrease relative to the amount of cumulative habitat loss and disturbance from incremental development. Displacement of individuals also could reduce the hunting success or wildlife viewing in the area, as described in Section 4.9.2, Proposed Action Alternative
- Decreased reproduction success. A decrease in reproductive success and physical condition from increased energy expenditure due to physical responses to disturbance could lead to increased mortality.
- Increased vehicle/wildlife collisions. An increase in traffic levels on roadways has the potential to increase vehicle/wildlife collisions and increased human utilization of resources through hunting and other recreational activities that would expose wildlife to potential human harassment, either inadvertent or purposeful.
- Increased hunting pressure. An increase in human activity in the CISAs may provide the opportunity for additional hunting pressure on game species such as mule deer, pronghorn, and small game species due primarily to increased public access.

Based on these cumulative impacts, ongoing and future development in the CISAs would cumulatively and incrementally reduce the ability of wildlife habitats in the CISAs to support wildlife populations at their current levels for the lifetime of the anticipated cumulative Project-related development, production, and reclamation. Cumulative impacts would continue until such time that reclamation is deemed successful (approximately 3 to 20 years depending on the vegetation cover type). Successful reclamation is assumed to establish wildlife habitats to pre-disturbance conditions.

5.18 Special Status Wildlife Species

Special status wildlife species would be cumulatively impacted by past, present, and RFFAs and the resulting direct and indirect impacts for the Proposed Action and RPA generally would be the same as discussed above in Section 5.17, Terrestrial Wildlife. On BLM-managed lands (and state of Wyoming lands and private lands in many cases), operators/proponents are typically required to conduct pre-construction surveys in potential or known habitats of threatened, endangered, or otherwise special status wildlife species. These surveys would help determine the presence of any special status wildlife species or extent of habitat, and protective measures would be developed in consultation with the BLM, WGFD, and USFWS to avoid or minimize direct disturbance in these habitats. No cumulative impacts to special status wildlife species would be anticipated under the No Action Alternative.