

## 4.0 ENVIRONMENTAL CONSEQUENCES

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### 4.1 INTRODUCTION

This chapter analyzes the potential environmental consequences that would result from implementation of the Proposed Action or No Action alternatives. The Proposed Action involves development of federal land or minerals associated with the POD for 24 exploratory well locations, access roads, injection wells, compressor station, and associated facilities defined in one coordinated master plan. The No Action alternative would involve denial of the master plan for interim drilling and development in the Project Area. Without a master plan, future mineral development in the Project Area would occur ‘piecemeal’ or on a case-by-case basis, under the guidelines of the RMP and site-specific COAs, with no coordinated planning that could reduce the cumulative impacts of interim drilling and development. Measures that would avoid or reduce impacts under the project have been presented in Chapter 2. The following impact assessment considers these measures. Additional opportunities to mitigate impacts beyond the measures proposed in Chapter 2 are presented in this chapter, where applicable, under the Summary of Mitigation for each resource area.

As discussed in Chapters 1 and 2, the Project Area lies within the Atlantic Rim EIS study area ([Figure 1-1](#)). Drilling and field development associated with the project would conform with the guidance found in the Interim Drilling Policy ([Appendix A](#)). The purpose of the Interim Drilling Policy is to guide the gathering of information that will support the formulation of the Atlantic Rim EIS.

This analysis of environmental consequences addresses the direct and indirect impacts associated with exploration and interim development of the Doty Mountain area. It also addresses cumulative impacts that would result from past, present, and reasonably foreseeable future actions within a cumulative impact assessment area relevant to the resource analyzed. The description of the environmental consequences includes the following subsections, where applicable:

#### 4.1.1. Direct and Indirect Effects

This subsection analyzes the level and duration of direct and indirect effects that would occur because of the Proposed Action or the No Action alternative. The impact evaluation assumes that the applicant-committed and BLM-required practices described in Chapter 2 would be implemented.

#### 4.1.2. Cumulative Impacts

This section describes impacts that are likely to occur as a result of this project. These impacts are described in combination with other ongoing and recently approved activities, recently constructed projects and other past projects, and projects likely to be implemented in the near future (reasonably foreseeable future actions, or RFFAs).

This environmental analysis addresses cumulative impacts associated with exploration and interim development of 200 coal bed natural gas (CBNG) wells (including the project) and other activities, ongoing or proposed, within the Atlantic Rim EIS study area. The Atlantic Rim area is located generally in Townships 13 through 20 North and Ranges 89 through 92 West in Carbon County, Wyoming. Cumulative impacts associated with exploration and development of the Project Area are described later in this chapter.

## **4.2 GEOLOGY, MINERALS, AND PALEONTOLOGY**

### **4.2.1. Proposed Action**

Use of cut and fill construction techniques to develop well locations and access roads and to install pipelines and facilities would alter existing topography. In total, an estimated 145 acres would be affected by surface-disturbing activities. Use of proper construction techniques, described in Chapter 2, would reduce the effects associated with topographic alteration.

In addition, as discussed in Chapter 3, no major landslides or other geologic hazards have been mapped within the Project Area. By following prescribed procedures, construction would not be likely to activate landslides, mudslides, debris flows, or slumps. Seismic activity is low in the Project Area, so the potential for an earthquake to damage project facilities is minimal.

Drilling the wells may result in discovery of CBNG resources. An economic discovery in the Project Area, in conjunction with other economic discoveries under the interim drilling projects, could lead to full-scale development, which is currently being analyzed in the Atlantic Rim EIS (in preparation). If no CBNG resources are discovered, however, additional exploratory wells may or may not be drilled, depending on the information obtained in drilling the proposed wells. In addition, the Atlantic Rim EIS may not be required or may be modified. No other major mineral resources would be affected by the project.

As discussed in Chapter 2, mitigation measures for the project presented in the sections on Water Resources or Soils would reduce potential effects to the surface geologic environment. Implementation of these measures and adherence to federal and state rules and regulations regarding drilling, testing, and completion procedures would prevent potential effects on the subsurface geologic environment.

It is not anticipated that development of the project would affect any sensitive resource area, such as a high-density paleontological site or stabilized sand dunes. Although the surface-disturbing activities associated with the project could disturb paleontological resources, the potential for recovery of important vertebrate fossils in the Project Area is considered low to moderate. Excavation associated with development of access roads, well pads, gas and water pipelines, and related gas production and water disposal facilities could directly expose, damage, or destroy scientifically significant fossil resources. For example, fossils may be damaged or destroyed by erosion that is accelerated by disturbance from construction. In addition, improved access and increased visibility as a re-

sult of construction and ongoing production may damage or destroy fossils through unauthorized collection or vandalism. However, no occurrences of paleontological resources are documented in the Project Area. The Lewis Shale of Cretaceous age, which underlies the area, has produced fossils of scientific significance elsewhere in Wyoming (and thus meets BLM Condition 2). However, mitigation measures discussed in Chapter 2 would protect potential paleontological resources that may be inadvertently uncovered during excavation.

#### **4.2.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. The federal natural gas resources in the Project Area would not be depleted if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts. Furthermore, additional information on CBNG accumulation under federal lands in this area of the Washakie Basin would not be obtained, and the collective knowledge base would not increase.

### **4.3 AIR QUALITY**

#### **4.3.1. Proposed Action**

The small number of exploratory wells and facilities included in the project would generate only a small amount of air pollutants. Some temporary effects on air quality would likely occur in the immediate vicinity of the project caused by particulate matter and exhausts from vehicles and equipment. These effects would be local and would be dispersed by prevailing winds. The effects on air quality would be minimized through dust abatement practices.

No noticeable deterioration in visibility would occur at Class I or sensitive Class II wilderness areas that are located within 100 miles of project activities (Mount Zirkel, Rawah, Savage Run, Platte River, Huston Park, or Encampment River). Similarly, no noticeable deterioration in visibility would occur at Dinosaur National Monument in Colorado. Dispersion by wind of the small quantity of air pollutants generated by the project would likely eliminate formation of regional haze or acid deposition.

If these wells were deemed economical to produce, the Companies would be required to file an application with WDEQ for an air quality permit for oil and gas production facilities under Section 21 of the Wyoming Air Quality Standards and Regulations.

No violations of applicable state or federal air quality regulations or standards are expected to occur as a result of direct or indirect emissions of air pollutants from well development (including both construction and operation) in the Project Area.

Air emissions would occur from construction and production of gas wells within the Project Area. Emissions from construction would include PM<sub>10</sub>, SO<sub>2</sub>, oxides of nitrogen (NO<sub>x</sub>), CO, and volatile organic compounds (VOCs) from ground clearing, use of heavy equipment, drilling, and completion, as well as from construction of access roads. Emissions from construction are temporary and would occur in isolation, without significantly interacting with adjacent wells.

Production emissions of NO<sub>x</sub>, CO, VOCs, and hazardous air pollutants (HAPs) (specifically formaldehyde) would result primarily from operation of compressor engines. Estimated impacts to air quality assumed that the average potential NO<sub>x</sub> emission rate for the compressor engines would be approximately 2.0 grams per horsepower-hour (g/hp-hr) of operation. This rate reflects emission control levels that have already been required in similar applications, and is conservative when compared with the emissions projected in Chapter 2, (less than 1.5 g/hp-hr). WDEQ-AQD operating permit records also have shown existing facility emissions to be substantially less than 2.0 g/hp-hr. The emissions generated from operation of the compressors would contain negligible amounts of SO<sub>2</sub> and particulate matter because of the composition of methane from coal seams in the Mesaverde Group. Production emissions from the compressor engines would occur over the life of the project. Emissions from production wells would be negligible because the produced gas is nearly 100 percent methane and would require no ancillary production facilities at the well sites.

Pollutant emissions from construction and operation of natural gas fields near the Project Area have been analyzed in recent air quality studies completed by BLM under NEPA. Studies conducted for the Continental Divide/Wamsutter II and South Baggs Natural Gas Development Projects (BLM 1999a, 2000) indicated potential near field increases in concentrations of CO, NO<sub>2</sub>, PM<sub>10</sub>, and SO<sub>2</sub>; however, the predicted maximum concentrations would be well below applicable WAAQS, CAAQS, and NAAQS. Similarly, predicted concentrations of HAPs (formaldehyde) would be below various 8-hour maximum Acceptable Ambient Concentration Levels, and the related incremental cancer risks to residents, would also be below applicable significance levels.

The emissions that would result from implementation of this project would be much the same as those projected for other oil and gas projects, such as Continental Divide, but on a smaller scale. The 24-well exploratory project described in this EA is within the limit of the 3,000-well air quality analysis prepared for the Continental Divide EIS, considering that only 2,130 wells were authorized for that project. The analysis for the Continental Divide EIS project included impacts to Class I areas from oil and gas development in southern Wyoming. Based on the relative size of this project, including the associated lateral sales pipeline when compared with the magnitude of these previous projects, no ambient air quality standards would be violated and no adverse air quality conditions would result from the proposed project.

#### **4.3.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on air quality would be expected to occur beyond the current pollutant concentrations if the proposed wells are

not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## **4.4 SOILS**

### **4.4.1. Proposed Action**

The proposed construction and operation of wells, facilities, and access roads could affect the productivity of soils in the Project Area by:

- Removing existing vegetation cover;
- Redistributing or removing all or part of the soil profile;
- Compacting soils;
- Potentially exposing soil to accelerated wind and water erosion;
- Potentially covering adjacent soils and drainages with sediments; and,
- Potentially exposing the soil to noxious weeds or invasive species.

These activities could reduce soil productivity within and immediately adjacent to the proposed area of disturbance. The affects of these activities on soil productivity have been evaluated based on their duration, magnitude and intensity and are described below. The measures that would be conducted to prevent, reduce or mitigate the effects of these activities on soil productivity are identified below. Any residual impacts (if any) to the soils productivity and their significance are identified.

Both long-term and short-term effects on soil productivity would occur under the Proposed Action. An estimated 145 acres of surface disturbance would occur as a result of drilling and testing and construction of facilities. If exploratory wells are productive an estimated 56 acres of land would remain disturbed for the production of natural gas. Therefore, approximately 99 acres of surface would be affected in the short-term only (i.e. no more than 2 to 4 years) and 46 acres would be affected in the long-term (i.e. for as long as 20 years).

Disturbance would occur within the following soil map units:

- Cushool-Worfman-Blackhall Complex
- Forelle - Patent Complex
- Rentsac - Shinbara Complex
- Blazon - Shinbara Complex
- Seaverson - Blazon Complex
- Diamondville - Blazon - Forelle Complex
- Forelle - Diamondville Loams

Vegetation and soil would be removed from 145 acres of land, and subsoil would be re-distributed to construct well and compressor pads, roads, flowlines, and facilities for the underground injection of produced water.

Removed and redistributed soils would be:

- Compacted in localized areas due to equipment traffic;
- Susceptible to accelerated wind and water erosion and deposition due to an increase in the amount of exposed and unprotected soil surfaces; and,
- Susceptible to noxious and invasive weed infestation due to the removal of desirable perennial vegetation.

As a result, the productivity of soils would decline due to:

- Reduced soil microbial activity and soil fertility;
- Interruption of nutrient and organic matter addition to soil from vegetation;
- Soil loss; and,
- Introduction of weed seeds.

The intensity of effects would vary according to the type and location of disturbance from development and production activities, and the period of disturbance prior to reclamation.

The Companies have committed to using the BMPs described in the Master Surface Use Plan (MSUP) ([Appendix B](#)) and Chapter 2 during construction, operation, and reclamation that, combined with existing regulatory requirements, would reduce the effects on soil productivity through the following measures:

- Removal and storage of soils prior to drilling and testing;
- Scarification of disturbed areas prior to soils redistribution;
- Management of noxious weeds and invasive species; and,
- Timely and effective erosion control and revegetation of disturbed areas.

Vegetation and the top 6 inches or more of soil material would be separately removed prior to the initiation of drilling and testing activities and facilities construction. The removed vegetation and soil would be stockpiled in specific locations around the perimeter of disturbed areas, seeded, and protected from wind and water erosion and other contaminants that may reduce their productivity.

Following construction, drilling, and testing activities, the disturbed areas not required for production of natural gas, or an estimated 99 acres, would be reclaimed as described in the MSUP and Chapter 2.

In early successional stages of reclamation invasive species may be beneficial to the recovery of disturbed areas due to protection from erosion and thermal extremes, and through additions of organic matter to the soils. However, native plant species may be excluded if growth of invasive species progresses to the point that the density of desirable plant species and plant diversity is reduced. Therefore, the procedures and measures that would be used to identify and eradicate undesirable plant species on soil stockpiles, disturbed areas, and areas that are undergoing reclamation are described in the MSUP and Chapter 2.

The anticipated reduction in soil productivity would require many years to fully recover due to low annual precipitation and soil fertility, and short growing season. However, the majority of the sagebrush/grassland community that would be disturbed by the proposed action is decadent with little herbaceous and grass cover and diversity. Therefore, the reclamation of disturbed areas would initially lead to greater diversity and production of herbaceous and grass species. In addition, the structural diversity of the sagebrush/grassland vegetation community would be increase due to the reclamation of disturbed areas. Eventually recolonization of the reclaimed area by surrounding native shrub species would reduce herbaceous and grass production, and species and structural diversity. Reclamation would reduce erosion within the disturbed areas and would more that compensate for the short-term loss in soil productivity due to natural gas development.

For the 46 acres that would be affected in the long-term, the impacts to soil productivity described above would be slightly more intense and prolonged. However, the intensity of the reduction in microbial activity and organic matter addition and its effect on inherent soil fertility will be substantially greater than for soils that would be disturbed in the short-term. To minimize this long-term effect on soil productivity, the BMPs described in the MSUP and Chapter 2 would be implemented.

Impacts to soil resources in the Project Area are anticipated to be minimal based on the following factors:

- Small area of disturbance;
- Small amount of disturbance to the soil map units when compared to the area covered by these same map units in Carbon County;
- Use of proper construction and reclamation techniques; and,
- Implementation of the measures described in the MSUP and Chapter 2.

#### **4.4.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on soils would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## **4.5 WATER RESOURCES**

### **4.5.1. Proposed Action**

Minimal effects on aquifers and groundwater quality would be anticipated as a result of the project with the use of proper construction techniques, drilling practices, and BMPs described in the MSUP ([Appendix B](#)) and Chapter 2. Groundwater would be removed from the coal seam aquifers within the Allen Ridge, Pine Ridge, and Almond Formations,

members of the Upper Cretaceous Mesaverde Group. Well testing is intended to lower the hydraulic head in the affected coal seam aquifer. (The reduction of hydraulic head in an aquifer also is referred to as drawdown.) Relative to the available drawdown within the aquifer, the effect on the coal aquifer during the interim drilling project is expected to be minimal.

These targeted coal seams are classified as confined to semi-confined aquifers because they are bounded by confining layers that consist of impervious to semi-pervious layers of shale and siltstone. Hydraulic connection between the coal seams and any aquifer stratigraphically above or below the coal seams is limited. The hydrostatic head of the water measured in test wells completed in coal seams in the Project Area can be considerably higher than the aquifer or even the elevation of the ground level at a specific well location. Confined, or artesian, aquifer conditions of this type indicate an effective seal above and below the aquifer. However, lowering the hydraulic head in the coal seam aquifers by removing water may induce a slight leakage through the semi-pervious shale layers into the pumped aquifer. Because of the extremely low hydraulic conductivity of the confining layers and the limited number of gas wells proposed (24), enhanced leakage from an aquifer stratigraphically above or below the affected coal seams would be minimal.

The water level also may be lowered or drawn down in an area of influence within a 1/2-mile radius of individual exploratory wells completed in the Mesaverde aquifer. The potential yield from nearby water wells may be affected by removal of groundwater. Other wells completed in the coal seams could be affected by the project; however, no other wells permitted by the WSEO are known to occur within 1 mile of the Project Area. Potential effects on water wells would be minimized by a water well agreement and the other mitigation measures described in Chapter 2.

The exploratory wells would produce water that would be disposed of in two deep injection wells. The proposed injection targets are the Cherokee and Deep Creek Sandstones that occur about 3,800 to 4,600 feet below the surface. The injection wells would be stratigraphically below existing water wells. It is anticipated that the produced water that would be injected would be of equal or higher quality in regards to class of use as defined by WDEQ Ground Water Division regulations. In addition, injection of produced water is not expected to result in any deterioration in groundwater quality within the injection horizon. The only effect on the injection horizons would consist of an increase in the hydraulic head emanating from the injection well, which would dissipate with distance away from the wellbore. In terms of water quantity and quality, the effect of the Proposed Action on the injection horizon would be minimal.

The proposed deep injection wells would be drilled, cased, and cemented from total depth (50 feet below the base of the Cherokee or Deep Creek Sandstone) to the surface. These sandstones are isolated above and below by competent shale that is a barrier to flow. The Cherokee or Deep Creek Sandstone would be tested to evaluate its suitability for disposal before any water is injected. Maximum pressure requirements to prevent initiation and propagation of fractures through overlying strata to any zones of fresh water would be determined and would be regulated by the State of Wyoming and the BLM. The results of the open-hole log and injectivity test would be provided to the regulatory agencies. The

injectivity tests will be used to determine the fracture pressure limits that will be imposed to insure the overlying shale is not breached. In addition, before produced water is injected, water from the Cherokee or Deep Creek Sandstones (or both) would be analyzed and the results provided to the regulatory agencies. Produced water would come from coals in the Mesaverde Group.

Because water produced would be injected, no surface waters of the state would be affected by the management of produced water. All water disposal plans would be permitted with the state agency that regulates the facilities, including but not limited to the WOGCC or WDEQ.

Before the injection wells are completed, water produced from the exploratory wells may be transported to nearby drilling locations and used for drilling and completion activities in the operation of additional wells. Formation water may be temporarily contained in the reserve pit during drilling and well completion activities. During the testing period, produced water from the Mesaverde aquifer will be contained in closed tanks on location or trucked to an authorized disposal well, pending the completion of flowlines for produced water. Fracing fluids also will be contained in closed tanks on location. All closed tanks on location will be encompassed by protective berms. Once all wells have been drilled, water produced at the exploratory well sites would be gathered and transported to the injection wells for disposal, which would be permitted by all necessary agencies.

Produced water would be collected in a buried polyethylene flowline (pipeline) for transport to a water disposal facility. The water disposal facilities would be approved by the WOGCC or the WDEQ and the private surface owner, as required. To keep surface disturbance to a minimum, ditches would combine as many pipelines as possible (water, electricity, and gas). BMPs would be used to control erosion and divert overland flows away from the facility. Centrifugal pumps, reciprocating pumps, filter systems, and tanks at the disposal facility would be used to remove solids from the water stream and to pump the water at pressures sufficient to allow downhole disposal. If it is not possible to safely inject the volume of produced water planned into the proposed injection wells, some or all of the exploratory wells would be shut in temporarily while alternative plans are developed and approved. These alternative plans would include additional injection wells.

The fracture gradient of the shale aquitards that overlie and underlie the injection horizons will not be exceeded based on injectivity tests and applicable permit limits. Thus, all injected water would be contained in the injection horizon and would not migrate vertically. For this reason, the injected water is not expected to degrade water quality of the Mesaverde or any other aquifer.

The groundwater would be removed from a formation that is stratigraphically lower than and hydraulically isolated from shallow groundwater sources that are developed by water wells. The proposed injection zone is also stratigraphically lower than the shallow groundwater sources. Shallow groundwater sources (stratigraphically above the Mesaverde coal zones) are not likely to be affected by the project.

Information about the groundwater system in the Project Area could be obtained in three ways: first, by monitoring the quality of produced water; second, by monitoring the vol-

ume of water produced over time during testing; and third, by measuring the static water levels in nearby wells before the project begins and during the life of the project. This information also would be used to quantify impacts during the interim drilling phase of the project for use in the preparation of the Atlantic Rim EIS and evaluating future field development.

As almost all produced water is to be injected under the project, with only small amounts of produced water provided to livestock or wildlife in self-contained tanks that would not discharge to surface drainages, the quality or quantity of surface water would not be affected directly by its disposal. The Companies would implement BMPs to ensure that produced water is not spilled and that it would not come in contact with surface waters in the Project Area.

Surface disturbance associated with drilling and installing pipelines and utilities would increase the potential for erosion and the sediment and salt load in the already overburdened Muddy Creek drainage. These disturbances include removing vegetation and stockpiling topsoil, constructing roads, or digging shallow excavations for drill pads or facilities. The Companies would implement the mitigation measures described in the MSUP and Chapter 2 to control wind and water erosion at disturbed sites so that surface drainages are not affected by interim drilling. The Companies have committed to practices in the MSUP and Chapter 2 that, combined with existing regulatory requirements, would include design of surface-disturbing activities in a manner that diverts and controls runoff and provides for re-establishment of vegetation on disturbed areas. These measures, collectively, would represent BMPs for erosion control. Application of these BMPs would result in minimal impacts on water and soil resources.

Potential effects on surface water resources would include increased surface water runoff and off-site sedimentation caused by soil disturbance, impairment to surface water quality, and changes in stream channel morphology caused by construction of roads and pipeline crossings. Effects on surface water resources would depend on:

- The proximity of the disturbance to a drainage channel,
- The aspect and gradient of the slope,
- The degree and area of soil disturbance,
- Characteristics of the soil, duration of construction, and
- Timely implementation and success or failure of mitigation measures.

Increases in sedimentation that would occur as a result of the project would be minimal, because construction and operation would comply with measures described in the MSUP and Chapter 2. Construction would occur over a relatively short period. Impacts from construction would likely be greatest in the short term and would decrease in time as a result of stabilization, reclamation, and revegetation. Construction disturbance would not be uniformly distributed across the Project Area, but instead would be concentrated near drill locations and access roads.

Water for use in drilling the wells would be obtained from existing wells completed in the coal seams of the Mesaverde Group. Approximately 700 barrels of water (almost 30,000 gallons) would be needed to drill each well. The actual volume of water used in

drilling operations would depend on the depth of the well and any losses that might occur during drilling. In all, the proposed project would require nearly 100,000 gallons (or 0.3 acre-feet) of water per well for drilling, preparation of cement, well stimulation, and dust control.

#### **4.5.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on water resources would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

### **4.6 VEGETATION, WETLANDS, AND NOXIOUS WEEDS**

#### **4.6.1. Proposed Action**

Implementation of the project would result in the loss of natural vegetation in terms of cover and species composition in areas where well sites, facilities, and access roads would be constructed. An estimated 145 acres would temporarily be affected by surface disturbance associated with drilling and testing activities. Topsoil would be stockpiled, and reclaimed areas would be revegetated with site-specific seed mixes approved by BLM or the landowner, as appropriate, to avoid permanent loss of species diversity and vegetative cover. Should the exploratory wells be productive, the surface areas required for production facilities would not be reclaimed until production ends, which could be up to 20 years. An estimated 46 acres could be affected by production facilities over the long term. Reclamation efforts would initially lead to greater species and structure diversity within these communities. Herbaceous species composition and production would be increased once established, until big sagebrush or other shrubs reoccupy disturbed areas.

The Wyoming big sagebrush community type that would be disturbed under the project is commonly found across southwest Wyoming. The short-term or long-term loss in acreage described above would not alter the overall abundance and quality of these habitats.

In general, the duration of effects on vegetation in the Project Area would depend on the time required for natural succession to return disturbed areas to pre-disturbance conditions of diversity (both species and structural). Reestablishment of pre-disturbance conditions would be influenced by factors that are both climatic (growing season, temperature, and precipitation patterns) and edaphic (physical, chemical, and biological conditions in soil). Edaphic factors would include the amount and quality of topsoil salvaged, stockpiled, and spread over disturbed areas. Use of BMPs described in the MSUP ([Appendix B](#)) and Chapter 2 during construction, operation, and reclamation would minimize effects on vegetation resources.

Surface disturbance could affect vegetation directly and indirectly by removal of existing vegetation and by introducing weeds. Weedy species often thrive on disturbed sites such as road ROWs and out-compete more desirable plant species. Increased invasion by weeds may render a site less productive as a source of forage for wildlife and livestock. However, if the BMPs summarized in the MSUP and Chapter 2 are applied, invasion of weed species is not expected.

One noxious weed species (knapweed) was identified in the Project Area on September 18, 2003. Other noxious weed species may exist within the Project Area that were not apparent during the site reconnaissance. Noxious weeds would be monitored during drilling, production, and reclamation. Any noxious weeds found would be treated in accordance with BLM requirements.

No threatened or endangered plant species are expected to occur in the Project Area because of a lack of suitable habitat. Therefore, development of the project is not expected to directly affect federally listed plant species. Proposed BMPs and mitigation measures described in Chapter 2 would prevent impacts to federally listed species, if any are found.

The distribution of plant species of concern is likely limited in the Project Area because of a lack of suitable habitat for most of the species. Given the low likelihood that the sensitive plant species occur in the Project Area and the small amount of disturbance associated with the project, no effects on the plant species of concern would be expected.

No impacts on wetlands are anticipated, given that no wetlands have been identified in the Project Area. However, if produced water can be used by livestock during dry periods to stay the normal length of time in the summer pasture, riparian habitat along Muddy Creek north of the Project Area would benefit by delayed livestock use and less impact during the hot summer months (July-August).

#### **4.6.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on existing vegetation would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

### **4.7 RANGE RESOURCES AND OTHER LAND USES**

#### **4.7.1. Proposed Action**

Anticipated effects on range resources associated with the project are limited to a minimal loss of forage, an increased potential for collisions between livestock and vehicles, and an increased potential for the spread of noxious weeds and invasive species (previously discussed above under the section on Vegetation, Wetlands, and Noxious Weeds).

The project would not be likely to result in noticeable effects on range resources. In two to three years, reclaimed areas would have higher forage production that would compensate for the short-term loss of forage due to development.

Livestock grazing would continue during drilling and interim development. Forage in the Project Area would be reduced slightly during drilling and field development and would be restored as soon as practical. Areas used for roads, production equipment, and ancillary facilities would remain disturbed throughout the productive life of the field. The increased traffic in the Project Area during the drilling and field development phases could correspondingly enhance the potential for collisions between livestock and vehicles. Temporary, self-contained troughs that can be established for livestock use would benefit livestock season-of-use and distribution, particularly in the years with below normal levels of precipitation.

The project would result in an estimated 145 acres of short-term disturbance during drilling and field development; an estimated 46 acres of long-term disturbance would remain after the initial reclamation measures described in the MSUP ([Appendix B](#)) and Chapter 2 are completed. The short-term disturbance from portions of drill pads that are not needed for production facilities would be reclaimed as soon as practical after drilling ends, as would all areas disturbed for gas and produced water pipelines. All remaining disturbed areas would be reclaimed at the end of field operations, except any that BLM may identify as desirable for another use.

The average stocking rate for the Doty Mountain Allotment is 12 acres per AUM. The project would result in a short-term loss of forage associated with almost five AUMs in the Doty Mountain Allotment. This loss would correspond to a small long-term reduction in available forage within the Doty Mountain Allotment. These losses would amount to substantially less than 1 percent of the total grazing capacity in this area. Also, disturbances would be interspersed throughout the Project Area, and shouldn't affect grazing in the Doty Mountain Allotment.

There is potential for conflict between development of the project and range operations. The increased activity associated with drilling and field development could raise the potential for collisions between vehicles and livestock. Conversely, the activities under the project also could benefit range operations. Reclamation may increase forage production and availability, since shrubs would be removed in disturbance areas, and shrub species would be slow to recover.

#### **4.7.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on range resources would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## 4.8 WILDLIFE AND FISHERIES

### 4.8.1. Proposed Action

The effects on wildlife would be associated with construction and operation and would include displacement of some individuals of some wildlife species, loss of wildlife habitats, and an increase in the potential for collisions between wildlife and motor vehicles. Other potential effects include an increase in the potential for illegal kill, harassment, and disturbance of wildlife because of increased human presence and improved vehicle access. The magnitude of impacts to wildlife resources would depend on a number of factors, including the type and duration of disturbance, the species of wildlife present, the time of year, and successful implementation of avoidance and mitigation measures described in the MSUP ([Appendix B](#)) and Chapter 2.

The project would cause a loss of natural habitats in areas where well sites, facilities, and access roads would be constructed. An estimated 145 acres would be affected in the short term by surface-disturbing activities during drilling and testing.

Should the exploratory wells be productive, the surface areas required for roads or production facilities would not be reclaimed until production ends, which could be within 10 to 20 years. An estimated 46 acres could be affected by production facilities over the long term.

The capacity of the Project Area to support various wildlife populations should remain essentially unchanged from current conditions. Construction, operation, and maintenance of the proposed gas wells and associated facilities are expected to have minimal short-term effects on wildlife in the Project Area. Some wildlife species may be temporarily displaced during construction of pipeline routes, well sites, and access roads, but should return once construction is complete. Extensive, suitable habitats for many species exist on lands adjacent to the Project Area and would support any individuals that may be temporarily displaced. Long-term effects on wildlife are expected to be minimal, as most species would become accustomed to routine operation and maintenance. Only a small proportion of the available wildlife habitat in the Project Area would be affected. Temporary self-contained water troughs that would be established for livestock use also would benefit wildlife, providing sources of water in areas where it was previously not available.

During the production phase, pipelines and the unused portion of well sites would be reclaimed. After production operations end (the life of the project is estimated at 10 to 20 years), the well field and ancillary facilities would be reclaimed and abandoned. Well pads would be removed; the areas would be revegetated with seed mixes approved by the BLM, and some are specifically designed to enhance wildlife use. The duration of impacts to vegetation would depend, in part, on the success of mitigation and reclamation efforts and the time needed for natural succession to return revegetated areas to pre-disturbance conditions. Grasses and forbs are expected to become established within the first several years after reclamation; however, much more time would be required to re-

establish shrub communities. Consequently, disturbance of shrub communities would result in a longer-term loss of the specific habitat.

In addition to the direct loss of habitat caused by construction of well pads and associated roads and pipelines, disturbances from human activity and traffic would lower use of habitat immediately adjacent to these areas. Species that are sensitive to indirect human disturbance (both noise and visual) would be most affected. Habitat effectiveness of these areas would be lowest during the construction phase, when human activities are more extensive and localized. Disturbance would be reduced during the production phase of operations, however, and many animals may become accustomed to equipment and facilities in the gas field and return to habitat adjacent to disturbance areas.

#### **4.8.1.1. Wildlife**

Direct disturbance likely would reduce the availability and effectiveness of wildlife habitat in the Project Area for a variety of common small mammals, birds, and their predators. The initial phases of surface disturbance and increased noise that are likely would result in some direct mortality to small mammals and would displace songbirds from construction sites. In addition, a slight increase in mortality from increased vehicle use of roads in the Project Area would be expected. Quantification of these losses is not possible; however, the loss is likely to be low over the short term. During the operations phase of the project, increased noise from compressor engines and other production activities would displace some animals and would affect the production potential of some species. Based on the relatively high production potential of these species and the relatively small amount of habitat disturbed, no long-term effects on populations of small mammals and songbirds would be expected.

##### **4.8.1.1.1. Big Game**

In general, effects on big game would include direct loss of habitat and forage and increased disturbance and noise from drilling, construction, operation, and maintenance operations. Disturbance of big game during the parturition period and on winter range can increase stress and may influence species distribution (Hayden-Wing 1980; Morgantini and Hudson 1980). There may also be a potential for an increase in poaching and harassment of big game, particularly during winter. According to management directives in the RMP (BLM 1990), crucial big game winter ranges would be closed to construction and development from November 15 through April 30. This seasonal closure of crucial winter ranges would reduce disturbance to wintering big game. This seasonal closure would also limit the potential for poaching and harassment of big game species wintering in the area. Recreational use of the area and production activities would not, however, be affected by the seasonal closure. Effects on big game are expected to be minimal and no long-term loss of habitat is expected once construction is complete, as big game species are expected to return to the Project Area.

A portion of the Project Area has been designated as winter/yearlong range for pronghorn antelope. Pronghorn likely migrate through the northern portion of the Project Area toward crucial winter/yearlong range located northwest of the POD boundary (HWA 2003). Activities associated with the construction phase of the project would likely temporarily

displace antelope; however, once construction is complete, antelope would likely return to pre-disturbance patterns of activity. HWA (2003) found that pronghorn became acclimated to increased traffic and machinery as long as both moved in a predictable manner.

A portion of the Project Area has been designated as winter/yearlong range for mule deer, but no major migration routes for mule deer cross the Doty Mountain area. Likewise, no major elk migration routes cross the Project Area, although habitat in the area is designated as elk winter range. Activities associated with the construction phase of the project would likely temporarily displace mule deer and elk; however, once construction is complete, these animals would likely return to pre-disturbance patterns of activity.

Overall, no noticeable effects on the antelope, mule deer or elk that inhabit the Project Area are expected, provided mitigation measures contained in this document, the RMP, and the Interim Drilling Policy ([Appendix A](#)) are implemented.

#### **4.8.1.1.2. Upland Game Birds**

Although no active greater sage grouse leks were documented within the POD boundary, three active leks occur within 2 miles of the POD boundary. The overlapping 2-mile buffers around the two leks that are located southwest of the POD boundary include 539.5 acres of the Project Area, where construction of 6 wells is proposed. The proposed pipeline and access road intersect 4.9 miles of potential sage-grouse nesting habitat within the 2-mile buffers of the two leks. Pipeline disturbance (approximately 32.1 acres) would be reclaimed; however, disturbance from the access road (approximately 14.1 acres) would remain for the life of the project. The proposed access road would not intersect severe winter relief habitat near the section line between Sections 28 and 29 in T17N R91W. One active sage-grouse lek is located less than 2 miles from the southeastern limit of the Project Area. The 2-mile buffer around this lek includes 96 acres within the POD boundary, where construction of one well is proposed.

Greater sage grouse are of special concern because populations throughout the west have been declining and this species is petitioned for listing under the Endangered Species Act. Under the Proposed Action, 136.9 acres of the Wyoming big sagebrush vegetation cover type located within the Project Area would be disturbed during construction over the short term and 36.5 acres would be disturbed in the long term. This amount of habitat disturbance is minimal considering the amount available in the Project Area, however, greater sage grouse can be affected by other activities associated with development, including increased human activity, increased traffic disturbance, and noise from pumping or compressor engines. Increased noise that occurs in sensitive resource areas could affect the ability of greater sage grouse to mate. Careful siting of noise sources, addressed in applicant-committed and BLM-required mitigation measures in Chapter 2, would result in minimal effects on greater sage grouse. Greater sage grouse exhibit site fidelity to leks, winter areas, summer areas, and nesting areas (HWA 2003). Therefore, steps should be taken to ensure that impacts to these areas, especially leks and nesting areas, are minimized.

Minimal effects on the population of greater sage grouse are expected, provided that all applicant-committed and BLM-required mitigation measures described in the MSUP ([Appendix B](#)) and Chapter 2 are implemented. Mitigation measures described in Chapter 2 and the Application for Permit to Drill (APD) conditions of approval would be followed to protect wildlife values in the Project Area. Production facilities at well sites often act as raptor perches, increasing predation on greater sage grouse and other wildlife. Use of low-profile structures should mitigate these potential effects of any wells that produce commercial quantities of natural gas.

The RMP contains mitigating measures that would protect nesting greater sage grouse from February 1 to July 31, including strutting grounds and nesting habitat. Exceptions may be granted, however, if the activity would occur in unsuitable nesting habitat. Controlled surface use (CSU) stipulations are applied within ¼-mile around active leks. The portion of the Project Area included within the 2-mile buffer of an active greater sage grouse lek is a sensitive resource area for the protection of nesting habitat. As a result, mitigation measures must be followed to protect this area, especially during periods when greater sage grouse mating could be affected by noise associated with the project. Direct disturbance to high quality greater sage grouse habitat could also be minimized by constructing well pads within the 400-acre area that was burned, instead of construction within denser sagebrush areas. If all avoidance and mitigation measures in this document, the RMP, and the Interim Drilling Policy are implemented, however, minimal impacts to habitats or populations of greater sage grouse would be expected.

#### **4.8.1.1.3. Raptors**

The principal potential effects of the project on avian species could be nest abandonment and reproductive failure caused by project-related disturbance and increased noise. Other potential effects involve increased public access and subsequent human disturbance that could result from new construction or production and from small, temporary reductions in prey populations for raptors. However, no active raptor nests were found within or near the Project Area during the 2001 and 2003 surveys (Jackson 2003). Seventeen inactive raptor nests were located within 1 mile of the pipeline and access road corridor. Construction activities may dissuade raptors from nesting at these sites in the future. Above-ground electrical transmission lines are not included in the project; therefore, there would be no potential effects.

No effects on breeding raptors are expected, provided avoidance and mitigation measures are followed. Mitigating measures contained in the RMP for oil and gas projects state that no activity or surface disturbance would be allowed near raptor nesting habitat from February 1 through July 31. The size of the restrictive radius and the timing on the restriction may be modified depending on the species of raptor and whether the nest is within the line of sight of construction. No effects on breeding raptors are expected, if avoidance and mitigation measures in this document, the RMP, and the Interim Drilling Policy are followed.

## **4.8.1.2. Threatened and Endangered Species - Wildlife and Fish**

### **4.8.1.2.1. Wildlife Species**

The following wildlife species are threatened, endangered, or proposed for listing under the ESA: black-footed ferret; bald eagle; and Canada lynx. These species may occur in or near the Project Area according to the FWS; therefore, potential impacts to these species that could occur under the Proposed Action are considered.

Black-footed Ferret. In Wyoming, white-tailed prairie dog colonies provide essential habitat for black-footed ferrets. Ferrets depend almost exclusively on prairie dogs to obtain food, and they rely on prairie dog burrows for shelter, parturition, and raising young (HWA 2002). One small prairie dog colony, encompassing approximately 4 acres in Section 23 of T17N, R91W, was located in the Project Area. Prairie dog towns must be larger than 200 acres and the burrow density must be greater than or equal to eight burrows per acre to be considered suitable habitat for black-footed ferrets (HWA 2002). No ferrets or their signs were found during surveys conducted in the Project Area during April and May 2001 (HWA 2003). As long as no construction occurs within the 4-acre prairie dog colony, implementation of the project is not expected to affect black-footed ferrets.

Bald Eagle: Although incidental sightings have occurred near the Project Area, no bald eagle nests were found within a 2-mile buffer of the Project Area during surveys in 2001 (HWA 2003). If bald eagles inhabited a portion of the Project Area, the proposed activities would not be expected to affect bald eagles, provided the avoidance and mitigation measures outlined in this document, the RMP, and the Interim Drilling Policy are implemented. Bald eagles feed on road-killed carrion in the Project Area, and workers should be educated about the danger of striking a bald eagle with a vehicle.

Canada Lynx. The Canada lynx is not expected to occur within the Project Area because of the lack of potentially suitable habitats. Thus, implementation of the project is not expected to affect Canada lynx.

### **4.8.1.2.2. Fish Species**

The lack of large river habitat within the Project Area precludes the occurrence of adults of the four species of endangered fish: the Colorado pikeminnow, bonytail and humpback chubs, and razorback sucker. Furthermore, the project is not expected to reduce base flows in the area's major rivers, either through withdrawals of groundwater or surface water. Finally, critical habitat has not been established anywhere in Wyoming for any of these species (Upper Colorado River Endangered Fish Recovery Program 1999).

Depletions to the Colorado River that could result from reduced groundwater discharge (base flows) are not expected based on the project's distance from the Colorado River. In addition, depletions are not expected because of the subsurface orientation, or bedding attitude, of the aquifers contained in production formations that would be affected by the project. The depth and orientation of the Mesaverde aquifer would preclude groundwater contained in the coal zone that would be produced from discharging as base flow to the

Colorado River or its tributaries (Whitehead 1996). Therefore, removal of groundwater from the Mesaverde aquifer during the project would not be expected to affect base flows or water quality of the Colorado River or its tributaries.

Injection of produced water during the project would not be expected to affect base flows or water quality of the Colorado River or its tributaries, based on the project's distance from the Colorado River, a lack of major faults, and the subsurface orientation of the aquifers contained in injection formations. The depth and orientation of the formations in the injection zone would preclude groundwater that would be injected from discharging as base flow to the Colorado River or its tributaries (Whitehead 1996). Confining layers are expected to preclude interaction between the injection and production formations.

No surface water withdrawals from Colorado River system drainages are included in the project, and no surface discharge of produced water is planned. The project would not be expected to affect the quantity or quality of surface water in the Colorado River or its tributaries. Water would have to flow from Muddy Creek to the Little Snake River to the Yampa River and then to the Green River, finally reaching the Colorado River in southeastern Utah, for surface water in drainages in the Project Area to reach the Colorado River.

#### **Colorado Pikeminnow**

Although Muddy Creek and the Little Snake River may support this species of fish at certain times, this species is absent downstream of the Project Area. The project therefore would have no impact on this species.

#### **Bonytail and Humpback Chub**

These species are absent downstream of the Project Area; therefore, the project would have no impact on these species.

#### **Razorback Sucker**

Suitable habitat is not available in the Little Snake River drainage; therefore, the project would have no impact on this species.

The occurrence of these endangered fish species has not been confirmed in the Muddy Creek drainage or downstream in the Little Snake River, and is highly unlikely. If any of these species is identified within the downstream portion of Muddy Creek or immediately downstream in the Little Snake River, the BLM would consult with the FWS and develop a protection plan for the fish. Given these precautionary measures, no adverse impacts to any of these species would be expected to result from the project.

Within Muddy Creek, sediment levels may be elevated during construction of crossings for well access roads and road grades along and across the creek. Implementing reasonable precautions to limit off-site movement of sediment from these areas would prevent substantial increases in sediment loadings in the downstream section of Muddy Creek and downstream from its confluence with the Little Snake River. In addition, these precau-

tions would avoid violations of Wyoming Surface Water Quality Standards (WDEQ 2001). Because the limited water development and usage for this project are predicted to affect only subterranean aquifers related to the coal seams, surface flows would not be affected by wells developed for this project.

#### **4.8.1.3. Species of Concern - Wildlife and Fish**

##### **4.8.1.3.1. Wildlife**

Effects on BLM wildlife species of concern could occur as a result of loss of habitat or displacement caused by increased noise. Based on the relatively small size of the Project Area, the inherent mobility of the species of concern and the abundance of potentially suitable habitats nearby, no noticeable effects are expected under the project. Burrowing owls will not be affected as long as no construction occurs within the 4-acre prairie dog colony. However, the lack of effects assumes that the avoidance and mitigation measures outlined in this document, the RMP, and the Interim Drilling Policy are followed.

Mountain Plover. No portions of the Project Area were determined to provide potential habitat for mountain plovers (HWA 2003). Although no mountain plovers were found during surveys in 2001, the presence of prairie dog towns indicates that plovers may use these areas at some time. The potential exists for effects on mountain plovers if nesting habitat were removed or an active nest were disturbed. If mountain plovers were observed in the Project Area in the future, the avoidance and mitigation measures in this document, the RMP, and the Interim Drilling Policy would be followed to prevent effects on mountain plovers. Implementation of the project is not expected to affect mountain plovers, provided any required avoidance and mitigation measures identified are implemented.

##### **4.8.1.3.2. Fish**

The project is not likely to adversely effect BLM sensitive fish species ([Appendix E](#)) that occur within or downstream of the Project Area if measures to prevent downstream sedimentation are implemented. These measures would prevent off-site movement of fluid spills (if any occur) or disturbed soils caused by construction under the project (WDEQ 2001). Implementation of reasonable precautions to limit off-site movement of sediment should prevent violations of Wyoming Surface Water Quality Standards (WDEQ 2001). Furthermore, water would be drawn from productive wells to avoid depleting surface flows in Muddy Creek and Little Snake River and subsequent adverse impacts to these species caused by removal of surface water or near-surface water for drilling use. Stream crossings of Muddy Creek and Dry Cow Creek would be constructed to allow passage for upstream spawning migrations of these sensitive native fish, including the roundtail chub, bluehead sucker, flannelmouth sucker, or Colorado River cutthroat trout. Given these precautionary measures, implementation of the project is not likely to adversely affect these sensitive fish species.

#### **4.8.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on wildlife or fisheries or threatened, endangered, or sensitive species would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

### **4.9 RECREATION**

#### **4.9.1. Proposed Action**

In light of the abundance of nearby, similar recreational opportunities for hunting, camping, and ORV use, no noticeable effects on the recreational experience are expected under the project. Impact to the recreational use of the Project Area would involve a temporary displacement of some hunters, particularly during construction and drilling. Some hunters perceive these activities as displacing game species and creating an environment that detracts from the hunting experience. Displacement would be highest during the general deer and elk season, when the most hunters are in the area. The proposed drilling schedule would limit displacement to one season. Furthermore, hunters could relocate to other areas near the project.

Undisturbed landscapes and solitude are important to some recreationists. Project-related disturbances that impair the characteristic landscape could also contribute to a decline in the recreational experience for these visitors. The recreational experience could be less satisfying than under the pre-disturbance conditions described in Chapter 3.

The effects would diminish substantially after drilling and construction are completed. Some long-term displacement of hunters and other recreationists likely would occur under the project. Human access and activities would increase under the project with the improved and new access roads. Overall, effects on the recreation resource would be minimal because of the short-term nature of drilling and construction and the concentrated locations of these activities.

#### **4.9.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on recreation resources or use would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## 4.10 VISUAL RESOURCES

### 4.10.1. Proposed Action

As noted in Chapter 3, Affected Environment, the Project Area is not pristine. ORV tracks are evident throughout the area and are used by ranchers, recreationists, and traffic related to mineral development. The Proposed Action would be consistent with the existing VRM Class III objectives in the Project Area.

Short-term impacts to visual resources associated with construction and drilling in the Project Area would include contrasts in line, form, color, and texture. These contrasts would be associated with drilling rigs, construction equipment, service trailers, and the general industrial character of drilling. Additional impacts may occur from fugitive dust produced by construction.

The Project Area would not be visible from WY 789 or the community of Baggs. Potential viewers of the contrasts described would be few and would include hunters and other recreationists, ranchers, and oil and gas field workers. In addition, project facilities would not be constructed on ridgelines.

The severity of impact with the BLM VRM rating system is related to the scenic quality, sensitivity level, and distance zone of the affected environment. In general, short-term impacts would be most severe where the level of contrast is high and is highly visible to the most viewers.

The short-term impacts would be considered acceptable impacts in a Class III area. The contrasts during construction would be seen by relatively few viewers and would be visible only for a short time.

Permanent production facilities, as described in Chapter 2, would remain after well drilling is completed. The presence of permanent production facilities would create continued impacts over the long term.

These facilities would create contrasts in line, form, color, texture, and overall pattern in the landscape that would remain for the duration of the project. Impacts from fugitive dust as part of ongoing operations would also persist, but could be reduced by dust abatement. However, as noted for short-term impacts, these contrasts would not be visible to many viewers. The level of contrast would not exceed Class III standards if the mitigating measures described in Chapter 2 are applied. Levels of contrast would, however, detract from the recreation experience of visitors to the Project Area.

Additional facilities, such as access roads, would be required to service production facilities. Roads would create additional contrasts in line, color, and texture. The level of contrast would not exceed Class III standards with appropriate mitigation measures. However, contrasts could diminish the experience of motorists and recreationists.

## **4.10.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on visual quality or visual resources would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## **4.11 CULTURAL RESOURCES**

### **4.11.1. Proposed Action**

Direct and indirect adverse effects to historic properties can be through avoidance or mitigating measures (data recovery or recordation) and can be prevented on a case-by-case basis. There are six sites recorded within the Project Area. Two of these sites could not be relocated in the 2001 and 2003 cultural resource inventories. Three identified sites (48CR7956, 48CR7960, 48CR7961) are remains of prehistoric open camps and are recommended eligible for inclusion in the NRHP. One site (48CR7617) is a historic cairn and is recommended not eligible for inclusion in the NRHP. None of the known sites in the Project Area would be disturbed by the project.

Direct impacts would result primarily from construction-related activities. Activities that could affect cultural resources would include grading well pads and associated facilities and construction of roads and pipelines. Sites located outside the Project Area would not be directly affected by construction. Alteration of the environment that abuts eligible historic properties may be considered an adverse direct impact.

Indirect impacts would not immediately result in physical alteration of the property. Instead, indirect impacts to prehistoric sites would result primarily from unauthorized surface collection of artifacts, which could physically alter the sites. At historic properties, these impacts could include bottle or tool collecting or erosion from surface disturbance.

Block surveys have been completed in the Project Area, as required by the Interim Drilling Policy. Additional cultural inventory is required to encompass all of the area of potential effect for this project, however. Unless a supplemental report addressing uninventoried federal lands within the area of potential effect, including the proposed route for road access and the market pipeline, is submitted prior to the approval of the project, COAs would require completion of additional cultural inventory before surface disturbing activities could begin. Identification and avoidance or mitigation of eligible sites before disturbance would minimize impacts to these cultural resources. Previously unidentified buried sites could be impacted during construction activities. Implementation of measures described in Chapter 2 would reduce impacts and minimize the loss of cultural resource information.

Mitigation measures could include avoidance or monitoring of the historic properties. The proposed impact at the sites would be moved to prevent disturbance during construction or a qualified archaeologist would monitor construction of the proposed impact location. All recommendations are subject to approval and alteration by the BLM RFO archaeologist. In the event that buried cultural materials are discovered during construction, those activities would be halted until a qualified archaeologist visited the site and evaluated the find. If the Proposed Action is modified, an additional cultural resources inventory for the new area of proposed disturbance may be required.

#### **4.11.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on cultural resources would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

### **4.12 SOCIOECONOMICS**

#### **4.12.1. Proposed Action**

Socioeconomic impacts of the project would be largely positive. The project would enhance regional economic conditions and generate revenues from local, state, and federal government taxes and royalties. The relatively small, short-term drilling and field development workforce would not create noticeable effects on population or demand for temporary housing or local government services.

The project would involve capital investment in gas wells, injection wells for produced water, gathering systems, compression stations, and other field infrastructure. The project would require between 16 and 36 drilling and field development workers over a 30- to 45-day period and one operations worker for as much as a 20-year period (Table 2-2).

Development and operation of the project would require goods and services from a variety of local and regional contractors and vendors, from the oil and gas service industry and from other industries. Expenditures by the Companies for these goods and services, coupled with employee and contractor spending, would generate economic effects in Carbon County, southwest Wyoming, and the nation as a whole. The project may create up to three new indirect jobs (defined as jobs that become available in support industries as a result of project activities).

It is reasonable to assume that the direct and indirect economic benefits of the project would be positive.

#### **4.12.1.1. Oil and Gas Activity in Carbon County**

Successful completion of the project would increase production of natural gas in Carbon County, particularly during the first several years of the project. To date in 2003, 225 APDs have been issued for Carbon County. The 24 wells associated with the project would be about 11 percent of the current 2003 APD level for the county. However, the relatively short drilling time and low requirements for infrastructure and labor associated with the proposed wells would not result in a substantial increase in drilling activity or employment in the county.

Economic effects on grazing would include small losses of forage caused by temporary and long-term disturbance until revegetation of disturbed areas is successful. Temporary disturbance could result in a small reduction in grazing. If grazing does not increase accordingly in nearby areas, the associated economic activity in Carbon County could be lost. A recent University of Wyoming study estimated that each AUM of cattle grazing was worth \$65.07 in total economic impact in the region (UW 2000). Using this estimate, the proposed development could result in a loss of about \$300 annually in the Doty Mountain Allotment for the life of the project.

Some hunters and other recreationists may be temporarily displaced from the area associated with the project during drilling and field development. The effects of the project on the hunting and recreation economy in Carbon County are not expected to be noticeable given the short-term nature of drilling and field development. In addition, effects are likely to be limited based on the potential that hunters and recreationists may use other areas within Carbon County during this period.

#### **4.12.1.2. Population Effects**

Population effects of the project would not be noticeable. Some of the skills and services required for the project are available in the local labor pool, although the recent increase in oil and gas drilling in southwest Wyoming has absorbed much of the available workforce. Of the short-term demand for 16 to 36 drilling and field development workers, some would likely be contractors from other areas of Wyoming (such as Rock Springs, Gillette, and Casper) and from northern Colorado. The remainder would be hired from the local workforce. Given the short duration of the drilling phase (less than 2 months), most non-local workers who would relocate to Carbon County would be single.

Non-local workers would attempt to obtain temporary housing as close to the work site as possible, most likely in Baggs. Workers who are not able to secure temporary housing in Baggs might locate in Rawlins or Rock Springs, Wyoming, or to Craig, Colorado. Given the current level of drilling and field development in Wamsutter, it is unlikely that drilling and field development workers for the project would find temporary housing in that community.

Based on the relatively small workforce and short-term nature of the drilling and field development phase of the project, area businesses could accommodate the increase in economic activity with existing employees.

#### **4.12.1.3. Temporary Demand for Housing**

Existing resources could accommodate the relatively small demand for temporary housing during drilling and field development under the project. Demand may be accommodated in Baggs, Rawlins, Rock Springs, and Craig, depending on seasonal considerations and other activity in the oil and gas industry.

#### **4.12.1.4. Law Enforcement and Emergency Response**

The relatively small level of field development and operations would be accommodated by existing law enforcement and emergency management resources.

#### **4.12.1.5. Fiscal Effects**

If gas wells drilled for the project produce, the fiscal effects from the facilities developed and amount of natural gas that could be produced may be considerable. These effects would contribute to the financial well being of Carbon County, including its schools and roads, in addition to positive fiscal effects to the State of Wyoming and the U.S. Treasury.

Production of natural gas would generate revenues for the U.S., the State of Wyoming, and Carbon County; the distribution of these revenues would vary, but is generally shared. Sources of revenue consist of the following: federal and state oil and gas royalties; taxes that include severance, property, sales and use, ad valorem, and federal and state income taxes from the workers engaged in or supporting development of CBNG resources. These increased revenues would be realized for the life of the project.

The potential economic effect of CBNG development in the Project Area can be estimated based on assumptions regarding methane production rates, sales expectations, and the productive life of a well. Because no reliable data for the Atlantic Rim area would be available until exploratory drilling is complete, the assumptions presented here for this analysis may not be accurate.

If the productive life of each successful gas well in the project is 15 years and produces on average nearly 100 MCF per year of methane, which is sold (on average) for \$2.50 per MCF, the sales value of each well would be about \$3.5 million over the life of the project. If 16 federal gas wells within the project were productive, the federal royalties would be \$7 million. The severance tax collected by the State of Wyoming would exceed \$3 million. The ad valorem taxes collected by Carbon County also would exceed \$3 million. These values are approximate, are based on assumptions, and are intended to indicate the order of magnitude of possible fiscal effects.

#### **4.12.1.6. Environmental Justice**

The project would not directly affect the social, cultural, or economic well being and health of Native American, minority, or low-income populations. The Project Area is relatively distant from population centers, so no populations would be affected by physical or socioeconomic impacts from the project.

## **4.12.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No federal mineral royalties would be gathered and no additional socioeconomic effects would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## **4.13 TRANSPORTATION**

### **4.13.1. Proposed Action**

#### **4.13.1.1. Federal and State Highways**

The project would increase the volume of traffic on highways that provide access to the Project Area and on county and operator-maintained roads within the Project Area. These increases would result from movement of project-related workers, equipment, and materials to and from the Project Area for drilling, field development, well service, field operations, and reclamation.

According to information provided by the proponent, drill rigs, water trucks, and other heavy equipment would be transported to and would remain within the Project Area until drilling is completed. Materials and supplies would be delivered weekly and stockpiled within the Project Area at a staging location. Drilling and completion crews and other personnel would commute to the Project Area daily, except for drilling engineers, who would reside in a mobile home at the drill site during the work week. Table 2-2 identifies the estimated average number of trips associated with various well field activities.

Based on these assumptions and estimates, the incremental increase in area traffic associated with the project would not result in a significant deterioration of level of service for I-80, WY 70, or WY 789 (Rounds 2000). Based on the relatively small increase and short duration of traffic caused by the project during the drilling and field development phase, it is unlikely that the project would result in a measurable increase in accident rates on federal and state highways. During the operations phase, the probability of an increase in accident rates that could be attributed to the project would be negligible.

#### **4.13.1.2. County Roads**

The project would increase traffic on the county roads that provide access to the Project Area (Carbon County 608). The relatively small, short-term increases in traffic are unlikely to result in significant deterioration of the roads or substantial increases in accidents. The primary effects of traffic related to the Proposed Action on county and BLM roads would be accelerated requirements for maintenance. The revenues related to the

Proposed Action generated to county government, which are described in the section on Socioeconomics, may offset the cost associated with accelerated maintenance on county roads.

Increased traffic may raise the potential for accidents that involve vehicles and stock animals, although the slower speeds required by the condition of county roads tend to minimize their frequency (Warren 2000). Coordination with livestock operators during sensitive periods (such as cattle movements and calving season) could further reduce the potential for accidents that involve vehicles and stock animals.

#### **4.13.1.3. Internal Roads**

The section in Chapter 2 on Access Road Construction describes the measure proposed by the Companies to develop the transportation network necessary to access wells and ancillary facilities within the Project Area. Based on these proposals, an estimated 7.9 miles of new roads would be constructed within the Project Area. The Companies would be responsible for constructing and maintaining new and improved roads within the Project Area; therefore, no fiscal impacts are anticipated for the BLM or Carbon County.

#### **4.13.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on transportation would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

### **4.14 HEALTH AND SAFETY**

#### **4.14.1. Proposed Action**

Health and safety impacts would include a relatively low risk to project workers from industrial accidents, firearms, and natural disasters. There would be a slight increase in risk of traffic accidents and range fires for the public during drilling and field development and a negligible increase during field operations.

##### **4.14.1.1. Occupational Hazards**

The statistical probability of injuries is low during the drilling and field development phase of the project, when a peak of 36 workers may be employed. The annual statistical probability of injuries is minimal during field development because only one worker would be employed.

The BLM, OSHA, USDOT, WOGCC, and WDEQ each regulate certain safety aspects of oil and gas development. Adherence to relevant safety regulations by the Companies and enforcement by the agencies would reduce the probability of accidents. Additionally, in light of the remote nature of the Project Area and the relatively low use of these lands by others (primarily grazing permittees and hunters), occupational hazards associated with the project would mainly be limited to employees and contractors rather than the public.

#### **4.14.1.2. Pipeline Hazards**

The risk of pipeline failure would increase with increasing length of the gathering system or market access pipeline. The relatively small amount of new pipeline associated with the project, coupled with the low probability of failure and the remote nature of the Project Area, would result in minimal risk to public health and safety. Pipeline markers posted on the rights of way for the pipelines reduce the likelihood that pipeline ruptures would be caused by excavation equipment, especially near road crossings or areas likely to be disturbed by road maintenance.

#### **4.14.1.3. Other Risks and Hazards**

Risks to public health and safety are not expected to increase under the project. Impacts to highway safety are discussed in the section on Transportation of this document. Impacts associated with sanitation or the materials used in CBNG development would be prevented or reduced by the mitigation measures described in Chapter 2.

The potential for firearms-related accidents would occur primarily during hunting season. If drilling and field development would occur during hunting season, the substantial activity in the Project Area would encourage hunters to seek more isolated areas, reducing the potential for accidents. The relatively few personnel onsite during production operations would create minimal risk of firearms-related accidents.

The risk of fire in the Project Area could increase under the project but would remain low. Fire is a potential impact associated with construction, industrial development, and the presence of fuels, storage tanks, natural gas pipelines, and gas production equipment. This small risk would be reduced further because facilities would be situated on pads and in locations that are graded and devoid of vegetation. In the event of a fire, property damage most likely would be limited to construction- or production-related equipment and rangeland resources. Fire suppression equipment, a no smoking policy, shutdown devices, and other safety measures typically incorporated into gas drilling and production also would minimize the risk of fire. Risk of wildfire would be heightened where construction places welding and other equipment near native vegetation. However, the risk to the public would be minimal because of limited public use and presence in the Project Area. There would be a small increase in risk to area fire suppression personnel associated with the project.

#### **4.14.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional effects on public health or

safety would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## **4.15 NOISE**

### **4.15.1. Proposed Action**

Noise associated with construction and natural gas production operations can create a disturbance that affects human safety (at extreme levels) or comfort and can modify animal behavior. Identifying the activities that may exceed the maximum standards is not a simple issue. Perception of sound varies with intensity and pitch of the source, air density, humidity, wind direction, screening or focusing by topography or vegetation, and distance from the observer. Noise levels that exceed the 55-dBA maximum standards can occur at construction and production operations. Noise levels around a compressor engine contained in an enclosed building would be below 55 dBA at an estimated 600 feet from the compressor site (BLM 1999b). Construction-related impacts would be short term, lasting as long as construction was under way at well sites, access roads, pipelines, and other ancillary facilities such as compressor sites. Noise would be created over a longer term at the individual well sites as a result of production facilities.

The density of the human population is low in the Project Area; therefore, construction and development operations under the project would be sufficiently distant from residences that none would likely be affected by construction or development operations. Overall, noise produced by construction and support equipment during periods of peak activity would be moderate because of the dispersed and short-term nature of these activities.

### **4.15.2. No Action**

Under the No Action alternative, the coordinated plan of development described under the Proposed Action would not be approved. No additional noise effects would be expected to occur if the proposed wells are not drilled. Demand for natural gas locally and nationally, however, likely would result in new proposals for exploration and development of the Project Area. Future mineral development in the Project Area would occur under the guidelines of the RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

## **4.16 CUMULATIVE IMPACTS**

### **4.16.1. Proposed Action**

Cumulative impacts would result from the incremental impacts of the project when added to non-project impacts that result from past, present, and RFFAs. Reasonably foreseeable development is any development likely to occur within the Project Area or cumulative

impact assessment (CIA) area, within the next 5 years. CIA areas vary between resources and are generally based on relevant landscapes, resources, projects, or jurisdictional boundaries.

The only major resource development currently proposed near the Project Area is the exploration planned under the Interim Drilling Policy for the Atlantic Rim area ([Appendix A](#)). Thus, the effects of the Doty Mountain Project (described in this chapter) would not overlap cumulatively with the effects of current or reasonably foreseeable projects or activities other than the interim drilling program, grazing activities, and existing or planned prescribed burns within the Atlantic Rim EIS study area.

The Interim Drilling Policy allows a maximum of 200 gas wells within the Atlantic Rim area for research and exploration during the interim period while the Atlantic Rim EIS is prepared. Wells would be allowed only in the nine pods identified by the Companies. In addition, a maximum of only 24 gas wells would be allowed within any pod, even if multiple zones are to be evaluated. Total distance between pods at the north and south ends of the Atlantic Rim EIS study area is about 40 miles. The distances between the individual pods vary, from 1.5 miles to more than 6 miles. The Doty Mountain Project is part of the 200-well interim drilling program.

Existing CBNG development under the 200-well interim drilling program in the Atlantic Rim EIS study area includes wells and related facilities that have been developed in the Sun Dog, Cow Creek, Blue Sky, and Red Rim areas. There have been 39 gas wells drilled in these areas, along with related facilities that include injection wells, roads, corridors for gathering lines and utilities, compressor stations, pumping stations, and water handling facilities. The cumulative long-term disturbance associated with existing CBNG wells and related facilities in the Atlantic Rim EIS study area is projected to be 69 acres.

Reasonably foreseeable development in the Atlantic Rim EIS study area includes development of the Doty Mountain area and the remaining well pods within the 200-well interim drilling program. Considering the wells that already exist (39), the proposed wells in the Doty Mountain area (24), the reasonably foreseeable wells in the Red Rim area (14), and the 200-well limit imposed by BLM under the Interim Drilling Policy, the remaining RFFAs associated with the interim drilling program would include 123 CBNG wells that would be located in the remaining well pods within the Atlantic Rim EIS study area.

Surface-disturbing activities for the 200-well interim drilling program may affect an estimated 650 acres (short-and long-term disturbance), including an estimated 60 miles of new access roads. (New roads associated with the interim drilling program would likely be in the form of spurs from the existing network of roads.). In addition, an estimated 100 miles of water and gas flowlines could be required.

The long-term disturbance from CBNG wells and facilities associated with the 200-well interim drilling program during the life of the project, after short-term disturbance is reclaimed, would include existing wells and facilities (69 acres), proposed wells and facilities in the Doty Mountain area (29 acres), RFFAs in the Red Rim area (28 acres), and RFFAs in the remaining well pods (220 acres). The cumulative long-term disturbance

associated with the 200-well interim drilling program would likely affect an estimated 346 acres. These 346 acres would be reclaimed, after the wells have been found to not produce or when they cease to produce some time in the future.

Other past or existing actions on or near the Project Area that continue today and have major influences include the road network, oil and gas wells that are not part of the proposed project, ranching and livestock facilities (including fences, stock watering facilities, ranch houses, power lines, and pipelines), and prescribed burns.

To date, 59 non-project wells have been plugged and abandoned or are in various stages of reclamation; 37 non-project wells are in various stages of completion. An estimated 337 acres of cumulative, long-term disturbance from non-project wells and facilities is associated with development of oil and gas resources in the Atlantic Rim EIS study area.

The total cumulative long-term disturbance anticipated in the Atlantic Rim EIS study area from oil and gas development, including the 200-well interim drilling program, is almost 700 acres. This disturbance would be associated with 200 CBNG wells, 96 other oil and gas wells, and related facilities.

#### **4.16.1.1. Geology, Minerals, and Paleontology**

Existing, proposed, and reasonably foreseeable future actions would not affect landslide deposits and would be unlikely to trigger events such as landslides, mudslides, debris flows, or slumps. Therefore, no incremental increase in cumulative impacts associated with geologic hazards would occur. The cumulative impacts to the surface geologic environment would be minimized if the Interim Drilling Policy is followed and proper techniques for well pad and facility siting, construction, and reclamation are used. Proposed actions and RFFAs would require reclamation of disturbed lands and would minimize alterations to topography. Standard stipulations and site-specific construction and reclamation procedures would be required for development on federal lands. These measures would further minimize cumulative impacts on the surface geologic environment.

With the exception of CBNG, no major surface mineral resources would be affected by the RFFAs. Subsurface mineral resources are protected by the BLM and WDEQ policies on casing and well bore cementing.

Drilling exploratory wells would contribute to the cumulative knowledge of the occurrence or absence of recoverable CBNG resources within the Atlantic Rim EIS study area, which encompasses 310,335 acres within portions of T13 through T20N and R89 through R92W. If wells drilled under the interim drilling program are productive, these 200 wells would contribute to the cumulative production from the Atlantic Rim Project Area and Wyoming, while at the same time adding to the overall depletion of CBNG resources within the same area.

No cumulative adverse impacts on paleontological resources would occur as a result of the project beyond any discussed earlier in this chapter in combination with other existing, proposed, and reasonably foreseeable actions. Adoption of mitigation measures prescribed in that section could foster cumulative beneficial effects by promoting discovery

of new fossil resources or providing paleontologists with evidence that these resources are absent in the area.

#### **4.16.1.2. Air Quality**

Cumulative impacts from emissions that would result from past oil and gas projects and the proposed 200-well program would be much the same as were found on other oil and gas projects such as the Continental Divide. Emissions from oil and gas facilities approved before 1999 were included in the 3,000-well air quality analysis prepared for the Continental Divide EIS, although only 2,130 wells were approved. The emissions from the 200-well interim drilling program have been incorporated into the air quality model completed for the Continental Divide project.

The Cumulative Impact Analysis completed for the Desolation Flats Natural Gas Field Development Draft EIS (DEIS) also included the 200 exploratory gas wells under the interim drilling program for the Atlantic Rim area (BLM 2003b). Environmental effects of these 200 wells, which would include the proposed project in the Doty Mountain area, were considered for the cumulative emissions inventory.

The CALPUFF model was applied to estimate far-field air quality and AQRV impacts resulting from cumulative emissions from the Desolation Flats Project, state-permitted emission sources, producing natural gas wells, approved NEPA actions, and the 200 exploratory wells, including the proposed Doty Mountain project. Potential impacts on air quality were estimated at the following PSD Class and I and II sensitive receptor areas discussed above: Dinosaur National Monument (Class II), Savage Run Wilderness (Class I), Mount Zirkel Wilderness (Class I), and Rawah Wilderness (Class I).

Ambient concentrations of NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> (particulate matter less than 2.5 microns in effective diameter) were estimated with the CALPUFF model to evaluate potential cumulative impacts. In addition, ambient concentrations were compared with applicable ambient air quality standards and PSD increments. The maximum cumulative impacts from all sources occurred at different sensitive areas, depending on the pollutant considered and the averaging time applied. The CALPUFF model showed that the maximum cumulative impacts from all sources analyzed in the Desolation Flats DEIS did not exceed the ambient air quality standards or the PDS Class I increments (BLM 2003b).

Also analyzed in the Desolation Flats DEIS were the cumulative impacts to visibility and acid deposition at the distant sensitive receptor areas (BLM 2003b). The effects of cumulative emissions on visibility were evaluated using the agency-recommended methods. Two thresholds of change in visibility are used in reporting: the number of days when the change in deciview (delta-deciview) is 0.5 or greater, and the number of days when the value is 1.0 or greater. Impacts on visibility of up to 25 days that exceed the 0.5-deciview threshold are predicted as a result of the cumulative emissions that were analyzed in the Desolation Flats DEIS.

Potential impacts of cumulative emission sources on acid deposition also were analyzed in the Desolation Flats DEIS. Using the method described by Fox (1989), the potential change in acid neutralizing capacity (ANC) was estimated at 12 sensitive lakes in the Bridger Wilderness, Fitzpatrick Wilderness, Popo Agie Wilderness, Mount Zirkel Wilderness, Medicine Bow Wilderness, and Rawah Wilderness. The potential impacts to ANC in the sensitive lakes analyzed were found to be less than the limits of acceptable change (BLM 2003b).

RFFAs, including the relatively small number of exploratory wells and facilities in the interim drilling program, would generate only a small amount of air pollutants. Some temporary effects on air quality would likely occur in the immediate vicinity of interim drilling, created by particulate matter and exhausts from vehicles and equipment. These effects would be local and would be dispersed by the prevailing winds from the west. The effects on air quality would be minimized through dust abatement practices. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, and vehicle emissions from recreation traffic, were not modeled, but would generate only a small amount of air pollutants.

No noticeable deterioration in visibility would occur at Class I or sensitive Class II wilderness areas located within 100 miles of interim drilling (Mount Zirkel, Rawah, Savage Run, Platte River, Huston Park, or Encampment River). Furthermore, no noticeable deterioration in visibility would occur at the Dinosaur National Monument in Colorado. Wind dispersion of the small quantity of air pollutants generated by RFFAs would likely eliminate formation of regional haze or acid deposition.

#### **4.16.1.3. Soils**

The CIA area for soils includes the 219,500-acre portion of the Muddy Creek Watershed that overlaps the Atlantic Rim EIS study area. Cumulative impacts include impacts to soil from ongoing exploration and development, recently constructed projects, and RFFAs. Cumulative long-term disturbance of about 700 acres would be 0.3 percent of the 219,500-acre Muddy Creek CIA area. This amount of cumulative impacts on the soil resources would be minimal if all mitigation and avoidance measures were implemented.

Minimal effects on soils would be anticipated under the interim drilling program with the use of proper construction techniques, drilling practices, and with the BMPs described earlier in this chapter in the section on Soils and Water Resources. Surface disturbance associated with drilling would increase the potential for erosion and sedimentation. This surface disturbance could include removing vegetation and stockpiling topsoil, road construction, or shallow excavations for drill pads or facilities. Implementation of BMPs during construction, operation, and reclamation to control erosion would minimize effects on soil resources. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, recreation use, and conventional oil and gas development, would have a minimal effect on soil resources, provided BMPs for the management of these activities are implemented. The establishment of self-contained troughs in scattered locations to provide for the beneficial use of small quantities produced water where water was previously not available, would reduce use of riparian areas by livestock and wildlife and conserve soil resources.

#### 4.16.1.4. Water Resources

The CIA area for water resources includes the 219,500-acre portion of the Muddy Creek Watershed that overlaps the Atlantic Rim EIS study area. Existing and future disturbance consists of about 700 acres, or 0.3 percent, of the Muddy Creek CIA area. This cumulative disturbance would have minimal impact on the quantity or quality of surface water or groundwater.

The cumulative impacts that would be associated with interim drilling and that would be predicted to occur are based on the current knowledge of the geology, CBNG resources, and groundwater hydrology in the area. Both the rates of natural gas and water production from future wells and specific information on injection cannot be accurately predicted. These variables could affect the configuration of field production, gas processing, and gas and water conveyance facilities; however, none of these changes is expected to measurably affect the conclusions presented here. Federal regulations require additional analysis if substantial changes in resource conditions would alter the conclusions reached in this document.

Impacts to groundwater are not anticipated within the Atlantic Rim EIS study area. The springs in the area are classic “contact” springs, which result from permeable rocks that overlie rocks of much lower permeability. In the Atlantic Rim area, the permeable Browns Park Formation overlies the less permeable Almond Formation. Further evidence that there is no communication between the Almond Formation and the overlying permeable layers is the fact that the Almond Formation is currently overpressured or has a hydrostatic head that is substantially higher than current elevation of the overlying layers. A line of springs can result where this contact is exposed by erosion. No impact to these springs is foreseen from pumping the coal seams in the Almond Formation during the interim drilling program. The source of the springs is infiltrating precipitation, and this source would not be removed by pumping water from the underlying coal seams.

Water wells completed in water-bearing strata above or below the Almond Formation coal seams are not likely to be affected because of the thick confining layers. Water wells completed in the coal seams of the Almond Formation in close proximity (less than 1 mile) to interim drilling projects could be affected, but it is not likely that wells of this type exist. As described in Chapter 2, tests are under way to evaluate whether water from the coal seams in the Almond Formation contributes to the surface water system in the Colorado River Basin. It is highly unlikely that the Almond Formation is contributing to the Colorado River Basin considering that the overpressured condition of the Almond Formation indicates it is isolated and has no communication with upper horizons.

Cumulative impacts to the groundwater resources within the Mesaverde Group would be limited to a decline in hydrostatic head within the coal aquifers targeted that would result from development of gas wells associated with the interim drilling program. Existing impacts to groundwater resources within the Mesaverde Group that have resulted from prior development are so limited as to be nonexistent.

Minimal effects on groundwater aquifers or groundwater quality would be anticipated under the interim drilling program. These effects would be minimized with proper construction techniques, drilling practices, and BMPs similar to the applicant-committed and BLM-required mitigating measures. These measures are described in Chapter 2. Current and future oil and gas exploration and development in the Project Area must comply with federal and state environmental regulations. Specifically, wells would be completed in accordance with Onshore Order No. 2 and the recent BLM guidelines that reduce the potential for groundwater contamination.

Surface disturbance would increase the potential for erosion and sedimentation. This disturbance would be associated with related activities, such as removing vegetation and stockpiling topsoil, road construction, or shallow excavations for drill pads or facilities and existing burned areas within the CIA. Burns, prescribed and otherwise, would increase the potential for erosion and sedimentation for the first 2 years after they occur, because of their effects on erosion of areas without vegetative cover.

Cumulative impacts to surface water resources would be maximized shortly after construction begins and would decrease over time in response to reclamation efforts. These impacts would then stabilize during the production and operation period, when routine maintenance of wells and ancillary facilities takes place. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, recreation use, and conventional oil and gas development, would have a minimal effect on water resources, provided BMPs for the management of these activities are implemented. The establishment of self-contained troughs in scattered off-channel locations for the beneficial use of small quantities produced water, would reduce sedimentation caused by concentrated use of riparian areas along drainage channels by livestock and wildlife, and benefit water quality. Additionally, all roads, well locations, and facility infrastructure would be regularly inspected and maintained to minimize erosion, sedimentation, and impairment of surface water quality. BMPs to control erosion would ensure that surface water resources of the Colorado River Basin would not be affected by surface-disturbing activities.

#### **4.16.1.5. Vegetation, Wetlands, and Noxious Weeds**

The CIA area for vegetation, wetlands, and noxious weeds includes the 219,500-acre portion of the Muddy Creek Watershed that overlaps the Atlantic Rim EIS study area. Cumulative impacts include impacts to vegetation and wetlands from ongoing exploration and development, recently constructed projects, prescribed burns where the sagebrush cover type has been converted to grass and bare ground, and RFFAs. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, recreation uses such as hunting and ORV use, and conventional oil and gas development, would have a minimal effect on vegetation resources, provided BMPs for management of these activities are implemented.

An estimated 20,000 acres have been burned as a result of prescribed fires and 4,000 acres have been affected by wildfires over the past 15 years within a 500,000-acre area that includes the CIA. The objective in prescribed fires is not to burn all vegetation, but to leave mosaics of burned and unburned areas. These burned areas are in various stages of recovery.

Anticipated cumulative long-term disturbance that can be quantified (700 acres) would be 0.3 percent of the 219,500-acre Muddy Creek CIA area. This amount of vegetation loss would be minimal. In addition, no direct effects on wetlands or aquatic and riparian areas would be expected because existing and reasonably foreseeable activities would avoid these areas in accordance with provisions of the RMP. Provided mitigation measures are followed to control erosion, no indirect impacts to aquatic or riparian resources would be expected. Implementation of BMPs during construction, operation, and reclamation would minimize the effects on vegetation resources and the potential for invasive or weedy species to encroach during RFFAs. Cumulative impacts on both vegetation and wetland resources would be minimal, provided all mitigation and avoidance measures specified by the RFO are implemented. The effects on riparian areas caused by use of available forage by livestock and wildlife would be reduced by the establishment of self-contained troughs in scattered off-channel locations for the beneficial use of small quantities produced water away from riparian areas. The cumulative impact of existing and reasonably foreseeable future activities and prescribed burn areas in the CIA area would be a reduction in sagebrush cover and in sagebrush-dependent habitat types. An estimated 95 percent of the prescribed fires conducted by BLM occur in mountain big sagebrush and basin big sagebrush. Wyoming big sagebrush, the main forage for big game and main habitat for sage grouse, would not be affected. Most big sagebrush habitat is mature to decadent, so small disturbances with proper reclamation may provide beneficial turnover to younger plant communities with more variable species composition and structure. This diversity improves the health of the plant community and benefits wildlife, which use these habitats.

The distribution of plant species of concern is likely limited within the Atlantic Rim EIS study area by the lack of suitable habitat. The required application of existing FWS and BLM monitoring and mitigation measures would be expected to adequately protect threatened, endangered, and special status plant species. Thus, impacts to special status species would be expected to be minimal.

#### **4.16.1.6. Range Resources and Other Land Uses**

The CIA area for range resources and other land uses includes the 219,500-acre portion of the Muddy Creek Watershed that overlaps the Atlantic Rim EIS study area. Cumulative impacts include ongoing exploration and development of CBNG resources, recently constructed projects, and RFFAs. Cumulative long-term disturbance of 700 acres under the interim drilling program would be 0.3 percent of the 219,500-acre Muddy Creek CIA area. This amount of cumulative impacts on range resources and other land uses would be minimal if all BMPs are implemented. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, recreation uses such as hunting and ORV use, and conventional oil and gas

development, would have a minimal effect on range resources and other land uses, provided BMPs for management of these activities are implemented.

RFFAs located within the Doty Mountain Allotment include the proposed Doty Mountain Project analyzed in this document, the Blue Sky Project, and the Sun Dog Project. Based on the anticipated disturbance associated with these RFFAs, the cumulative disturbance would be 80 acres in the Doty Mountain Allotment. The estimated 80 acres of cumulative long-term disturbance equates to a small reduction in available forage within the Doty Mountain Allotment. The availability of small quantities of produced water at scattered locations in self-contained troughs that allow no discharge into surface drainages would benefit livestock grazing during the life of the interim drilling program.

#### **4.16.1.7. Wildlife and Fisheries**

##### **4.16.1.7.1. Wildlife**

RFFAs, including the interim drilling program, are expected to have minimal cumulative, short-term effects on wildlife. Some wildlife species may be temporarily displaced by construction at well sites, access roads, and pipeline routes, but should return once construction is complete. Extensive suitable habitats for many species exist on adjacent lands and would support individual animals that may be temporarily displaced during RFFAs. Cumulative long-term effects on wildlife also are expected to be minimal, as most species would become accustomed to routine operation and maintenance. Only a very small proportion of the amount of available wildlife habitats within the Atlantic Rim EIS study area would be affected. As a result, the capacity of the area to support various wildlife populations should remain essentially unchanged from current conditions. The presence of water in upland areas, where not previously available, would benefit wildlife by making more forage obtainable for the life of the project. These water developments could be removed at the end of the project, or could be maintained by ranchers once natural gas development has ended. No cumulative effects on wildlife, including threatened or endangered species or species of concern, are expected during the interim drilling program. This lack of effects is predicted provided avoidance and mitigation measures, lease stipulations, and provisions in the RMP are followed. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, recreation uses, and conventional oil and gas development, would have a minimal effect on wildlife and fisheries resources, provided BMPs are implemented.

The CIA area varies with species, as indicated in the analyses. Disturbance of wildlife habitat that results from RFFAs, including the interim drilling program, would reduce the availability and effectiveness of habitat for a variety of common mammals, birds, and their predators. Initial phases of surface disturbance would result in some direct mortality to small mammals, would displace songbirds, and would cause a slight increase in mortality from increased use of vehicles. However, populations of small mammals and songbirds would quickly rebound to pre-disturbance levels after reclamation is complete because of the relatively high production potential of these species and the relatively small amount of habitat disturbed (0.006 percent of the Atlantic Rim EIS study area). Therefore, no long-term impacts to these populations are expected.

RFFAs, including activities associated with the construction phase of each of the pods in the interim drilling program, would likely temporarily displace antelope, mule deer, and elk; however, once construction is completed, they would likely return to pre-disturbance activity patterns. Elk winter range occurs in the Project Area, but should not be affected by interim drilling. Crucial winter range for the pronghorn occurs only in the Blue Sky area. The proportion of crucial winter range for the pronghorn within the Baggs Herd Unit that would be affected over the short term would be 0.03 percent and would be 0.008 percent in the long term. Crucial winter range for mule deer occurs in well pods not yet proposed. The proportion of crucial winter range for mule deer within the Baggs Herd Unit that would be affected would be 0.05 percent over the short term and 0.01 percent over the long term. Furthermore, construction on crucial winter range would be limited to May 1 through November 14. Prescribed fires are not expected to affect big game, as the burns would not alter the dominant forage. Provided that mitigation measures described in Chapter 2 and the Interim Drilling Policy are implemented, cumulative impacts to big game populations within the herd units are expected to be minimal.

Greater sage grouse occupy the area where interim drilling is proposed year-round and make seasonal use of the habitats. No exact figures are available on the amount of greater sage grouse habitat available within the Atlantic Rim EIS study area, but the RMP identifies the area as included in the Baggs Habitat Management Plan. In this larger area, 160,500 acres of greater sage grouse habitat was identified. Prescribed fires are not expected to affect greater sage grouse, as the height and density of the sagebrush typically treated by burns are outside of the range that greater sage grouse use for nesting and brooding habitat.

The following habitat components area would be affected by RFFAs under the interim drilling program:

- a portion of the ¼-mile NSO radius of a lek
- about 11,005 acres (56.2 percent of the total surface area that would be affected by the 200-well interim drilling program) that overlaps the 2-mile radius of the historical leks in the area
- about 365 acres (3.3 percent) of potential nesting habitat for greater sage grouse would be affected cumulatively by short-term disturbances associated with production
- 112 acres (1.0 percent) would be affected in the long term

Considering the amount of potential nesting habitat available, the 112-acre loss would be minimal. Greater sage grouse within Sierra Madre Upland Game Management Unit (Area 25) would be only minimally affected by the cumulative 361-acre disturbance associated with RFFAs, including interim drilling. This minimal amount affected assumes that provisions and stipulations in the RMP, interim drilling guidelines, seasonal closures, reclamation, and mitigation measures specified by the RFO are followed.

Although no active raptor nests were located in the interim drilling pods during aerial surveys in 2001, the protection measures identified in Chapter 2 and the Interim Drilling Policy are expected to protect the raptor populations within the interim drilling area dur-

ing RFFAs. Therefore, only minimal cumulative impacts to raptors within the Muddy Creek Watershed are likely to occur.

Acreages and burrow densities that are adequate to support black-footed ferrets (200 or more acres with eight or more burrows per acre) are currently estimated to occur in only two of the pods included in the interim drilling program. Surveys for black-footed ferret have been conducted on both of these pods, and no ferrets or ferret sign were found. No impacts to this species are expected as the result of RFFAs, including the proposed 200-well interim drilling program. The lack of impacts is predicted because of the lack of evidence that black-footed ferrets occur and because surveys for the black-footed ferret will be conducted when required (per interim drilling guidelines).

#### **4.16.1.7.2. Fisheries**

Currently, four BLM sensitive fish species ([Appendix E](#)) are known to occur in Muddy Creek and downstream in the Little Snake River (Baxter and Stone 1995). Although it is unlikely, four endangered species of fish have the potential to occur immediately downstream in the Little Snake River. Cumulative impacts from existing, proposed, and reasonably foreseeable development may influence off-site endangered fisheries resources; therefore, potential impacts are evaluated within the boundaries of the Muddy Creek watershed. Additionally, direct impacts to the four BLM sensitive species through increased sediment or depletions of surface water in Muddy Creek may result from the interim drilling program.

Perennial surface waters are limited within the analysis area. Additionally, no contact between the surface springs and coal aquifers that would be affected by the interim drilling program is anticipated. Water used in drilling and construction associated with the interim drilling program would be obtained from wells drilled into aquifers that are geologically isolated from the Little Snake River. Furthermore, they are not generally associated with surface water expression in the Muddy Creek watershed. Therefore, no surface water depletions would occur that would affect BLM sensitive, threatened, or endangered fish species. If the existing, proposed, or reasonably foreseeable development depletes surface water in either Muddy Creek or the Little Snake River (both tributary to the Colorado River and falling under the Colorado River Compact), adverse impacts to the BLM sensitive species could occur. In that case, potential impacts to the four downstream endangered species would require consultation with FWS.

RFFAs are not expected to reduce the number of BLM sensitive, threatened, or endangered adult fish or exclude them from or degrade their spawning areas within the Muddy Creek watershed or in downstream waters of the Little Snake River. Additionally, permitted disturbances associated with well pod development and other actions within the Muddy Creek watershed would employ erosion control measures and construction techniques. These techniques would be suitable to limit off-site movement of soil and degradation of fisheries habitat downstream caused by sediment inputs.

The mitigation and avoidance measures set forth in this EA and standard protection and reclamation measures for wetlands and surface water to protect fisheries resources would be adequate to protect surface waters and the threatened, endangered, and BLM fish spe-

cies of concern. Thus, the cumulative impacts to fish species found within the affected watersheds are expected to be minimal.

The required application of existing FWS and BLM monitoring and mitigation measures to the proposed interim drilling program is expected to provide adequate protection for threatened, endangered, and special status species of fish.

#### **4.16.1.8. Recreation**

BLM has not obtained statistics on historical use of the interim drilling area by recreation groups that could be used to identify trends in cumulative impacts on recreation use and displacement that could result from past or current activities and RFFAs. Cumulatively, overall impacts to the recreation resource are expected to be minimal, with some temporary displacement of hunters and recreationists during the short-term construction and drilling periods. Some long-term displacement of hunters and nonconsumptive users may occur, and there may be reduced levels of satisfaction for any who might continue to use the area. The cumulative effects of other RFFAs in the Atlantic Rim EIS study area, such as prescribed burns that are planned, projected grazing of livestock, and conventional oil and gas development would have a minimal effect on recreation resources, provided BMPs for management of these activities are implemented.

#### **4.16.1.9. Visual Resources**

Existing visual qualities in the interim drilling area and adjacent lands have already been affected by ongoing natural gas development, including road building and pipeline construction. Existing, proposed, or reasonably foreseeable development would add to the level of impact to visual resources in the immediate area. The composite experience of people traveling through the area, particularly on back roads, is a modified landscape. Contrasts in line, form, color, and texture from development begin to dominate the viewer's experience. These conditions would increase the likelihood that viewers would be dissatisfied with the visual component of the recreation experience. However, the cumulative impact of the interim drilling program and other RFFAs, such as grazing, recreation use, prescribed burns, and conventional oil and gas development, on visual resources would still be consistent with the current VRM Class III designation, provided BMPs for these activities that are similar to the techniques described in Chapter 2 would be implemented.

#### **4.16.1.10. Cultural Resources**

Federal law and regulations protect cultural resources on public lands, including archaeological sites and historic properties. Cultural resources in the interim drilling area and adjacent lands already may have been affected by surface-disturbing activities, including ongoing natural gas development, road building, and pipeline construction. Existing, proposed, or reasonably foreseeable development could add to the level of impact on cultural resources in the immediate area unless inventories and protective or mitigation measures specified by BLM are followed. BLM has required cultural resource inventories before surface-disturbing activities can begin. These inventories have been used to

identify sites potentially eligible for inclusion on the NRHP and to identify sites BLM has required past exploration and development to avoid.

The potential for increased impacts on cultural artifacts would be minimized because Class III cultural resource inventories would be completed. Cultural resource inventories would have a beneficial, cumulative impact on the level of cultural information available about the interim drilling area.

It should be possible to eliminate direct and indirect adverse effects on historic properties under the interim drilling program through avoidance or mitigation measures (data recovery or recordation) on a case-by-case basis. The potential for incremental increases in cumulative impacts would be precluded by avoiding known cultural and historical sites during the layout of drill sites, access roads, and pipeline corridors. Some unintentional damage to subsurface resources could occur during grading or excavation. However, implementation of resource protection and mitigation measures similar to the techniques described in Chapter 2 would protect these resources when they are discovered.

#### **4.16.1.11. Socioeconomics**

Southwest Wyoming is currently experiencing an increase in the pace and level of natural gas development. Drilling and field development are occurring near the interim drilling area, including Continental Divide/Wamsutter II, South Baggs, Mulligan Draw, Creston/Blue Gap, Hay Reservoir and, potentially, Desolation Flats. Although this surge in development would result in increased employment, income, and tax revenues in the region, it would also raise the demand for housing and for local and state government facilities and services. Rawlins is also experiencing some growth associated with the opening of a new prison facility.

Communities such as Rawlins and Rock Springs are still below the peak population levels of the early 1980s and have infrastructure and housing in place to accommodate some growth in population. Smaller communities near the Project Area, such as Wamsutter or Baggs, are struggling to accommodate population growth associated with development of the currently approved natural gas fields identified above. Neither the relatively small, short-term drilling and field development workforce nor the minimal operations employment and activity associated with the existing, proposed, or reasonably foreseeable development would add appreciably to cumulative demand for housing and local government services in the area. Drilling and field development associated with these activities would be completed some time before the proposed Atlantic Rim Natural Gas Project begins.

The potential for degradation of the quality of recreation resources in the area would increase if the current accelerated pace of drilling and field development in southwest Wyoming continues. Levels of dissatisfaction among some residents and area visitors would correspondingly increase if Carbon County residents perceive that recreation resources have been degraded.

#### **4.16.1.12. Transportation**

Oil and gas development in western Carbon County and eastern Sweetwater County would result in increased traffic on affected segments of I-80, WY 70, and WY 789. The condition of these highways is adequate to accommodate existing levels of traffic with some increase (Rounds 2000).

Currently known cumulative impacts on Carbon County Roads 605 and 608 would be limited to grazing, recreation, and occasional traffic associated with oil and gas exploration. The increased traffic associated with drilling and field development under the interim drilling program would accelerate maintenance requirements; however, revenues generated, which are described under the section of this chapter on Socioeconomics, should offset associated costs.

#### **4.16.1.13. Health and Safety**

Cumulative impacts to health and safety would be limited to effects associated with the 200-well interim drilling proposal and existing grazing and recreation. Cumulative impacts to health and safety are anticipated to be similar to the effects described for the project. Occasional traffic and activity associated with oil and gas exploration would slightly increase the risks to workers and the public.

#### **4.16.1.14. Noise**

Cumulative noise impacts would be limited to the 200-well interim drilling proposal and existing grazing and recreation. Cumulative noise impacts are likely to be similar to the effects described for the project. Noise would result from ongoing construction, drilling, and production operations, including an estimated nine compressor stations, during the life of interim drilling. Traffic would increase on existing transportation system roads within the area where interim drilling is planned, thus adding to existing traffic noise. The additional traffic-related noise would be minimal given the current and anticipated low volume of traffic and the dispersed nature of traffic and natural gas operations within the interim drilling pods. The locations of the interim drilling pods are dispersed, so that the noise from compressor stations would not likely be noticeable throughout the interim drilling area ([Figure 1-1](#)). The distance between the pods also would minimize the overall impact of noise on visitors to the area; however, the cumulative additional noise from all RFFAs would combine to create an environment with an overall increase in sound disturbances. Applicant-committed and BLM-required mitigating measures for interim drilling activities, similar to the techniques described in Chapter 2 for the project, would result in minimal noise impacts.

### **4.16.2. No Action**

Under the No Action alternative, without a coordinated plan of development for the Project Area, mineral development within the Project Area and other pods within the Atlantic Rim EIS study area likely would still occur. Demand for natural gas locally and nationally likely would result in new proposals for exploration and development. However, reasonably foreseeable mineral development would occur under the guidelines of the

RMP, by development of individual wells with no coordinated planning for the cumulative impacts.

The cumulative impacts could be similar to the effects of the 200-well interim drilling program described above under the Proposed Action, provided the consideration of drilling proposals individually, instead of in a coordinated plan, would not result in additional cumulative impacts. However, considering the difficulty of siting routes for road access and pipelines in the coordinated plan for Doty Mountain so that impacts to important wildlife habitat and cultural resources were prevented, impacts almost certainly would be greater without a coordinated plan.

Cumulative effects of RFFAs other than the 200-well interim drilling program would be similar to the Proposed Action. Grazing, hunting, ORV use, other recreational activities, prescribed burns, and conventional oil and gas development still would occur. These RFFAs would affect soil and water resources, vegetation, and socioeconomics of the Atlantic Rim EIS study area even if RFFAs associated with the interim drilling program did not occur, or did not occur under a coordinated plan. If no coordinated plan were developed, the potential benefits to grazing, soil and water resources, vegetation in riparian areas, and wildlife, that would be associated with a coordinated plan to reduce concentrated use of riparian areas by providing small quantities of produced water where it was previously not available, might be reduced or eliminated.