Amended
Environmental Assessment

Desolation Road Exploratory Gas Wells

Sweetwater County, Wyoming

October 2010

BLM

High Desert District – Rock Springs Field Office

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DOI-BLM-WYD40-2010-43-EA

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1.0 INTRODUCTION

1.1 BACKGROUND

Samson Investment Company (Samson) proposes to develop the Desolation Road Gas Exploratory Wells Project (Desolation Road Project) in Sweetwater County, Wyoming. The U.S. Department of the Interior, Bureau of Land Management (BLM) has determined that an Environmental Assessment (EA) will be prepared for the Desolation Road Project. The Desolation Road Project is located in Township 16 North, Range 96 West in Sweetwater County, Wyoming, approximately 30 miles south of Wamsutter, Wyoming.

Samson submitted an Application for Permit to Drill (APD) to the BLM Rock Springs Field Office (RSFO) in December 2008 for an exploratory well (South Well, DRU #31-28) in Section 28, Township 16 North, Range 96 West, 6th Principal Meridian, Sweetwater County Wyoming (see Figure 1-1). Samson also proposes to drill a second exploratory well (North Well, DRU #34-21) on private surface to the north of the South Well in Section 21, Township 16 North, Range 96 West 6th Principal Meridian, Sweetwater County, Wyoming.

The proposed location of the South Well, DRU #31-28 and portions of the access route for both proposed wells are within the Monument Valley Management Area (MVMA) as designated in the Green River Resource Management Plan (RMP) (BLM 1997). Both locations and the access route are outside of the Adobe Town Wilderness Study Area (WSA), with the southern well located approximately 1.5 miles north of the Adobe Town Wilderness Study Area (WSA) boundary.

The proposed action includes construction of a new well access road approximately 5.42 miles in length. Depending on exploration results the wells could go into production, get shut-in pending decisions by Samson, or would be plugged, abandoned, and reclaimed. A second alternative includes upgrading 5.38 miles of existing two-track and constructing 0.95 miles of new road to access the proposed wells. Under the Proposed Action, total land disturbance is estimated at 30.1 acres, and 32.6 acres under Alternative 2.

This Environmental Assessment (EA) for the Desolation Road Exploratory Gas Wells (Desolation Road) proposal has been prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. Prior to authorizing gas exploration and well development on Bureau of Land Management (BLM) administered lands, the environmental and social effects of those actions must be evaluated on all federal and non-federal lands within the potentially affected areas. The purpose of this EA is to disclose the potential direct, indirect, and cumulative effects of the Proposed Action, Alternative 2, and the No Action alternative. This EA will be used for evaluation of the alternatives and to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). The BLM will make its decision based on consideration of the purpose and need for the proposal, the significance of the effects of alternatives, and the public concerns (based on public comments). If impacts are not significant, as defined in 40 Code of Federal Regulations (CFR) 1508.27, a Decision Record (DR), and FONSI will be prepared. The DR and FONSI, along with the final EA, will be made available to the public. If impacts are determined to be significant, the EIS process will be initiated. For this proposal, the responsible official is:

Lance Porter, Field Manager
Bureau of Land Management
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901

1.2 PURPOSE AND NEED

Exploration and development of federal oil and gas leases by private industry is an integral part of the BLM oil and gas program under authority of the Mineral Leasing Act of 1920 as amended, the Mining and Minerals Policy Act of 1970, the Federal Land Policy and Management Act of 1976, the National Materials and Minerals Policy, Research and Development Act of 1980, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. The Energy Policy Act of 2005, which promotes the development of oil and gas resources by facilitating oil and natural gas production from existing federal oil and gas leases.

In addition, the Green River Resource Management Plan (BLM 1997) includes a mineral resource objective that provides for leasing, exploration, and development of oil and gas, while protecting other values. The management action states that BLM-administered public lands not specifically closed are open to consideration of oil and gas leasing with appropriate mitigation measures. Timing limitations (seasonal restrictions) will be applied when activities occur during crucial periods or would adversely affect crucial or sensitive resources. The area at the proposed South Well is open to oil and gas leasing with appropriate mitigation measures and timing limitations.

The proposed natural gas development would allow the leaseholder to exercise their rights within the project area to drill for, extract, remove, and market natural gas products. Also included is the right to build and maintain necessary improvements.

The Proposed Action allows the leaseholder to explore for, test the feasibility of future development, and develop oil and gas resources on federal and private oil and gas leases within the Desolation Road Unit including federal oil and gas lease WYW-147885.

Based on review of this EA and taking into consideration other factors, the BLM will make a decision on which of the three alternatives would be approved. As part of the BLM decision making process a determination that the selected alternatives is in conformance with the approved RMP and will not have any significant impacts on the human environment would need to be made. If a determination of potential significant impact is made, and Environmental Impact Statement could be required.

1.2 CONFORMANCE WITH LAND USE PLANS AND TIERING

The RSFO, as required by 43 CFR 1610.5, has determined that the Desolation Road Proposal conforms to the decisions, guidelines, and terms and conditions in the Record of Decision of the Green River RMP (BLM 1997). This EA is tiered to the BLM Green River RMP (BLM 1997) and the additional documents associated with the RMP. The RSFO has determined that the oil and gas exploration under the Desolation Road Proposal meets the management conditions and mitigation requirements for the MVMA, given the required restrictions and stipulations in the Green River RMP. Additionally, this EA is tiered to the Record of Decision for the Desolation Flats Natural Gas Field Development Project (BLM 2004) including, but not limited to, the general description of potential impacts from oil and gas development, the cumulative impacts of oil and gas development in the region, and the impacts of development in the MVMA and near the Adobe Town WSA.

1.2.1 Approval of Desolation Road Unit

Samson is drilling the South Well in partial satisfaction of its obligation to drill two initial obligation wells pursuant to the terms of the Desolation Road Unit Agreement. The Desolation Road Unit (DRU) (BLM Serial No. WYW-177629X) was approved by the BLM on December 22, 2008. The Mineral Leasing Act of 1920 (MLA) authorized the Secretary of the Interior to approve agreements unitizing leases upon a determination that the unitization is "necessary or advisable in the public interest" and "for the purpose of more properly conserving natural resources." 30 U.S.C. § 226(m); *see also* 43 CFR 3183.4(a). A Unit Agreement is a contract between private parties and the BLM regarding the development and operation of a particular geographic and geologic area. In this case, Samson is

the designated, BLM-approved unit operator although Anadarko Petroleum also owns oil and gas minerals within the DRU.

Unitization Agreements do not authorize on-the-ground development activities. In fact, unitization authorizes no development rights that oil and gas lessees do not already possess by virtue of holding the oil and gas lease. Unitization promotes conservation and efficiency by allowing exploration and development to occur in accord with geologic and geophysical conditions, rather than dictated by lease boundaries. Absent unitization, each lease could be developed and, in fact, individual wells must be drilled on each individual lease in order to extend leases into their secondary terms. A Unit Agreement may allow unitized leases to be held by production companies on a unit basis, rather than on an individual lease basis. The Agreement removes the necessity of commencing operations and constructing access roads, drill pads, waste pits, and other infrastructure on each lease. A Unit Agreement, therefore, allows development within a unit area to occur on a less intensive scale reducing the potential impacts of development. Under the terms of a Unit Agreement, leases may be developed with the fewest number of wells and the least potential environmental impacts. Overall, Unit Agreements benefit both the public and the lessee by reducing environmental impacts of drilling, while saving the lessee the cost of drilling multiple wells.

The BLM previously approved the creation of the DRU. The information regarding the approval of the DRU is included herein solely as background for the reader and to the extent the approval of the Unit may be considered a connected action. The BLM is not approving the Unit Agreement as part of the instant EA because the Unit Agreement was approved in 2008, and that approval was categorically excluded from NEPA documentation.

1.3 Relationship to Statutes, Regulations, or Other Plans

Development of federal oil and gas leases is an integral part of the BLM oil and gas leasing program under the authority of the MLA of 1920, as amended; the Mining and Mineral Policy Act (MMPA) of 1970; the Federal Land Policy and Management Act (FLPMA) of 1976; the Federal Oil and Gas Royalty Management Act of 1982 (Pub. L. No. 97-451); the Federal Onshore Oil and Gas Leasing Reform Act (FOOGRLA) of 1987; and the Energy Policy Act of 2005, which promotes the development of oil and gas resources by facilitating oil and natural gas production from existing federal oil and gas leases. The BLM oil and gas leasing program is intended to encourage the development of domestic oil and gas resources, thereby reducing national dependence on foreign energy supplies.

This EA has been prepared in accordance with the NEPA (42 U.S.C. §§ 4321– – 4347), as amended. The regulatory framework that governs oil and gas drilling, production, and abandonment involves a number of policies, legislation, and regulations. The Desolation Road Proposal is being evaluated in accordance with requirements of Onshore Oil and Gas Operations (43 CFR 3160), BLM Onshore Oil and Gas Order Nos. 1 through 7 (43 CFR 3164.1), Notices to Lessees (43 CFR 3164.2), NEPA and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR 1500-1508), and the BLM NEPA Handbook H-1790-1 (BLM 2008).

1.4 Scoping

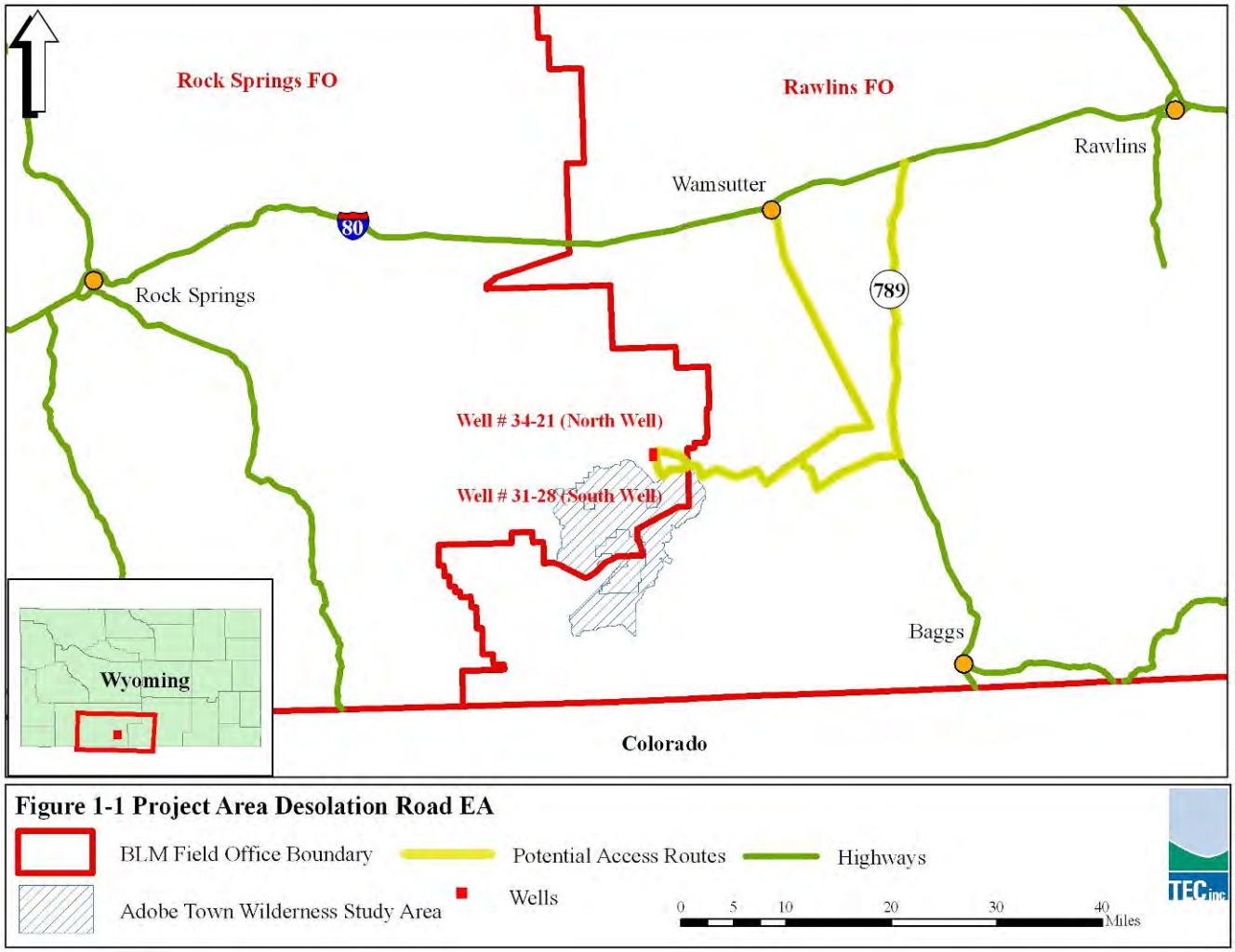
Because of public interest in this proposal, the scoping process was extended beyond the customary period. The scoping process included two public comment periods. The first was a 30-day scoping period from December 1 to December 30, 2008. The second was a 15-day public comment period from June 1 to June 15, 2009. During the two scoping periods, the RSFO received 35 comment letters. The comments covered a wide range of issues and concerns, many of which expressed concerns about potential impacts from future gas development to wilderness study areas, visual resources, recreation, and wildlife. A summary of the scoping comments is included as Appendix C of this EA. In addition to written comments, one site visit was scheduled for the public on December 9, 2008, but was cancelled because of inclement weather.

1.5 Issues

In addition to the public comment collected during the scoping process, a BLM interdisciplinary team considered issues associated with and the potential consequences for various natural resources of the Proposed Action, Alternative 2, and the No Action Alternative. Chapter 2 of this EA contains a description of the three alternatives, and Chapter 3 contains a description of resources considered. The following are the key issues identified during the public comment period and by the BLM interdisciplinary team. These issues were used as basis for evaluation of potential impacts in this EA:

- Potential weed infestation as a result of ground disturbance.
- Air emissions from vehicles, rigs, and flare stacks during drilling.
- Potential for contamination of groundwater aquifers in the MVMA, an important groundwater recharge area.
- Potential conflicts with management objectives and decisions for the MVMA.
- Potential for an increase in soil erosion at the well site and the potential of associated sediment loading to nearby streams.
- Potential visual impacts to the visiting public related to the wells.
- Potential impacts to cultural and paleontological resources resulting from ground-disturbing activities.
- Potential visual impacts to the Adobe Town WSA and MVMA and a related loss of natural backcountry recreational experience.
- Potential impacts to wildlife, including mountain plover nesting habitat, sage-grouse, nesting raptors, white-tailed prairie dog colonies from noise and other disturbance during construction and drilling.
- Potential impact to pronghorn antelope in their crucial winter range.
- Potential disruption of the pronghorn antelope hunting season.
- Potential impacts to federally-listed and BLM sensitive wildlife and plant species.
- Concern about reclamation success in areas disturbed during construction and drilling.
- Concern about the wilderness qualities, and potential designation as Area of Critical Environmental Concern.
- Concern that the requirements of the Green River RMP are being followed.
- Potential for reducing impacts through the use of directional drilling, carpooling, and other practices.
- Ensure that the EA analysis is comprehensive including impacts to wildness qualities.
- Potential impact to wild horse management area.
- Concern about the irretrievable loss of the unique and rare characteristics of the area.

Figure 1-1. Project Area Desolation Road EA



2.0 PROPOSED ACTION AND ALTERNATIVES

The Desolation Road Proposal is defined as a federal undertaking and all federal requirements will be applied to ensure protection of the environment. The majority of surface disturbance would occur on BLM-managed lands, although one proposed well location is on private surface and portions of the access road under the Proposed Action (Alternative 1) and Alternative 2 cross a portion of private surface (Figure 2-1, Figure 2-2 and Table 2-1). Three alternatives are described in this chapter as part of the analysis of the Desolation Road Exploratory Gas Wells Proposal (Table 2-2). Alternative 1 is the Proposed Action, which would include two new well pads and a new access road. Alternative 2 would be similar to Alternative 1, except an existing two-track road would be upgraded and improved rather than constructing a new access road. Under the No Action Alternative, the BLM would reject Samson's proposal to drill an exploratory well and construct/upgrade the associated access roads to explore for natural gas, as described in Alternatives 1 and 2.

Because the North Well (DRU #34-21) site is located on private surface with private mineral ownership, the well pad and associated infrastructure are not subject to BLM requirements, but are subject to State of Wyoming Oil and Gas Conservation Commission (WYOGCC) regulations. Under NEPA, however, construction of the access road across federal land to the North Well site is considered a "connected action", since project activities on the private surface are connected to activities on federal land, and would not likely occur without access across BLM-managed public lands. Consequently, the EA analysis includes a description of the effects of both the North Well and the South Well (DRU #31-28), along with the road construction and or upgrades.

Table 2-1. Summary of Major Project Components for the Desolation Road Exploratory Gas Wells Proposal

	South Well	North Well
Well Number	Desolation Road Unit #31-28	Desolation Road Unit #34-21
Location (6th P.M.)	Section 28, T16N, R96W	Section 21, T16N, R96W
Quarter-Quarter Section	NWNE	SESE
Access Road Location	Sections 21-23,25-26, and 28 T16N, R96W; Sections 30-31 T16N, R95W	Sections 21-23,25-26 T16N, R96W; Sections 30-31 T16N, R95W
Production	Natural Gas	Natural Gas
Surface Ownership	Federal – BLM managed	Private – Fee
Mineral Ownership	Federal – BLM managed	Private – Fee
Management Area	MVMA	Not applicable to fee land
Well Depth (feet)	11,000	11,000

Table 2-2. Estimated Disturbance by Alternative

	Proposed Action –Alternative 1	Alternative 2
South Well Pad (acres)	4.78	4.78
North Well Pad (acres)	4.78	4.78
New Access Road (acres)	20.51	3.45
New Access Road (miles)	5.42	0.95
Improvements to Existing Roads (acres)	0	19.56
Improvements to Existing Roads (miles)	0	5.38
Intermittent Drainage Crossings	4	8
Ephemeral Drainage Crossings	8	20
Total Project Disturbance (acres)	**30.1**	**32.6**

2.1 Management Objectives Common to All Alternatives

The South Well and the majority of the access road would be on lands leased under the Green River RMP. The management objective for minerals management of BLM-administered Federal minerals is "to maintain or enhance opportunities for mineral exploration and development, while protecting other resource values" (Green River RMP, pg. 11, BLM 1997).

Portions of the proposed access road would be located in the MVMA. The Green River RMP (BLM 1997) identifies relevance criteria and importance values of the MVMA. These criteria include unstable, fragile soils; unique ecological features; watershed and cultural values; and sensitive species of regional, national, and international importance.

The management objectives for the MVMA are to provide protection of wildlife, geologic, watershed, scenic, and scientific values (cultural and paleontological) Green River RMP, pg. 37 (BLM 1997).

Specific management objectives for the MVMA include the following:

- The area is a priority area for future cultural and paleontological inventory. Cultural and paleontological surveys are required prior to surface-disturbing activities.
- Surface-disturbing activities, including rights-of-way (ROWs), will be managed to avoid slopes greater than 25 percent and highly erosive areas, unless a plan can be developed to mitigate adverse effects to the resource values.
- Off-road vehicle travel is limited to designated roads and trails.
- The entire area will be managed consistent with the Class II visual resource management (VRM) classification. All management actions will be designed and located to blend into the natural landscape and not be visually apparent to the casual viewer.

2.2 Alternative 1 - Proposed Action – New Road Access

Samson proposes to drill two exploratory gas wells; one drilled on BLM-administered public land and a second drilled on adjacent private land, both within Sweetwater County, Wyoming (see Figure 2-1, and Figure 2-2). The proposal includes the following actions:

- Construction of one well pad on BLM-managed surface and minerals and one well pad on private surface with privately owned minerals;
- Construction of a new access road;
- Drilling, completion, and testing of the wells;

- After testing, the wells would either be put into production, shut in pending further action, or plugged, abandoned, and reclaimed.
- If the well(s) go into production, additional construction of facilities would include well pad equipment, features, and a pipeline from each well pad.

South Well (DRU #31-28) pad disturbance on federal land is estimated to be 4.78 acres. North Well (DRU #34-21) pad disturbance on private lands is estimated to be 4.78 acres. Total potential disturbance from construction of the new access road is approximately 20.51 acres. Access roads would also cross four larger intermittent drainages (intermittent streams generally flow for several weeks or months each year) and eight smaller ephemeral drainages (ephemeral drainages only flow after precipitation events). Total potential project disturbance is estimated to be 30.1 acres (Table 2-1).

2.2.1 Lease Stipulations

The proposed South Well site and proposed access road are subject to BLM (federal) lease stipulations. The lease stipulations include Controlled Surface Use (CSU), Timing Limitation Stipulation (TLS), and a special lease stipulation. The CSU refers to an oil and gas stipulation that allows use and occupancy (unless restricted by another stipulation), but requires special operational constraints that may modify the lease rights for identified resource values. The CSU serves as operating guidance, not as a substitute for the No Surface Occupancy (NSO) or TLS. This term is also applied to surface use activities other than oil and gas. It is the definition of CSU that supports the No Action Alternative and the option of denying the proposed action.

Below is a summary of the lease stipulations for the proposed South Well located on federal surface and for federal minerals.

1. Lease area may contain protected cultural properties and/or resources. The operator must complete its obligations under applicable regulations prior to receiving BLM approval. The BLM may require modifications to protect such properties/resources.

2. There is a no surface disturbance stipulation from November 15 to April 30 for pronghorn antelope crucial winter range.

3. Surface occupancy and/or CSU may be restricted within the MVMA to protect steep slopes—those greater than twenty-five percent (>25%), visual resources, recreation, watershed, cultural resources, and wildlife values. The operator must develop a mitigation plan to offset the anticipated impacts that are acceptable to the RSFO, prior to receiving BLM approval.

4. This lease area may contain threatened, endangered, or other special status species or their habitats. The BLM may modify or reject activities to further conservation and management objectives and to avoid activities that will contribute to a listing of species or their habitat. The BLM must fulfill its obligations under the federal Endangered Species Act (ESA), BLM regulations and policies, and State of Wyoming regulations prior to approving any ground-disturbing activities that may impact the sage sparrow, loggerhead shrike, sage thrasher, sage-grouse, pygmy rabbit, Wyoming pocket gopher, and Ute ladies'-tresses.

2.2.2 Access Road Construction

Access to both pad sites is provided from the east via State Highway (SH) 789 to the BLM Standard Road, located at milepost 29, south of Creston Junction, Wyoming, and traveling west for approximately 25.6 miles. Some upgrade and maintenance of the existing BLM roads may be necessary. A new 5.42-mile long access road would be constructed for the final leg to the proposed South Well pad (Figure 2-1). This includes a new 130-foot long access road section from the new access road to access the North Well. The new access road includes a section of

previously reclaimed road. Construction activities would begin after approval of the EA, APDs, and appropriate ROWs, and during times when there are no timing stipulations.

The new access road would be constructed to BLM standards as a resource road in accordance with the *Surface Operating Standards for Oil and Gas Exploration and Development, The Gold Book* (Gold Book) (BLM 2007). The road would be completed prior to moving drilling equipment to the location. Because these are exploratory wells, there would be only minor improvements to the new access road during drilling activities. If the wells are commercially productive, the road would be upgraded to a crowned and ditched, single lane 16-feet wide subgrade road prior to beginning production operations. The road would include ditches designed to carry away water and prevent saturation of the subgrade and surfacing materials. Runoff and erosion control measures, such as water bars, berms, and interceptor ditches, would be installed as specified in Chapter 4 of the Gold Book and at the direction of the BLM Authorized Officer (AO). No turnouts, major cuts, fills, culverts, or bridges are planned along the proposed access road. No gates, fence cuts, cattleguards, or modification to existing facilities would be necessary along the proposed access route. Low water crossing techniques would be used to cross ephemeral and intermittent washes. If the access road is dry during drilling and/or completion activities, dust control measures may be applied to minimize soil loss as a result of wind erosion. All access road disturbance estimates assume a 30-foot ROW corridor with a 16-foot travel width.

During construction, topsoil and vegetation will be windrowed to the edge of the disturbance and would be reclaimed by redistribution along the back slope of the ditch. Reclamation and seeding would be accomplished in accordance with the Surface Use Plan and site-specific Conditions of Approval (COA).

2.2.3 Well Pad Construction

For the South Well, an approximate 4.78-acre well pad would be constructed. For the North Well, an approximate 4.78-acre well pad would be constructed pursuant to WOGCC and landowner requirements. For both wells, a reserve pit approximately 90 feet wide by 220 feet long by 10 feet deep would be constructed on the well pad for the drilling operations and permanent disposal of the cuttings. The pits would be lined with a 12-mil liner.

Construction of the well pads and access road would use a combination of heavy equipment. Estimated equipment types or equivalents include: a D8 crawler tractor; Class 12 motor graders; 160G motor grader; mid-sized backhoe; and 20-yard belly-dump trucks. Approximately 10 large truck trips would be needed to move equipment to and from the site during the 15-day construction period.

Best Management Practices (BMPs) for erosion control, soil viability, and maintenance would be followed during construction and drilling operations. In order to clear surfaces for well pad construction, a crawler tractor would strip existing topsoil and brush, and would stockpile the topsoil along the uphill side of the well pad to prevent any possible contamination and soil loss. Cut and fill slopes needed for the well pad would be constructed so that slope stability would be maintained. Diversion ditches and berms would be constructed to achieve zero runoff from the well pad. Energy dissipaters such as straw bales and silt fences may be used in areas where the possibility of erosion or down-cutting exists.

2.2.4 Drilling Operations

Drilling operations would be conducted in compliance with Federal Onshore Oil and Gas Onshore Orders, BLM regulations and applicable Notices to Lessees, Wyoming regulations, approved APDs, COAs, and other applicable rules and regulations. After construction of the well pad and access road is complete, drilling equipment would be moved to the well pad. The South Well would be drilled first, with development of the North Well dependent on the results of the South Well. For each well, the total equipment transport, rig-up activities, and installation of ancillary facilities would take approximately 5 days to complete. Drilling would require transport to and from the site with approximately 50 to 70 truckloads of drilling-related equipment and materials. It would take approximately 20-30 days to drill each well to a total expected vertical depth of 11,000 feet. The extent of additional traffic would

depend on the phase of the drilling operation. Other support trucks, such as a mud truck, would make additional trips during the drilling phase. Site-specific descriptions of drilling procedures and equipment for the South Well are included in the BLM APD for the well.

A diesel-powered drill rig would be used to drill each well. The exact type and size of rig would be dependent upon rig availability at the time of drilling operations. Approximately 10,000 barrels of water are expected to be used for drilling each well. Early in the drilling operations, surface casing would be installed in the well. Surface casing would be set and cemented to the surface to protect freshwater aquifers. Completion operations would commence after the drilling rig moves off location. Site-specific descriptions of drilling procedures and equipment are included in the South Well APD.

Drilling operations generally continue 24 hours per day until completed. Because of timing limitation stipulations, the construction, drilling, and completion operations would occur between September 10th and November 15th, unless otherwise approved by the BLM AO. The timing limitations do not apply to the North Well; however, constructing the access road and accessing the site through BLM-managed land would be subject to timing limitations.

2.2.4.1 Reserve Pit and Cuttings Disposal

Once drilling operations are complete, the drill cuttings would be dried out and buried in the reserve pits, in accordance with BLM and State of Wyoming requirements. The reserve pits would measure approximately 90 feet wide by 220 feet long by 10 feet deep and lined with 12-mil liner Produced water held in the pit would be hauled to Samson's permitted disposal facility located in Wamsutter, Wyoming for proper disposal.

2.2.5 Well Completion

After each well is drilled, completion operations would commence. Completion operations would involve setting casing to the total depth of the well and perforating the casing in target production zones, followed by hydraulically fracturing the formation under high pressure, and then testing the well for gas production. Approximately 8,000 barrels of hydraulic fracturing fluid (primarily water) would be needed. Hydraulic fracturing fluids would be stored in onsite tanks. Any excess or used hydraulic fluid would be hauled to Ice Cycle, which is a produced water treatment and disposal facility owned by Samson in Wamsutter, Wyoming for proper disposal. Equipment transport and setup would take several days, and the hydraulic fracturing would take approximately three to five days. The well would then be tested, which would require approximately five days and include setup of a workover rig.

Vehicle traffic would increase during hydraulic fracturing operations in order to mobilize the equipment and hydraulic fracturing fluid to the well site, including support vehicles, such as water trucks. Additional vehicles would be needed for worker access. A pit is expected to be used during testing and completion operations. The flare pit would be located a minimum of 100 feet from the wellhead. Because no commercial sales pipelines would be in place at this point in the operations, flaring is the only practical means of burning off the natural gas that is produced during testing operations.

2.2.6 Well Production

If a well is determined to be productive, the well could be shut-in pending further actions, or the natural gas could be shipped to market. Sending the natural gas to market would entail a number of actions. First would be installation of necessary facilities on the well pad. These facilities could include installation of a separator to remove natural gas from water and condensates. To store the produced water and condensates, tanks would be installed along with secondary containment. Production would also include installation of a metering system to measure gas flow.

Initially a temporary, approximately 8.1-mile long aboveground, 4-inch gas pipeline would be installed along the access road ROW to the nearest natural gas trunk line. The temporary pipeline would be needed to test whether commercial quantities of gas would be produced over time. If commercial quantities of gas are produced over time,

a buried gas pipeline following the access road would be installed. The exact pipeline location would be based on BLM AO authorization.

If a well was not productive, then the site would be reclaimed in accordance with the BLM AO, and the APD COA, considering wildlife stipulations and weather. Well abandonment is described in Section 2.2.11.

The South Well would be drilled first, with the North Well drilled only if the South Well is productive.

During the production and operation phase, vehicle traffic and well maintenance activities would result in emissions of fugitive dust and vehicle exhaust emissions. Vehicle traffic to the South Well during production would amount to approximately one to two vehicles trips per day. Diesel combustion equipment would be required at well sites during production.

2.2.7 Water Use

Water for drilling, completion, and dust abatement would be obtained from a private water source located outside the Project Area and transported to the well sites by an approved commercial water hauler. Approximately 10,000 barrels of water would be needed to drill each well, 8,000 barrels would be needed for completion activities and approximately 1,000 barrels of water would be needed for dust abatement (depending on weather conditions). An estimated 19,000 barrels (or 2.45 acre-feet) of water per well may be used during the construction, drilling, and completion operations.

Depending on the source of the water, water use for this project may fall under the Colorado River Endangered Fish Recovery Program. The purpose of this program is to recover endangered fish while also providing for future water development for human use. To help accomplish this, recovery program managers have developed an agreement clarifying how the Fish and Wildlife Service will apply Section 7 of the Endangered Species Act to water development projects in the upper Colorado River Basin. Under the agreement, impacts associated with new water depletion projects are offset by recovery program accomplishments and by a one-time contribution made by the water project. There is no charge for existing depletions or for new depletions of less than 100 acre-feet of water.

2.2.8 Solid Waste Management and Sanitation

Self-contained, chemical portable toilets would be provided. The holding tanks would be pumped out, as needed, and the contents disposed in the nearest approved sewage disposal facility.

Garbage, trash, and other non-flammable waste materials would be collected in portable, self-contained, fully-enclosed trash containers during operations. Accumulated trash would be disposed at an approved sanitary landfill. Trash would not be burned or buried on location.

All debris and other waste materials, not contained in the trash containers, would be removed from the location as soon as safe and practical after removal of the completion rig. No potentially hazardous materials or substances will be left on the location.

2.2.9 Spill Response

If spills of oil, condensate, or other fluids occur during the construction, drilling, completion, or abandonment, Samson or their contractors would immediately begin cleanup operations and contact the BLM and other required regulatory agencies (e.g., Environmental Protection Agency [EPA] National Response Center, State of Wyoming). A Spill Prevention, Control, and Countermeasures (SPCC) Plan would be prepared and remain on site during the drilling and completion operations.

2.2.10 Hazardous Materials

Samson would maintain on site Material Safety Data Sheets (MSDSs) for all chemicals used during construction, drilling, and completion operations, in accordance with 29 CFR 1910.1200(g). Potentially hazardous materials, which may be found on site, would include drilling mud and cementing products (primarily inhalation hazards); fuels (flammable and combustible materials); materials that may be necessary for well completion/testing (flammable or combustible materials); and acids/gels (corrosives). No Superfund Amendments and Reauthorization Act (SARA) listed Extremely Hazardous Substances (EHS) would be used or stored on site. Samson also maintains an Emergency Response Plan for its operations.

2.2.11 Reclamation

2.2.11.1 Interim Reclamation

Interim reclamation would be conducted on facilities and portions of the well pad no longer needed during production operations. The reserve pit would be covered with no less than five feet of soil, and mounded over to allow for soil settling. Facilities remaining after completion would include the wellhead, fencing, and paneling around the wellhead. Soil stabilization activities would include reseeding and installing or upgrading BMPs, as needed. Samson should begin reclamation as soon as practical after the completion of the well and as soon as the drilling facilities are removed. This will expedite re-establishment of re-vegetation and reduce soil loss in the area's poor reclamation potential soils.

2.2.11.2 Well Abandonment and Final Reclamation

If the well is determined to be non-commercial, the well would be "abandoned" and the area returned to the condition that existed prior to the initiation of the gas development project. Upon abandonment, the borehole would be plugged, capped, and its related surface equipment would be removed. A Sundry Notice would be submitted to the BLM for approval that would describe the engineering, technical, and environmental aspects of final plugging and abandonment. The notice would also describe final reclamation procedures and any mitigation measures associated with final reclamation. The BLM standards for plugging and abandonment would be followed.

Earthwork would consist of recontouring the well pad, constructed access roads, and other disturbed areas to approximate the original ground contours, and final grading and replacement of top soil. All disturbed areas would be seeded with the seed mixtures listed in the APD that are certified to be weed-free. Seeding and maintenance would be repeated, as necessary, until approved by the BLM AO. Noxious weed control measures would be undertaken, as needed, to control weed outbreaks. If necessary, the site will be fenced to limit livestock and wildlife access to ensure re-vegetation.

2.3 Alternative 2 – Existing and New Road Access

Alternative 2 would be the same as described under Alternative 1 (Proposed Action), with the exception that Samson would access the proposed North and South well sites by improving the existing two-track road that is located along the northern boundary of the Adobe Town WSA, and constructing a small section of new road to access the South Well site (DRU #31-28) and another segment to access the North Well site (see Figure 2-1 and Figure 2-2). A re-route of a portion of the existing two-track is required to avoid two known archeological sites (see section 4.8.2).

Under Alternative 2, the potential disturbance for the South Well pad on federal land is estimated to be 4.78 acres and an additional 4.78 acres for the North Well. Estimated road disturbance would be 19.56 acres from the improvements to existing two-track roads, and 3.45 acres from construction of the new access road. The total estimated project related disturbance 32.6 acres. Access roads would cross eight larger intermittent drainages and up to 20 smaller ephemeral drainages.

2.4 Alternative 3 - No Action Alternative

NEPA and its implementing regulations require that a No Action Alternative be evaluated for comparison with the Proposed Action. The No Action Alternative serves as a benchmark, enabling decision-makers to compare the magnitude of environmental effects resulting from the Proposed Action with a No Action Alternative. Under the No Action Alternative, the BLM would reject Samson's proposal to drill the exploratory South Well and associated access road to explore for natural gas, as described in the Proposed Action. As a result, there would be no new disturbance to vegetation, wildlife, special status plant and animal species, soil, cultural resources, paleontological resources, recreation, surface water and groundwater, range resources, and other resources.

2.5 DESIGN FEATURES

Design features are those specific means, measures, or practices that make up the proposed action and alternatives. Additional design features are added as needed to the proposed action or alternatives. Regulations, standard operating procedures, stipulations, and operator commuted measures, and best management practices are usually considered design features. For example, if the Action sites a reserve pit for drilling fluids away from areas of shallow groundwater, this is a design feature, not mitigation. Design features are incorporated into the Proposed Action or alternatives to reduce or avoid adverse effects.

Because the formulation of alternatives and the impact analysis is often an iterative process, additional means, measures or practices can be identified through impact analysis process. If any means, measures, or practices are not incorporated into the Proposed Action or alternatives, they are considered mitigation measures. Mitigation measures, if needed, are listed at the end of each environmental consequence section. Mitigation measures are added only if the design features do not reduce or avoid adverse effects to protected resources.

Below are some of the more relevant design features that would reduce or eliminate adverse effects after the initial formulation of alternatives.

2.5.1 Pre-Project Design Features

As part of the onsite visit for the APD and the NEPA scoping process, adjustments were made to Samson's Proposed Action. The changes are intended to ensure that the Proposed Project is in accordance with BLM requirements. The additional design features would reduce impacts to other important resources in the Project Area. Changes to the original project proposal include the following:

- The original proposal involved the use of the existing road that runs along the boundary of the Adobe Town WSA. This existing road is in poor condition and contains known cultural resource sites. The BLM determined that a new road to the north of the existing road should be constructed to avoid visual impacts into the Adobe Town WSA, and avoid cultural resource sites.

- In order to reduce visual impact to the VRM I Adobe Town WSA and VRM II MVMA the proposed well pad locations were moved in order to occupy low-lying areas behind bluffs. In addition, low profile facilities, painted to match the landscape, would be used during production.

- In order to reduce the visual impacts to the VRM II MVMA, the BLM proposed and Samson agreed to keep the new access road in lower elevation areas and non-linear.

- Due to erosive and saline soils in the area, the BLM determined that a low water crossing approach would be used to reduce the risk of stream bank and stream bottom erosion.

2.5.2 Relevant Environmental Protection Measures

The following list summarizes some relevant means, measures or practices, including applicant-committed environmental protection measures that would be implemented by Samson to avoid, minimize, or reduce environmental impacts (see Appendix E).

2.5.2.1 Air Quality

- Members of the construction and drilling crew would be encouraged to car pool to and from surrounding towns to minimize vehicle-related emissions.

- In accordance with regulatory requirements, Samson will comply with EPA and Wyoming Department of Environmental Quality (DEQ) air quality standards for diesel powered drill rig engines and other applicable DEQ Minor Source Regulations.

2.5.2.2 Cultural/Paleontological Resources

- If cultural or paleontological resources are discovered during construction and drilling activities, all activity within the immediate area would cease. Samson would immediately notify the BLM of the discovery. The BLM archaeologist and Wyoming State Historic Preservation Office (SHPO) representatives would then determine how to avoid impacting the site or artifact.

- Well pads and associated equipment would be placed in an area that is not visible from the Adobe Town WSA and where visibility is reduced, to the extent possible, from the Haystacks area.

2.5.2.3 Water Quality

- Drilling cuttings would be buried onsite, in accordance with all state and federal regulatory requirements.

2.5.2.4 Erosion and Sedimentation Control

- No cross-country travel would be allowed and all vehicles would be restricted to permitted roads and approved ROWs.

- Employees and contractors would be instructed to travel at appropriate speeds to limit disturbance to soils and vegetation, and to minimize the potential for vehicle-wildlife and vehicle-vehicle collisions.

- Samson would apply water to access roads and well pads, as directed by the BLM AO to reduce dust (also applicable for air quality).

- At the end of the life of the project, all surface facilities would be removed and all disturbed areas would be re-contoured and reseeded.

- The operator would prepare and follow a Storm Water Pollution Prevention Plan (SWPPP). A copy of the approved plan would be available to the RSFO, and would be available on site (also applicable to water quality).

2.5.2.5 Vegetation Resources

- To reduce the spread/introduction of noxious weeds and invasive plant species from vehicles and equipment to the well sites, employees and contractors would not be allowed to drive off-road (unless on approved ROWs).
- A noxious weed control management program would be implemented to prevent or control the spread of noxious weeds at the project site.

2.5.2.6 Wildlife Protection

- Samson would comply with all BLM decisions/approvals concerning the restriction of construction and drilling activities, as designated by BLM wildlife stipulations.
- To reduce the potential for wildlife-vehicle collisions, Samson would require its employees and contractors to always drive at safe speeds. Safe speeds would be posted at regular intervals on access roads.
- No dogs/pets would be allowed in the Project Area.
- No firearms would be allowed in the Project Area.

2.5.2.7 Public/Crew Safety

- Samson would take all necessary precautions for the protection and safety of the public during construction.
- To further facilitate coordination with local emergency services, Samson would provide mapped locations of the proposed drilling locations and times to the respective emergency services personnel, as applicable, in advance of any construction and drilling activities. In addition, Samson would have cell phones or radios onsite, as appropriate, to provide immediate communication to emergency services.
- Local emergency telephone numbers and GPS coordinates would be posted at drilling locations.
- Vehicle traffic would be limited to existing roads, trails, and approved ROWs. Vehicles would travel within set speed limits on main access roads and at slower speeds appropriate for conditions on more remote roads and trails.
- In accordance with regulatory requirements, all crew members will comply with the Occupational Safety and Health Administration (OSHA) regulations.

2.5.2.8 Road Maintenance

- Samson would repair and/or improve, as needed, the new BLM access roads according to BLM road standards.

2.5.2.9 Fire Protection

- Vehicles with catalytic converters would be restricted to existing roads and trails. Parking or idling would not be permitted in portions of roads or trails with tall vegetation.
- The following operational procedures would be followed to prevent fires:
    1. All brush build-up around mufflers, radiators, heater-treaters, and other engine parts would be avoided; periodic checks would be conducted to prevent this build-up.
    2. All personnel would be advised that smoking is only allowed in company vehicles and/or in designated smoking areas; and that all cigarette butts should be placed in appropriate containers and not thrown on the ground or out of vehicle windows.
    3. All personnel would be advised that campfires or uncontained fires of any kind are prohibited.
    4. The crew contingency plan would include a fire communications protocol for contacting fire-fighting personnel.

2.5.2.10 Noise

- All vehicles and construction equipment would be appropriately muffled to minimize construction- and drilling-related noise.

2.5.2.11 Visual Resources

- In order to minimize visual resource impacts, low profile tanks would be used during production.

Figure 2-1. Surface Ownership and Management Areas

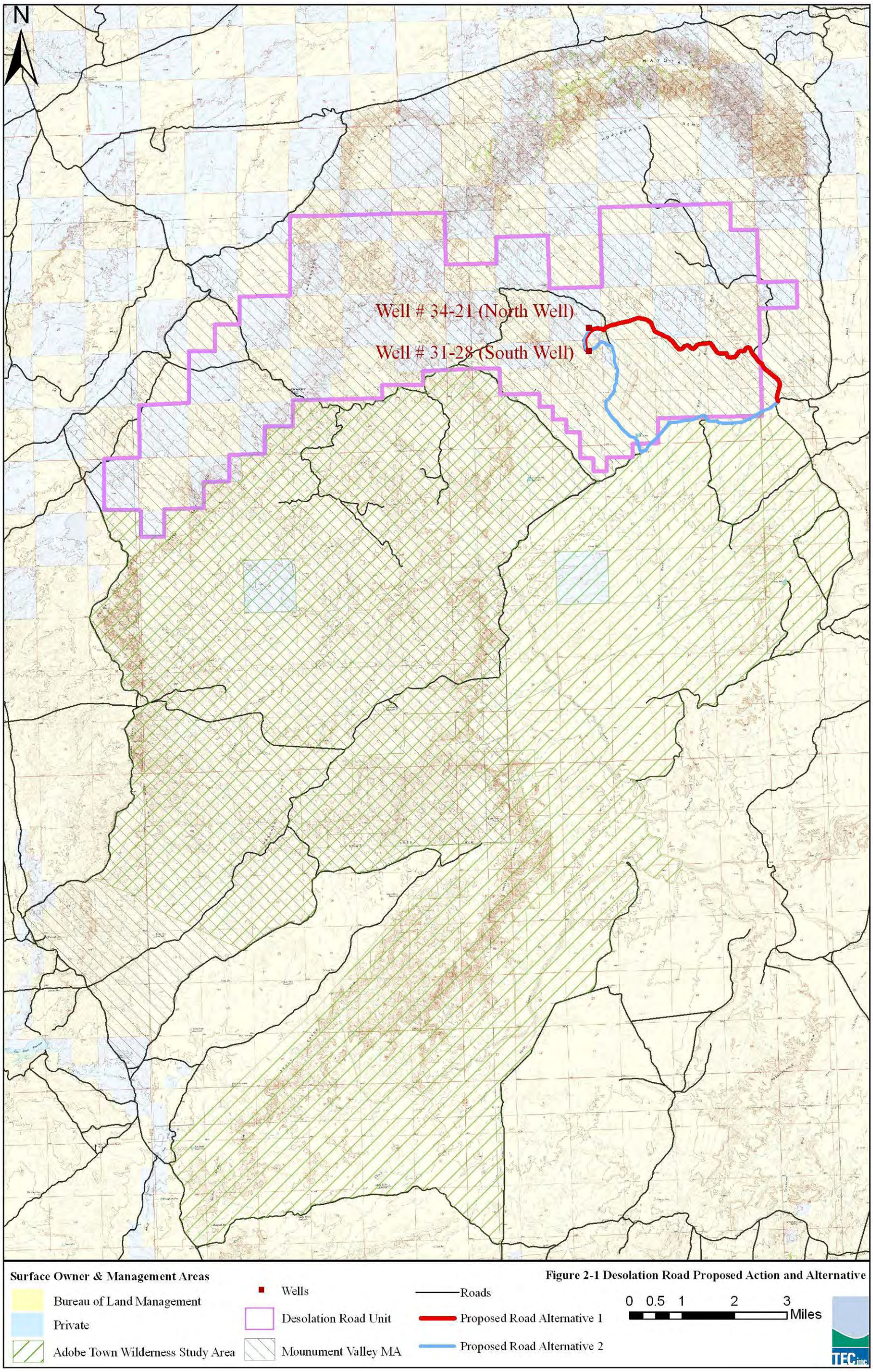
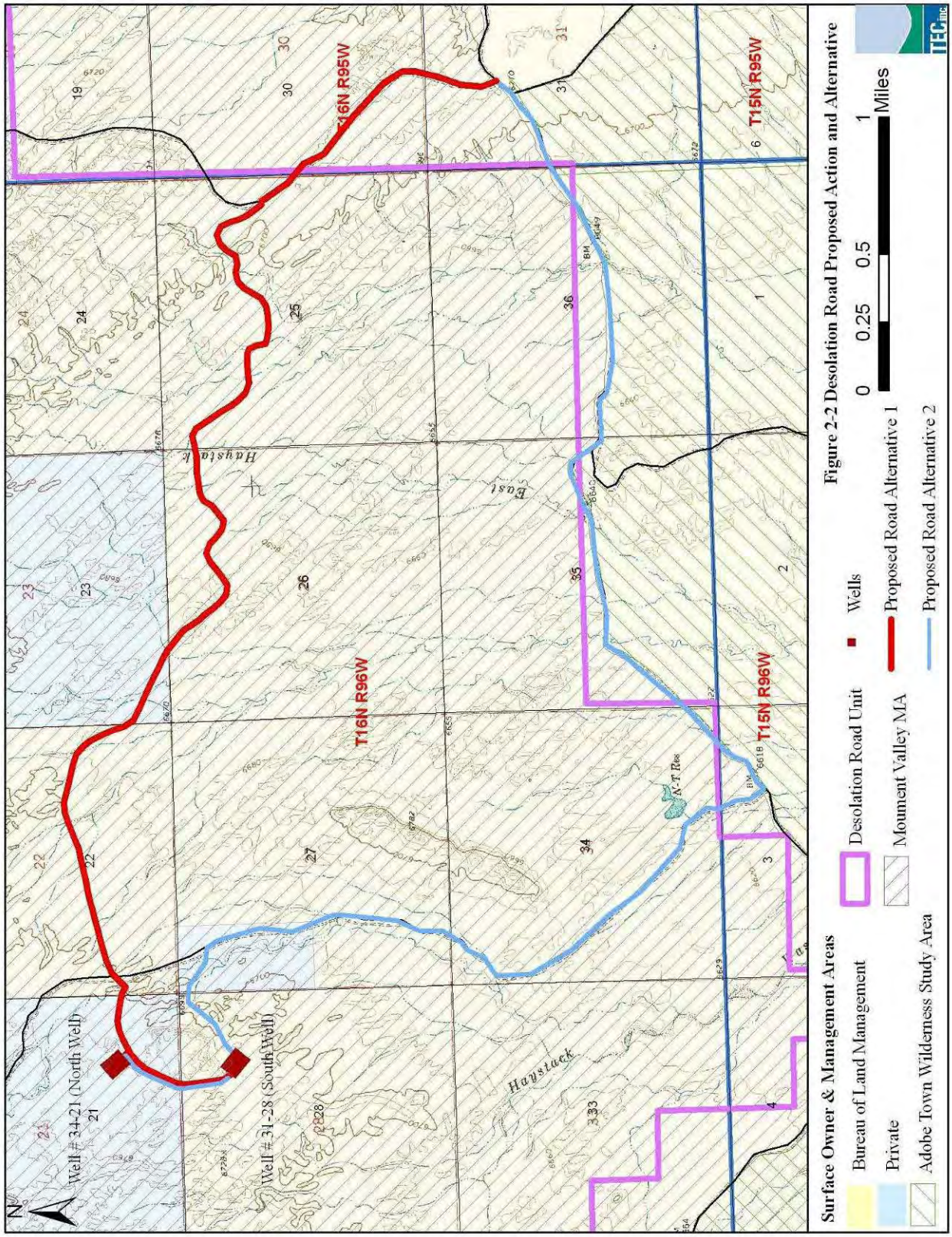


Figure 2-1 Desolation Road Proposed Action and Alternative

Figure 2-2. Proposed Action and Alternative



3.0 AFFECTED ENVIRONMENT

3.1 Special Designations and Management Areas

A special management area is an area where the BLM management objective is to protect specific resources. Management areas potentially affected by the Desolation Road Proposal are the MVMA and the Adobe Town WSA. The South Well and portions of the access route for the Desolation Road Proposal are located within the MVMA, with the South Well on federal surface and the North Well on private surface, as described in Chapter 2. The Desolation Road Proposal area is located outside of and to the north of the WSA, with the South Well located roughly 1.5 miles from closest point on WSAs northern boundary road.

3.1.1 Monument Valley Management Area

The MVMA contains 69,940 acres of BLM-administered public lands, plus interspersed "sections" (cadastral survey units of one square mile each) of private land included within the bounded area (see figure 2-1).

Approximately one-third of the total area is located in the northern part of the MVMA where the alternating sections of publicly and privately-owned land form a "checkerboard" pattern. The BLM cannot directly impose management objectives on private lands.

To the south, the MVMA overlaps parts of the Adobe Town WSA. Management of the WSA part of the MVMA is governed by Wilderness Resource Management objectives described elsewhere in the Green River RMP (BLM 1997).

The MVMA was considered for designation as an Area of Critical Environmental Concern (ACEC) during preparation of the Green River RMP. The evaluation criteria were the MVMA's "potentially outstanding geologic features, prehistoric and historic values of national significance [and] recreation values" (BLM 1997, Table A1-1). Designation of the MVMA as an ACEC was deferred pending additional cultural and paleontological inventory (BLM 1997).

Natural gas drilling has been analyzed by BLM and authorized for at least two other projects involving land in the MVMA. Drilling at a 640-acre spacing (one well per square mile) in part of the MVMA overlapping the Mulligan Draw Field was analyzed in the Mulligan Draw EIS (BLM 1992, cited in BLM 2003). Drilling in the Desolation Flats Field part of the MVMA was analyzed in the Desolation Flats Natural Gas Field Development Project Final EIS (BLM 2004).

3.1.2 Adobe Town Wilderness Study Area

The Adobe WSA contains almost 86,000 acres that have been inventoried by the BLM as having the basic wilderness characteristics described in the Wilderness Act of 1964. The BLM has proposed recommending 10,920 acres for final wilderness designation by Congress and 74,790 acres to be returned to availability for multiple-use management and development (BLM 1987). To date, Congress has not acted on the BLM recommendation.

The WSA is located 80 miles southwest of Rawlins, Wyoming, about 25 miles south of Interstate 80, in Sweetwater County. The entire Adobe Town WSA actually comprises two separate but contiguous WSAs. The WSA to the northwest (WY-040-408) is managed by the Rock Springs Field Office (RSFO). The WSA to the southeast (WY-040-401) is managed by the Rawlins Field Office. The two WSAs combined are the largest BLM WSA in Wyoming. The RSFO part contains more than two-thirds of the total Adobe Town WSA.

The Adobe Town WSA is a remote area containing landscapes characterized previously by the BLM as "some of the region's most dynamic spaces and diverse visual resources" (BLM 2003, 3-75). The BLM has stated, "Size, which

is one of the Adobe Town WSA's important attributes, enhances the wilderness character of the area" (BLM 1987, 21).

The BLM manages WSAs under the "Interim Management Policy for Lands Under Wilderness Review (H-8550-1)". This management is generally referred to as Interim Management or the Interim Management Policy (IMP). The policy is to manage WSAs to retain their wilderness character until Congress makes a decision to designate the area as wilderness or to release the area for non-wilderness uses. The IMP is the basic reference for WSA management and provides detailed direction on management of activities within WSAs (NLCS no date).

The Green River RMP explicitly adopted the IMP as its Wilderness Resource Management Objective (BLM 1997). The guidance to RSFO personnel undertaking Management Actions under the Green River RMP is, pending Congressional action to either designate the WSA as wilderness or release it to multiple use. "Discretionary uses within or adjacent to WSAs will be reviewed to ensure they do not create conflicts with management and preservation of wilderness values" (BLM 1997).

In 2002 Biodiversity Conservation Alliance of Wyoming (BCA) submitted a petition asking the BLM to consider adding more acreage to the two Adobe Town WSAs. The BLM references this petition in its files as The Adobe Town Citizens Proposal, WY-030-411/WY-040-408 (Citizens Proposal) (BLM 2002b). One proposed addition, called "Area A," is an assemblage of about 10,800 acres contiguous to the northern boundary of the WSA. The Desolation Road Proposal is located within what the Citizens Proposal calls Area A or "The Haystacks".

In its letter of reply to the Citizens Proposal the BLM said, "Lands in the checkerboard land pattern which are not contiguous with the existing WSA were dropped from consideration [as potential additions to the Adobe Town WSAs] because many of the individual tracts have no public access and each tract is approximately 640 acres in size which is of insufficient size to make practicable its preservation or use as wilderness. The balance of the lands included within your Citizens' Proposal may have wilderness characteristics" (BLM 2002b).

In 2007, the RSFO conducted field surveys of lands within the Adobe Town area for scenic quality factors and wilderness characteristics in accordance with Section 201 of FLPMA. This evaluation focused only on lands outside of the WSA; which included the portions of 'Area A' from the Citizens' Proposal within the RSFO boundary.

Survey data collected from the identified 'Stop 1 (T. 16 N, R.97 W., Sec 17)' of the field report included the Desolation Road Project Area. The four major wilderness characteristics are: size (at least five thousand acres of land are of sufficient size as to make practicable its preservation), naturalness (imprint of human's work substantially unnoticeable), solitude (outstanding opportunities for solitude or primitive recreation), and supplemental values (contains natural features or scientific, educational, scenic, or historical values). This area failed to meet the size criteria due to the majority of lands being part of the checkerboard land grant, with many of the individual tracts having no public access and being only approximately 640 acres in size. The area also failed to meet the naturalness criteria due to a variety of factors including existing rights-of-ways for several maintained roads, multiple two-tracks, and existing oil and gas leases (some with abandoned wells). Figure 3-0 identifies the project area, Stop 1, existing rights-of-ways, two-tracks, and abandoned wells. Due to the above factors, the area also failed to meet the solitude criteria for wilderness characteristics (BLM 2007c).

A large portion of the Desolation Road Project Area is composed of checkerboard lands. As previously stated, such lands fail the major wilderness characteristics due to size, naturalness and solitude. Factors leading to this determination include: small land tracts (approximating 640 acres), existing ROWs, two-track roads, existing oil and gas leases, and wells. A lesser portion of the lands within the Desolation Road Project Area contain a contiguous block of federal lands. These lands also fail the major wilderness characteristics due to lack of naturalness and solitude for many of the same reasons as the checkerboard land block. Although this contiguous

federal land block is greater than 5,000 acres, BLM Road 4411, an existing ROW, two-track roads, oil and gas leases, and a well create a lack of naturalness and solitude.

Based on existing data, the 1997 Green River RMP has not been amended to reflect changes in management of the MVMA or discretionary uses within or adjacent to WSAs as described above, which allow for oil and gas leasing and development within the Desolation Road Project Area. As the RSFO conducts future analysis through the RMP revision process, management objectives for this area may change.

3.2 Visual Resources

The Desolation Road Proposal area is part of a landscape known as Monument Valley, which is an extension of similar features found in the Adobe Town WSA. The Desolation Road Proposal area is at the foot of an eroded, dissected complex of hills called "The Haystacks."

The combination of topography, buttes, badland breaks, and variations in vegetation subdivide the area into smaller viewsheds. Views that encompass several viewsheds are available from high points near the Project Area. The horizon is a defining characteristic of all distant views, and spacious panoramas may be seen from any number of overlooks. Numerous viewpoints are approachable from existing roads or overland on foot or by horseback and would look down on the Desolation Road Proposal Project Area from the Haystacks (foreground-middle ground views) or the Adobe Town and Skull Creek rims (middle ground-background views).

3.2.1 BLM Visual Resource Management Program

The intent of the BLM Visual Resource Management (VRM) program is to preserve scenic values in concert with resource development. The BLM assigns all public lands to VRM management classes in the RMP.

The Desolation Road Proposal area is located in a VRM Class II. The management objective of the VRM Class II is to "design proposed alterations so as to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract attention of the casual observer. Any change must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape" (BLM 2000).

The Adobe Town WSA is a VRM I. The BLM management objective for VRM Class I is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention" (BLM VRM Manual 8410). When applied to WSAs the VRM Class I objective is used to support the primary objective of WSA management, which is "to retain the WSA's natural character essentially unaltered by humans" (BLM 2000).

3.2.2 Visual Context for the Desolation Road Proposal

The Project Area lies to the south and east of the Haystacks, which the BLM has characterized previously as "a unique visual resource" (BLM 2003, 3-76). The Haystacks themselves delineate the northern extent of the larger Monument Valley landscape, which itself is an extension of similar features found in the Adobe Town WSA.

The Monument Valley-Haystacks landscape has very limited natural gas development activity dating mostly from the 1980s. This development is characterized by visual scars of partly reclaimed access roads and a very few dry hole markers. They are noticeable and attract attention but are not a dominant visual element of the characteristic landscape, due to weathering of the dry hole markers and partial reclamation of access roads.

The area is substantially natural in character. The view in every direction reveals no man-made intrusions. It is an atypical landscape as recognized by the 'rare and uncommon' designation. Adjacent scenery of the Adobe Town

WSA adds substantially to the visual quality of the area. This is a striking-landscape considered by many to be unique in form, line, color and texture. The evidence of differential erosion in nearby landform indicates that it is also a fragile landscape easily damaged by man-made intrusions.

The area is a highly prized landscape specifically for the diversity of its landform, line, color and texture. Local modern culture values this area highly. Monument Valley and the adjacent Adobe Town WSA are substantially elevated in the public eye in the face of the pace of development in other places.

The Project Area itself constitutes a small part of the Monument Valley-Haystacks landscape, and because of its location, the Project Area also exhibits a qualitative difference from areas to the south, west and north. This is because the Project Area is situated at the transition where ownership of the Monument Valley-Haystacks landscape changes to the public-private checkerboard from the continuous BLM ownership that lies west of the Adobe Town Rim and generally south of Adobe Town WSA's northern boundary. The Haystacks formation itself is in the checkerboard and is divided up into one-square-mile public and private tracts.

The two square miles at the center of the Project Area lie amidst broad fans and relatively shallow drainages that slope gradually away from the Haystacks formation. The plains are broken occasionally by short bluffs. The landscape remains linear but the scale is small compared to the surrounding rims. The surface is patchy and thinly vegetated, and coloration is limited to the gray of soils and eroded bluffs and the grayish-green of the scattered sagebrush. At close range, the texture ranges from granular soils to coarse vegetation, backed by roughly eroded bluffs. Scars from past exploration activity are more common in the immediate vicinity of the Project Area. The characteristic rims of the larger landscape are visible in the background when looking out from the Project Area.

3.2.2.1 Form

The Monument Valley land type, including the Project Area, is predominantly hilly with moderate elevation changes. It is a fairly rough, broken landscape with some visual variety. The overall impression is of a sequence of distinct hills with steep slopes, fairly deep eroded drainage, rocky outcrops and long ridges.

Larger outcrops and slopes are often devoid of vegetation because of erosion. These features exhibit strong horizontal elements where the underlying sandstone layers are differentially eroded, giving the illusion of houses, monuments, and other structures. Appearances like these suggest how the popular names, "Monument Valley" and "Adobe Town," may have arisen.

Any typical view in the Monument Valley-Haystacks landscape contains foreground, middle ground and background images. Vegetation consists of large irregular patches of sagebrush with extensive areas of bare ground and exposed rock. Scattered juniper is found in the drainage on sheltered slopes.

There are no dominant existing man-made structures. Existing man-made structures include partially reclaimed access routes and weathered dry hole markers. The existing access to the basin, the Manuel Gap Road, is a primitive two track, which forms the north boundary of the Adobe Town WSA.

3.2.2.2 Line

There is a strong broken horizontal alignment to the landscape due to the rugged nature of the -adjacent Adobe Town WSA. Hills in the Project Area are of random height and are irregular and scattered. At smaller-than-landscape scale, the hills and drainages introduce mostly vertical but irregular lines formed by the broken differentially eroded features. In most places, the element of 'line' is a jumble of crisscrossing diagonal and vertical lines, a result of the substantially eroded landscape.

The line of vegetation is more subdued and is the result of changes in density of the vegetation. The line of vegetation is not a dominant feature in the landscape. The line of existing structures is limited to the line of the Manuel Gap Road. Due to the curvilinear nature of the road, it is not a dominant feature in the landscape.

3.2.2.3 Color

The color of the landforms ranges from white where the surface sand is visible to bright reds in the eroded clay areas and deep orange, rust and tan in the exposed rock outcrops. The wide color variation is due to a large part on the broken nature of the rock and clay layering of the underlying geology and subsequent erosion. The color of the vegetation is predominantly gray-green of the sagebrush interspersed with deep greens of the juniper groupings. Spring wildflowers and grasses provide a very brief wash of color variety.

The color of man-made structures is not a dominant feature in the landscape.

3.2.2.4 Texture

The texture of the landform is rough and jagged due to the ruggedness of the hills and exposed rock outcrops. The vegetation is smooth to coarse. Sagebrush tends to exhibit a medium to course texture and juniper a coarse texture. Man-made structures neither add to nor detract from texture in the dominant landscape.

3.3 Hydrology – Surface and Groundwater

Surface water and groundwater within the region are influenced by climate, geology, and topography (BLM 2008b). The climate in the Project Area is semi-arid to arid, with seasonal precipitation and storm events dictating surface water flows. The Project Area is located within the Washakie Basin, a sub-basin of the Greater Green River Basin and within the Upper Green/Colorado River and White/Yampa Colorado River major surface water basins. The named intermittent drainages within the Area include East Haystack Wash and West Haystack Wash, which flow north from the Haystacks and south to Sand Creek.

The topography within the region consists of landforms and vegetation types that include, but are not limited to: “sage brush steppe, shortgrass prairie, active and vegetated sand dunes, playas, ridges formed by sedimentary rock outcrops, entrenched intermittent and ephemeral stream systems…and land surface dissected by erosion, ranging from branching stream erosion patterns to intensely eroded badlands” (BLM 2008b, 3-123).

3.3.1 Surface Water

Under the Proposed Action, the access road would cross four intermittent and eight ephemeral drainages; whereas under Alternative 2, the access road would cross eight intermittent and 20 ephemeral drainages. Intermittent drainages generally flow for several weeks or months each year and ephemeral drainages only flow after precipitation events. Peak surface water runoff results primarily from snowmelt and seasonal rain events, and occurs in April through June. In sandy substrates, intermittent streams may disappear in some areas (BLM 2008b). Storm events in the summer are the primary influence on water flows in ephemeral streams. The annual water balance in the Project Area is in deficit. The annual potential evapotranspiration exceeds annual precipitation, resulting in the Project Area becoming dry by early June. Water from the Project Area ultimately drains into the Gulf of California, via Sand Creek and the Little Snake River and the Colorado River.

As part of the Colorado River Basin, surface water in the Project Area may fall within terms of the Colorado River Compact (1922), the Upper Colorado River Compact (1948), and the Colorado River Basin Salinity Control Act (1974).

3.3.1.1 Surface Water Quality

The surface water quality within the Project Area varies, depending on local geography, vegetation, groundwater interactions, and flow conditions (BLM 2008b). The quality of the surface water associated with the ephemeral and intermittent drainages within the Project Area is generally within the range expected for streams of this type given the geology, soils, vegetation types, and level of disturbance. The amount of suspended sediment being transported by the East and West Haystack washes to Sand Creek is likely naturally elevated because soils within the Project Area have high water erosion potential and may result in increased dissolved salts and suspended sediments load into the watershed (BLM 2008b). Erosion from surface water runoff and limited vegetation cover has changed channel morphologies (BLM 2004).

3.3.2 Groundwater

3.3.2.1 Regional Ground Water Aquifers

The Washakie Structural Basin is situated southeast of Rock Springs and south of Wamsutter and is the groundwater aquifer that underlies the Project Area. This large basin lies east of the Rock Springs Uplift, south of the Wamsutter Arch, west of the Sierra Madre, and north of the Sand Wash Basin of Colorado. The Washakie Structural Basin contains many water bearing sediment layers, which extend throughout the basin. The basin is a deep and structurally complex synclinal depression with groundwater typically flowing downward from the surface as a result of recharge from seasonal storm events and seepage (BLM 2008b).

3.3.2.2 Groundwater Quality

As with the surface water, groundwater quality varies within the basin. Little site-specific groundwater data have been collected in the Project Area or the DRU. The Wyoming State Engineer's Office has no groundwater permits in good standing order within the Project Area (Wyoming State Engineer's Water Rights Database). Shallow groundwater may be used for livestock, but may contain high total-dissolved solids (TDS) concentrations (BLM 2008b).

3.4 Wildlife Including Special Animal Status Species

3.4.1 General Wildlife Species

3.4.1.1 Big Game

Pronghorn Antelope

Pronghorn antelope (*Antilocapra americana*) occur in the Project Area, and are part of the 2,915 square-mile Bitter Creek Herd Unit (BLM 2004). The entire Project Area is within the Wyoming Game and Fish Department (WGFD)-designated pronghorn crucial winter crucial range (Figure 3-1). The total crucial winter range in the MVMA is about 16,029 acres, and is also considered pronghorn yearlong range. The WGFD annual timing stipulation prohibiting project activities in pronghorn crucial winter range is November 15 – April 30. As of 2007, the most recent year for which data is publically available, pronghorn antelope populations are still below the current Bitter Creek Herd Unit population objective of 25,000 animals with populations trending between 12,000 and 14,000 antelope. The harsh winter in 2007 – 2008 likely caused additional stress and negatively impacted existing populations (WGFD 2008c).

Mule Deer

Mule deer (*Odocoileus hemionus*) within the Project Area are part of the 3,440-square-mile Baggs Herd Unit (BLM 2004). Few mule deer, however, occur in the Project Area due to the lack of suitable habitat. Most mule deer occur north of the Project Area in the Haystacks where there is more suitable habitat, including a crucial winter/yearlong range along the southern edge of the Haystacks (BLM 2004). As of 2007, the most recent year for which data is publically available, mule deer populations have been above the current Baggs Herd Unit population objective of 19,000 animals with populations increasing from 20,300 animals in 2003 to 23,600 animals in 2007. The unusually harsh winter in 2007 – 2008 was expected to have a negative impact on the Baggs Herd Unit with populations possibly falling to 19,000 animals (WGFD 2008c).

Elk

The WGFD considers the MVMA unclassified habitat for elk (*Cervus elaphus*) (BLM 2004).

3.4.1.2 Raptors and Migratory Birds

The only active raptor nest observed in the Project Area is a burrowing owl (*Athene cunicularia*) nest located during field surveys conducted from April to August, 2009 (Kane and DeVito 2009). An abandoned golden eagle (*Aquila chrysaetos*) nest site and an abandoned ferruginous hawk nest site (*Buteo regalis*) also occur within 0.25 mile of the Project Area. The burrowing owl and ferruginous hawk are BLM sensitive species and are discussed further in section 3.4.2.3 below.

Migratory bird habitat in the Project Area is classified as a shrub-steppe type (Kane and DeVito 2009). Nineteen migratory bird species that potentially breed and nest in the shrub-steppe habitat type of the Project Area are listed in Table 3-1 (Nicholoff 2003; Cerovski et al. 2004). Most of the birds listed in Table 3-1 typically nest from mid-April through mid-July on the ground or in shrubs, and all species listed are protected under the Migratory Bird Treaty Act (MBTA).

Table 3-1. List of Migratory Bird Species Potentially Found within the Desolation Road Exploratory Gas Wells Project Area.

Common Name	Scientific Name
Ferruginous Hawk[1]	*Buteo regalis*
Prairie Falcon	*Falco mexicanus*
Golden Eagle	*Aquila chrysaetos*
Burrowing Owl[1]	*Athene cunicularia*
Mountain Plover[1]	*Charadrius montanus*
Brewer's Sparrow[1]	*Spizella breweri*
Sage Sparrow[1]	*Amphispiza belli*
McCown's Longspur	*Calcarius mccownii*
Loggerhead Shrike[1]	*Lanius ludovicianus*
Northern Shrike	*Lanius excubitor*
Sage Thrasher[1]	*Oreoscoptes montanus*
Lark Bunting	*Calamospiza melanocorys*
Vesper Sparrow	*Pooecetes gramineus*
Lark Sparrow	*Chondestes grammacus*
Lark Bunting	*Calamospiza melanocorys*
Grasshopper Sparrow	*Ammodramus savannarum*
Western Meadowlark	*Sturnella neglecta*
Horned Lark	*Eremophila alpestris*
Common Poorwill	*Phalaenoptilus nuttallii*

[1]Wyoming BLM Sensitive Species – see table 3.4-2

During the 2009 field surveys, five BLM sensitive species were observed in the Project Area, including the Greater sage-grouse, mountain plover, Brewer's sparrow, sage thrasher, and sage sparrow (Table 3-2).

3.4.1.3 Reptiles and Amphibians

Reptiles and amphibians that may occur in the area include northern sagebrush lizard (*Sceloporus graciosus graciosus*), eastern short-horned lizard (*Phrynosoma douglassi breviostre*), prairie rattlesnake (*Crotalus viridis viridis*), and Great Basin spadefoot toad (*Scaphiopus intermontanus*) (Baxter and Stone 1980; Cerovski *et al.* 2004; WGFD 2005). The Great Basin spadefoot toad is unlikely to occur in the Project Area due to the lack of perennial water sources. The eastern short-horned lizard and prairie rattlesnake were observed in the Project Area during the 2009 field surveys (Kane and DeVito 2009).

3.4.1.4 Fish

The ephemeral and intermittent streams in the Project Area do not support any fish populations.

3.4.2 Special Status Animal Species

Field surveys in the Project Area, including both the access roads under the Proposed Action and Alternative 2, were conducted for special status species from April to August 2009 (Kane and DeVito 2009).

3.4.2.1 Federally Listed Animal Species

The Endangered Species Act (ESA) requires that Federal agencies protect those species listed under the Act. While much of ESA applies only to federal agencies, it does cover private actions such as mineral development on federal lands. In addition, Section 9 of the ESA makes it unlawful for anyone to "take" a listed animal, and this includes significantly modifying its habitat. The only federally listed endangered or threatened species that is potentially present in the project vicinity includes the black-footed ferret. The pygmy rabbit, Wyoming pocket gopher, and Greater sage-grouse are not federally listed. These species are currently undergoing the U.S. Fish and Wildlife Service (USFWS) status review process, which is the initial step to possible ESA listing. These species are also BLM sensitive species.

Black-footed Ferret

The federally endangered black-footed ferret (*Mustela nigripes*) historically occurred within the Project Area and the MVMA (BLM 2004, BLM 2008b). In June 2009, the USFWS issued a letter to the BLM Rawlins Field Office stating black-footed ferrets were unlikely to occur in the Project Area, and that surveys are no longer recommended for the Project Area (USFWS 2009, Appendix C).

Colorado River Fish

The Colorado Pikeminnow, Razorback Sucker, Humpback Chub and Bonytail are endangered fish species that once thrived in the Colorado River system. Dam installation, the introduction of nonnative fish, and water depletions altered the Colorado River System causing changes to their habitat resulting in a decline in their populations. The recovery of these fish are covered under the Upper Colorado River Endangered Fish Recovery Program established in 1988 It is a partnership of public and private organizations working to recover these endangered species while allowing continued and future water development.

3.4.2.2 Animal Species Proposed for Federal Listing

Pygmy Rabbit

The pygmy rabbit (*Brachylagus idahoensis*) is currently being petitioned for listing under the ESA. It is also a BLM sensitive species. The WGFD lists the pygmy rabbit as a species of special concern and considers it a rare species because of restricted and vulnerable habitat (WGFD 2005). Pygmy rabbits prefer habitat dominated by mature Wyoming big sagebrush (*Artemisia tridentata*) with a dense canopy, which provides cover from predation. Pygmy rabbits are often found in the area where the sagebrush is denser and taller than in other nearby areas (Katzner and Parker 1997; Gabler et al. 2000; Himes and Drohan 2007). The sagebrush habitat is often near streams or riparian areas. Pygmy rabbits dig their own burrows and are found in areas were the soil is relatively deep and friable. Sagebrush is also the primary food of the pygmy rabbit (Green and Flinders 1980; Siegel Thines et al. 2004). The distribution, trends, and populations of the pygmy rabbit are not well known in Wyoming (WGFD 2005).

Suitable habitat for pygmy rabbits is limited within the Project Area (Kane and DeVito. 2009). No pygmy rabbits or sign (e.g., suitable burrows, pellets) were observed during the 2009 field surveys, which were conducted within 800 feet of the access roads and pad locations under the Proposed Action and Alternative 2.

Greater Sage-grouse

On March 5, 2010, the USFWS determined listing of the Greater sage-grouse *(Centrocercus urophasianus)* is "warranted, but precluded" under the ESA. With the USFWS decision, the Greater sage-grouse will be added to the federal list of candidate species while the USFWS works on listing proposals for other species that are at greater risk of extinction. The Greater sage-grouse, (sage-grouse) is highly dependent upon sagebrush-steppe habitat. It relies on sagebrush not only for forage but also for cover from predators and shelter from the elements (Schroeder et al. 2004; Aldridge and Boyce 2007). Sage-grouse also require open locations with high visibility and adequate escape cover for courtship and mating. Mating areas are referred to as "leks" (Connelly et al. 2000). The Greater sage-grouse has been extirpated from approximately half of its pre-settlement range (Schroeder et al. 2004). Threats include conversion of grasslands and sagebrush-steppe habitat to dry-land farming as well as invasion of weeds, such as cheatgrass. Most recently, outbreaks of West Nile virus have been major contributors to the sage-grouse decline (Naugle et al. 2005; Schroeder et al. 2004, Holloran 2005, Naugle et al. 2006, and Walker et al. 2007). They also investigated how sage-grouse respond to gas field and coal bed methane development considering multiple variables, including male lek attendance, nesting success, egg-laying success, juvenile survival, and overall population vigor. Holloran (2005) and Naugle et al. (2006) concluded that sage-grouse populations are highly likely to decline from extensive energy field development, when there is extensive surface occupancy. Naugle et al. (2006) concluded that when drilling was conducted near active leks and nesting areas, declines may be expected at least two miles from the drilling site.

On January 4, 2010, the BLM Wyoming State Office issued Instruction Memorandum (IM) Number IM-2010-12, *Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands including the Federal Mineral Estate*. The purpose of the IM is to provide guidance to BLM field offices for the conservation of Greater sage-grouse and their habitat inside and outside Sage-Grouse Core Conservation Areas (SCCA).

Sage-grouse habitat has not been mapped in the vicinity of the Project Area, and the Project Area does not occur with any indentified SCCA. However, the IM states that projects occurring outside of SCCA that are not mapped or modeled implement the following restrictions:

- Surface disturbing activities or surface occupancy is prohibited or restricted (No Surface Occupancy) on or within one quarter (0.25) mile radius of the perimeter of occupied or undetermined sage-grouse leks;
- Disruptive activity is restricted on or within one quarter (0.25) mile radius of the perimeter of occupied or undetermined sage-grouse leks from 6 pm to 8 am from March 15 – May 15;
- Surface disturbing and/or disruptive activities are prohibited or restricted from March 15 – June 30 in sage-grouse nesting/early brood-rearing habitat Apply this restriction in *suitable sage-grouse nesting and early brood-rearing habitat* within mapped habitat important for connectivity or within 2 miles of any occupied or undetermined lek; and
- For the purpose of effects analysis for a proposed action, a sage-grouse habitat evaluation shall extend, at minimum, out to 4 miles from relatively small individual proposed actions and shall extend, at minimum, out 11 miles from the project boundary for large-scale proposed actions (> 500 acres in size).
- In suitable sage-grouse habitat outside SCCA, NSO restrictions within 0.25 mile of a lek and seasonal timing restrictions may be implemented within two miles of a lek.

The WGFD lists one sage-grouse lek within two miles of the Project Area and within the Adobe Town WSA (Figure 3-2). An aerial survey conducted in April 2009 confirmed that the lek was active with up to six strutting males recorded (Kane and DeVito 2009). A new lek was also located during the aerial survey, and up to 12 strutting males

were recorded on the lek (Kane and DeVito 2009) (Figure 3-2). Activity at both sites was confirmed on the ground (Kane and DeVito 2009). Approximately three percent of the Project Area is within 0.25 mile of a lek, where surface disturbance is prohibited by BLM lease stipulations (No Surface Occupancy) and 95 percent is within two miles of a lek, where BLM controlled surface use (CSU) and timing limitation stipulations (TLS) would apply to proposed project activities.

3.4.2.3 BLM Sensitive Species

Thirteen of the 34 Wyoming BLM sensitive animal species listed for the Rock Springs Field Office are known to occur, or may occur, in the Project Area (Table 3-2). These include three mammals (pygmy rabbit, white-tailed prairie dog, and Wyoming pocket gopher), nine birds (ferruginous hawk, Greater sage-grouse, mountain plover, burrowing owl, sage thrasher, Brewer's sparrow, loggerhead shrike, and sage sparrow), and one amphibian (Great Basin spadefoot toad) (BLM 2005; Kaczor 2009, personal communication).

Table 3-2. BLM Sensitive Animal Species Likely to Occur in the Desolation Road Exploratory Gas Wells Project Area.

Common Name	Scientific Name	Preferred Habitat
Mammals		
Pygmy Rabbit	*Brachylagus idahoensis*	Basin-prairie and riparian shrub
White-tailed Prairie Dog	*Cynomys leucurus*	Basin-prairie shrub, grasslands
Wyoming Pocket Gopher	*Thomomys clusius*	Shallow, stony soils with small islands of low vegetation within a sagebrush matrix
Birds		
Peregrine Falcon	*Falco peregrinus*	Generally associated with tall cliffs
Burrowing Owl	*Athene cunicularia*	Grasslands, basin-prairie shrub
Common Name	**Scientific Name**	**Preferred Habitat**
Ferruginous Hawk	*Buteo regalis*	Basin-prairie shrub, grassland, rock outcrops

Greater Sage-grouse	*Centrocercus urophasianus*	Basin-prairie shrub, mountain-foothill shrub
Loggerhead Shrike	*Lanius ludovicianus*	Basin-prairie shrub, mountain-foothill shrub
Mountain Plover	*Charadrius montanus*	Shortgrass, great basin-foothills grassland, and sagebrush-grasslands
Brewer's Sparrow	*Spizella breweri*	Basin-prairie shrub
Sage Sparrow	*Amphispiza belli*	Basin-prairie shrub, mountain-foothill shrub
Sage Thrasher	*Oreoscoptes montanus*	Basin-prairie shrub, mountain-foothill shrub
Amphibians		
Great Basin Spadefoot Toad	*Spea intermontana*	Springs, seeps, permanent and temporary waters

White-tailed Prairie Dog

The white-tailed prairie dog inhabits arid grassland and shrub/grassland habitats, usually with slopes less than twelve percent (12%) to fifteen percent (15%). It lives primarily at higher elevations than the black-tailed prairie dog, in intermountain valleys, benches, and plateaus with diverse grass and forb cover (WGFD 2005).

There are several, mostly small (less than 2 acres) white-tailed prairie dog colonies scattered throughout the western third of the Project Area (Kane and DeVito 2009) (Figure 3-3). No active white-tailed prairie dogs were observed and most burrows were abandoned, collapsed, or debris- and vegetation-filled, possibly due to disease, predation, and drought (Kane and DeVito 2009). This area was estimated to cover about a four-acre area (Kane and DeVito 2009).

Wyoming Pocket Gopher

A status review process by the USFWS was completed for the Wyoming pocket gopher (*Thomomys clusius*) on April 15, 2010 [Federal Register: April 15, 2010 (Volume 75, Number 72)]. The USFWS determined that a listing the Wyoming pocket gopher as either endangered or threatened was not warranted at this time. According to Griscom et al. (2010), historic habitat descriptions of Wyoming pocket gophers occurring exclusively along ridge-top topography are unfounded. Data collection in 2009 and revised modeling conducted in 2010 indicate the species is a habitat specialist limited to south-central Wyoming, occurring predominantly on flatter slopes where Gardner's saltbush and winterfat are present and big sagebrush is absent or subdominant. Wyoming pocket gopher habitat also tend to have less grass, rock, and litter cover when compared to the habitat occupied by the plains pocket gopher (*T. talpoides*). Data collected in 2009 also indicate that the Wyoming pocket gopher occupies soils having sandy loam, loamy sand, sand clay loam, clay loam and clay textures (Griscom et al. 2010).
Current trapping data and modeling indicate there is a moderate to high probability that Wyoming pocket gophers are present in the Project Area (Griscom et al. 2010). Soils in the area are generally in poor structural condition, and are characterized as shallow, highly erosive, and sandy with poor moisture retention. Poor soil conditions may limit Wyoming pocket gopher distribution due to tunnel cave-ins and poor insulation from warm and cold winter temperatures. Although some suitable habitat occurs within 1,200 feet of the proposed access roads and well pads, no Wyoming pocket gopher burrows were identified during field surveys conducted in 2009 (Kane and DeVito 2009).

Peregrine Falcon

While it is considered a rare resident in Wyoming, The peregrine falcon is a cosmopolitan species and is found scattered throughout the state (NatureServe 2009, WGFD 2005). Peregrines in Wyoming breed mostly in the

western half of the state, though some individuals are year-round residents in Wyoming, while others winter south in Mexico (WGFD 2005).

The peregrine falcon preys on smaller birds and forages in a variety of open habitats from open woodlands and forests to shrub-steppe, grasslands, marshes, and riparian habitats. It nests in cliffs that are usually proximate to habitats with abundant prey. No suitable nesting habitat occurs within the Project Area (Kane and DeVito 2009). The closest potential nesting sites occur along Skull Creek Rim~~,~~ and Adobe Town Rim (south of the Project Area), and the adjoining Haystacks (north of the Project Area).

Ferruginous Hawk

The ferruginous hawk occurs and breeds throughout most of Wyoming, inhabiting semi-arid open country, primarily grasslands, basin-prairie shrublands, and badlands (WGFD 2005). It requires large tracts of relatively undisturbed rangeland and nests on rock outcrops, the ground, cut banks, cliff ledges, or trees (WGFD 2005). The ferruginous hawk is considered a common resident in Wyoming. The species is both a BLM sensitive species and a WGFD species of special concern because populations are restricted in distribution, and because it is sensitive to human disturbance (WGFD 2005, WYNDD 2009).

Aerial and ground surveys for raptors were conducted in 2009 (Kane and DeVito 2009). The Project Area generally has few cliffs and bluffs within one mile of the Project Area that are suitable for nesting raptors. No ferruginous hawks were observed; however, an abandoned and decadent ferruginous hawk nest site was observed on a large rock located two feet aboveground and within 0.25 mile of the South Well (Figure 3-3).

Burrowing Owl

In Wyoming, the highest concentrations of burrowing owls are in the south and east, although it occurs and breeds throughout most of the state (WGFD 2005). Despite its distribution, the burrowing owl is considered an uncommon summer resident in Wyoming. The species is both a BLM sensitive species and a WGFD species of special concern because population status and trends are unknown, although they are suspected to be stable. Its habitat is vulnerable, although there is no ongoing significant loss of burrowing owl habitat. The species also is sensitive to human disturbance (WGFD 2005, WYNDD 2009).

The burrowing owl inhabits grasslands, basin-prairie shrublands, and agricultural areas, and depends on existing mammal burrows, especially those of prairie dogs and ground squirrels, for nesting, roosting, and escape (Cerovski et al. 2004). During the 2009 field surveys, a nesting pair was located in an abandoned white-tailed prairie dog town within the Project Area (Kane and DeVito 2009) (Figure 3-3).

Mountain Plover

The mountain plover occurs and breeds throughout most of Wyoming, and is considered a common summer resident with a statewide population of approximately 3,400 individuals (range 2,270 to 4,430) (WGFD 2005). The species is both a BLM sensitive species and a WGFD species of special concern because its population status and trends are unknown, although they are suspected to be stable; its habitat is vulnerable, although there is no ongoing significant loss of habitat. It also is sensitive to human disturbance (WGFD 2005; WYNDD 2009).

The mountain plover inhabits low, open habitats such as arid shortgrass and mixed grass prairies dominated by blue grama and buffalo grass with scattered clumps of cacti and forbs, and saltbush habitats of the shrub-steppe of central and western Wyoming (WGFD 2005). It prefers to nest in large, flat grassland expanses with sparse, short vegetation (4 inches or less), and bare ground. It is adapted to areas that have been disturbed by prairie dogs, heavy grazing, or fire (WGFD 2005). Mountain plover habitat has been identified in the Project Area (Kane and DeVito 2009). Approximately 20 percent of the Project Area occurs in known mountain plover habitat. Two mountain plovers were observed during the 2009 field season, but nest sites could not be located and no nesting activity could be confirmed (Kane and DeVito 2009) (Figure 3-2).

Great Basin Spadefoot Toad

In Wyoming, the Great Basin spadefoot toad is the most abundant toad west of the Continental Divide in the Wyoming Basin, including the Washakie and Green River subbasins (Baxter and Stone 1980, WGFD 2005). The Great Basin spadefoot toad survives the winter in a burrow that it digs in soft soil and has been found as much as 15 feet below ground (WGFD 2005). Breeding occurs between May and July, usually where permanent or temporary water bodies are present, although they spend the majority of their lifespan in upland sites (WGFD 2005).

The Great Basin spadefoot toad prefers sagebrush communities below 6,000 feet in elevation, although they have been found at elevations of 9,200 feet (WGFD 2005). The species is both a BLM sensitive species and Wyoming special status species because wintering and breeding areas and the safe passages required between them are susceptible to habitat fragmentation and direct habitat loss (WGFD 2005). No Great Basin spadefoot toads were observed during the 2009 field survey (Kane and DeVito 2009), and is unlikely to occur in the Project Area due to the lack of perennial water sources.

3.4.2.4 Wild Horses

The Adobe Town Wild Horse Management Area (HMA) is within the RSFO and Rawlins Field Office (RFO) administrative area and encompasses approximately 447,916 acres. The majority of the MVMA overlaps the Adobe Town Wild Horse HMA.

The Appropriate Management Level (AML) for the Adobe Town Wild Horse HMA is 610-800 wild horses (BLM 2009). The most recent BLM wild horse population estimate (2009) for the Adobe Town and Salt Wells Creek HMA Complex was approximately 1,966 animals. Wild horses observed in the Project Area during the 2009 field surveys occurred in small bands up to fifteen individuals, although most bands observed had fewer than eight individuals (Kane and DeVito 2009). Bands were not evenly distributed and appeared to concentrate in areas of suitable habitat (i.e., near water sources). Bands use different portions of the HMA during different seasons (BLM 2004).

3.5 Soils

Soils in the Project Area are primarily included in the Torriorthents-Camborthids-Haplargids association (BLM 2004). Such soils generally formed under a dry, cool (frigid) climate with spring moisture, and are characterized as

moderately deep to shallow with low organic matter, naturally low soil productivity, varying permeability, high erosion potential, low strength, poor stability, and a susceptibility to compaction (BLM 2004, BLM 2008b).

Principal parent materials of soils within the Project Area are derived from the underlying sedimentary rock of calcareous sandstone and shale, and are composed of weathered residuum, colluvium and alluvium, and have developed on flats, floodplains and valley fill terraces, coalescing alluvial fans and flats, and among rock outcrops (Bamberg 2009, Winterfeld 2009). Soil depth varies from shallow to non-existent on outcrops and slopes to deeper alluvium in the flats and along drainages (BLM 2004, BLM 2008b, Bamberg 2009, and Winterfeld 2009). Pockets of unconsolidated Quaternary sands are scattered throughout the central and western portion of the Project Area; resulting soils are distinctly sandy and almost appear dune-like (BLM 2004, BLM 2008b, Bamberg 2009, and Winterfeld 2009).

Residual soils formed from the many types of bedrock, as well as from wind and flowing water deposits, are exposed at the surface (BLM 2008b, Bamberg 2009). Sandy soils within the Project Area have high wind erosion potential and clayey soils have a high water erosion potential, low bearing strength, and varying amounts of salts resulting in a fairly harsh environment for plant growth and productivity (BLM 2005). Because soils are generally saline, plants in the Project Area are hearty, and most vegetation is low to the ground and tolerant of low precipitation and local temperature extremes (Kane and DeVito 2009). Soil erosion rates are generally higher due to the naturally low vegetative cover, soil crusting, low organic matter, and soft shales and alluvium that are susceptible to erosion. Accelerated rates of erosion occur within localized areas, including some drainages and in areas where wild horses congregate and the vegetative cover is low (Kane and DeVito 2009). Reduced vegetation along drainages tends to destabilize drainages and contributes to downcutting and gullying (BLM 2004, BLM 2008b).

3.6 Vegetation Including Special Status Plant Species, & Noxious Weeds

3.6.1 Vegetation

The Project Area is located within the central portion of the Desolation Flats basin south of the Haystacks (see Figure 2-2) in Sweetwater County. This area has a small vertical gradient and generally drains to the south towards Sand Creek. The proposed road runs east to west at an elevation of 6,710 feet, crosses relatively flat terrain at 6,670 to 6,680 feet for 5.42 miles west to the north well (6,710 feet), and then south 0.45 mile to the south well (6,720 feet). The total relief along the road is less than 40 feet, and the terrain is flat except for shallow drainages, low sand dunes, and approximate 30-foot high rock bluffs near the well sites. The Alternative 2 proposed route also starts at an elevation 6,710 feet and crosses relatively flat terrain at about 6,640 feet to the well sites at 6,710 feet.

Vegetation community types are closely tied to the soil properties of depth, texture, pH, salinity, water capacity, and salt and mineral content. Soil depth and types and the related vegetation communities are controlled by the topographic influences of slope, drainage, snow accumulation patterns, and moisture regimes. Micro-climatic differences are related to aspect, water, and air drainage along streams, draws and valleys, and changes brought about by the structure of the plant community. There is little change in plant species composition and structure noted from horse grazing and trampling. Cattle do not graze this area heavily, due to long distances to permanent water.

The main ecological system that determines vegetation communities present on the site is the inter-mountain basin semi-arid shrub steppe (NatureServe, 2008). The other main ecological system found in the area, the foothill riparian woodland and shrubland, does not occur on the Project Area, as the Project Area is located at the head of small drainages and contains no permanent streams. The shrub steppe occurs throughout the intermountain western U.S. on alluvial fans and flats. It is the most common and prevalent type on the project site. In addition to the shrub steppe ecological system, land cover types include small bare areas, due to natural soil or topographic conditions.

Shrubs and sub-shrubs with graminoids and forbs as a ground cover or growing within the shrub clumps dominate the semi-arid shrub steppe type. The principal shrub species are in the genera *Artemisia* and *Atriplex*, and the graminoids are a mixture of warm and cool season grasses and sedges. Forbs are prevalent in some vegetation types, and are abundant in years of good rainfall.

The Project Area ephemeral drainages are small and shallow and do not form a distinctive habitat.

There were three vegetation community types or complexes identified and mapped in the shrub steppe system. The shrubland community types identified during the field surveys include: 1) a mixed shrubland on stabilized sand dunes, 2) mixed desert shrubland on alluvial flats, and 3) a low sage/saltbush/forb/grass type. In addition to the vegetation communities, other prominent land cover types are the stabilized dunes, bare shale and rock outcrop, and buttes and steep slopes.

The vegetation communities and land cover types mapped during the field survey are presented in Table 3-3 with an estimate of their associated acreage and percent of the Project Area. Similar vegetation types occur along the alternate proposed route but were not mapped. A detailed description of the vegetation communities is included in the Wildlife, Vegetation, and Habitat Survey Field Reports for the Desolation Road Exploratory Gas Wells Project (Kane and DeVito 2009).

Table 3-3. Table of Vegetation Communities and/or Land Cover Types along the Alternative 1 Primary Route.

Type	Acreage (est)	Percent (est)
Shrubland steppe		
Mixed shrubland on dunes	1,600	31
Mixed shrubland on flats	2,770	54
Low sage/saltbush/forb/grass dwarf shrubland	450	9
Other Land Cover		
Bare/rock outcrops/cliffs	300	6
Totals	**5,120**	**100**

3.6.2 Shrubland Steppe Communities

3.6.3 Threatened, Endangered, Sensitive Plant Species

The BLM Wyoming has prepared a list of sensitive species found in the Rock Springs Field Office management area (BLM 2002a). There are 15 sensitive plant species on the BLM Rock Springs Field Office management area list of sensitive plant species. A review of the Wyoming Natural Diversity Database identified six sensitive plant species in Sweetwater County in the Project Area. None of the listed plants were observed or collected during the field surveys. The Final EIS for the Desolation Flats Natural Gas Field Development Project EIS (BLM 2004) lists 21 potential species as occurring in the larger areas to the southeast of the Project Area. The EIS Project Area has more plant communities including wetlands and juniper woodlands that do not occur on the Desolation Road Project Area, therefore many of the species were not considered potential occupants of the Project Area.

Table 3-4 provides information about the BLM Wyoming sensitive plant species list that may have the potential to occur within the Project Area. The habitats on the Project Area are common in southern Wyoming, and there are no specific soils or substrates that are known to support sensitive plant species.

Table 3-4. BLM Wyoming Sensitive Plant Species that May Occur in the Desolation Road Exploratory Wells Project Area[1,2]

Common Name	Scientific Name	Potential Project Area Occurrence	Habitat[2]
Ownbey's Thistle	*Cirsium ownbeyi*	low	Sparsely vegetated shale slopes in sage & juniper communities at 6,440-8,400 feet. Habitat not present.
Stemless Beardtongue	*Penstemon acaulis var acaulis*	low	Cushion plant on black sage grassland communities on semi-barren rocky ridges, knolls, & slopes at 5,900-7,200 feet. Habitat not present.
Gibben's Beardtongue	*Penstemon gibbensii*	low	Barren slopes on shale or clay at 5,500-7,700' in southeastern Sweetwater County. Potential habitat low or not present.
Tufted Greenthread	*Thelesperma caespitosum*	low	Sparsely vegetated shale slopes & ridges on the Green River Formation at approximately 6,300 feet. Formation not present on site.
Hairy Greenthread	*Thelesperma pubescens*	low	Ridges in southwestern Sweetwater County on Bishop Conglomerate at 8,100-8,900 feet. Formation not present on site.
Small-head Daisy	*Townsendia microcephala*	low	Ridges in southwestern Sweetwater County on Bishop Conglomerate at approximately 8,500 feet.

[1]Source: BLM 2002a.
[2]Source: WYNDD 2008

3.6.4 Noxious Weeds and Non-Native Plant Species

The spread of non-native plants and noxious weeds is a concern in areas proposed for surface disturbance. Noxious weeds are plants designated by federal, state, or county government as injurious to public health, agriculture, recreation, wildlife, or property.

Opportunities for introduction and/or increase of invasive plants are directly related to the extent of surface disturbance, bare ground, and the proximity of available seed source of invasive plant species, e.g., roads, roadside borrow areas, and adjacent washes. Selective grazing by domestic cattle reduce native species and open up bare ground and space for weeds. Additional factors contributing to the spread of invasive plant species include open raw soils, climatic changes, historic and current weed control, and historic and current grazing management practices.

Noxious weed species in Sweetwater County, which have the potential to occur in the Project Area, include Canada thistle (*Cirsium arvense*), hoary cress (*Cardaria draba*) Russian knapweed (*Centaurea repens*), musk thistle (*Carduus nutans*), perennial pepperweed (*Lepidium latifolium*), dalmatian toadflax (*Linaria dalmatica*), spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), and common tansy (*Tanacetum vulgare*).

Most of the Project Area has native vegetation with little disturbance and has been only lightly grazed by horses and some cattle. No obvious noxious weed species infestations were observed on the site.

3.7 Recreation

The general area of the Desolation Road Proposal has been used by area residents for recreation for many years. Typical activities include hunting, sightseeing, camping, and rock collecting.

Hunting by unguided license holders for antelope and mule deer and driving roads to watch wild horses are the main recreation activities in the vicinity of the Desolation Road Proposal area. The BLM has not issued any Special Recreation Permits in the MVMA for commercially guided big game hunting or wild horse interpretive tours.

The last estimates of recreational use made by the BLM specific to the Adobe Town area (including the MVMA and the Desolation Road Proposal area) Show that recreational ORV use was approximately 200 visitor days per year in the Adobe Town WSA[1]. Hunting, sightseeing, camping, and rock hounding accounted for an additional 900 visitor days of use per year (BLM 1987b). ORV use is generally associated with or in support of other activities, though recent recreation trends indicate rising ORV use for its own sake. For example, the Adobe Town area contains a very large herd of wild horses that attracts sightseers.

Over the years, the wider Adobe Town area has had a statewide reputation for high quality antelope hunting and for trophy deer hunting (BLM 1987b). The level of hunting activity is moderate in WGFD hunt areas that include the MVMA, and the active hunters are predominantly Wyoming residents. In 2008, the WGFD antelope Hunt Area 57 (South Wamsutter) had 199 active antelope hunters, and mule deer Hunt Area 100 (South Wamsutter) had 400 active deer hunters. About 70 percent of all hunters in the two hunt areas held Wyoming resident licenses. The antelope hunter success rate was about 98 percent and the deer hunter success rate was about 33 percent (WGFD 2008a, WGFD 2008b).

3.8 Cultural Resources

3.8.1 Definitions

Cultural resources are manifestations of past human activity. They include both the material remains and elements of the natural environment altered by such activities. Prehistoric cultural resources are those cultural resources that were produced prior to the advent of written documentation, generally by Europeans. Information on prehistoric cultural resources is gathered through archaeological, ethnographic, and linguistic investigations. Historic cultural resources are those cultural resources produced after the advent of written documentation. Information on historic resources is gathered from archaeological investigations, oral interviews, and historic documents.

Historic properties are those cultural resources that are listed, eligible for, or potentially eligible for, inclusion in the National Register of Historic Places (National Register). Historic properties can be buildings, structures, objects, sites, or districts. To be considered eligible for inclusion on the National Register, the resources generally more than 50 years old and meet at least one of the eligibility criteria and possess at least one of the qualities of integrity. TCPs are cultural resources that are significant in the beliefs, customs, and practices of living Native American

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Estimates of recreational use in the Adobe Town WSA are used to as a proxy to estimate the recreational use that occurs in the Desolation Road Proposal area and vicinity because the area is served by the same access roads and is contained within the same Wyoming Game and Fish Department (WGFD) hunt areas (i.e., areas for which hunting licenses are issued for each game species). BLM makes official annual estimates recreational use of public lands but only for entire management area under Field Office control. The entire Field Office area is much larger and too diverse to represent recreation in just the Adobe Town area. The 1987 estimates of recreational use had to be used because the BLM does not have more recent estimates for the Adobe Town area.

communities that have been passed down through the generations. Sites of Native American Concern are sites that have importance to Native Americans that are not directly important in maintaining the cultural identity of the living community. TCPs are by definition eligible for nomination to the National Register and may be require consideration under provisions of the American Indian Religious Freedom Act.

3.8.2 Previous Inventories and Known Sites

Previous projects that have been conducted in the Project Area include seismic surveys (number (n) =13), well pad and access road surveys (n=14), access road surveys (n=2), pipeline surveys (n=2), small block surveys (n=3), range improvement surveys (n=1), and construction monitoring (n=2). A files search of the Project Area through the Wyoming Cultural Records Office (WYCRO) indicates that the overwhelming majority of the sites that have been previously recorded in the area are prehistoric (n=45) with only two scatters of historic debris recorded (http://gruyere.uwyo.edu/WYOCROWEB). Recorded prehistoric sites in the area consist of lithic scatters or knapping stations (n=21) that containing scatters of chip stone tools and the associated chipping debris with no indications for presence of features and prehistoric camp sites (n=22) consisting of scatters of chip stone tools and debris in association with hearth features or evidence of hearth features (e.g., fire-cracked rock, charcoal staining) have been recorded in the Project Area. The prehistoric lithic scatters can be found on the deflated flats and in the surrounding sand dunes. Camp sites are largely restricted to the sand dunes or the margins of sand deposits in the Project Area. The temporal affiliations of a majority of the sites that have been recorded in the Project Area are unknown. A majority of the sites (n=18) have not been evaluated for the eligibility to the National Register of Historic Places (NRHP). A few (n=16) have been recommended as eligible for the NRHP and a few (n=9) have been recommended as not eligible for the NRHP.

3.8.2.1 Alternative 1: Proposed Action

The entire Area of Potential Effect (APE) of the Proposed Action has recently been intensively inventoried for cultural resources during Section 106 compliance surveys of the access road/pipeline corridor to the Desolation Road Unit #34-21 and the Desolation Road Unit #31-28 (Roufs 2009; Bartlett 2008a; Bartlett 2008b). The originally proposed Desolation Road Unit #s 34-21 and 34-28 and their associated access road and pipeline corridors were surveyed for cultural resources in 2008 by Current Archaeological Research, Inc. (CAR) (Barlett 2008a; Barlett 2008b). However, the original alignment of the access road and pipeline corridor to the Desolation Road Unit #34-28 well location was rejected due to wildlife concerns and a new alignment proposed. The current alignment of the access road and pipeline corridor to the Desolation Road #34-21 well location was surveyed for cultural resources in 2009 by CAR (Roufs 2009). Small portions of the APE in Section 25, Township 16N, Range 96W may also lie within the APE of the UPR MDW #3 Seismic Line survey conducted in 1992 and portions within Sections 22-28, Township 16N, Range 96W may also lie within the Haystacks 3D Seismic Project survey conducted in 2001.

These inventories yielded only one prehistoric site within the APE of the Proposed Action. Site 48SW17687 is an open camp that was tested for National Register eligibility and evaluated as not eligible (Roufs 2009). As well, a previously reported rock alignment of potential Native American concern within a mile of the Proposed Action could not be relocated during inventory of the Desolation Road #34-21 well pad and access road (Bartlett 2008a).

The Overland Trail is located approximately 6 miles to the north of the Proposed Action. The Overland Trail has been determined to be eligible for the NRHP under multiple criteria (Criteria A, B, and C), the integrity of various portions of the trail has been evaluated including portions directly north of Proposed Action. At least five segments of the trail north of the current Project Area are considered to retain sufficient integrity to contribute to the overall eligibility of the trail itself (Johnson et al. 2005: Appendix A). Associated sites have also been recorded in the area including the Dug Springs Stage Station (48SW942) which is listed on the NRHP (Johnson et al. 2005:12). The Proposed Action is located well outside the Visual Area of Potential Effects (APE) of 5 miles utilized for historic

trails by the BLM (personnel communication from BLM archaeologist Terry Del Bene to TEC on January 26, 2010 in Draft EA Comments). The Haystack hills are also located between the Proposed Action and the Overland Trail, obscuring the proposed alternative from views along the trail.

3.8.2.2 Alternative 2: Existing Road Access

The Existing Road Access Alternative has never been inventoried for cultural resources in its entirety, but small portions of it may have been covered during previous inventories. A small portion of the Alternative in Section 27, Township 16N, Range 96W may lie within the inventory corridors for the UPR MDW #3 Seismic Line conducted in 1992 and the GRB1 Seismic Line conducted in 1990. Portions of the Alternative in Sections 35 and 36, Township 16N, Range 96W and in Section 31, Township 16N, Range 95W may also lie within the inventory corridor for the access road to the AUSA Century Federal #1-2 Well Pad conducted in 1981. The road crosses through the southeast corner of the 40-acre inventory block of the Jeep Trail Unit No. 1 well pad in Section 36, Township 16N, Range 96W conducted in 1991. Small portions of the Existing Road Access Alternative in Sections 28 and 34-36 of Township 16N, Range 96W, and in Section 31 of Township 16N, Range 95W may lie within the inventory corridors for the Haystack 3D Seismic Project conducted in 2001. All but one of these previous inventories is more than ten years old. None of the previous surveys can be utilized for cultural resource clearance purposes as surveys that more than ten years old are considered inadequate by current standards and the locations of seismic projects are generally considered to be inaccurate (personnel communication from BLM archaeologist Terry Del Bene to TEC on January 26, 2010 in Draft EA Comments).

Two sites have been recorded along the existing two-track road that is proposed to be used under the Existing Road Access Alternative. Both sites are located within Section 35 of Township 16N, Range 96W. Site 48SW3694 is a prehistoric camp that was recorded in 1981 during inventory of the AUSA Century Federal #1-2 well location access road. Site 48SW8482 is a prehistoric open camp that was recorded during inventory of the Celsius Energy Line #90-11 seismic line in 1990. Both sites have been recommended as eligible for the National Register, but neither evaluation has received the concurrence of the Wyoming SHPO. These two sites were recorded more than ten years ago and their plotted locations are considered unreliable and likely inaccurate. It cannot be determined if the sites lie with the APE of the proposed Alternative or not.

Five other prehistoric sites (48SW2993, 48SW8475, 48SW8481, 48SW9086, and 48SW2727) have been recorded near the existing two-track road proposed to be used under the Existing Access Road Alternative. Site 48SW2993 is a lithic scatter recorded during inventory of the access road to the Amoco Production Company Emigrant Trail Unit #3 in 1980. This site is evaluated as not eligible for the National Register. Sites 48SW8475 and 48SW8481 are lithic scatter recorded during inventory of the Celsius Energy Line #90-11 in 1990. Site 48SW8475 is recommended as eligible for the National Register and site 48SW8481 is recommended as not eligible for the National Register. Site 48SW9086 is an open camp recorded in 1991 during inventory of the Celsius Energy Company Jeep Trail No. 1 well location. The site was evaluated as not eligible for the National Register and that evaluation has received Wyoming SHPO concurrence. Lastly, site 48SW2727 is an open camp recorded during inventory of the Salt Wells Planning Unit in 1980. It was evaluated as eligible for the National Register. All of these sites were recorded more than ten years ago and several were recorded during seismic inventories. The plotted locations of the sites are considered to be unreliable and inaccurate, and it cannot be determined if they lie within the APE of the proposed Alternative or not.

The Overland Trail is located more than 7 miles to the north of the Existing Access Road Alternative. The trail has been determined to be eligible for the NRHP under multiple criteria (Criteria A, B, and C), and the integrity of various portions of the trail has been evaluated including portions directly north of the current Project Area. At least five segments of the trail north of the Existing Access Road Alternative are considered to retain sufficient integrity to contribute to the overall eligibility of the trail itself (Johnson et al. 2005: Appendix A). Associated sites have also been recorded near the area including the Dug Springs Stage Station (48SW942) which is listed on the NRHP

(Johnson et al. 2005:12). The Existing Access Road Alternative is located well outside the Visual Area of Potential Effects (APE) of 5 miles utilized by the BLM for historic trails (personnel communication from BLM archaeologist Terry Del Bene to TEC on January 26, 2010 in Draft EA Comments). The Haystack hills are also located between the Existing Access Road Alternative and the trail, obscuring the proposed alternative from views along the trail.

3.9 Paleontology

The Probable Fossil Yield Classification (PFYC) system (USFS 1996) provides a framework for land managers to base the probability for discovery of vertebrate paleontological resources within given geological units, as vertebrate fossil resources are generally more highly regulated than other fossil resources. The PFYC system features five ratings: Class 1, through Class 5, with Class 1 and Class 5 respectively representing the lowest and highest probabilities for the presence of vertebrate fossil resources.

3.9.1 Washakie Formation

The proposed access road and well location is underlain by the Washakie Formation, in addition to unconsolidated Quaternary sand (Winterfeld 2009).

The Washakie Formation dates from approximately 43-44 million years ago (Ma), within the Eocene epoch. In particular, portions of the Middle and Late Eocene are represented in the Washakie Formation; subdivisions include the Bridgerian and Uintan land mammal ages, which are in turn subdivided into faunal zones. The Washakie Formation includes the Bridger C-D faunal zone, the Uinta B faunal zone, a portion of the Bridger A-B faunal zone, and possibly the Uinta C faunal zone.

Numerous fossil localities have been documented in Washakie Formation bedrock in the region surrounding the proposed Project Area, and many scientifically significant fossils have been discovered within the formation. Paleontological resources commonly present in the Washakie Formation include turtle and fish fossils. Other fossils represented in the Washakie Formation include those of titanotheres, uintatheres, rodents, condylarths, insectivores, primates, carnivores, and marsupials; in fact, at least 35 mammalian taxa from over 75 sites in the region are attributed to the Washakie Formation (Turnbull 1972; Turnbull and Martill 1988: 96).

Within the proposed Project Area, the Washakie Formation generally underlies surface deposits composed of varying thicknesses and mixtures of alluvium, colluvium, and stabilized sand dunes; however, the Washakie Formation is exposed intermittently along the eastern and western ends of the planned access road (Winterfeld 2009).

Washakie Formation bedrock within the proposed Project Area dates to the middle Eocene, and has a high probability (generally considered Class 4 or 5, depending upon levels of outcrop exposure) for the presence of paleontological resources. A review of Chicago Field Museum records indicated numerous documented fossil localities in Washakie Formation bedrock in the townships around the proposed Project Area, and many scientifically significant fossils have been discovered within the formation (Winterfeld 2009).

3.9.2 Results of the Field Surveys

A field survey of the proposed well pad and access road was conducted in August 2009. The two 4.78-acre well pad areas were inventoried for the proposed well pad, along with the 20.51-acre (5.42 linear miles) estimated disturbance area for the proposed access road. Two new fossil localities were discovered in the course of the survey; one is located within and adjacent to the proposed well pad, and the second is located along the eastern end of the proposed access road (Winterfeld 2009). Both findings included fossil vertebrate remains of fragmentary gar fish scales, crocodile dermal scutes, and turtle bone and shell (Winterfeld 2009). Additionally, a large amount of fragmentary fossil wood was noted across the proposed well pad site, as well as along the eastern and western ends of the

proposed access road (Winterfeld 2009). None of the discovered fossils are considered scientifically significant (Winterfeld 2009).

3.10 Geology

3.10.1 Geology

The proposed South Well and North Well are within the Washakie Structural Basin, which is a 2,200 square mile (42 miles north to south, and 54 miles east to west) sedimentary sub-basin of the Greater Green River Basin. The Washakie Basin is part of the Wyoming Basin Physiographic Province, and is situated southeast of Rock Springs and south of Wamsutter. The basin also lies immediately east of the Rock Spring Uplift, south of the Wamsutter Arch, west of the Sierra Madre, and north of Cherokee Ridge, which divides the basin from the Sand Wash Basin of Colorado (BLM 2004; BLM 2008b; Wyoming State Geological Survey 2009). Surface elevations in the basin range from about 6,100 to 8,700 feet and average about 7,000 feet.

The Washakie Basin is a deep and structurally complex synclinal depression, and is deepest and most structurally complex along its southwestern and southern edges, where dips are steepest and several zones of faulting are present (BLM 2008b, Wyoming State Geological Survey 2009). Rocks exposed at the surface in most of the basin are relatively flat lying, with the topography controlled mostly by differences in resistance to erosion (Wyoming State Geological Survey 2009). More detailed information on formation and sedimentary deposits that make up the basin is provided in the *Desolation Flats Natural Gas Fields Project EIS* (pp. 3-2 to 3-3, and in Table 3-3).

In the southwestern part of the Washakie Basin that includes the Project Area, Roehler (1992a) reports a thickness of 1,691 feet (ft) for the main body of the Wasatch Formation, 329 ft for the Niland Tongue of the Wasatch Formation, 827 ft for the Cathedral Bluffs Tongue of the Wasatch Formation, 293 ft for the Luman Tongue of the Green River Formation, 183 ft for the Tipton Tongue of the Green River Formation, 119 ft for the Wilkins Peak Member of the Green River Formation, and 1,320 ft for the Laney Member of the Green River Formation. The total thickness in this measured section in the Washakie Basin is 4,762 ft (Roberts 2005).

In the deep, central portion of the Washakie Basin near Adobe Town, Roberts (2005) indicated that oil-prone and gas-prone source rock intervals may have a greater potential for hydrocarbon generation, particularly in the more deeply buried, stratigraphically lower units.

3.10.1.1 Geologic Hazards

Potential geologic hazards include subsidence and active or suspected active faults. No earthquake epicenters have been noted in the Project Area. Several NW-SE trending faults have been mapped south of the Project Area and are associated with the Cherokee Arch (BLM 2004).

3.11 Air Resources

3.11.1 Climate, Temperature, and Precipitation

The Project Area is classified as a semi-arid mid-continental regime. The climate typically has dry, windy conditions with limited precipitation and long cold winters (BLM 2004). The nearest meteorological measurements were recorded at the Bitter Creek 4 NE, Wyoming weather station (480761) and obtained from the Western Regional Climate Center (WRCC 2009). The weather station records date from September 1962 thru April 2009. The station is located approximately 25 miles northwest of the Project Area at an elevation of 6,720 ft above sea level. Climatic conditions at the Project Area may vary from the conditions recorded at the Bitter Creek 4 NE weather station, because of the separation distance, topography changes and elevation differences. The data collected at the Bitter Creek 4 NE weather station are the best representational data available for the Project Area.

At the Bitter Creek 4 NE weather station, the average maximum and minimum temperatures in January are 32.1 and 7.3 degrees Fahrenheit (F). The average maximum and minimum temperatures in July are 84.2 and 46.9 degrees. The annual average maximum temperature is 57.0 degrees F and the annual average minimum temperature is 26.3 degrees F. The annual average total precipitation at the weather station is 6.4 inches with an annual average total snowfall of 16.2 inches (WRCC 2009).

The Project Area is subject to strong and gusty winds, often accompanied by snow during the winter months, producing blizzard conditions and drifting snow (BLM 2004). The annual mean wind speed for the region is 10.4 miles per hour and predominately from the south or southwest (BLM 2004).

3.11.2 Air Quality

The DRU is regulated under the national and Wyoming air quality standards for regulated air pollutants. The National Ambient Air Quality Standards (NAAQS), as mandated by the Clean Air Act and set by the Environmental Protection Agency (EPA), require a national standard of air quality be maintained throughout the nation. The air quality regulations are designed to protect the public health and welfare by regulating the acceptable limits for six criteria pollutants: carbon monoxide, lead, nitrogen dioxide, particulate matter with a nominal aerodynamic diameter of 10 and 2.5 micrometers (PM_{10}, $PM_{2.5}$), ozone, and sulfur dioxide (EPA Website: http://www.epa.gov/air/criteria.html).

The transportation and dilution of air pollutants are primarily a function of wind speed and direction Winds dictate the direction in which pollutants are transported. As wind speed increases, the dispersion of emitted pollutants also increases, thereby reducing pollutant concentrations. Wind data within the DRU have not been directly measured, though the annual mean wind speed for the region is 10.4 miles per hour (BLM 2004).

The stability in the atmosphere is also important to the dispersion of emitted pollutants. During stable conditions, vertical movement in the atmosphere is limited and the dispersion of pollutants is inhibited. Temperature inversions can result in very stable conditions with virtually no vertical air movement and light winds, thereby restricting dispersion. Conversely, during convective conditions, upward and downward movement in the atmosphere and stronger winds prevail, and the vertical mixing of pollutants in the atmosphere is enhanced. The potential for favorable atmospheric dispersion is relatively high for the DRU, due to the frequency of strong winds. Calm periods and nighttime cooling may enhance air stability, thereby inhibiting air pollutant transport and dilution.

The State of Wyoming has assumed primacy for the regulation of air pollution in the state and therefore, the project is subject to the Wyoming Air Quality Standards and Regulations (WAQSR). The Wyoming Department of Environmental Quality's Air Quality Division (WDEQ-AQD) is responsible for implementing the WAQSR. Table 3-5 displays the NAAQS and WAAQS.

Table 3-5. National and Wyoming Ambient Air Quality Standards.

Pollutant and Averaging Time	National Ambient Air Quality Standards	Wyoming Ambient Air Quality Standards
Carbon Monoxide (CO)		
1-hour	35 parts per million (ppm)	35 ppm
8-hour	9 ppm	9 ppm
Lead (Pb)		
Calendar Quarter	1.5 micrograms per cubic meter ($\mu g/m^3$)	1.5 $\mu g/m^3$
Rolling 3-Month Average	0.15 $\mu g/m^3$	

Pollutant and Averaging Time	National Ambient Air Quality Standards	Wyoming Ambient Air Quality Standards
Nitrogen Dioxide (NO_2)		
Annual (Arithmetic Mean)	0.053 ppm	0.053 ppm
Ozone		
1-hour	0.12 ppm	
8-hour	0.075 ppm (2008 standard)	0.08 ppm
Particulate Matter (PM10)		
Annual (Arithmetic Mean)		50 µg/m^3
24-hour	150 µg/m^3	150 µg/m^3
Particulate Matter (PM2.5)		
24-hour	35 µg/m^3	65 µg/m^3
Annual (Arithmetic Mean)	15 µg/m^3	15 µg/m^3
Sulfur Dioxide (SO_2)		
3-hour	0.50 ppm	0.50 ppm
24-hour	0.14 ppm	0.10 ppm
Annual (Arithmetic Mean)	0.03 ppm	0.02 ppm

Site-specific air quality monitoring has not been conducted for the DRU, but regionally-measured criteria pollutant background concentrations are in attainment with national and Wyoming standards indicating that the local air quality is good (BLM 2004).

Hazardous Air Pollutants (HAPs) are regulated by the WDEQ-AQD with primacy from the Environmental Protection Agency via 40 CFR 70. The State of Wyoming's EPA approved State Implementation Plan includes a permitting program that addresses both major and minor sources. For major sources, The WDEQ-AQD requires any source that emits or has the potential to emit greater than 10 tons per year of any HAP or 25 tons per year or greater of any combination of HAPs to obtain a Title V, Part 70 operation permit. A Title V Operating permit is also required when a pollution source emits or potential to emit 100 tons per year of a regulated air pollutant. The Title V air permit process is designed to grant public, EPA and neighboring states participation in the permit approval process. Additionally, Wyoming's permitting program exceeds federal permitting requirements by requiring construction permits for any source that may emit any air contaminant in any form, including minor sources from oil and gas operations (Wyoming Air Quality Standards and Regulations, Chapter 6). The State of Wyoming requires that all sources, including minor sources from oil and gas operations, implement best available control technology (BACT) to reduce or eliminate emissions (Wyoming Air Quality Standards and Regulations, Chapter 6 § 2(c)(v)). As part of the permitting process, the WDEQ-AQD requires applicants for both major and minor sources to demonstrate that the proposed facility "will not prevent the attainment or maintenance of any ambient air quality standard" or "cause significant deterioration of existing ambient air quality" before an air quality permit will issue (Wyoming Air Quality Standards and Regulations, Chapter 6 § 2(c)(ii), (iii)).

The Prevention of Significant Deterioration (PSD) program (40 CFR 52) applies to new major sources or major modifications to existing sources of pollutants for areas in attainment or unclassifiable with the NAAQS (EPA http://www.epa.gov/nsr/psd.html). The PSD program regulates incremental increases in ambient concentrations of criteria pollutants. PSD requires that applicable pollution sources install the Best Available Control Technology (BACT), conduct an air quality impact analysis in conjunction with public involvement.

The PSD program classifies air quality by area and designates them as Class I or II. Class I air quality areas are defined as pristine and are typically applied to wilderness areas, national parks, and national monuments. Class I areas are carefully protected and only very small incremental increases in pollutant concentrations are allowed. All remaining attainment areas are designated as Class II, which allows moderate incremental increases of pollutant concentrations below the NAAQS.

The DRU and the surrounding area are classified as PSD Class II. Five PSD Class I areas were identified and were analyzed in the Desolation Flats Natural Gas Field Final EIS (BLM 2004). There are no Class I or nonattainment areas near the Unit. The regional federally designated Class I areas include Dinosaur National Park (Colorado and Utah), Flat Tops Wilderness, Mount Zirkel Wilderness (Colorado), Savage Run Wilderness (Wyoming), and Bridger Wilderness Area (Wyoming). The closest Class I area to the DRU is Dinosaur National Park, located about 100 miles southwest of the DRU.

3.12 Land Use

3.12.1 Transportation and Access

Wyoming SH 789 would serve as the primary access to the Project Area from Wamsutter or Rawlins, Wyoming. SH 789 can be accessed from Interstate Highway 80 (I-80) via Creston Junction (exit 187). This stretch from I-80 to the Colorado state line is subject to recurrent winter weather closures from October to May. The highway is a secondary rural road that may not be cleared until after a winter storm and after other highway priority roads.

Roads within the Project Area consist of unpaved, unimproved, and unmaintained roads and primitive two-tracks. Numerous two-tracks from light vehicles and off-road vehicles (ORVs) are evident throughout the Project Area, likely a result of public recreational use of the Monument Valley. The Green River RMP does not place any off-road restrictions for travel within the MVMA (BLM 1997).

Access to the Project Area is made by traveling approximately 29 miles south of the I-80/Creston Junction exit on SH 79 to the improved South Barrel Springs Road that intersects SH 789 at Dad, Wyoming, then traveling another 26 miles via the South Barrel Springs Road to other marked and unmarked dirt roads and two-tracks.

3.12.2 Grazing

Limited livestock grazing occurs in the Project Area and within the DRU. Grazing occurs on both private and federal land, and is located within portions of both the Rock Springs (#13018) and Willow Creek (#10528) Grazing Allotments, administrated by the BLM Rock Springs and Rawlins Field offices. No grazing allotments are wholly contained within the DRU and the Project Area. The proposed access road and well locations under the Proposed Action would be located wholly within the Rock Springs Grazing Allotment. The access road under Alternative 2 would cross the Rock Springs and Willow Creek grazing allotments.

The season of use within the Rock Springs Grazing Allotment is December through April; however, the allotment typically receives little to no use due to limited water and difficult access. The allotment supports about 57 Annual Unit Months (AUMs) of cattle with a fair to good range condition (BLM 2004).

3.12.3 Other Land Uses

The DRU is wholly located within the BLM Rock Springs Field Office administrative area and is administered in accordance with the Green River RMP.

Energy exploration is an existing land use within and adjacent to the DRU. Four conventional natural gas wells exist within the DRU boundary. The wells are located within 2.5 miles, of the two proposed wells and are located

on adjacent federal leases. Energy development outside of the DRU is limited primarily to conventional natural gas development in Township 16N, Range 95W, which has 14 developed wells. Limited energy development has occurred in adjacent townships to the north, west and south. Three wells have been drilled in Township 17N, Range 96, one well in Township 16N, Range 97W, and one well in Township 15N, Range 96W.

Additional land uses beyond grazing and energy development include wildlife habitat and recreation. The DRU and surrounding area have no developed recreational facilities (BLM 2004). Sections 3.4 and 3.7 discuss the wildlife and recreational uses.

3.12.4 Local Land Use Plans

Sweetwater County has developed and implemented zoning ordinances (Sweetwater County 2003) and subdivision regulations (Sweetwater County 1986) with regulatory authority over all non-federal land within the DRU and Project Area. The purpose of the zoning ordinances and subdivision regulations is to provide for the protection of public health, safety, land values, and the environment though public planning.

The private land within the DRU is designated under an agricultural zoning district. Oil and gas exploration, drilling, and extraction facilities are all permitted uses within an agricultural zoning district (Sweetwater County 2003).

Sweetwater County has developed a Growth Management Area Plan for select portions of the County. The DRU is entirely outside the currently established Growth Management Area Plan boundary and is not required to meet the associated regulations.

3.13 Solid and Hazardous Wastes/Materials

3.13.1 Solid Waste

Solid wastes that could be generated by the proposed project may include sanitary wastes, trash/garbage, construction and equipment debris.

3.13.2 Hazardous Waste

Hazardous wastes are wastes designated as dangerous or potentially harmful to human health or the environment. Hazardous wastes are regulated by the Resource Conservation and Recovery Act (RCRA) Subtitle C for the purpose of protecting human health and the environment by requiring hazardous wastes to be handled in an appropriate manner.

Hazardous materials used or generated by the proposed project may come from fuels, drilling materials, cement and plugging materials, fracturing materials, produced products, vehicle emissions, workover operations, and other miscellaneous materials.

3.13.3 Hazardous Materials

The primary agencies that regulate hazardous materials are the Environmental Protection Agency (EPA), U.S. Department of Transportation (DOT), and the Occupational Safety and Health Administration (OSHA).

The proposed project will not use extremely hazardous substances. Hazardous substances may be used and generated in conjunction with project activities, but in quantities less than 10,000 pounds. Material Safety Data Sheets (MSDS) are required to be kept on site for all hazardous substances utilized during project activities.

3.14 Noise and Odor

Noise in the Project Area will predominantly be the result of wind with insects, animals, occasional vehicle and air traffic contributing (EPA 1971). The average background noise will likely range from 35 to 45 dBA with possible spikes resulting from periodic vehicle and air traffic influences (EPA 1971). High wind conditions will also result in increased noise above background levels for the duration of the wind event. Anthropogenic sources of noise are irregular and periodic with no consistent sources. Vehicular noise is the most common anthropogenic source as a result of traffic on county and BLM area roads within and adjacent to the Project Area.

Noise-sensitive receptors in and adjacent to the Project Area include recreational users, wild horses, pronghorn antelope, nesting raptors, sage-grouse, and migratory birds. No ambient noise measurements have been made in the Project Area.

Because of the Project Area's rural setting, natural odors from soils and vegetation predominate. Odors from livestock, wild horses, and exhaust from vehicles occur locally.

Figure 3-0. Monument Valley Management Area

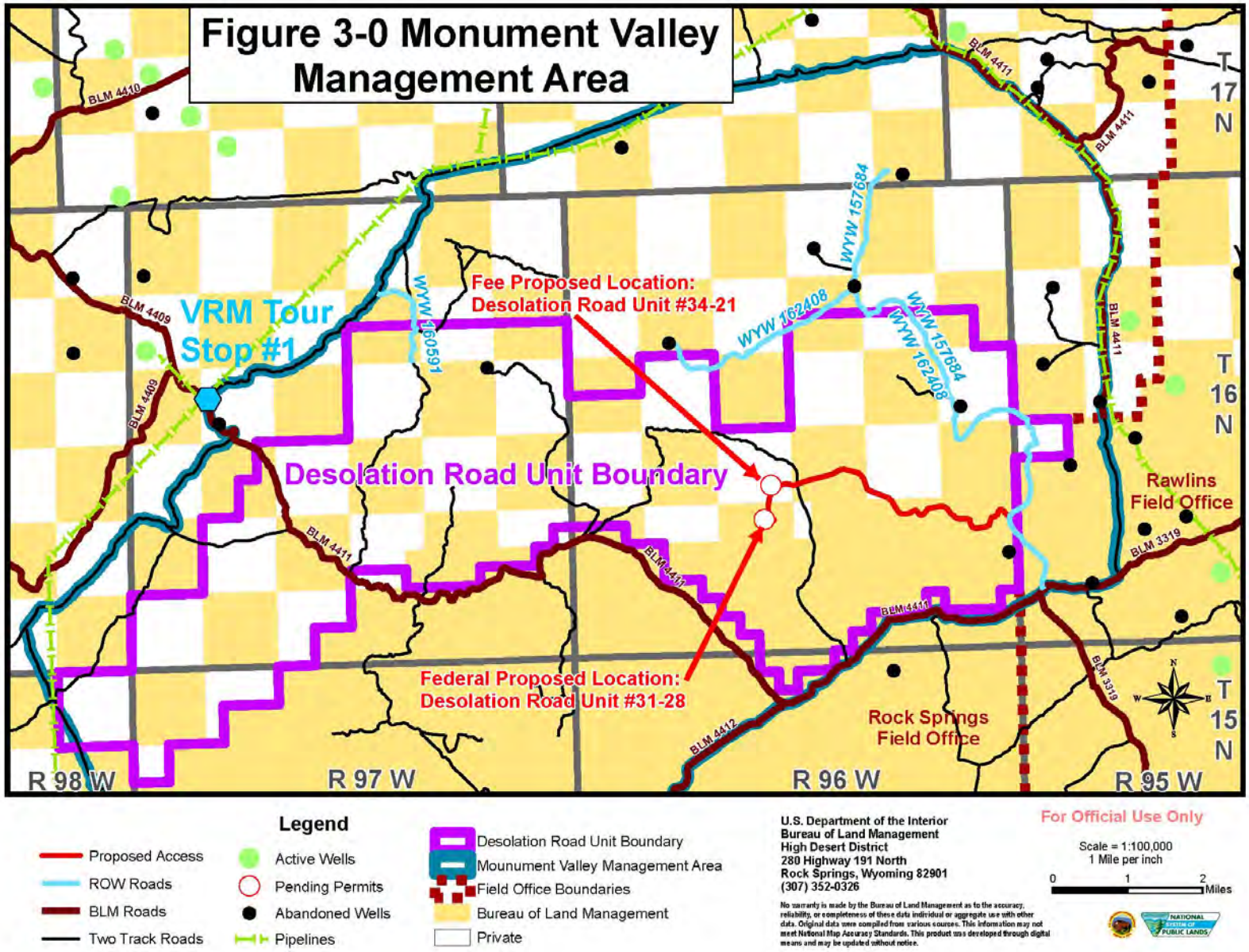


Figure 3-1. Pronghorn Antelope Crucial Winter Range

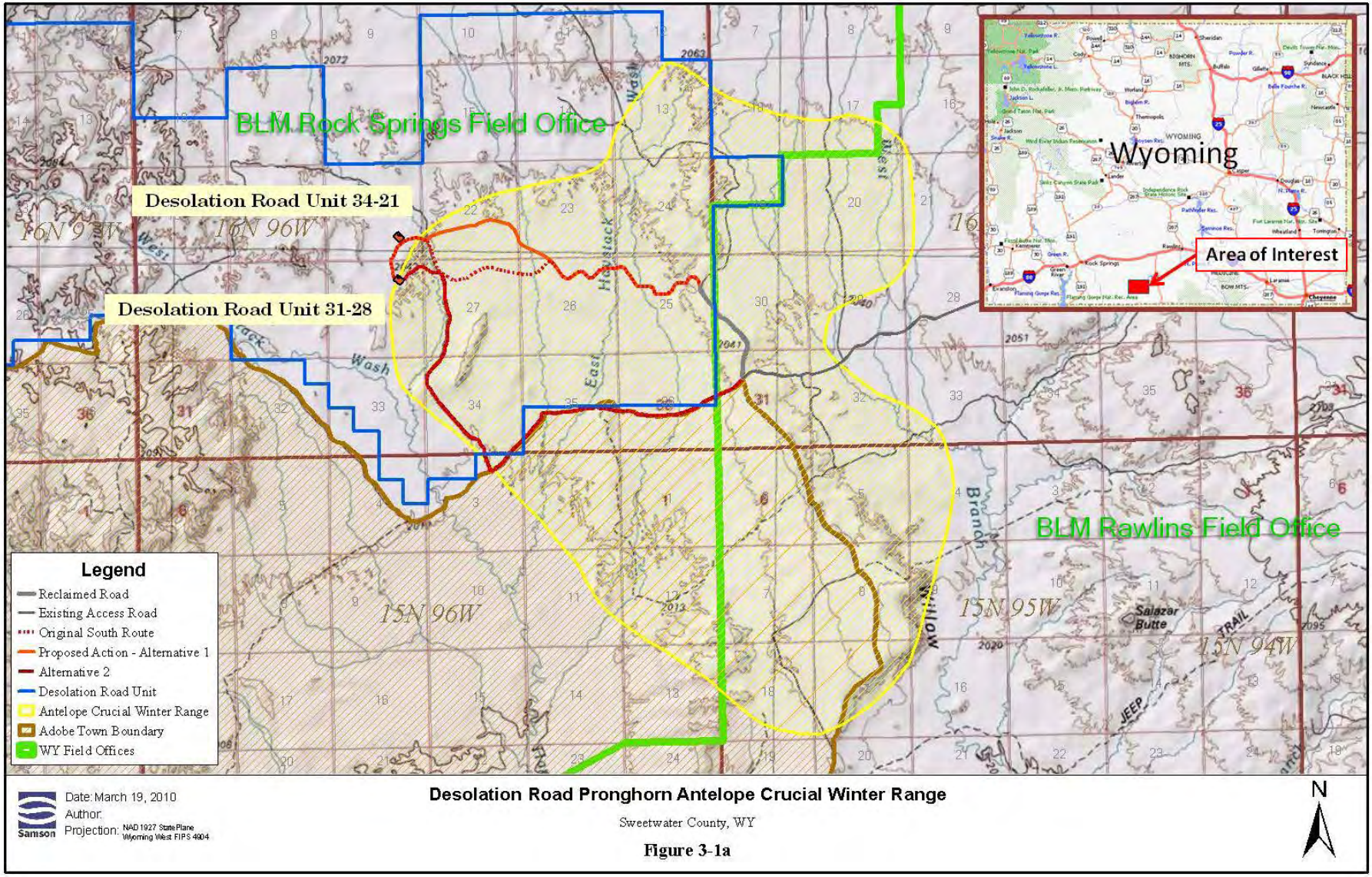


Figure 3-2. Sage-Grouse and Mountain Plover Locations, Habitats, and Timing Limitation Stipulations

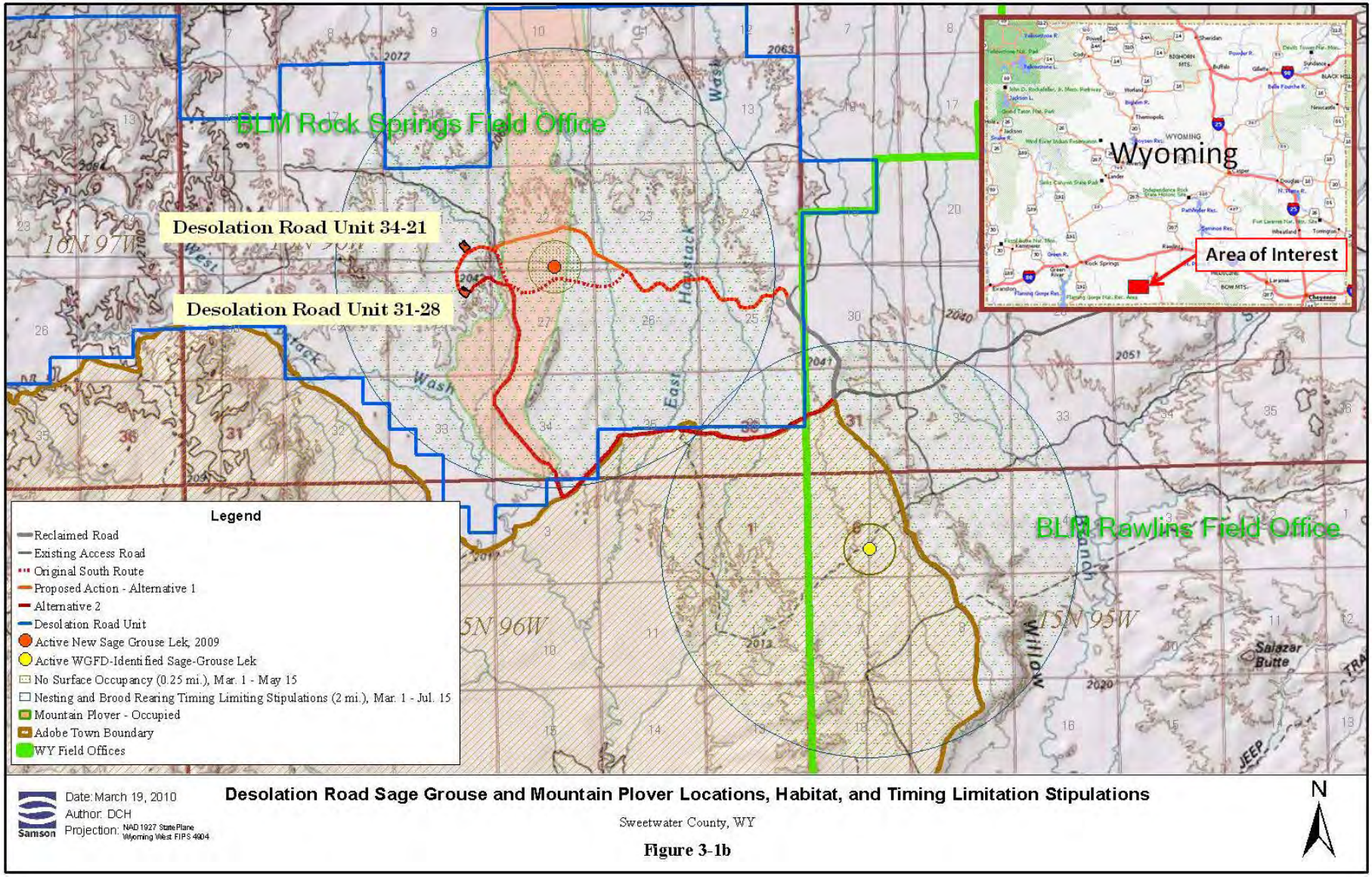
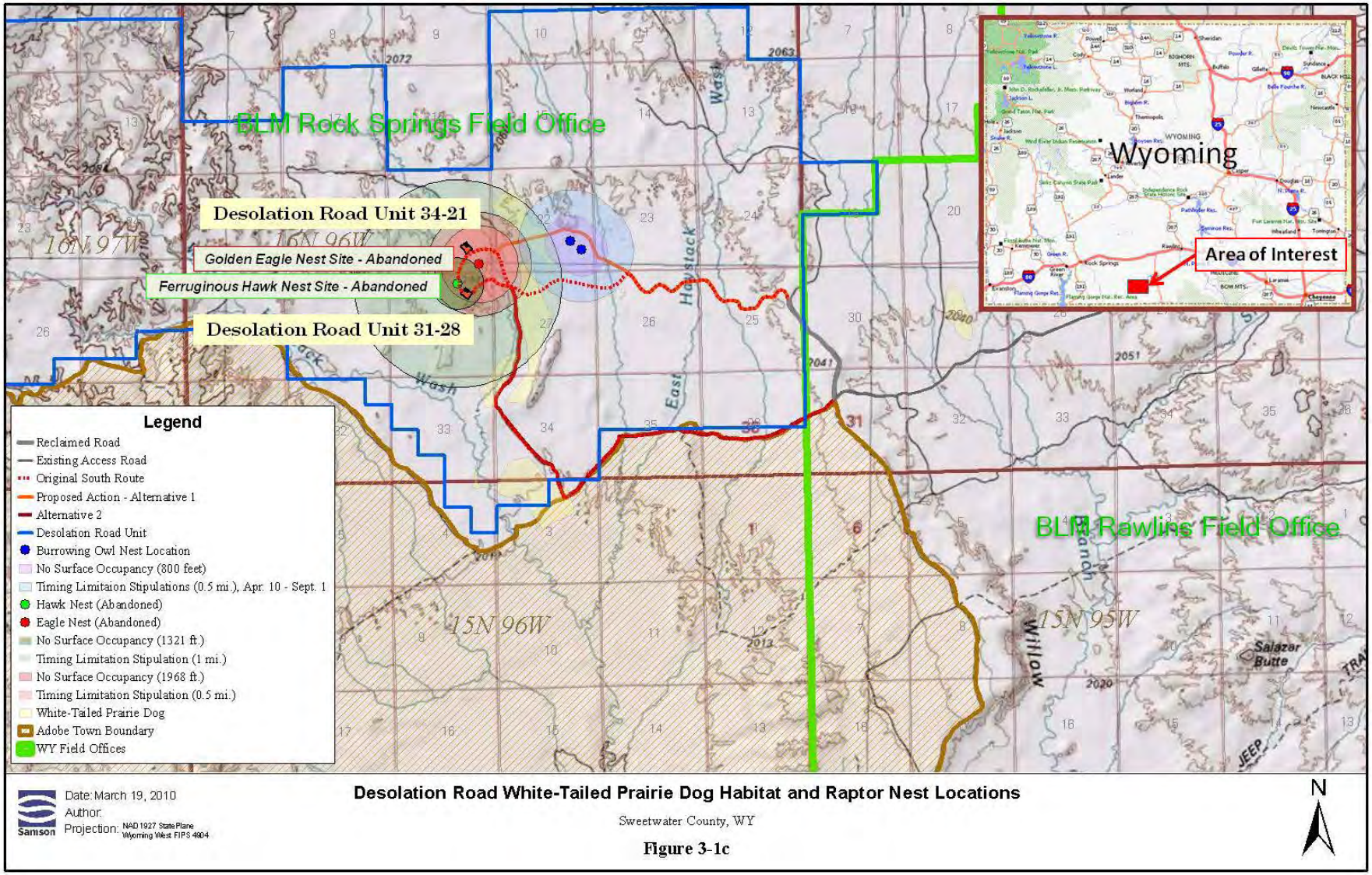


Figure 3-3. White-Tailed Prairie Dog Habitat and Raptor Nest Locations



4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Special Designations and Management Areas

4.1.1 Alternative 1: Proposed Action

Monument Valley Management Area

The objective of the MVMA is to provide protection for wildlife, geologic, cultural, watershed, scenic, and scientific values (paleontological and cultural). Implementation of the design features would result in avoidance or mitigation of potential impacts from Alternative 1: Proposed Action. The MVMA is open to consideration for mineral leasing, exploration, and development provided mitigation can be applied to retain the resource values (Green River RMP [no page numbers in document]). Analysis of impacts to scenic values (visual resources) in the MVMA and mitigation to lower impacts is presented in Section 4.2.

Adobe Town Wilderness Study Area

No oil and gas development would occur within the Adobe Town WSA under the Alternative 1-Proposed Action. The design of Alternative 1-Proposed Action would divert oil and gas development from the Adobe Town WSA boundary road, and mitigate the potential for more use of existing roads within the Adobe Town WSA. In addition, the potential for more use of unauthorized vehicle tracks already existing within the area, and the potential for more trespass by vehicles on otherwise undisturbed surface could be reduced. This would mitigate the potential for impairment of characteristics in the Adobe Town WSA, like naturalness, opportunities for solitude and primitive recreation, and its special features (viz. the wild horse herd and its fossil resources).

Should the North and South wells go into production, the potential for impacts to the Adobe Town WSA from Alternative 1-Proposed Action would be negligible. During the drilling phase of Alternative 1-Proposed Action, a very low to low potential for incremental, unauthorized motorized use in the Adobe Town WSA would still exist just because travel by project personnel in the vicinity of the Adobe Town WSA would increase awareness of its existence and its values in a population new to the area, inviting visits to the area, some of which could possibly violate the standard of non-motorized use in place for WSAs. This would be a negligible to very low indirect and temporary effect, which could be mitigated by raising the level of awareness among project personnel of standards for use of the Adobe Town WSA.

4.1.2 Alternative 2: Existing Road Access

Monument Valley Management Area

As specified above for the Proposed Action, the design features would result in avoidance or mitigation of potential impacts from Alternative 2: Existing Road Access. The MVMA is open to consideration for mineral leasing, exploration, and development provided mitigation can be applied to retain the resource values (Green River RMP). Analysis of impacts to scenic values (visual resources) in the MVMA and mitigation to lower impacts is presented in Section 4.2.

Adobe Town Wilderness Study Area

Under Alternative 2-Existing Road Access the road to the Project Area would be substantially upgraded and temporarily exposed to an increase in traffic during the drilling phase of the activity. Should the North and South Wells go into production and the road is kept open and maintained it would also potentially attract traffic by casual users and expose the Adobe Town WSA to a higher level of awareness and potential use over the long term.

As use of the road by both workers and recreationists potentially increases, the potential for unauthorized motorized use in the Adobe Town WSA would increase as well. During drilling, the potential for this indirect and temporary effect would be low to moderate. The effect could be mitigated by raising the level of awareness among project personnel of standards for use of the Adobe Town WSA. Should the North and South Well go into production, the indirect and long-term potential for unauthorized motorized use in the Adobe Town WSA would be very low to low, but with the potential for cumulative effects over time to wilderness values such as roadlessness and freedom from evidence of human activity. Mitigation of this effect is also possible through measures to inform road users of the location and protected status of the Adobe Town WSA.

4.1.3 No Action Alternative

Under the No Action Alternative, the BLM would deny the Desolation Road Proposal, so there would be no impact to Special Designation and Management Areas.

4.1.4 Additional Mitigation Measures

Samson shall inform its personnel and require contractors to inform their personnel of standards for use of the Adobe Town WSA to mitigate the potential for incremental use of unauthorized vehicle tracks and trespass by vehicles on otherwise undisturbed surface by project personnel.

It is presently standard operating procedures that the BLM erect Adobe Town WSA boundary signs along the BLM road near the WSA boundary to better define the protected area as a way of mitigating the potential for an indirect and temporary effect from unauthorized vehicle intrusion into the WSA during Proposed Project drilling and production phases.

In coordination with the BLM, Samson shall place a sign along the new access road stating that off road vehicle travel is not permitted.

4.2 Visual Resources

The Desolation Road Proposal would cause both short- and long-term impacts to visual resources where drilling equipment, production facilities, and construction related damage to vegetation, topography or other visible features create unnatural contrast with patterns of area, line, form, color, and texture in the characteristic landscape. The severity of impact depends upon scenic quality, sensitivity level, distance from the viewer to the affected environment, reclamation potential of the landscape disturbed, and the level of disturbance to the visual resource created by the Alternative 1-Proposed Action and Alternative 2-Existing Road Access.

Short-term adverse impacts from well construction equipment, surface disturbance, and fugitive dust would be juxtaposed with the existing landscape. The well drilling process—which is the most intrusive upon views that include the Desolation Road Proposal area—would last for 35 to 65 days, which is the length of time Samson proposes to allow for rig construction and drilling, and removal of the rig. Long-term impacts would result from production facilities, access roads, fugitive dust, and un-reclaimed surface disturbance.

4.2.1 Alternative 1: Proposed Action

During drilling, the Desolation Road Project would introduce these man-made contrasts to the natural landscape: industrial machinery, cleared areas, roads, traffic and dust. These contrasts would be visible to anyone at Key Observation Points (KOP) about two miles away on the Manuel Gap Road and within 5.5 miles or less of views from The Haystacks, which are less commonly attained by visitors to the area because of limited and difficult access.

The magnitude of the contrast during drilling would be moderate to strong in the middle ground of these overviews, especially along the Manuel Gap Road. The observer's attention would be drawn by frequent traffic movement and related dust plumes and by the contrast between man-made forms and colors and the natural background.

The contrast generated within the Project Area and on access roads during drilling would affect only a small portion of the entire Monument Valley-Haystacks landscape. The duration of the effect is temporary since the process is proposed to last for 35 to 65 days. However, the effect would be noticeable, especially from vantage points along the Manuel Gap Road, which is the principal route into the area for casual viewers.

Should the North and South Wells go into production, a number of features are proposed to remain as man-made contrasts to the natural landscape for the 40 year life of the wells. These include two cleared production pads of reduced size, a wellhead, production tanks, a separator, a flare stack, and the improved access road.

The pads, structures, and road would all represent contrasting elements of form, line, color and texture with the characteristically natural background. However, because of design features described in Chapter 2 the magnitude of the impact would be lower than for a conventional design. Well pads in low-lying areas behind bluffs would be more likely hidden from view points. Low profile facilities painted a suitable environmental color and sited on the low-lying pads also would be less likely to be seen by possible observers and when seen would introduce less contrast. The access road following the terrain and aligned in lower elevation areas would appear less often or perhaps as a less vivid intrusion on the surface. Because of the design in Alternative 1-Proposed Action the magnitude of the contrast potentially introduced for the long term, should the wells go into production, would be weak to moderate in middle ground of the overviews accessible by the casual observer—seen and beginning to attract attention but perhaps often hidden along the routes followed by casual visitors to the area.

Alternative 1-Proposed Action partially uses existing two-tracks and a partially reclaimed road that veers to the north away from the WSA boundary road. This avoids additional impacts of road-upgrading along approximately 3.0 miles of the WSA boundary road and 2.38 miles of the road north to the Desolation Road Proposal area from the WSA boundary road. The access road alignment under the Alternative 1-Proposed Action does include about 1.5 miles of new disturbance and it swings along the base of The Haystacks. This brings Alternative 1-Proposed Action closer to the Haystacks.

4.2.2 Alternative 2: Existing Road Access

As under Alternative 1, the magnitude of impacts to visual resources under Alternative 2-Existing Road Access, take into consideration the location of the Project Area within the larger Monument Valley-Haystacks area. These impacts would be moderate to strong in the middle ground of overviews accessible to the casual viewer, especially along the Manuel Gap Road.

Also as under Alternative 1, the impacts to visual resources should the North and South Wells go into production under Alternative 2, drilling would be weak to moderate in middle ground of the overviews accessible by the casual observer—seen and beginning to attract attention but perhaps often hidden along the routes followed by casual visitors to the area. The expectation is that design features described in Chapter 2 would lower the magnitude of visual impacts to this level from levels that would otherwise occur with a conventional design for the production pad, facilities and access road.

Since Alternative 2 would use approximately 3.0 miles of the WSA boundary road and 2.38 miles of the existing road north to the Desolation Road Proposal area, it would unnatural visual contrast at the boundary of the WSA. However, Alternative 2 would avoid the visual contrast introduced at the base of The Haystacks by Alternative 1 of upgrading existing roads and introducing 1.5 miles of new road disturbance in order to follow a new alignment for the access road.

4.2.3 No Action Alternative

Under the No Action Alternative, the BLM would deny the Desolation Road Proposal, so there would be no impact to visual resources.

4.2.4 Mitigation Measures

These mitigation measures would mitigate short- and long-term impacts to visual resources from the Desolation Road Proposal:

1. Improve access road surface with material of a color chosen to reduce contrast with the surrounding natural surface.

2. After the commencement of commercial production, when Samson moves from the temporary above ground natural gas line to a buried gas line, that line will be buried in the areas previously disturbed by road construction (such as the burrow ditch) to the greatest extent practical.

3. It is recommended that the BLM include sagebrush seed in the required seed mixture when and where reclamation is done. Re-establishing vegetation types that currently exist in the Proposal Area (where sagebrush is the dominant vegetation) should be a reclamation objective.

4.3 Hydrology – Surface Water and Groundwater

Degradation of surface water could result from increased runoff and sedimentation from soil disturbance during construction of well pads and roads, as well as from spills or uncontrolled discharges of drilling fluids, produced water, or other hazardous contaminants used during the project. Mitigation of potential impacts to surface waters would be accomplished by implementing measures included in the following: lease stipulations, Green River RMP, Surface Operations Standards and Guidelines for Oil Exploration and Development (Gold Book), Wyoming Stormwater Permit, Spill Prevention Control and Countermeasure (SPCC) Plan, Wyoming Water Quality Regulations, the Clean Water Act, Samson's Storm Water Pollution Prevention Plan, and Samson's Reclamation Plan.

Degradation of groundwater is possible due to uncontrolled spills of hazardous contaminants that are first introduced into surface water, but could migrate to the subsurface and infiltrate groundwater aquifers. Potential contamination sources include drilling fluids, hazardous materials used onsite, and leaking reserve pit liners. Adherence to BMPs and the measures described above would also minimize the risk of groundwater contamination.

4.3.1 Surface Water

Alternative 1: Proposed Action

Potential for increased sedimentation to surface waters

The Proposed Action would result in the disturbance of 30.1 acres. The surface water features in the Project Area are mostly low gradient, narrow, and relatively shallow ephemeral drainages with some intermittent features. The access road would cross four intermittent and eight ephemeral drainages. Road construction would be done in accordance with the Gold Book (BLM 2007). No culverts or bridges are planned along the proposed access road. Due to the erosive and saline soils in the Project Area, low water crossing techniques will be utilized instead of culverts and bridges because they are more desirable for relatively narrow and shallow drainage locations. Low water crossings are less susceptible to trapping debris or vegetation than culverts. Low water crossings are frequently armored with native bedrock or coarse soils, and are less likely to blow out in drainages with unknown or variable flow characteristics.

Low-water crossings at West and East Haystack Washes are the widest drainage crossing in the Project Area and have the greatest potential to affecting channel geometry. Potential aggradation, degradation, or side-cutting resulting from stream crossings, particularly in the major drainages, would be expected to last for the life of project (20 years). Short-term impacts to surface water from sedimentation would be negligible because the project phases with the greatest surface disturbing activities (construction and development) would be short term in nature. The long-term downstream effect on sediment load would not be significant. Interim and final reclamation would restore disturbed areas to pre-construction conditions, and would also reduce the potential for increasing long-term downstream sediment loads.

Potential for increased surface runoff

Surface disturbance may result in a slight increase in surface water runoff to nearby areas. In most cases, however, nearby undisturbed areas would provide an area for the increased runoff from the semi-impervious areas to infiltrate into the ground and slowly percolate to the nearby drainages. The proposed South Well pad would be located up a gentle slope (less than three percent (3%) grade) more than 0.25 mile from the West Haystack Wash. Under intense precipitation or runoff events, sediment could be mobilized to the drainage. Other than around the uphill side of the well pad, there are no planned surface conveyances, such as drainage ditches, planned for this proposal. Design features such as those described in the Samson SWPPP, in the Applicant-Committed Environmental Protection Measures, and in the SPCC Plan should minimize potential increased runoff impacts.

BLM stipulations prohibiting project activities in crucial pronghorn winter range would indirectly provide benefits to help control surface runoff and sedimentation by prohibiting surface disturbance and project activities from November 15 to April 30. Reducing the number of vehicle trips by carpooling or bussing field personnel, restricting vehicles to permitted roads and approved ROWs, and maintaining travel speeds in the Project Area would also minimize fugitive dust and soil and vegetation disturbance. Surface occupancy and/or Controlled Surface Use stipulations in the MVMA prohibits project activities on steep slopes, those greater than 25 percent (>25%); however, the Project Area is relatively flat, and no project construction or development would occur on any slopes greater than about a three percent gradient.

Potential surface runoff would continue during the production phase and be long term (20 years), however, potential ground disturbing activities are at a less intense level during the production phase than during either construction or development. Impacts to surface water quality resulting from surface runoff off of the well pads and road would be minimized by following the requirements of the BLM AO and the design features described in the of Gold Book (BLM 2007). Surface runoff on the well pads and roads would also be reduced by implementing stormwater BMPs to control erosion and soil loss. Stormwater BMPs would include the use of diversion ditches, berms, straw bales, silt fence, and cut and fill construction techniques. Other design features including prohibiting cross-country travel, limiting travel to existing permitted roads and approved ROWS, and dust suppression could also reduce the potential for damaging surface runoff.

Potential for surface runoff would be further reduced as portions of the well pad are reclaimed as part of interim and final reclamation. Measures to reduce surface runoff during interim reclamation include stabilizing soils by re-contouring disturbed areas and reseeding unused areas of the well pad. Interim reclamation would occur as soon as practical after well completion. At the end of the life of the project, final reclamation would include re-contouring the well pad and road to approximately pre-project contours followed by reseeding with native vegetation. Prior to final reclamation, Samson would submit a Sundry Notice to the BLM that would describe the engineering, technical, and environmental aspects of the earthwork, grading, and topsoil replacement.

Potential for accidental spills

There is a potential for contamination of water resources from spills or discharges of drilling fluids, fuels, or other chemicals used for natural gas drilling, testing and completion activities, as well as produced water. The risk of uncontrolled spills reaching surface water exists throughout the implementation of the Proposed Action. An SPCC plan would cover the storage, transfer, use, training, and spill response related to petroleum products. Adherence to the plan would greatly reduce the risk of a petroleum product spill occurring and would ensure that a proper response is mounted in the event of a spill. Similarly, an emergency response plan would be in place that covers non-petroleum product spills, such as hazardous materials. There is an increased risk of contamination because of Samson's proposed use an open reserve pit, which would increase the possibility of an overflow event or leak in the pit liner. The pit location is, however, more than 0.25 mile from the West Haystack Wash, which would reduce the risk of surface waters becoming contaminated as the result of an accidental release.

Water would be produced during the drilling and completion operations. Based on previous groundwater testing in area geology, the produced water would likely contain high concentrations of salts that could negatively impact water quality if released to surface waters. There are no planned surface or groundwater discharges of produced water. Overall, the risk to surface waters from the release of waters produced as a result of drilling and completion operations is considered to be low.

Measures to reduce the risk of contamination from an accidental spill would be contained in the SPCC Plan that is required to remain on site during drilling and completion operations. MSDS for all chemicals used during project activities and an Emergency Response Plan would also be maintained on site for use as part of clean-up action

occurs if needed. Given the applicant-committed mitigation measures, regulatory requirements, and other direct and indirect design features, the project is not expected to have a significant impact on surface and ground water quality from accidental spills.

4.3.2 Alternative 2: Existing Road Access

Impacts to surface water under Alternative 2 would be similar to those described under Alternative 1. Alternative 2 would result in the disturbance of 32.6 acres. The access road would cross eight intermittent and 20 ephemeral drainages. The potential for increased surface runoff and sedimentation under Alternative 2 is not appreciably different from the Proposed Action (30.1 acres). The additional drainage crossings could potentially increase sedimentation to downstream watersheds, as compared to the Proposed Action, but would still not have a significant impact on surface water resources.

4.3.3 Alternative 3: No Action Alternative

Under the No Action Alternative, the Proposed Action and Alternative 2 would be denied. Therefore, the proposed wells would not be drilled and the proposed well pads and access roads would not be constructed or improved. Surface water would remain unchanged from current conditions and no additional impacts to surface and ground water resources would occur.

4.3.4 Groundwater

Alternative 1: Proposed Action

The Proposed Action is located in the MVMA which has a primary management goal of watershed protection making protecting water-quality is a priority. Groundwater resources of most concern are the shallow aquifers in Washakie Basin Formation. There are no developed water wells within one mile of the proposed well. Several small reservoirs have been developed for stock water, but occur more than one mile from the well pad and access road. These reservoirs were dry during field site visits in 2009 (Kane and DeVito 2009).

Potential impacts to groundwater resources include possible contamination of groundwater with produced water, drilling fluids, or petroleum constituents during drilling operations. Additionally, shallow groundwater could be impacted by accidental surface spills of petroleum products or other fluids used to support drilling operations.

During drilling operations, the boreholes could penetrate several aquifers or could breach zones that provide barriers between aquifers (aquitards). Cross contamination of aquifers may occur if drilling fluids or other contaminants from the wellbore migrate vertically into freshwater aquifers. An integrated casing and cementing program would be put in place that is designed to protect freshwater aquifers. Therefore, the potential for contamination or cross-contamination of freshwater aquifers is considered low.

Accidental surface spills of contaminants could adversely impact shallow groundwater. Reserve pits would be constructed at each well site for disposal of the drill cuttings. A 12-mil liner would be installed in the reserve pit to prevent drilling fluids and other contaminants from infiltrating shallow groundwater aquifers. Improperly lined reserve pits can leak, which could potentially affect groundwater quality. The BLM-approved Plan of Development (POD), however, would require Samson to conduct regular pit inspections to assess the integrity of the reserve pit and pit liner. Additionally, if a petroleum spill or leak were to occur, the countermeasure portion of the SPCC plan would be implemented to minimize, control, and cleanup the affected area. The Applicant-Committed Environmental Protection measures described above for the protection of surface water quality would also contribute to protection for groundwater quality.

Once the well is drilled and the casing is set, hydraulic fracturing would occur. Fluids used in this process would be stored in onsite tanks. Any excess or used fracing fluids would be hauled to a water treatment and disposal facility near Wamsutter, Wyoming. If fractures extend into freshwater zones, freshwater aquifers could become contaminated with fracing fluids. An integrated casing and cementing is required under the APD process in order to protect freshwater aquifers from hydrofracing fluids. The approval of the Proposed Action is not anticipated to have a significant impact on groundwater resources.

Alternative 2: Existing Road Access

Impacts to groundwater under Alternative 2 would be the same as those described under the Proposed Action.

4.3.5 Alternative 3: No Action Alternative

Under the No Action Alternative, the Proposed Action and Alternative 2 would be denied. Therefore, the proposed wells would not be drilled and the proposed well pads and access roads would not be constructed or improved. Groundwater would remain unchanged from current conditions and no additional impacts to surface and ground water resources would occur.

4.3.6 Mitigation Measures

To mitigate the potential for runoff and sediment mobilization to surface waters to Project Area drainages, diversion ditches, and berms will be constructed so that any runoff from the well pad would be contained on the well pad and along the access road.

4.4 Wildlife Including Special Status Animal Species

Impacts to wildlife would include direct loss of habitat due to surface disturbance; habitat fragmentation and displacement of wildlife due to vehicles, equipment, and human activity; potential increased mortality due to poaching and harassment; and a higher likelihood of animal/vehicle collisions due to increased traffic. Habitat loss and habitat fragmentation impacts occur where the well pad and access road remove vegetation. Poaching and harassment would most likely occur in the vicinity of the access road, whereas animal/vehicle collisions would occur on the access road.

4.4.1 Alternative 1: Proposed Action

Common Wildlife Species

The impact to area common small birds and mammals (not covered in other sections) would be to reduce habitat availability. The primary small mammals found in the Project Area include, but are not limited to, mice and rats, shrews, voles, ground squirrels, bats, cottontail rabbit, white-tailed jackrabbit, northern pocket gopher, coyote, and badger. The project related disturbance would tend to favor early succession wildlife species, such as ground squirrels and horned larks, and would have more negative impacts on mid-to-late-succession songbird species, such as sage sparrows and sage thrashers (BLM 2004).

Although there is no way to accurately quantify these changes, the impact on common wildlife species is likely to be low. Disturbance would be gradually reduced over time as reclaimed areas begin to recover and provide suitable habitats (BLM 2004).

Birds are also highly mobile and would disperse into surrounding areas and utilize adjacent suitable habitats to the extent that they are available (BLM 2004). Disturbance of nesting migratory birds, their eggs, and young is prohibited under the Migratory Bird Treaty Act, which could restrict surface-disturbing activities during the February – August migratory bird nesting season.

The initial phases of surface disturbance would result in some mortality and displacement of small mammals from construction sites. Quantifying these changes is not possible because population data are lacking, however, the impact is likely to be minimal. The high reproductive potential of the small mammal species occurring in the Project Area would enable populations to quickly repopulate the area once reclamation efforts are initiated (BLM 2004).

Big Game

The proposed exploration and development would occur within pronghorn crucial winter range; however, disturbance of seasonal pronghorn ranges within the Project Area is not likely to reduce pronghorn carrying capacity within the Bitter Creek Herd Unit. Project construction would temporarily remove up to 30.1 acres, or less than one percent, of the 5,708 acres of available crucial winter range habitat in the MVMA. The reduction in forage availability would have a direct but insignificant impact on pronghorn antelope. Sagebrush and other shrubs removed would re-establish in eight – fifteen years with many shrub species not reaching maturity after 10 or more years (BLM 2004). Displacement of pronghorn antelope due to human disturbance during the crucial winter period would be avoided during construction and drilling because BLM stipulations would prohibit project activities from November 15 – April 30.

Human presence and noise would be the principal factors contributing to the displacement of pronghorn antelope from the Project Area, although pronghorn may habituate to human disturbance over time (Segerstrom 1982, Reeve

1984, Deblinger 1988, Hayden Wing Associates 1991, Berger et al. 2006, Berger et al. 2007, and Berger et al. 2008). Pronghorn would be displaced during the most intensive construction and drilling phases. The potential for vehicle collisions with pronghorn would also increase as a result of increased vehicular traffic associated with the construction and drilling phases. During the production phase, the intensity of project activity would gradually diminish as construction of production facilities is completed. During production, human presence and traffic would be minimal and the magnitude of displacement and the risk of vehicle collisions would be reduced.

Increased access to pronghorn may increase legal and illegal harvest by providing additional opportunities for humans to come into contact with animals. Some individuals may be deterred from poaching because of the greater access and likelihood of being observed by other area users. The area is already a popular recreation area, so poaching is unlikely to increase, and impacts to pronghorn would be negligible and insignificant.

Special Status Animal Species

Colorado River Fish

The Upper Colorado River Endangered Fish Recovery Program requires the BLM to coordinate with the USFWS under Section 7 of the ESA on potential impacts to these listed fish species. The purpose of coordination is to evaluate the potential downstream effects of water depletions within the Colorado River drainage system on the four federally endangered Colorado River fish and their designated critical habitat.

The BLM RSFO determined that the proposed offsite withdrawal of 2.45 acre-feet of "water from a private source 'may affect, likely to adversely affect', as this depletion may jeopardize the continued existence of the listed Colorado River fish species (*Bonytail, Colorado Pikeminnow, Humpback Chub, Razorback Sucker*) or affect their critical habitat." The BLM RSFO and requested formal consultation with the USFWS on the potential impacts to the listed fish (BLM 2010).

The USFWS responded affirming the BLM RSFO finding, and explained how the Recovery Implementation Program for the Endangered Fish Species in the Upper Colorado River Basin is intended to be a reasonable and prudent alternative to avoid jeopardy of the endangered fishes by depletions from the Upper Colorado River Basin (USFWS 2010).

The letter further states that "In order to further define and clarify the process in the Recovery Program, a Section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Incorporated into this agreement is a Recovery Implementation Program Recovery Action Plan which identities actions currently believed to be required to recover the endangered fishes in the most expeditious manner in the Upper Colorado River Basin" (USFWS 2010).

The USFWS further stated that "On July 8, 1997, the Service issued an intra-Service biological opinion determining that the depletion fee for depletions of 100 acre-feet or less are no longer required because the Recovery Program has made sufficient progress to be the reasonable and prudent alternative to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat by depletions of 1 00 acre-feet or less" (USFWS 2010). Based on this finding, the depletion fee for the Proposed Project is waived, and no further coordination is necessary unless there is a change in water use.

Pygmy rabbit

Potential impacts to the pygmy rabbit, if present in the Project Area, would primarily be crushing of burrows, direct mortality, and overall habitat fragmentation resulting in reduced habitat values in areas where surface disturbance,

increased human presence, and noise occurs. There is a low likelihood of occurrence due to the lack of suitable habitat in the Project Area. Overall, direct and indirect impacts to pygmy rabbits, if present, would be insignificant.

Wyoming pocket gopher

Potential impacts to the Wyoming pocket gopher, if present in the Project Area, would be similar to other burrowing animals. Although field surveys were unsuccessful in locating pocket gophers and their mounds, preliminary modeling by the WYNDD (2009) suggest there is a moderate to high probability for the species to occur in the Project Area. Because soil conditions in the area are shallow, highly erosive, and sandy with poor moisture retention, Wyoming pocket gopher distribution may be limited due to increased susceptibility to tunnel cave-ins and the characteristically poor insulation necessary during warm summer and cold winter temperatures. Soil analysis also suggests that Wyoming pocket gopher occupies soils having greater depth and structural strength, including sandy loam, loamy sand, sand clay loam, clay loam and clay textures (Griscom et al. 2010). Overall, direct and indirect impacts to pocket gophers, if present, would be insignificant, however, individual pocket gophers could be impacted if they were to occur in the areas where suitable habitat occurs within the Project Area.

Greater sage-grouse

Table 4-1 compares the amount of surface disturbance that would occur within 2 miles of the WGFD-identified lek and the recently identified lek located within the Project Area.

Table 4-1. Comparison of Existing and New Surface Disturbance for Leks within Two Miles of the Desolation Road Exploratory Gas Wells Project Area

	Alternative 1		Alternative 2	
	WGFD-Identified Lek	Recently Identified Lek (2009)	WGFD-Identified Lek	Recently Identified Lek (2009)
Existing Disturbance				
Existing Well Pad (number)	3	2	3	2
Existing Well Pads (acres)[1]	7.5	5.0	7.5	5.0
Existing Road Surface Disturbance (miles)[2]	6.3	5.8	6.3	5.8
Existing Road Surface Disturbance (acres)[2]	9.2	8.4	9.2	8.4
Total Existing Disturbance (acres)	16.7	13.4	16.7	13.4
New Disturbance				
New Well Pads (number)	0	2	0	2
New Well Pads (acres)	0	9.5	0	9.5
New Surface Disturbance - Access Road (miles)	0	5.1	0	1.0
New Surface Disturbance – Access Road (acres)	0	18.5	0	3.6
Improvements to Existing Roads (miles)	0	0	1.5	5.4
Improvements to Existing Roads (acres)	0	0	3.3	11.8

	Alternative 1		Alternative 2	
	WGFD-Identified Lek	Recently Identified Lek (2009)	WGFD-Identified Lek	Recently Identified Lek (2009)
Total New Disturbance (acres)	0	28.0	3.3	24.9
Total Existing and New Surface Disturbance (acres)	**16.7**	**41.4**	**20.0**	**38.3**

[1]Well pads have been reclaimed but field conditions suggest that average disturbance remains approximately 2.5 acres.
[2]Existing two-tracks within a two-mile radius of lek.

Approximately 16.7 acres of existing surface disturbance occurs within two miles of the WGFD-identified lek in the Adobe Town WSA. Existing surface disturbance in relation to this lek results from about 6.3 miles of two-track roads used by hunters and other recreationists and three plugged and abandoned wells (approximately 7.5 acres). Restoration of the three well sites has not achieved pre-construction conditions. Approximately 13.4 acres of existing surface disturbance currently occurs within two miles of the recently identified lek, including five acres resulting from two previously drilled wells, and an additional 8.4 acres (5.8 miles) of existing 12-foot wide two-track. Alternative 1 would result in an additional 28.0 acres of new disturbance within two miles of the recently identified lek (9.5 acres, new well pads; 18.5 acres/5.1 miles of new access road). No additional surface disturbance would occur relative to the WGFD-identified lek under Alternative 1. Under Alternative 1, total new and existing surface disturbance within two miles of the recently identified lek would be 41.4 acres, and the total for both leks would be 58.1 acres.

Lease restrictions prohibit surface occupancy within 0.25 mile of the lek identified during the 2009 field surveys (Figure 4-1). This lek is not a WGFD-recognized lek; however, the access road was re-routed more than 0.25 mile north of the lek perimeter (Figure 3-2). In addition, neither the lek nor the Project Area are located within Wyoming's designated SCCAs (WGFD 2008). Applicable restrictions outlined in IM-2010-12, and listed in Section 3.4.2.2, would apply to project activities to ensure protection of Greater sage-grouse occurring in the Project Area, but outside a designated SCCA. Because the proposed project would include two exploratory wells located in adjacent sections, the density of wells adheres to the one well per section (640 acres) guidance contained in IM-2010-12.

Sage-grouse breeding, nesting, and brooding would not be impacted by construction and drilling activities. The BLM stipulations provide protection of nesting/brooding Greater sage-grouse within a 2.0-mile radius of a lek from March 1 to July 15. Direct negative impacts to individual sage-grouse would be due primarily to noise, where noise levels could be more than 10 dBA above background, which is the limit suggested by the WGFD (2002). Construction, drilling, and completion activities for the South and North wells would not occur during the breeding/nesting/brooding period, after which the only disturbance would be from production activities that would generally consist of a relatively few trucks per day on the Project Area access road.

Under the Proposed Action, the South Well would be located about 0.75 miles from the lek located in 2009 and the North Well would be located about 0.85 miles from the same lek (Kane and DeVito 2009). Hollaran (2005) suggested that current BLM development stipulations are inadequate to maintain Greater sage-grouse breeding population in natural gas fields. He suggested that maintaining well densities of one well or less per section within 1.9 miles of a lek could reduce the negative consequences of gas field development.

Hollaran (2005) also suggested that vehicular activity on roads within 0.8 mile of a lek during the daily strutting periods intensified the negative influences of traffic. Under the Proposed Action, the access road would be 0.25

mile from the new lek located in 2009. Walker et al. (2007) also suggested that the current 0.25-mile buffer lease stipulation is insufficient; however, his studies were conducted in full-field coalbed methane development; whereas, the South and North wells are single exploratory wells and will incur less intensive human activity and noise than full-field development. Impacts to sage-grouse during the strutting period (March 1 to May 15) would be avoided because the BLM TLS would apply to areas within two miles of the lek from March 1 to July 15.

The distance traveled by male birds from the lek during the breeding season generally averages 0.6 mile (Colorado Greater Sage-Grouse Conservation Plan Steering Committee 2008). Females breeding on leks within 1.9 miles of natural gas development demonstrated lower nest initiation rates and nested farther from the lek compared to non-impacted females (Lyon and Anderson 2003). Because the South and North wells would be more than 0.6 mile from the lek, and TLS would be applied, and the risk of impact to males attending the lek located in 2009 would be low. The location of the wells (more than 0.6 miles from the lek) also adheres to guidance in IM-2010-12 for managing development and conserving sage-grouse and their habitat. The risk of female nest initiation failure would also be lower during the construction and completion phases because the TLS applies. However, the risk would be elevated during the production phase, when maintenance activities would not be restricted during breeding and nesting.

Habitat fragmentation is also a factor that can have adverse impacts on Greater sage-grouse: it is difficult, however, to assess the impacts in the Project Area because the extent and location of other potentially important sage-grouse habitat (e.g., nesting, wintering) is unknown. The new access road would increase noise and traffic, especially during drilling and completion. The South and North well pads also would contribute to habitat fragmentation, but to what extent it is difficult to tell. Overall impacts are expected to be insignificant.

<u>White-tailed prairie dog.</u>

Project activities would not result in disturbance of the white-tailed prairie dog towns in the Project Area because the towns are abandoned and decadent. No impacts to white-tailed prairie dogs would occur.

<u>BLM Sensitive raptor species</u>

The peregrine falcon could potentially occur in the Project Area. While suitable nesting substrate for the peregrine falcon is outside the Project Area, occasional foraging and/or migrating peregrine falcons could occur. Impacts from project activities could displace foraging and/or migrating birds. Given the infrequency of peregrine falcons in the Project Area, impacts from project activities to the peregrine falcon are not expected to occur.

Suitable ferruginous hawk nesting habitat exists in the rock outcrops within one mile of the South and North wells. The ferruginous hawk, like the golden eagle, is susceptible to disturbances and may abandon nests in proximity to project activities. Ferruginous hawks are particularly sensitive to disturbance during the breeding period. An increase in human presence, noise, and vehicle traffic could directly impact nesting birds if they occur in close proximity to the nest site. If a ferruginous hawk were to nest in the Project Area, project activities would be prohibited within 1.0 mile of the nest between February 1 and July 31. A year round NSO restriction would also apply to project activities within 1,321 feet (400 meters) of a ferruginous hawk nest.

The burrowing owl demonstrates a moderate to high nest site fidelity to breeding areas, prairie dog colonies, and even nest burrows (Klute *et al.* 2003). Burrowing owls may be more tolerant of disturbance, but nests may be lost from surface disturbance during project construction, as they nest in burrows. A No Surface Occupancy restriction exists within an 800-foot radius of the burrowing owl nest site identified during the 2009 field survey (Figure 4-1). The nest site location required that the original road access be moved more than 1,000 feet north to accommodate both the NSO restriction and to avoid impacts to sensitive dune habitat.

The BLM stipulations also require a 0.5-mile radius buffer around the active burrowing owl nest during the nesting season from April 1 to September 10. With the BLM stipulations, no impacts to burrowing owl nesting habitat from project activities would be expected to occur. The potential for vehicle/owl collisions may increase the risk of mortality due to the proximity of the access road to the burrowing owl nesting habitat.

The golden eagle is more susceptible to disturbances than most raptors and may more readily abandon nest sites in the proximity to project activities. Golden eagles are particularly sensitive to disturbance during the breeding period. An increase in human presence, noise, and vehicle traffic could directly impact nesting birds potentially resulting in nest abandonment if they occur in close proximity to the nest site. The breeding success of the golden eagle is limited by reduced habitat availability and decreased prey populations resulting from habitat conversion (Murphy 1977). Few studies have documented the effects of habitat fragmentation on raptors. However, in several studies, raptors survived only on large habitat patches (Robinson 1991). In arid regions, golden eagles require large expanses of undisturbed shrub habitat (Marzluff et al. 1997).

If the currently abandoned golden eagle nest becomes active when project activities commence, the BLM would require seasonal restrictions that would protect the nest by delaying project activities occurring within 0.5 mile of the nest from February 1 – July 31. A year round NSO would also apply to project activities occurring within 1,968 feet (600 meters) of an active nest.

Mountain plover

The access road crosses about 0.75 mile of known occupied mountain plover habitat, and construction would result in the long-term (20 years) removal of about 1.6 acres of mountain plover habitat.

If construction, drilling, completion, and production activities were to occur during the breeding season, increased human presence and noise could result in displacing adult plovers from their nesting territories, resulting in the potential loss of productivity for that season. Depending on the duration and frequency of the disturbance, plovers may abandon the habitat completely or may return following final reclamation.

BLM stipulations prohibit surface use activities from April 10 to July 10, and the BLM may require a survey of the known nesting habitat where project activities may occur. Project activities occurring within 0.25 mile of an occupied mountain plover nest may be required to be relocated. These procedures are outlined in the BLM Instructional Memorandum No. WY-2004-35, dated April 16, 2004, which states that three surveys (14 days apart) would be required prior to the initiation of project activities to minimize impacts to breeding and nesting birds. The BLM has also developed additional protection measures in the event a nest site is recorded in the vicinity of project activities. As a result, impacts are expected to be insignificant.

Wild Horses

The Proposed Action would result in minor, insignificant impacts to wild horses. The types of impacts to wild horses would be similar to those described for wildlife, including direct habitat loss (30.1 acres or less than one percent of the acreage within the Adobe Town HMA), displacement from suitable habitats, potential habituation, and animal/vehicle collisions. Construction and drilling activities would temporarily disturb some wild horses and displace them to unoccupied habitats. Once construction and drilling activities are completed, it is likely that some or all of the horses would return. Samson has committed to implementing wildlife and wild horse protection measures, including traffic control, minimization of disturbance, restrictions to prevent direct contact such as feeding or harassment, timely reclamation and revegetation, and fencing of reserve pits to prevent accidental entrapment of horses. Water sources important to wild horses do not occur in the Project Area, and therefore, would not be depleted or contaminated.

4.4.2 Alternative 2: Existing Road Access

4.4.2.1 General Wildlife Species

Under Alternative 2, habitat disturbance due to the well pad construction (9.56 acres) would be the same as the Proposed Action. General impacts including direct mortality and displacement of songbirds and small mammals would be the same as described under the Proposed Action, and would not reduce the carrying capacity of local species.

Big Game

Impacts to pronghorn antelope would be the same as described under the Proposed Action. The removal of about 20.0 acres of pronghorn crucial winter range would be less than one percent of the total available pronghorn crucial winter range available in the MVMA and are expected to be insignificant.

Special Status Animal Species

Impacts to the pygmy rabbit, Wyoming pocket gopher, white-tailed prairie dog, peregrine falcon, and ferruginous hawk would be the same as described under the Proposed Action.

Impacts to the Greater sage-grouse would increased under Alternative 2. The closest distance the access road would occur relative to the sage-grouse lek would be about 0.5 mile (Figure 3-3). Project activities would continue to be prohibited within 2.0 miles of the lek to protect sage-grouse during nesting/brood rearing (February 1 – July 31). A 1.5-mile long segment of the proposed improved access road would occur within the 2.0-mile buffer, to protect nesting/brood rearing sage-grouse, associated with a WGFD-recognized lek located south of the Project Area in the Adobe Town WSA. Total existing surface disturbance (9.2 acres/6.1 miles attributable to existing roads; 7.5 acres attributable to three existing well pads; Table 4-1) within two miles of the WGFD-identified lek is 16.7 acres. Additional surface disturbance includes 134 acres (8.4 acres/5.8 miles attributable to existing two-tracks; 5.0 acres attributable to two plug and abandoned wells) occurs within two miles of the new lek located within the Project Area (Table 4-1). Alternative 2 would result in 3.3 acres of new disturbance within two miles of the WGFD-identified lek. An additional 24.9 acres of new disturbance within two miles of the new lek (9.5 acres, new well pads; 1.0 acres/3.6 miles of new access road; and 11.8 acres/5.4 miles of existing road improvements). Under Alternative 2, total new and existing surface disturbance within two miles of both leks would be 58.3 acre, which is comparable to Alternative 1 (58.1 acres).

Potential impacts to nesting burrowing owls would be avoided under Alternative 2 because the access road does not occur within or near any identified burrowing owl habitat.

The access road skirts the edge of several areas identified as known mountain plover habitat (Figure 3-1). Impacts would be the same as described under the Proposed Action, and the BLM stipulations described under the Proposed Action would apply to Alternative 2.

Wild Horses

Impacts to wild horses would be the same as described for the Proposed Action.

No Action Alternative

Under the No Action Alternative, there would be no surface disturbances and human activities beyond those currently occurring in the Project Area. Impacts to wildlife species, including special status species and wild horses, would remain at current levels.

4.4.3 Mitigation Measures

Wildlife habitat may be improved if additional water sources are developed, assuming each development would not concentrate wildlife in a manner that would otherwise have adverse environmental impacts.

4.5 Soils

Impacts resulting from drill pad, access road, and production facility construction could include removal of vegetation, exposure of the soil, mixing of soil horizons, soil compaction, loss of topsoil productivity, and increased susceptibility of the soil to wind and water erosion. These impacts could lead to an increased stormwater runoff, soil erosion, and off-site sedimentation. As described in the Soils Section of Chapter 3 (Section 3.5), most of the Project Area falls into sensitive soils categories for topsoil depth and quality, limitations to road and facilities construction, rapid runoff potential, and severe to very severe wind and water erosion potential.

4.5.1 Alternative 1: Proposed Action

The Proposed Action would result in surface disturbance of approximately 30.1 acres, including 4.78 acres each for both the South and North Well pads, 20.51 acres (5.42 miles) for the access road and turnouts. An 8.1-mile long aboveground, 4-inch diameter pipeline may be installed if the wells produce natural gas in economically recoverable quantities. Once a well goes into production, interim reclamation of the well pads would reduce surface disturbance to approximately 2.5 acres each. The unused portion of the well pads (cut and fill slopes, subsoil and topsoil piles, reserve pit, and portions of the drill pad) would be reclaimed as described in Chapter 2.

Increased soil susceptibility to erosion would occur because the Proposed Action would result in newly disturbed areas. Soil compaction caused by equipment traffic or by increased rain impact after loss of surface cover may decrease infiltration and water storage capacity, increase runoff, and reduce soil productivity. Increased surface runoff and erosion would occur primarily in the short term and would decline in time due to natural stabilization. Increases in surface runoff would also depend on the success of mitigation measures.

Indirect impacts from off-road use of vehicles include vegetal cover destruction, as well as rutting and compaction of the soil. Given the sensitivity of the soils, unauthorized off-road vehicle use would be restricted according to BLM guidance.

The access road would cross four ephemeral and eight intermittent drainages in the Project Area. Soil erosion, which is likely to be a primary adverse impact related to the stream crossing, would increase potential runoff and sedimentation to these drainages without the application of required BMPs and applicant-committed soil stabilization practices. Erosion can impede successful revegetation, result in a loss of site productivity, and impair water quality if eroded sediment is transported to area drainages. In addition, some soils and geologic units in the Project Area may have relatively high levels of salinity. Erosion of salinity-laden sediment could increase salinity loading of area drainages.

Wind and water erosion would decrease due to effective interim reclamation, natural stabilization, and a maturing vegetal cover. By the fifth year after construction, erosion in reclaimed areas would likely be reduced to 0.2, 0.5, and 0.5 t/ac/yr for the well, pipelines, and roads, respectively (BLM 2004). Erosion reductions for well sites and roads would be less than reductions for pipelines because exposed earth material that comprise the surface of these features would continue to be exposed to erosion. These numbers suggest that soil erosion could be reduced to minor levels with application of aggressive construction and reclamation methods outlined in Appendix C of the *Desolation Flats Natural Gas Development Project Final EIS* (BLM 2004).

Wind erosion could also be an adverse effect of project development without adequate soil protection measures given the dominant sandy texture of the soils in portions of the Project Area. Soil loss due to wind erosion could add to the water erosion estimates. Chronic and severe wind erosion could occur in limited areas where roads and/or pipelines traverse sandy soil areas. Because these areas are particularly susceptible to "blow outs," special efforts to

avoid such areas should be applied. Where avoidance is not feasible, special erosion control and soil stabilization measures should be applied as discussed in Appendix C.

The project would comply with the provisions of the Storm Water Discharge Permit and associated Storm Water Pollution Prevention Plans (SWPPP) that Samson would obtain from the Wyoming Department of Environmental Quality (WDEQ). Samson would also implement the BMPs in the Gold Book, comply with specifications in the BLM Road Manual 9113, and follow the requirements in the Surface Use Plan for each APD. Interim reclamation would be undertaken as soon as practicable. The permit requirements and measures outlined in the applicable permits and manuals would reduce direct impacts to soil over the short and long term. Overall, impacts to soils would be minor and insignificant under the criteria identified above.

The federal leases for the DRU include MVMA Controlled Surface Use (CSU) provisions including prohibition of surface disturbance on slopes in excess of 25 percent. In addition, construction with frozen materials or during periods when soil material is saturated or watershed damage is likely to occur would be prohibited. These measures would protect soils by minimizing soil movement by water and wind erosion. A SPCC Plan would minimize impacts to soils from any spill of hazardous materials that may occur. Following application of these mitigation procedures, the susceptibility of disturbed areas to soil erosion would be minimized, and the impacts would be minor for both the short term and for the life of the project.

4.5.2 Alternative 2: Existing Road Access

Impacts to soil resources under Alternative 2 would be similar to those described under the Proposed Action with the exception that construction of Alternative 2 would result in soil disturbance on 32.6 acres compared to 30.1 acres for the Proposed Action. This assumes that the new road is all new disturbance, which given the primitive nature of the two track is a reasonable assumption. Alternative 2 would also cross eight ephemeral and 20 intermittent drainages compared to four ephemeral and eight intermittent drainages under the Proposed Acton. Given the increased levels of surface disturbance and the potential for increased surface runoff and sedimentation due to topsoil removal, the impacts would be greater under Alternative 2, although still insignificant.

4.5.3 No Action Alternative

Under the No Action Alternative, there would be no surface disturbances beyond those previously approved within the Project Area, and impacts to soils would remain at current levels.

4.6 Vegetation and Special Status Species

4.6.1 Alternative 1: Proposed Action

4.6.1.1 Vegetation

The impacts resulting from construction of 5.42 miles of new access road, and construction of the South Well and North Well pads on Project Area vegetation include the loss of native plant species and the potential invasion of noxious weeds and exotic species. Under the proposed action, the direct impacts include approximately 30.1 acres of native vegetation removal from the shrub steppe vegetation community. These are mature plant communities with low plant cover and open bare areas in an arid environment.

Maintenance of the new access road and well pads will incorporate vegetation reclamation and weed controls (i.e., selective removal and herbicide application). Interim reclamation activities would be carried out as soon practical in the appropriate season following construction.

4.6.1.2 Threatened, Endangered, Sensitive Plant Species

There are no suitable habitats for threatened, endangered, or sensitive plant species in the Project Area. Field surveys and plant collections did not identify any of the listed threatened, endangered, or sensitive plant species. Therefore, impacts to special status plant species would not occur.

4.6.1.3 Wetlands/Riparian

There are no wetland or riparian areas present in the drainages of the Project Area and no impacts are expected.

4.6.1.4 Invasive and Noxious Weeds

The ground disturbing activities associated with the project development will expose approximately 30.1 surface acres to weed infestations. No obvious noxious weed species infestations were observed on the site. Disturbance from the Proposed Action could result in the spread of noxious weeds. The invasion of noxious weeds in the disturbed areas would be minimized by reclaiming the disturbed areas as soon as feasible in the fall prior to November or in spring before May 15th. In addition, BLM-approved herbicides would be used to further minimize the spread of these weed species.

4.6.2 Alternative 2: Existing Road access

4.6.2.1 Vegetation

The impacts resulting from construction of 0.95 miles of new access road, improvements to 5.38 miles of existing road, and construction of the South Well and North Well pads on Project Area vegetation includes the loss of native plant species, and the potential invasion of noxious weeds and exotic species. Under the Alternative 2, the direct impacts include approximately 32.6 acres of native vegetation removal from the shrub steppe vegetation community. These are mature plant communities with low plant cover and open bare areas in an arid environment.

Removal of vegetation could potentially result in invasion of noxious weeds in the disturbed areas, which would be minimized by reclaiming the disturbed areas as soon as feasible in the fall prior to November or in spring before May 15th. In addition, BLM-approved herbicides would be used to further minimize the spread of these weed species.

4.6.2.2 Threatened, Endangered, Sensitive Plant Species

There are no suitable habitats for threatened, endangered, or sensitive plant species in the Project Area. Field surveys and plant collections did not identify any of the listed threatened, endangered, or sensitive plant species. Therefore, impacts to special status plant species would not occur.

4.6.2.3 Wetlands/Riparian

There are no wetland or riparian areas present on the Project Area and no impacts are expected.

4.6.2.4 Invasive and Noxious Weeds

The ground disturbing activities associated with project development will expose approximately 30.1 surface acres to potential weed infestations. Noxious weeds would be treated as described in Section 4.5.1.4.

4.6.3 No Action Alternative

Under the No Action Alternative, the BLM would deny the Desolation Road Exploration Gas Wells Project. Because the No Action alternative would not result in any disturbance, there would be no disturbance to plant communities or drainage areas. The existing plant cover in the shrubland steppe communities would continue as the dominant vegetation. In addition, there would be no ground-disturbing activities to expose the area to further infestation by weeds.

4.6.4 Mitigation measures

To reduce the potential for vehicles and equipment to carry weed seeds onto the site, a thorough washing would be required prior to entering the Project Area. Prompt interim reclamation following construction, using native plant materials and local species would be required. Use of weed-free seed mixes and reclamation materials (i.e., hay or straw) would be used, along with weed control management practices.

4.7 Recreation

Well drilling, testing and production operations, and associated site preparation and construction activities would alter the recreation setting and recreation opportunities in the Desolation Road Project Area.

Drilling the natural gas wells would require intense, industrial activity that generally conflicts with the type of dispersed recreation sought by the public in settings such as public lands south of the Project Area. Members of the general public do not have a right to recreate on private lands within the Project Area and even public access to some public land tracts within the Project Area, situated as it is within the checkerboard land ownership pattern, is limited or even excluded by the public land being surrounded by private tracts.

Drilling involves construction and heavy equipment, a relatively large contingent of people, and heavy vehicular traffic, all of which generates levels of activity, noise and fugitive dust at the well site and on roads, which conflicts with a natural recreation setting. Production from a natural gas well involves similar kinds of activity but at much lower levels.

4.7.1 Alternative 1: Proposed Action

Alternative 1-Proposed Action would adversely affect recreation in the Project Area and its vicinity. The activity and surface disturbance involved in drilling two natural gas wells and possibly production from those wells would reduce the quality of the setting for dispersed, unstructured recreation and lower the quality of the experience for people recreating in the area. Impacts of drilling would be short term. Impacts of production, if it occurs, would be long term. The amount of surface disturbance would be small, limiting the impacts to a relatively small area surrounding the well.

The impact of drilling the two wells upon recreationists hunting antelope in Hunt Area 57 (South Wamsutter) and deer in Hunt Area 100 (South Wamsutter) would be mostly short term, occurring locally for one or two hunting season. The impact to hunting from two producing wells, located within one-half mile of each other, over the long term is expected to be negligible to very low.

4.7.2 Alternative 2: Existing Road Access

The impact to recreation of Alternative 2-Existing Road Access would be the same as that of Alternative 1-Proposed Action.

4.7.3 No Action Alternative

Under the No Action Alternative, the BLM would deny the Desolation Road Proposal, so there would be no impact to recreation.

4.8 Cultural Resources

4.8.1 Alternative 1: Proposed Action

The Proposed Action would result in the disturbance of up to 30.1 acres of BLM-managed lands. It would also result in increased numbers of workers in the MVMA during well field development and operation. Recent cultural

resource surveys of the Alternative, including the northern well unit, did not identify any significant cultural resources within the APE of the well pad, access road, or pipeline. Only one site (48SW17687) was recorded within the APE of the proposed 5.42-mile long access road that has been evaluated as not eligible for the NRHP and is not considered a historic property under Section 106 of the NHPA. The Proposed Action, as currently aligned, avoids the site and will have no impact upon it (Roufs 2009). As the site is evaluated as not eligible for the NRHP, the Proposed Action will have No Effect upon it under Section 106 of the NHPA. A reported stone alignment of potential Native American concern located within a mile of the proposed alternative that might have been impacted visually was not relocated. The Proposed Action will have no direct impact on any other known significant cultural resources within the APE. The Proposed Action does have the potential to impact unknown subsurface cultural remains during construction of the well locations, access roads, and pipeline trench as well as through erosion of soils at the outlets of wing ditches along the access roads. Long-term indirect effects will result from the increased access of a previously remote area. The increased access could result in increased collecting of cultural resources at the numerous sites in the area.

4.8.2 Alternative 2: Existing Road Access

The Existing Road Access Alternative would result in a maximum initial disturbance of 32.6 acres of BLM-managed lands. It would also result in increased numbers of workers in the MVMA during well field development and operation. While small portions of the APE for this proposed Alternative may have been covered by previous cultural resources inventories, those surveys are considered inadequate for cultural resource clearance purposes due to their age and the unreliability of the data from them. . If this Alternative is selected, it will need to be inventoried for cultural resources in its entirety, and the effects on any cultural resources within the APE assessed under Section 106 of the NHPA. Adverse effects will need to be reduced or eliminated through project redesign, data recovery or other methods agreed upon between the BLM, the Wyoming SHPO, and other parties.

Two previously recorded sites (48SW3694 and 48SW8482) are located along the two-track road proposed to be used as the Existing Road Access Alternative, and five others are plotted in close proximity to it (48SW2993, 48SW8475, 48SW8481, 48SW9086, 48SW2727). Four of the sites have been evaluated as eligible for the NRHP (48SW3694, 48SW8482, 48SW8475, 48SW2727). The selection of the Existing Access Road Alternative could have an adverse effect on these cultural resources if significant portions of them are located within the APE. In addition, the Existing Road Access Alternative has the potential for impacting subsurface cultural remains during construction of the well locations, access roads, and pipeline trench as well as through erosion at the outlets of wing ditches along the access roads. Long-term indirect effects will also result from the increased access of a previously remote area. The increased access could result in increased collecting activity at the numerous sites in the area.

The adverse effects to the sites from Existing Access Road Alternative could be avoided or mitigated. The sites could be avoided through reroutes of the proposed access road such that the sites are no longer within the APE. The sites would have to be avoided by a minimum of 100 feet. The reroutes would need to be surveyed by a qualified archaeologist to insure that the sites were avoided and that there are no significant cultural sites within the proposed reroute alignment.

Mitigation of the adverse effects to the sites would take the form of testing and possible data recovery. . If testing indicates the presence of significant cultural materials within the APE of the road, those areas would need to be avoided through a reroute of the road or through a program of data recovery on the site. The level and location of data recovery would be set forth in a Memorandum of Agreement (MOA) between Samson, the BLM, and the Wyoming SHPO.

4.8.3 No Action Alternative

The No Action Alternative would result in zero acres of BLM-managed lands being disturbed. This alternative would result in no cultural resources being impacted.

4.8.4 Additional Mitigation

A construction monitor of is recommended because of the potential for subsurface cultural materials (Roufs 2009). Samson has agreed to monitor all ground disturbing activity during construction to reduce potential adverse effects.

4.9 Paleontology

4.9.1 Alternative 1: Proposed Action

Ground disturbance within the proposed Project Area could result in direct and indirect, negative and positive impacts to paleontological resources. Direct negative impacts to paleontological resources include potentially destructive ground disturbing construction activities related to the development of the proposed access road and well pad. Indirect negative impacts to paleontological resources from the proposed project could include an increased erosion rate of the Washakie Formation, as well as the potential for vandalism and looting of fossil resources as a result of increased accessibility to the area.

The proposed action could also facilitate direct positive impacts to paleontological resources as the potential for the discovery of unknown scientifically significant fossil resources is augmented by construction activities that result in subsurface exposure. Any discoveries of scientifically significant fossil resources resulting from ground disturbing activities could benefit the knowledge base of the field, as the paleontological resource(s) would be recorded, collected, and curated in an approved institution, which would make the resource(s) available for research and analysis.

It is anticipated that impacts to paleontological resources from the proposed project would be minor. No scientifically significant fossil resources were discovered during the initial paleontological survey. Measures that would reduce impacts to paleontological resources include limiting major cut and fill ground disturbance during the development of the proposed 5.42 mile (20.51 acre) access road, a prohibition on off-road travel, and the avoidance of slopes of greater than twenty five percent (25%). It should be noted however, that significant ground disturbance will take place during the construction of the two proposed 4.78-acre well pads, and in particular with regard to the excavation of two 90-foot by 220-foot by 10-foot reserve pits. As the potential for impacts to paleontological resources does exist with ground disturbance, especially in geologic regions with high PFQY ratings such as the Washakie Formation, additional mitigation measures are recommended to account for any impacts, positive or negative, to paleontological resources within the proposed Project Area (see section 4.9.4). If mitigation measures are followed, no significant impacts to cultural resources are anticipated.

If paleontological resources are discovered during construction and drilling activities all activity within the immediate area of impact will cease and Samson will immediately notify the BLM of the find. The BLM paleontologist will then determine measures to take with regard to avoidance or mitigation of the resource.

4.9.2 Alternative 2: Existing Road Access

If Alternative 2 is pursued, it is anticipated that impacts to paleontological resources would be minor. The impacts would be similar to those described for Alternative 1. Neither the Alternative 2 proposed 0.95 mile (3.45 acre) new section of access road nor the proposed existing 5.38 mile (19.56 acre) two-track access road have been surveyed for paleontological resources. If Alternative 2 is pursued, the planned access road will need to be surveyed in its

entirety by a professional paleontologist. If mitigation measures are followed, no significant impacts to cultural resources are anticipated.

If paleontological resources are discovered during construction and drilling activities all activity within the immediate area of impact would cease and Samson would immediately notify the BLM of the find. The BLM paleontologist will then determine measures to take with regard to avoidance or mitigation of the resource.

4.9.3 No Action Alternative

Under the No Action Alternative, the BLM would reject Samson's proposal to drill the exploratory South Well (DRU #31-28) and associated access road to explore for natural gas, as described in the Proposed Action. As a result, there would be no new disturbance or impacts, positive or negative, to paleontological resources.

4.9.4 Additional Mitigation

Additional mitigation measures would include spot inspection of the access road and well pad by a professional paleontologist following construction and prior to the installation of the reserve pit liner on the well pad; the purpose of this inspection would be to account for impacts, negative or positive, to potential buried paleontological resources which might be exposed by ground disturbing construction activities (Winterfeld 2009). Any inadvertent discoveries of paleontological resources would be managed as detailed in the Proposed Action.

4.10 Geology

4.10.1 Alternative 1: Proposed Action

Potential impacts to geologic resources from the proposed action include changes to the local topography and increased slope instability along drainages. Construction of the access road and well pads would disturb about 30.1 acres, but would cause only minor topographic changes where cut- and fill-slopes are created, or the ground surface is otherwise modified. The Washakie Formation underlying the Project Area is prone to mass wasting in areas with steeper slopes. Both the well pad and the access road for the well pas would be located on gentle slopes, less than three percent (3%), and are unlikely to experience mass movement. Because the terrain is relatively flat and only small cut and fill slopes would be needed, impacts would be localized, but long term (20 years). Interim and final reclamation would return disturbed areas to their approximate original contours.

Potential impacts from geologic hazards (earthquakes, fault rupture, subsidence) could include damage to the South Well, pipeline, or access road. There are no active mapped faults in the area and only minor small earthquakes have been recorded. Overall, the seismic risk in southern Wyoming is very low, so the potential for impacts from seismic hazards is considered low. The removal of groundwater from aquifers can result in subsidence. Water for drilling, completion, and dust abatement would be obtained from offsite sources; therefore, the risk of subsidence in the Project Area would be negligible. Landslide deposits or active landslides have not been documented within the Project Area.

With the exception of petroleum reserves, no major mineral resources would be impacted by implementation of the proposed action. The proposed project would allow recovery of federal natural gas resources, as allowed in accordance with 43 CFR 3162(a), and generation of private and public revenues, if drilling leads to gas discovery and development. There has been limited past mineral exploration-in the area.

4.10.2 Alternative 2: Existing Road Access

Impacts to geology under Alternative 2 would be similar to those described under Alternative 1, with the exception that the construction of the access road and well pads would disturb about 32.6 acres. The access road would also cross up to 28 drainages, which would likely increase the risk for downcutting, flooding, and increased sediment load compared to the proposed action. Impacts on the surface natural gas pipeline would be potentially greater under Alternative 2 because the pipeline would follow the access road and cross a greater number of major and minor drainages compared to the proposed action. Under Alternative 2, a buried 4-inch pipeline would be installed to replace the temporary surface pipeline. Once the pipeline installation is completed, flash flooding wound not affect the buried pipeline.

Impacts to minerals under Alternative 2 would be similar to those described under Alternative 1

4.10.3 No Action Alternative

Under the No Action Alternative, the proposed action and Alternative 2 would be denied. Therefore, the proposed well would not be drilled and the proposed well pad and access road would not be constructed or improved. Geology, mineral resources, and topography would remain unchanged from current conditions and no additional impacts to these resources would occur.

4.11 Air Resources

In recent years, the development of mineral resources throughout Wyoming has heightened the public's awareness of air quality. Consistent with that concern is that a number of public comments concerning air quality issues were received during the scoping process for the Desolation Road Natural Gas Wells Project (Appendix B).

Air emissions would be produced during all phases of the project, including construction, exploration, well development, production, and well abandonment, including reclamation. During exploration and development, traffic on unpaved and paved roads would cause emissions of particulate matter (PM), carbon monoxide (CO), nitrous oxide (NOx), sulfur dioxide (SO_2), and volatile organic compounds (VOCs). During well development and completion, well flaring and associated emissions would cause PM, CO, NOx, SO_2, and VOC emissions (which includes hazardous air pollutants [HAPs]). In addition, during well development, drilling activities and construction activities would cause PM emissions and tailpipe emissions because of heavy equipment usage. Emissions associated with drilling and completion operations are not continuous emissions but are rather temporary emissions. Typical well drilling and completion for the South Well and the North Well would be performed for a limited number of days (about 45 days).

Emission inventories were not developed and screening dispersion modeling was not performed to assess the potential air quality impacts from the Proposed Action and Alternative 2 with respect to various significance criteria. The air quality conditions in the general area are, however, very good, as characterized by limited air pollution emission sources (few industrial facilities, limited oil and gas exploration and production activity, and no residential emissions) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

The Desolation Flats Natural Gas Development Project Record of Decision (BLM 2004a), Atlantic Rim Natural Gas Project Record of Decision (BLM 2007b), Record of Decision for the Jonah Infill Drilling Project (BLM 2006), and Record of Decision for the Final Supplemental EIS for the Pinedale Anticline Oil and Gas Exploration and Development Project (BLM 2008c) describe potential effects from oil and gas development on a wide variety of air quality pollutants. The air section from these documents provide useful analysis from nearby projects on the potential impacts that oil and gas operations have on area air quality, and can help in understanding the potential impacts from the Proposed Action. The analyses in the referenced NEPA documents indicate that no adverse long-term effects would result under these projects given appropriate mitigation measures are implemented (unless otherwise noted in those documents). Because the Proposed Action is within the scope of the reasonably

foreseeable development (RFD) scenario analyzed in the Desolation Flats Final EIS (BLM 2004), it is anticipated that the Proposed Action and Alternative 2 would be unlikely to have adverse effects on air quality or visibility.

4.11.1 Alternative 1: Proposed Action

Emission sources which occur as part of the construction, drilling, completion, and production and operation phases would temporarily elevate pollutant levels, but impacts would be localized and would occur only for the duration of the project-related activities. Fugitive dust emissions (PM_{10} and $PM_{2.5}$) and small quantities of vehicle exhaust emissions (NOx, CO, VOC, PM_{10}, $PM_{2.5}$) would result from work crews commuting to and from the work site and from the transportation and operation of equipment to construct the wells pad, access road, and infrastructure. Fugitive dust emissions would also occur from construction of the South Well and North Well pads, access road, and the installation of the aboveground pipeline. Total surface disturbance would be 9.56 acres for the two well pads, and 20.51 acres for access road construction.

For the purposes of analysis, it is estimated that at each well site a 1000 hp diesel engine will be used to reach a well depth of approximately 11,000 feet below ground surface. The drill rig engines would be operating for approximately 45 days. Diesel-fired drilling engines would emit primarily NOx, CO, SO2, VOCs, PM_{10} and $PM_{2.5}$ as shown in Table 4-2. The exact type of and size of rig and the length of time it will operate are dependent on rig availability and drilling operations, which could alter the estimated emissions in Table 4-1.

Table 4-2. Well Pad Construction & Drilling Emissions Summary

Emission Source	HP	Drilling & Flaring Days	Pollutants (tons)					
			NOx	CO	SO2	VOC	PM	HAPs
Well Pad Construction Fugitive Emissions	-	-	-	-	-	-	1.0	-
Rig Engine	1,000	45	3.65	2.06	0.16	0.16	0.11	0.02
Well Completion Flaring	-	8	0.63	0.16	-	0.22	-	-
TOTALS			**4.28**	**2.22**	**0.16**	**0.38**	**1.11**	**0.02**

Emissions will reach the highest levels of the project during drilling and completion operations. Drill rig operations will result mainly in an increase of NOX and CO emissions. Testing would occur several days after the South Well is drilled. During the approximately eight-day testing period, gas and condensate will be flared. In accordance with the WDEQ regulations, total gas released during flaring will not exceed 50 MMCF for a maximum duration of 30 days.

Although no site-specific modeling was conducted for the Proposed Action, modeling conducted for the Desolation Flats EIS indicated that the maximum predicted annual near-field concentrations of NO_2 are below the WAAQS and NAAQS (BLM 2004). Estimated short-term and annual average concentrations of SO_2 in the Desolation Flats EIS are also below the WAAQS and NAAQS. The operations of engines for hydraulic fracturing and stimulations operating during the completion phase would the largest source of CO emissions. According to the Desolation Flats EIS, CO concentrations are also in compliance with the applicable WAAQS and NAAQS (BLM 2004). The largest source of particulate matter emissions for the project is construction of a typical well pad. Concentrations of PM_{10} as well as $PM_{2.5}$ are below all applicable WAAQS and NAAQS (BLM 2004).

Impacts from the concentration of air pollutants during the project would be temporary and would occur in isolation, with no other sites in the area under concurrent development. Air pollutant concentration impacts from well production sources would be small due to the limited site visit requirements, limited power generation, no proposed compression, and limited number of other emissions sources at the Project Area. Production emissions would include mainly VOCs and HAPS, originating mostly from the wellsite production equipment.

During the production and operation phase, vehicle traffic and well maintenance activities would result in emissions of fugitive dust and vehicle exhaust emissions. Vehicle traffic to the South Well during production would average 18 vehicle trips per month. Natural gas combustion equipment would be used at well sites during production. Each well site would be equipped with a TEG dehydrator, three-phase separator, and tanks for storage of produced water, condensate, methanol, fluids, and glycol.

It is anticipated that construction and production activities would likely produce high levels of dust in dry conditions without dust abatement. To mitigate dust generated by these activities, Samson would implement dust abatement strategies as needed or directed by the BLM AO by watering the access road and construction area.

Overall, impacts to air quality from all project-related activities would be temporary or short term, and therefore, insignificant over the long term.

4.11.2 Alternative 2: Existing Road Access

Impacts on air quality under Alternative 2 would be greater than under the Proposed Action. The surface disturbance under Alternative 2 would be the same for the two well pads (9.56 acres), while the improvements to the existing access road (19.56 acres) and construction new access (3.45 acres) would disturb a total of about 32.6 acres, or about 2.5 acres more than the Proposed Action (30.1 acres). The difference in the acreage disturbed is negligible; however, the collocation of the improved access road along the Adobe Town WSA northern boundary under Alternative 2 would likely contribute to air quality impacts in the WSA. Pollutants would primarily include fugitive dust emissions (PM_{10} and $PM_{2.5}$) and small quantities of vehicle exhaust emissions (NOx, CO, VOC, PM_{10}, $PM_{2.5}$) resulting from work crews commuting to and from the project site. Overall, impacts on air quality from Alternative 2 would be temporary or short term, and therefore, insignificant over the long term.

4.11.3 No Action Alternative

Under the No Action Alternative, there would be no air quality impacts beyond those that currently occur within the Project Area.

4.12 Land Use (Including Grazing)

4.12.1 Alternative 1: Proposed Action

4.12.1.1 Land Status

Changes in land ownership are not expected to occur during the life of the project. The Proposed Action would not impact the BLM or private landowner decisions to acquire withdraw, exchange, or purchase lands within the Project Area and surrounding areas.

4.12.1.2 Transportation and Access

The Proposed Action would generate increases in traffic volumes on highways and BLM roads that provide access to the South Well location. These increases would result from the movement of project-related workers, equipment and materials to and from the Project Area to perform drilling, field development, well service, field operations and reclamation activities.

Impacts on transportation and access under the Proposed Action would be temporary and negligible. Assuming a 45-day construction and drilling period for each well, 50-70 truckloads of equipment for mobilization and equipment, twelve trucks for the transport of crews, and several larger trucks to transport water, and supplies, the average daily traffic would be about fifteen trips or less per day. The number of daily trips may increase temporarily during completion/fracing operations with up to 20 heavy trucks needed to mobilize the equipment to the each well site, plus another ten to fifteen vehicles would access the site on a daily basis. Peak daily traffic would occur during a drilling shift change when the fresh crews travel into the site and the retiring crews depart. The number of daily trips would be substantially reduced during the production and operation phase because trips to perform maintenance, reclamation, and the resupplying of equipment would only occur intermittently. A workover rig may also need to be transported intermittently to the well site during production to maintain the wells.

Impacts on transportation and access during the production, operation, and maintenance phases would be substantially less intensive compared to the activity that peaks during the construction, drilling, and completion phases. Impacts from production, operation, and maintenance would be long term, but negligible.

BLM timing stipulations to protect wildlife would restrict project activities to the period from July 15 to November 15, or about 120 days. The increased traffic to the Project Area could lead to an increase in accidents in the short term. Estimated current use of SH 789 is approximately 600-700 vehicles per day and 110 to 130 trucks per day. On average there are 26 accidents a year on this segment of SH 789. The Proposed Action could increase truck traffic by as much as ten percent (10%) to twenty percent (20%) and passenger vehicle traffic by two percent (2%) on days when equipment is mobilized or demobilized. The additional traffic on I-80 and SH 789 is not, however, expected to cause a measurable reduction in service or an increase in accident rates. Transportation impacts to I-80 and SH 789 would, therefore, be negligible.

4.12.1.3 Grazing

Project activities would temporarily remove 30.1 acres of grazing lands from production resulting in the long-term loss of approximately three AUMs. The temporary loss of forage would not impact grazing levels in the allotment. Potential conflicts with grazing, including vehicle/livestock/wild horse collisions, would be avoided because some project activities would be prohibited during the permit window to protect pronghorn antelope crucial winter range (November 15 to April 30). Given the limited use of the area for grazing coupled with the timing limitations, no significant impacts are anticipated.

Disturbance due to drilling and construction activities could allow the introduction of noxious and nonnative invasive plant species. Noxious and nonnative plant species compete with native species, which could result in an area that is a less productive source of forage for livestock and wildlife. Impacts from noxious and nonnative plant species is discussed in Section 4.6.1.

Drilling and construction activities could result in increased vehicle and wildlife/wild horse/livestock collisions. Given the low traffic volumes and measures to mitigate disturbance (utilizing buses or carpooling, imposing speed limits, etc.), the risk of vehicle wildlife/wild horse/livestock collisions is low. Impacts to wildlife/wild horse/vehicle collisions are discussed in Section 4.4.1.

The use of open earthen reserve pits at the South and North well sites to hold drill cuttings and produced water could potentially entrap livestock and increase the risk of mortality. During the drilling process, reserve pits probably do not attract livestock due to human activity and noise. However, once the drilling rig and other equipment are removed from the well pad, livestock may move onto the well pad near the reserve pit. The risk of mortality however, would be low because few livestock graze in the Project Area. Fencing the perimeter of the reserve pit will substantially reduce the risk of livestock mortality. Produced water held in the pit would be hauled to Samson's permitted disposal facility located in Wamsutter, Wyoming for proper disposal, and the reserve pits promptly reclaimed.

4.12.2 Alternative 2: Existing Road Access

Impacts to land use under Alternative 2 would be similar to those described under the Proposed Action with the exception that construction of Alternative 2 would temporarily affect 32.6 acres and the access road would cross both the Rock Springs and Willow Creek grazing allotments. The total long-term loss of AUMs for both allotments would be approximately three AUMs, which is comparable to the loss expected under Alternative 1.

4.12.3 No Action Alternative

Under the No Action Alternative, the Proposed Action and Alternative 2 would be denied. Therefore, there would be no surface disturbances or increases in traffic volumes beyond those currently occurring within the Project Area, and impacts to traffic, livestock grazing and wildlife habitat, and other land uses would remain at current levels.

4.13 Hazardous Materials and Waste

Construction, drilling, completion, and production activities require the use of a variety of chemicals and other materials, some of which generate waste that would be classified as hazardous. Potential impacts associated with hazardous and solid waste materials include human contact, inhalation or ingestion and the effects of exposure, spills or accidental fires on soils, surface and groundwater resources and wildlife. The risk of human contact would be limited predominately to Samson employees and contract employees. The Hazardous Substance Management Plan, Hazard Communication Program,

SPCC Plans, and other mitigation measures would reduce the risk of human contact, spills and accidental fires, and provide protocols and employee training to deal with these events should they occur. Based on successful implementation of the above-listed plans and procedures, no significant impacts associated with hazardous materials would be anticipated.

In general, the effects of the Proposed Action and Alternative 2 would be considered significant if the handling of wastes resulted in substantially increased risk to the public and the natural resources in the vicinity of the Project Area.

4.13.1 Alternative 1: Proposed Action

A variety of materials typical of oil and gas development could be onsite during construction and operations. Other solid wastes associated with the proposed development would include human waste and trash.

Table 4-3 describes the general types of materials typically used or resulting during each stage of oil and gas development.

Table 4-3. Potential Material Outputs from Oil and Gas Extraction Processes

Phase	Potential Materials
Construction, Drilling, and Completion	Drilling muds, organic acids, diesel oil, crankcase oils, and acidic stimulation fluids. (hydrochloric and hydrofluoric acids).
Production	Heavy metals, dissolved solids, organic compounds, and high levels of salt. May also contain additives including biocides, lubricants, and corrosion inhibitors.
Maintenance	Completion fluids, well-cleaning solvents, paint and stimulation agents. The volume of associated wastes (wastes related to maintenance) is typically very small, about one barrel per well per year.

Source: Profile of Oil and Gas Extraction Industry (EPA 2000)

Potential impacts from hazardous materials include potential discharges of waste streams (e.g., drilling muds, produced water, and gas condensate) to soils and ultimately water resources. The severity of these impacts would depend on the content of the waste stream, amount released, location of the discharge, permeability of soils, and climactic conditions.

Drilling wastes are the primary waste byproduct from oil and gas extraction. During drilling, an average of 375 cubic yards of drill cuttings is produced per well. Drilling muds would be water based but may also contain bentonite clay and small concentrations of a variety of contaminants, including mercury, cadmium, arsenic, and hydrocarbons. No chromate additives would be used in the mud system without prior BLM approval. Drilling mud would be reconditioned and reused, and would be actively monitored throughout the drilling phase to ensure against accidental release. Drilling mud is also highly viscous and any inadvertent discharges would have slow rate of overland flow that would be contained with spill containment procedures. Drill cuttings left onsite would be buried in place. Backfilling of the pit would be done in a manner to confine the mud in the pit and avoid incorporating the mud with surface soils.

The primary byproduct of the production phase is produced water (EPA 2000). Produced water is typically high in salinity and may contain other contaminants. While the disposal of produced water by approved underground injection or evaporation in reserve pits is common in some areas, produced water from the South Well would be contained by conveying it to the reserve pit, and, if necessary, trucked offsite to the approved disposal site near Wamsutter, Wyoming. Releases of produced water could occur from the wellhead, tanking, reserve pit, and transport trucks as a result of an accident, tank failure, or pit breach. Releases during the high-pressure fracturing (fracing) period due to poor well completion could contaminate groundwater. The risk of groundwater contamination would be small because drilling would occur to depths below 5,000 feet, which is below the usable depth of area groundwater. Production casing would be cemented to a depth extending 200 feet above the Lance Formation to further lower the risk of contaminates entering the aquifer.

Gas condensate, which resembles light crude oil, is composed of hydrocarbons in a liquid state. Similar to produced water, condensate would be contained and conveyed by pipeline to a centralized collection facility with secondary containment. Releases of condensate could result from wellhead, pipeline, or tank integrity failures.

Protection of sensitive environments in the drilling area would be accomplished through the use of a 12-mil liner in the reserve pit and the construction or installation of secondary containment and berm. All cuttings, drilling fluids, and chemicals would be contained in the lined pit. Pits are typically eight to ten feet deep. Any hydrocarbons in the reserve pit would be removed as soon as possible and processed or disposed at the permitted offsite facility near Wamsutter, Wyoming, and excess liquids in the reserve pit evaporated. Upon well completion, any hydrocarbons in the reserve pit would be removed in accordance with Onshore Order #7.

Tank batteries for the storage of produced water and condensate would be placed in secondary containment to prevent migration offsite and storage tanks would be surrounded by berms. Produced water and other byproducts would not be applied to roads or well pads for control of dust or weeds. Liquid hydrocarbons produced during completion operations would be placed in test tanks on the well locations and subsequently trucked offsite and sold or disposed of at a permitted disposal facility.

To reduce the potential of hydrocarbon contamination of soils, pipelines and associated collection piping for gas would be designed to minimize the potential for spills and leaks. Leaks or spills of saline water, hydraulic fracturing chemicals, fuels, and lubricants could also result in soil contamination. Depending on the size and type of spill, the effect on soils would primarily consist of the potential loss of soil productivity. Samson would implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan and an Emergency Response Plan prior to construction to minimize potential impacts from unintentional releases. The SPCC Plan would include accidental discharge reporting procedures, spill response, and cleanup measures. All potentially hazardous materials and substances would be handled in an appropriate manner that minimizes the risk of accidental contamination of soil and water resources. Any spills of gas, salt water, or other noxious fluids would be immediately cleaned up and removed to an approved disposal site. If a release of a hazardous substance in a reportable quantity occurs, a copy of the release report would be furnished to the BLM and all other appropriate Federal and State agencies. In addition, all releases

to soil or water of ten barrels or more of any substance would be immediately reported verbally to the BLM. Proof of cleanup would be provided for the project record. This mitigation would be applied at all stages of the project including drilling, completion, operation, and abandonment of the wells.

Samson and its contractors would be required to collect and properly dispose of any human and solid wastes generated by the project. All trash, stakes, flagging, and cap leads would be picked up and disposed of at an approved site, most likely the Carbon County landfill.

No chemicals subject to reporting under SARA Title III (hazardous materials) in an amount equal to or greater than 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with the drilling, testing, or completing of wells. Furthermore, extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, would not be used, produced, stored, transported, or disposed of in association with the drilling, testing, or completing of wells, as established by 40 CFR 117. Threshold quantities would be reported as required by the CERCLA of 1980. Under the proposed drilling plan, fuel and lubricants would be temporarily stored in transportable containment trailers or tanks on the proposed well pads, which would reduce the risk of impacts over the short and long term.

With the implementation of these precautionary measures, the risk of impacts to human health and natural resources from the accidental release of solid or hazardous materials is low.

4.13.2 Alternative 2: Existing Road Access

Potential impacts from hazardous materials and waste under Alternative 2 would generally be similar to the Proposed Action. The use of the access road would increase the risk for adversely affecting the Adobe Town WSA. The access road would also require crossing eight intermittent and 20 ephemeral drainages compared to the four intermittent and eight ephemeral drainages crossed by the Proposed Action. Under Alternative 2, there would also be an increased risk of accidental spills of hazardous materials being conveyed downstream given the increased number of crossings. Implementation of the precautionary measures and spill prevention and containment planning as described under the Proposed Action would continue to keep the risk of impacts to human health and natural resources from the accidental release hazardous materials low.

4.13.3 No Action Alternative

Under the No Action Alternative, there would be no impacts from hazardous materials and waste beyond those currently occurring within the Project Area.

4.14 Noise and Odor

Noise and odor associated with the Proposed Action and Alternative 2 would be caused by machinery used during construction, drilling, and operation of the well pad, drill rig, access road, construction and operation of the production facilities, and by heavy trucks and related equipment. Perception of sound varies with intensity and pitch of the source, air density, humidity, wind direction, screening/focusing by topography or vegetation, and distance to the observer.

The following criteria were used to assess the significance of noise and odor impacts related to this project:

- Long-term activities that would exceed federal 55 dBA maximum guidance for noise at either human or animal sensitive locations; and

- Activities that would create objectionable odors affecting a substantial number of people.

4.14.1 Alternative 1: Proposed Action

Overall, noise produced by construction, drilling, and completion phases would be minor because of the short-term nature of these activities. Noise produced during the production phase would be dispersed and long term (20 years). Given the remoteness and isolation of the Project Area, construction, drilling, completion, and production and operation activities associated with the Proposed Action would not affect noise sensitive locations for humans.

The construction, drilling and completion phases would produce noise levels up to 115 dBA at the source, with noise levels of approximately 55 dBA or less at 3,500 feet from the source. These activities would be the loudest noise-producing operations and would continue 24 hours/day at the South Well site. Increased noise levels associated with construction equipment such as scrapers, dozers, trucks, and loaders would be between 70 and 90 dBA at about 50 feet from the source and, like all noises, would attenuate at a rate of approximately 6 dBA with each doubling of distance from the source depending on conditions such as topography, wind, obstructions, etc. (Table 4-4; BLM 2006). Noise levels associated with production would be minimal because no compressor station would be required. Actual noise levels in the Project Area would be lower than more populated areas because of remoteness and Project Area topographical features.

Table 4-4. Estimated Noise Attenuation With Distance From Construction Equipment, Jonah Infill Drilling Project, Sublette County, Wyoming, 2006.

Distance from 115 dBa Generating Construction Equipment Noise Source (feet)	Range in Estimated Noise at Given Distance (dBA) (Example Noise Source)	
50	70 (busy traffic)	90 (endangers hearing)
100	64 (conversation)	84 (noisy factory)
200	58 (conversation)	78 (noisy factory)
400	52 (quiet)	72 (busy traffic)
800	46 (library)	66 (busy traffic conversation)
1,000	40 (library)	60 (normal conversation)

Construction and drilling-related noise impacts would be short term (60 days), occurring throughout the Project Area. Substantially lower and less frequent noise disturbances would occur throughout the estimated 20-year productive life of the South and South Wells.

Noise associated with construction, drilling, and completion could potentially affect human comfort and safety (at extreme levels) and modify animal behavior. Some users of the Project Area would be affected infrequently for periods or for a short duration as they move through the area. Effects on noise sensitive locations for animals would be avoided by implementation of the design features including the applicant-committed environmental protection measures described in Chapter 2.

Noise sensitive locations include areas that are routinely occupied or frequented by humans or animals. In general, it has been found that mammals and birds will consistently escape from noises that exceed 75-85 dBA (BLM 2004).

Below that level, noise sensitivity would vary by species (BLM 2004). Human sensitivity to noise would depend, in part, upon proximity to the noise source, background noise levels, physiology, frequency and the intended activity. For example, non-motorized recreation users may be more sensitive to noise impacts than most other resource users (BLM 2004). Current recreation use of the Project Area is, however, low.

Studies have found that big game move away from frequently traveled roads (BLM 2004). A study of the Birch Creek area of the BLM Pinedale Field Office found that displacement of big game animals away from drilling rigs occurs but animals quickly return to the area once drilling has been completed, despite some increase in maintenance-related traffic (Reeve 1995). Impacts to big game due to displacement would be greatest during periods when animals concentrate on crucial winter range. Noise that displaces pronghorn antelope that concentrate on crucial winter range in the Project Area may result in overcrowding and a subsequent increase in competition for space and forage, an increase in stress, and a decrease in physical condition. Displacement may also increase winter mortality and reduce reproductive fitness, resulting in lowered carrying-capacity. Sage-grouse are also known to be affected by high levels of noise (see Section 4.4). Wild horses would be expected to be temporarily displaced from areas where the highest level of noise associated with the more intensive construction and completion phases of the project would occur. Horses displaced during the construction and completion phases would return to local areas within the project area as noise levels subside during the production phase.

No noise impacts to pronghorn antelope would occur from drilling operations during the crucial winter range period (November 15 – April 30; Figure 3-1) because BLM stipulations would prohibit drilling and significant construction activities in the Project Area during that period. Noise impacts to sage-grouse would be avoided during breeding (February 1 – May 15) because the BLM NSO stipulation would apply within 0.25 miles of the lek identified in the Project Area (Figure 4-1). Potential impacts from noise would be reduced further because the BLM extends the timing stipulation to protect sage-grouse within two miles of an identified lek during the nesting and brooding period (March 15 – June 30; Figure 4-1). These timing stipulations and buffers would also indirectly benefit nesting migratory bird species occurring within the Project Area.

Though burrowing owls may be more tolerant to noise than sage-grouse and other raptors, the BLM stipulation that prohibits project activities within 0.5 miles of an occupied burrowing owl nests from February 1 to September 10 (Figure 4-1) would provide an additional measure of protection from noise.

Although the golden eagle and ferruginous hawk nest sites that occur near the access road and both well sites (Figure 3-3) have been unoccupied and abandoned, the nests could be reoccupied prior to construction. Nesting golden eagles are sensitive to noise and a 0.5-mile buffer around the nest would prohibit project activities during the breeding and nesting season from February 1 to July 31. Nesting ferruginous hawks are also sensitive to noise and a 0.75-mile buffer around the nest would prohibit project activities during the breeding and nesting season from February 1 to July 31. A year round NSO restriction would also apply to project activities occurring within 1,968 feet (600 meters) of an active golden eagle nest and within 1,321 feet (400 meters) of an active ferruginous hawk nest. Overall, impacts resulting from the implementation of buffers and seasonal timing stipulations to protect sensitive species and species of special concern would render noise impacts negligible.

Given the remoteness and isolation of the Project Area, no noise sensitive locations for humans (such as residences or places of business) would be affected. Grazing operators and recreationists using the Project Area may temporarily be affected by noise disturbances as they move through a construction or drilling area, however, such contacts are anticipated to be infrequent and short in duration. Drilling, construction and operations workers would be subject to federal and state health and safety standards for sound protection. Given these circumstances, and assuming successful implementation of the applicant-committed environmental protection measure to muffle project vehicles, noise impacts associated with the Proposed Action would not be significant.

Noise impacts could occur within the Adobe Town WSA because the South Well and access road would be located as close as 1.5 miles from the WSA boundary (Figure 2-1). WSA users would likely hear project activities, particularly during the construction, drilling and completion stages. These impacts would diminish substantially during the production and operation phases, and be limited primarily to vehicular traffic and occasional well maintenance activities. The magnitude of noise impacts within the WSA would also depend on the time of year, and actual use of the portions of the WSA near the project. Construction, drilling, and completion activities would occur nearly simultaneously (July 15 to November 15), when visitor use is highest. The noise impacts to visitors during these project phases would, however, be temporary and short term (121 days). Noise impacts on the Adobe Town WSA from the North Well would be less than for the South Well, with sounds being diminished or inaudible due to the buffering provided by the surrounding topography. Overall, noise impacts due to the Proposed Action would be minor.

Though offensive odors from stationary sources rarely cause any physical harm, they still remain unpleasant. The occurrence and severity of odor impacts depend on the strength of the source, nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the area user's olfactory receptors.

Impacts from odors associated with natural gas drilling and production would occur when odors would offend or be unpleasant to area users. Such impacts generally would be limited to the access road (from vehicle emissions) and in the vicinity of the South Well (from drilling, flaring, and production). Odors generally would be rapidly dissipated by the wind, and given the remoteness of project activities, their impacts would be negligible.

4.14.2 Alternative 2: Existing Road Access

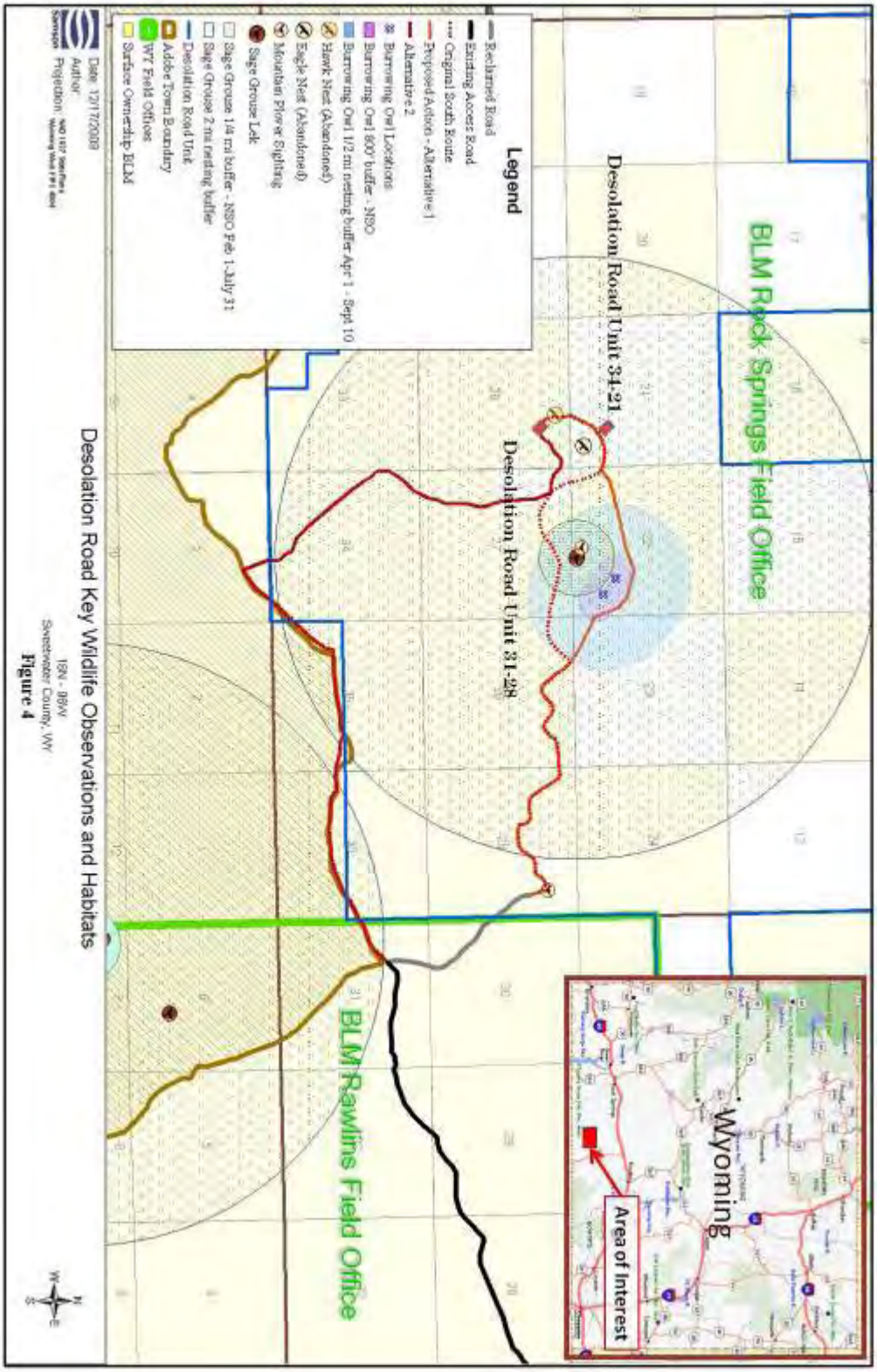
Noise impacts under Alternative 2 would be greater compared to the Proposed Action because the access road to the South Well would be collocated along the Adobe Town WSA northern boundary. Recreationists experiencing the northeastern portion of Adobe Town could be adversely affected by noise and odor from equipment and truck traffic traveling to the South Well site (Figure 2-1). The effects of noise and odor would be short term (121 days) and temporary, occurring during the construction, drilling, and completion phases. During the production and operation phase, traffic would be primarily for the maintenance of the production facilities and would be more intermittent, though long term (20 years).

No noise impacts on pronghorn antelope crucial winter range would occur because construction, drilling, and completion activities would be prohibited from November 15 to April 30. Some minor disturbances would likely occur during the production phase due to intermittent traffic caused by maintenance vehicles. Noise impacts on burrowing owl nesting would be negligible because the access road and South Well would be at least 0.25 to miles from the 0.5-mile nesting area buffer (Figure 4-1). Noise impacts on potential golden eagle nesting would be the same as the Proposed Action. Nearly the entire Project Area, including the access road and South and North Wells, would fall within the 2-mile buffer that would protect breeding, nesting, and brooding sage-grouse from noise impacts from February 1 to July 15 (Figure 4-1).

4.14.3 No Action Alternative

Under the No Action Alternative, there would be no noise and odor impacts beyond those that currently occur within the Project Area.

Figure 4-1. Key Wildlife Observations and Habitats



5.0 CUMULATIVE EFFECTS

5.1 Cumulative Effects Analysis

5.1.1 Past and Present Actions

Past actions in the project area include grazing and allotment management, ROW administration, hunting, oil and gas exploration and development, pipelines, recreation, wild horse administration, and other multiple uses. The 24,280-acre Desolation Road Unit (DRU), BLM Serial No. WYW-177629X, is an oil and gas exploratory unit that was approved by the BLM on December 22, 2008. The entire DRU occurs within the MVMA.

The primary surface disturbances in both the DRU and MVMA have been two-track roads used for recreation, and improved roads and well pads for oil and gas development (Table 5-1). There are 18 plugged and abandoned wells, and no producing wells in the MVMA. There are about 134 miles of road, including 37 miles of BLM-designated roads within the DRU; the remaining 97 miles of road occur outside the DRU, but within the MVMA. Travel in the MVMA is supposed to be limited to designated roads and trails (BLM 1997; Table 5-1).

Twelve miles of reclaimed pipeline right-of-way also occurs within the MVMA, including a 2.5–mile long section of gathering line owned by Questar and a 9.5-mile long section of the Southern Star Pipeline (Table 5-1).

Table 5-1. Summary of Past and Present Surface Disturbance in the Desolation Road

Oil & Gas Development – Wells and Pipelines			
	DRU	**Outside DRU**	**Total within MVMA**
No. of Plugged and Abandoned Wells	3	15	18
Federal	2	10	12
Private	1	4	4
State	0	1	1
Pipelines (miles)	12.0	0.0	12.0
BLM Designated Roads (miles)	37.0	97.0	134.0

Source: BLM 2009, WOGCC 2009. Two of the four producing wells are shut-in as of 1/19/2010.

The BLM has not issued any Special Recreation Permits that authorize recreational activities, such as guided big game hunting or wild horse interpretive tours in the MVMA.

5.1.2 Reasonably Foreseeable Future Actions

The RFFA within the DRU and the MVMA are related to oil and gas exploration and development, wildlife and wild horse management, recreation, protection of watershed, scenic, cultural and paleontological resource values, grazing, and public access. In addition to the South Well located on federal land, Samson is proposing to drill an additional North Well (DRU 34-21) on private land (SE ¼ ¼ of Section 21, Township 16 N, Range 96 W) within the DRU. Grazing by livestock and wild horses and foraging by wildlife would continue at approximately current levels. The BLM plans to maintain the wild horse population in the Adobe Town within the current AML. Designation of the area as an Area of Critical Environmental Concern (ACEC) for cultural and paleontological resources has been deferred until the BLM can inventory the area and make a determination that these resources meet the ACEC relevance and importance criteria (BLM 1997). The Green River RMP (BLM 1997) will continue

to provide management guidance on federal lands in the MVMA until an RMP revision is completed. Implementation of a revised RMP could reasonably be expected to occur in 5-10 years.

5.2 Cumulative Impacts

The MVMA and DRU are relatively undeveloped and retain many of their natural characteristics. A network of roads has been developed, but their use is governed by the BLM travel restrictions, which only allows travel on designated roads and trails (BLM 1997). Seventeen wells previously drilled in the MVMA have been plugged and abandoned, and with reclamation, their current impacts are minor. A previously reclaimed road that occurs on the eastern side of the Project Area has been used extensively by ORV users for recreation and/or hunting and continues to deteriorate. Grazing by livestock and wild horses has occurred for decades, and would continue for the foreseeable future, as would recreational activities such as hunting, wild horse and wildlife viewing and photography, mountain biking, rock and fossil hounding, nature photography, and studying the history, paleontology, and archaeology of the area.

No pending oil and gas projects were identified other than the this proposed action on federal (South Well, DRU 31-28) and private (North Well, DRU 34-21) lands within the DRU. Under the Proposed Action (Alternative 1), the two well pads would add approximately 9.56 acres of disturbance, and 20.51 acres for the new access roads (5.42 miles). Approximately 30.1 total acres of disturbance would occur over the life of the project. Alternative 2 would add approximately 32.6 acres of additional disturbance from the two well pads, new road access (0.95 miles; 3.45 acres), and necessary improvements to existing roads (5.36 miles; 19.56 acres).

The cumulative effects of past, present, or reasonably foreseeable future activities vary among resources and are generally based on relevant landscape, resource, project, and/or jurisdictional boundaries. The Cumulative Effects Assessment Area (CEAA) for individual resources affected by Proposed Action and Alternative 2 is summarized below (Table 5-1). This analysis assumes that the Proposed Action or Alternative 2 is approved and fully implemented.

If, under the Proposed Action, Samson's exploratory South Well (DRU 31-28) is economically viable, the company may pursue additional gas development activities (North Well; DRU 34-21) on an adjacent privately-owned parcel (Figure 2-1). The North Well would be less than one mile north of the South Well. The North Well would require an additional 4.78 acres of new surface disturbance for the well pad and 5.42-mile long section of new road (Figure 2-2). Under Alternative 2, approximately a half mile of new road access would be constructed from to the South Well from the existing two-track access and another half mile would be constructed from the South Well to the North Well (Figure 2-2). Construction activities for the North Well would likely begin within one year of drilling an economically viable South Well. The BLM would not have authority over the development of the North Well, but would have authority over the access road that would be required to cross BLM-managed land. The potential impacts of the North Well are included in this EA because the two wells are a connected action under the DRU agreement.

5.2.1 Special Management Areas, Visual Resource, and Recreation

The DRU occurs within the MVMA and adjacent to the Adobe Town WSA (Figure 2-1). The MVMA overlaps a portion of the Adobe Town WSA, which retain most of their natural character, with large areas of unobstructed views occurring throughout both areas. Additional impacts to visual resources from future proposals such as well locations, roads, production facilities, gas pipelines, and presence of dust could alter the viewshed. If the impacts are not mitigated or regulated by the BLM, there may be an increasing incremental loss of resources values, including the ability to retain the Class II VRM standard. The BLM does not, however, have control over activities on private lands in the MVMA; activities on private lands could impact the effectiveness of the BLM to retain the

MVMA Class VRM II rating. Recreation is likely to be dispersed away from the well site locations because recreationists seeking solitude likely would avoid the immediate area. Large areas of unobstructed views and open space would remain. Well development and the production from the North Well would likely extend the period of time that project-related activities would affect the MVMA and WSA over the short term.

5.2.2 Wildlife

Cumulative impacts to big game species, other mammals, and birds would be similar to impacts described for the Proposed Action, but increase as development and production activities increase in the DRU. Project development (e.g., wells, roads, and pipelines) could impact management of Greater sage-grouse and raptor habitat. Existing surface disturbances occurring in the 16,209-acre pronghorn antelope crucial winter range covers approximately 64.3 acres, including disturbance from 39.1 miles of two-track roads and three plug, abandoned, and reclaimed well pads. The action alternatives would add an additional 30.1 acres (Alternative 1, Proposed Action) to 32.6 acres (Alternative 2, Existing Access Road) of disturbance. The total disturbance within crucial winter range would range from 94.4 acres to 96.9 acres. Total surface disturbance resulting from past, present, and the Proposed Project within two miles of the two known leks would be approximately 58 acres (Table 4-1). Past and present anthropogenic activities have likely contributed to a reduction in habitat effectiveness for raptors, but the extent of such loss is unknown.

The Proposed Project and RFFA would continue to contribute to the loss of existing raptor nesting sites and foraging areas, further reducing habitat effectiveness for raptors that may use the Project Area. The long-term effect on raptor populations is, however, unknown as other factors such as drought, disease (e.g., plague) and subsequent decreased prey availability may contribute to reduced habitat effectiveness. The Proposed Project and RFFA would contribute to the continued fragmentation and incremental loss of pronghorn antelope crucial winter range and sage-grouse nesting and brood-rearing habitat in the Project Area. The effect on potential sage-grouse winter concentration areas within the Project Area is unknown, but suspected to be similar to the effects on nesting and brood-rearing habitat. The Proposed Project and RFFA could also contribute an incremental increase in downstream impacts to the four endangered Colorado River fish and their critical habitat. A jeopardy situation could be reached if either the demand for water depletions increases or it exceeds the 100-acre-foot threshold established in the USFWS agreement.

Protection of Greater sage-grouse leks and nesting habitat and raptor nests on public land is strictly enforced and would be applied to future projects to ensure existing populations are maintained and would not reach unacceptable cumulative impact levels. The Proposed Action and Alternative 2 may contribute additional impacts (e.g., habitat loss and increased human presence) to the cumulative effects of other activities on prairie dog habitat (including habitat that supports nesting burrowing owls and mountain plovers). Impacts from the Proposed Action or Alternative 2 would be in addition to those from other activities such as livestock grazing, oil and gas development, recreational use, and vehicle traffic on area wildlife. Application of design features, such as avoidance and timing stipulations would minimize impacts to these species. This includes guidance provided under the BLM IM-2010-12 for the conservation of sage-grouse which provides additional protection for big game, migratory birds, raptors, and other less mobile animal species associated with the area sagebrush-steppe habitat. The new guidance could potentially restrict the timing, distance, and density of the RFFA (e.g., oil and gas/wind/transmission development; lands and realty actions) that could occur in the sagebrush habitats within the sage-grouse non-core area.

5.2.3 Surface Water, Soils, Vegetation, and Noxious/Nonnative Invasive Plants

Reclamation of the Proposed Action (or Alternative 2), and other RFFA would be required on BLM-managed public lands. Topographic alterations due to the Proposed Action or Alternative 2 would generally affect less than one percent (30.1 or 32.6 acres) of the total land surface in the MVMA (69,940 acres). Cumulatively, the effect of

development and production of the Proposed Action or Alternative 2 on surface water, groundwater, soils, vegetation, and the risk of increasing noxious/nonnative invasive plant species when combined with past, present and other PFFA would be negligible.

The Project Area lies within a portion of the Washakie Basin. Existing facilities found in the MVMA CEAA are numerous upgraded roads and two-track trails, reclaimed well pads, and some pipelines. All of these developments affect surface water quality to a small degree, with runoff from gravel and two-track roads likely contributing most to surface water impacts. Storm water plans are required by federal, state, or county entities for construction projects such as road or well pad building. Cumulative impacts to surface water quality are expected to remain within acceptable levels (BLM 2004). Standard stipulations and site-specific construction and reclamation procedures are required on federal lands to maintain topsoil and surface drainage patterns. These procedures include re-grading and re-contouring disturbed areas to approximate original conditions, re-establishing appropriate vegetative cover, protecting soils from erosion, and stabilizing reclaimed landscapes and drainages, which would minimize cumulative impacts to topography, soils, surface water, and vegetation. Weed control would be implemented as necessary by the BLM.

5.2.4 Minerals

Gas development in the Project Area would not interfere with the potential recovery and transportation of other minerals. Natural gas production is considered a primary industry that is important to the economic well-being of Sweetwater County, the State of Wyoming (increased revenues), and the U.S. (energy availability).

5.2.5 Air Quality

Cumulative air quality impacts are defined as incremental impacts from the Proposed Project combined with impacts from other existing or proposed air emission sources in the region. Air pollutant emissions over the life of the project would occur from routine vehicle traffic and production facility emissions. The contribution from these activities to cumulative ambient air concentrations and AQRVs, including regional haze and N deposition, at the nearest PSD Class I area (Dinosaur National Monument) would be negligible.

5.2.6 Cultural Resources

Archaeological resources are a unique and irreplaceable resource, the cumulative loss of which diminishes the archaeological record of the region and hampers our ability to interpret and understand the past. Impacts from development on the archaeological record can be both direct and indirect, and can adversely affect historic properties. The current Project Area is known to contain a number of prehistoric archaeological sites including several historic properties. If the Proposed Action is selected, no known cultural resources or historic properties will be directly effected. In addition, all ground disturbing activities along this alternative will be monitored to reduce the potential for adverse effects on any discovered historic properties. If buried cultural materials are encountered, a discovery plan attached to the cultural resources survey report will be implemented (Roufs 2009). However, if the Existing Road Access Alternative is selected, the direct effects on archaeological sites, including several known historic properties, is unknown. Under Section 106 of the NHPA, the Existing Access Road Alternative will have to be inventoried for cultural resources if it is selected, and all historic properties found within the APE avoided or any adverse effects mitigated through project redesign, data recovery, or other methods agreed to in consultation with the BLM, the Wyoming SHPO, and other parties as appropriate. Indirect impacts to the cultural resources of the area will likely occur with the increased access to the area. Those impacts will take the form of the increased loss of artifacts and destruction of sites through collecting activity and vandalism.

5.2.7 Paleontology

Incremental impacts to paleontological resources could occur from the Proposed Action and Alternative 2, when added to past, present, and other RFFA. The potential impacts would include destruction of relevant paleontological data. With the application of appropriate mitigation measures, the likelihood of disturbing paleontological resources would remain low.

5.3 Conclusion

The effects of the Proposed Action when added cumulatively to the past, present, and other RFFA would have negligible or low impacts to soils, vegetation, water resources, wildlife resources, federally listed threatened and endangered species, BLM sensitive animal species, migratory birds, livestock grazing, and recreation (Table 5-2). In summary, the Proposed Action or Alternative 2 when added to the past, present, and other RFFA is not expected lead to unacceptable cumulative impacts.

Table 5-2. Summary of Potential Impacts in the Cumulative Effects Assessment Area for the Desolation Road Exploratory Gas Well Project.

Resource	Cumulative Effects Assessment Area	Potential Cumulative Effects/ Mitigation
BLM Management Areas	Project area including MVMA (69,940 acres); Adobe Town WSA (86,000 acres). The MVMA overlaps a portion of the Adobe Town WSA.	• The area maintains much of its natural character. Past, present, Proposed Action or Alternative 2, and other RFFA contribute incrementally to the impacts on the MVMA and indirectly on the WSA. Activities on federal land would be mitigated.
Visual Resources and Recreation	Project Area including MVMA and Adobe Town WSA (recreation); Project Area and MVMA within the Class II VRM. WSA within Class I VRM (visual).	• Past, present, Proposed Action, Alternative 2, and other RFFA contribute to the visual impact. • Some temporary displacement of recreationists and hunters during periods of drilling and construction. • There may be reduced levels of satisfaction with the recreational experience due to project-related activities, but increases in vehicle access. • All disturbance-related actions would be mitigated (i.e., placement of well, low-profile tanks). Large areas of unobstructed views would remain.
Surface Water Resources	• Proposed Action: Four larger intermittent and eight smaller ephemeral drainages within the project area . • Alternative 2: Eight larger intermittent and 20 smaller ephemeral drainages within the project area.	• Surface water not impacted incrementally by past, present, Proposed Action, Alternative 2, and other RFFA. Protection and mitigation (e.g., design features, BMPs for erosion control) required for activities on public lands.
Groundwater Resources	MVMA	• Groundwater not incrementally impacted by past, present, Proposed Action, Alternative 2, and other RFFA. Protection measures or mitigation (e.g., spill prevention and control) is required to prevent ground water contamination.

Resource	Cumulative Effects Assessment Area	Potential Cumulative Effects/ Mitigation
Pronghorn Antelope	Bitter Creek Herd Crucial Winter Range (CWR), 16,029 acres in the DRU, MVMA and Adobe Town WSA.	• Past, present, Proposed Action, Alternative 2, and other RFFA would contribute incrementally to impacts on CWR with surface occupancy. • Timing stipulations in CWR apply November 15 to April 30.
Greater Sage-grouse	Project Area plus a 2-mile buffer within the Bitter Creek Upland Game Bird Management, Area (19,200 acres).	• No past, present, and proposed wells are located within State-identified Sage-Grouse Core Areas. • Proposed Action, Alternative 2, and other RFFA handled on a case-by-case basis. BLM and WGFD mitigation would apply; Proposed Action and Alternative 2 would not occur in Core Areas. • No Surface Occupancy (NSO) applies within ¼ mile of leks. Timing stipulations would apply to present, Proposed Action, Alternative 2, and other RFFA from 15 – June 30.
Raptors (Burrowing Owl, Golden Eagle, Ferruginous Hawk)	Desolation Road project area plus 2-mile buffer; 19,200 acres.	• NSO applies to present, Proposed Action, Alternative 2, and other RFFA within 1,968 feet of active golden eagle nest site and within 0.5 mile from February 1 – July 31. • NSO for active ferruginous hawk nest within 1,312 feet and 1.0 mile from February 1 – July 31. • NSO for active burrowing owl nest with 820 feet and 0.5 mile from April 1 to September 10. • Impacts on raptors from Proposed Action, Alternative 2, and other RFFA would be avoided on federal lands with implementation of seasonal timing stipulations and buffers.
Threatened and Endangered (T&E) and BLM Sensitive Wildlife Species	• Existing prairie dog colonies, as potential black-footed ferret habitat with the project area. • Existing mountain plover habitat. • Proposed project area occurs within an area modeled to indicate moderate to high potential for Wyoming pocket gopher.	• Block clearance from the USFWS - No effects determination for black-footed ferret. • NSO and seasonal timing stipulations would apply to Proposed Action, Alternative 2, and other RFFA on federal lands. • Surface disturbing activities from past, Proposed Action or Alternative 2, and RFFA contribute to incremental increase to habitat fragmentation and loss without avoidance and mitigation. • Avoidance would be required to avoid impacts to pygmy rabbit, Wyoming pocket gopher, white-tailed prairie dog, mountain plover, and sensitive migratory/songbird species.
T&E and BLM Sensitive Plant Species	Within 300 feet of surface disturbing activities occurring in the project area.	• No effects determination for Ute ladies' tresses (listed plant species). NSO and seasonal timing stipulations would apply to wells roads on federal lands. • Past, present, Proposed Action, Alternative 2, and other RFFA could impact BLM sensitive plant species, if plants are present within 300 feet of project activities.

Resource	Cumulative Effects Assessment Area	Potential Cumulative Effects/ Mitigation
Soils/Vegetation/ Invasive Species	Project Area (10,240 acres)	• Mitigation required where soils are disturbed. Seeding with native species. • Mitigation to prevent invasive species invasion/weed treatments required. • Past, present, Proposed Action, Alternative 2, and other RFFA expected to incrementally contribute to erosion, vegetative loss, and invasive species without appropriate mitigation.
Geology and Minerals	Desolation Road Unit (24,280 acres)	• Past actions have not negatively impact geology and minerals. Proposed Action, Alternative 2, and other RFFA would benefit mineral development.
Cultural	MVMA (69,940 acres)	• The area maintains much of its natural character. Past actions have likely contributed to some loss of cultural resources. • Proposed Action would not result in adverse effects to any known cultural resources. Alternative 2 and other RFFA could contribute incrementally to the loss of cultural resources without survey and mitigation. • Additional surveys required where surface disturbing activities may be proposed.
Paleontological Resources	Project Area	• The area largely remains in its natural state. Proposed Action, Alternative 2, and other RFFA would require mitigation (pre-construction field surveys and, in some cases, monitoring during surface-disturbing project activities) to prevent destruction or damage to paleontological resources unearthed incidentally.
Air Quality	Regional air shed including portions of Wyoming, northern Colorado, and northeastern Utah.	• Emissions are within the federal and state thresholds. • Proposed Action, Alternative 2, and other RFFA would contribute to the degradation of air quality incrementally primarily due to fugitive dust, vehicle exhaust, drilling, and production . • Based on air modeling results undertaken for the Atlantic Rim Natural Gas Project Final EIS, no PSD increment at nearby Class I area is expected to be exceeded as a result of RFFA. Based on air modeling results undertaken for the Atlantic Rim Natural Gas Project Final EIS, predicted impacts from Proposed Action sources, when added to ambient background pollutant concentrations, are expected to be below the National and Wyoming Ambient Air Quality standards for NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$.

Resource	Cumulative Effects Assessment Area	Potential Cumulative Effects/ Mitigation
Land Use/ Grazing/ Transportation & Access	• Project area, including the Rock Springs and Willow Creek Grazing Allotments - 10,240 total acres, or less than one percent of the total grazing acreage available (approximately 2 million acres). • Regional transportation infrastructure including Interstate 80 between Rawlins and Wamsutter, WY State Highway 789, and unpaved roads.	• Past actions have resulted in temporary and negligible losses for grazing. The Proposed Action, Alternative 2, and RFFA are expected to have short-term and negligible effects on available forage and available AUMs. • Past traffic increases have been short term and had a negligible effect on level of service and the number of accidents. • Past road construction has increased access to the area for recreation, including hunting and ORV use. RFFA expected to increase the number of roads and ability to access new areas. • New access road construction, road improvements, and other RFFA expected to increase area traffic, and recreation visitor-days. • Other impacts due to increased access may include additional vegetation trampling and loss, habitat fragmentation, soil erosion, impacts on cultural and paleontological resources, and wilderness qualities due to off-road travel. • Additional wildlife impacts, noise, and waste also expected to increase with development.
Wastes	Project Area	• The Proposed Action and Alternative 2 would not add to the existing level of hazardous materials and wastes. • Impacts over the long term would be negligible.
Noise and Odor	Project Area	• Proposed Action and Alternative 2 would add slightly to the existing level of noise and odor (drilling is a temporary activity and would not occur all at once. • Testing /production results in minor increases to existing background noise and odor levels).

6.0 CONSULTATION AND COORDINATION

6.1 Public Participation

Due to public interest in this proposal, the scoping process was extended beyond the customary time frame. The scoping process included two public comment periods. The first was a 30-day scoping period from December 1 to December 30, 2008. The second was a 15-day public comment period from June 1 to June 15, 2009. Individuals and entities on the direct mailing list included Federal, state, and local officials and agencies, Native American Tribes, public land users and groups, groups expressing an interest in public lands, and the media. Refer to Appendix A for a copy of the scoping notice including the mailing list.

During preparation of the EA, the BLM has communicated with, and received or solicited input from various federal, state, county, and local agencies, elected representatives, environmental and citizens groups, industries, and individuals potentially concerned with issues regarding the Proposed Action. The contacts made are summarized in the following sections. Issues identified during public scoping are listed in Section 1.5 of Chapter 1.

6.2 Consultation and Coordination

The RSFO followed a process to ensure consultation and coordination throughout out the project in accordance with the CEQ requirements and BLM policy. A third party contractor working under the direction of and in coordination with the RSFO drafted the EA document. The RSFO provided two sets of reviews on a resource-by-resource basis on the third party EA draft. The third party contractor provided updated information as requested and coordinated with the RSFO on all edits. The RSFO also provided information on the format and content of all EA sections. Samson was involved in the development of the proposed action, and provided feedback on other portions of the EA.

Throughout the development of the EA public and outside agency comments were considered and were used to guide the document development. Formal consultation was carried out with the USFWS over potential depletion of water to Green River and its associated impacts to the endangered fish native to the system. Information coordination was carried out with a number of agencies including the WGFD and the WDEQ. Area tribal governments were notified of the Proposed Project, however none chose to participate.

6.3 List of Preparers

Tables 6-1 and 6-2 identify the BLM and third party interdisciplinary team members principally involved in the preparation of this EA.

Table 6-1. BLM Rock Springs Field Office Interdisciplinary Team Members

Name	Responsibility
Samantha Thurston	Natural Resource Specialist/Project Manager
John MacDonald	Assistant Field Manager - Lands and Minerals

Bernie Weynand	Assistant Field Manager – Resources
Trisha Cartmell	Petroleum Engineer/Minerals
Penny Daniels	Archaeologist/Cultural Resources
Adam Day	Paleontologist/Geology & Paleontology
Dennis Doncaster	Hydrologist/Water Resources
Jo Foster	Recreation Specialist/Visual, Special Management Areas, Recreation, & Wilderness
Jim Glennon	Botanist/Vegetation & Special Status Plants, Soils
Nick Kaczor	Wildlife Biologist/Wildlife & Special Status Animals
Doug Kile	GIS
Cherette Mastny	Range Management Specialist/Grazing
Carol Montgomery	Realty Specialist/Transportation and Access
Angelina Pryich	Writer – Editor/Editing
Jonathan Sheeler	Rangeland Management Specialist/Grazing
Jaci Wells	Archaeologist/Cultural Resources
Kimberlee Foster	Planning and Environmental Coordinator

Table 6-2. Third Party Interdisciplinary Team Members

Name	**Responsibility**
TEC Inc.	
Chris Rowe	Project Oversight/Technical Editor
Dulaney Barclay	Cultural Resources
Derek DeVito	References/Administrative Record
Mark Weitz	GIS/Technical Editor
Sam Bamberg LLC	
Sam Bamberg, Ph.D.	Vegetation & Special Status Plant Species
Erathem-Vanir Geological	
Gus Winterfeld, Ph.D.	Paleontology
Lloyd Levy Consulting	
Lloyd Levy	Visual, Special Management Areas, Wilderness & Recreation
InterTech Environmental & Engineering, LLC	
David Kane	Project Management/Air Resources, Land Use, Wildlife & Special Status Animal Species, Geology & Minerals, Soils, Wastes, Transportation & Access, Noise & Odor
Ben Blasko	GIS
Robert Gilson	Air Resources, Land Use, & Wastes

Name	Responsibility
Rebecca Morris	Water Resources, Land Use
Heather Shideman	Water Resources

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Appendix A

Scoping Notice

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901

TAKE PRIDE IN AMERICA

Scoping Notice
Desolation Road Exploratory Gas Wells Proposal

1.0 Project Overview

Samson Resources Company (Samson) has notified the Bureau of Land Management (BLM) Rock Springs Field Office (RSFO) regarding a proposal to conduct exploration and development operations underlying oil and gas leases owned by Samson within the Desolation Road Unit (DRU), Sweetwater County, Wyoming. Samson proposes to drill, complete, produce, and eventually reclaim 2 exploratory wells to the Fort Union Formation. Samson proposes to drill DRU Well #31-28 on Federal land and DRU Well #34-21 on fee (private) land with the associated infrastructure that includes an access road and gathering lines for the construction, delivery, operation, and maintenance of the Proposed Project. The BLM is the agency responsible for the authorizing action for the DRU Well #31-28 because the proposed project would occur on federal land with federal mineral rights. The Wyoming Oil and Gas Conservation Commission has primary authority for the DRU Well #34-21 because the Proposed Project would occur on private land with private mineral rights.

The productive life of each well is estimated to be approximately 40 years. Although actual operations are subject to change as conditions warrant, Samson's plan of development is to drill two wells within a year.

1.1 Project Location

The Proposed Project consists of approximately 18.5 acres including the pad and the access road located in the Haystack Wash area within the Monument Valley Special Management Area (SMA), and is about 30 miles southwest of Wamsutter, Wyoming, and 60 miles southeast of Rock Springs, Wyoming. All or parts of the Public Land Survey System sections listed in Table 1 are included in the Proposed Project Area and shown in Figure 1. Land ownership is characterized as checkerboard, where a large swath is intermixed between BLM-administered and private lands (Figure 1).

Ninety percent of the land within the DRU (T. 16 N., Rs. 95-97 W.) has been leased for oil and gas exploration and development and the Federal land encompasses 54% of the DRU, with minerals administered by the BLM RSFO.

1

Table 1: Approximate Project Location in Public Land Survey System

Township	Range	Sections
16 North	96 West	28, 27, 26, 25 Federal
16 North	96 West	21 Fee/Private

1.2 Existing Oil and Gas Development

As of May 2009, the closest well is 6 miles east of the Project Area, located in T. 16 N., R. 95 W. and is operated by Questar as the Mulligan Draw No. 4.

2.0 PROPOSED PROJECT OPERATIONS

2.1 Access Roads

Access to the Project Area is generally from the north along Interstate 80 (I-80) to the intersection of Creston Junction, then south for 29 miles on Wyoming State Highway 789 (SH 789) to Dad, Wyoming. About 25 miles of existing graveled and improved secondary roads beginning at the Barrel Springs Road would serve as the primary access to the Project Area, generally traveling northwesterly from Dad.

Access within the Project Area would be via the existing road network to a reclaimed road. Samson proposes to construct a total of about 3.8 miles of new access road from the reclaimed road to the federal well (DRU #31-28) on BLM-administered land and about 0.3 miles to DRU Well #34-21on private land from the DRU Well #31-28. An additional 1.1 miles of existing road would also be upgraded. Samson would develop a transportation plan to minimize surface disturbance from new and improved road construction and ensure safe traffic movement. The road width would be 18 feet with a maximum disturbance of 35 feet. The road and pipeline will be co-located.

2.2 Well Pads

The one well pad on federal land would be constructed from the native surface materials present onsite and leveled by balancing cut-and-fill areas where appropriate. Topsoil and native vegetation would be removed and stockpiled for use in the reclamation process, including the re-establishment of vegetation. Typically, an access road and well pad would generally be constructed in about 3 to 10 days, depending on terrain and site limitations.

A typical pad for a single vertical well would average approximately 4.5 acres. After interim reclamation, long-term surface disturbance associated with a typical single well pad would be approximately 1.5 acres.

A fenced, lined, and padded reserve pit, approximately 10 to 12 feet deep, would be excavated within the pad to temporarily store drilling fluids, cuttings, and water produced during drilling operations.

2.3 Drilling

Samson primarily uses vertical well bores to produce from the Fort Union Formation. Wells would typically be drilled utilizing a conventional, mechanically powered mobile drilling rig. Duration of drilling operations on a given well can vary greatly depending on depth and conditions encountered while drilling, ranging from approximately 10 to 20 days for a vertical Fort Union well.

[Page intentionally left blank Figure 1

Insert map]

Fresh water used for drilling purposes would be consistent with water appropriation permits obtained from the Wyoming State Engineer's Office, and would be obtained from commercial or privately owned water source wells. Water may be recycled for use in drilling, completion, workover, well abandonment, and hydrostatic pipeline testing operations.

2.4 Completion and Testing

Completion and testing operations would require approximately 3 to 10 days to perform. In general, the completion of the well would consist of perforating the production casing; productivity and/or formation pressure testing, if deemed necessary; stimulation of the formation(s) utilizing hydraulic fracturing technology (fracing); flow back of fracturing fluids; flow testing to determine post fracture productivity; and installation of production equipment to facilitate hydrocarbon sales. Fresh water used for fracing and flow testing purposes would be consistent with water appropriation permits obtained from the Wyoming State Engineer's Office, and would be obtained from commercial or privately owned water source wells. Water may also be recycled from drilling.

Hydrocarbons and water are typically quantified and flared during testing operations, which are conducted on an as-needed basis. Following the initial flow period, the well would be shut in until facilities are in place to allow the well to produce.

2.5 Production

Gathering lines made of steel or other durable materials to transport the produced gas from the new wells to the pipeline system would typically be buried. Samson, in consultation with BLM, would consider installing surface pipelines, where practical, to minimize erosion. Surface lines may be installed while Samson tests the exploratory wells to determine whether they will produce in economically recoverable quantities.

Produced water is typically minimal and would be stored on the well pad and transported by truck to a permitted disposal well. Produced water storage tanks would be emptied approximately once every two months, resulting in minimal project-related truck traffic.

2.6 Interim Reclamation

Samson would comply with Onshore Oil and Gas Order Number 1 to perform interim reclamation. The reserve pit, the portion of the well location and access road not needed for production operations, and pipeline corridors would be rehabilitated according to the requirements specified in the BLM-approved Application for Permit to Drill (APD) and Conditions of Approval (COAs).

2.7 Final Reclamation

Abandonment of the well and its facilities would occur at the end of the productive life of a well and would comply with applicable federal and state regulations as well as the APD to the COAs. Once surface equipment is removed from the site, the area would be recontoured to its original appearance, to the extent possible. Topsoil that was stockpiled during well pad and facility construction would be distributed on the surface and all disturbed areas would be planted with a seed mixture of species specified by the BLM.

3.0 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

Samson will comply with all applicable federal, state, local, and agency rules and regulations, and has committed to the following environmental protection measures within the Project Area. Additional applicant-committed environmental protection measures and COAs necessary to protect resources in the Project Area will be developed pending the outcome of the impact analysis in the Environmental Consequences section of the EA.

3.1 Cultural and Wildlife Resources

- Samson will conduct site-specific surveys for cultural resources and protected wildlife and plants prior to surface-disturbing activities, as applicable. The cultural and wildlife resources reports will be provided to the BLM for review.
- Samson will avoid or mitigate impacts to these resources in compliance with all applicable rules and regulations.
- A BLM approved monitor will be present for surface-disturbing activities.

3.2 Surface Disturbance and Transportation Planning

- Samson will develop a transportation plan and utilize transportation planning to minimize impacts from project development, providing the BLM with a description of its construction procedures.
- Samson will construct a new road and well site to the standards described in the BLM publication Surface Operating Standards for Oil and Gas Exploration and Development, 4th Edition (Gold Book) (BLM and USFS, Revised 2007) and in BLM Manual 9113.
- Samson will design and construct all new roads to a safe and appropriate standard to accommodate their intended use.
- Samson will surface access roads with gravel or other appropriate material as directed by the BLM if the well is put into production.
- Samson will install 210 to 400-bbl (billion barrel) tanks on the pads of producing wells to minimize collection and transport of produced water to its disposal site.
- Samson anticipates that water hauling trucks will need to visit well locations on the average of only once every two months, thereby minimizing impacts from well-associated truck traffic.
- Appropriate mitigation measures for surface disturbing activities, including avoidance of 25% slopes or greater and erosive soils, will be applied.
- Samson will install surface pipelines temporarily until the well produces adequately.

3.3 Soils and Sedimentation

- Samson will implement best management practices as described in its Storm Water Pollution Prevention Plan (SWPPP) and will consult with the AO to determine procedures and construction techniques to prevent bank erosion from construction and use, erosion, and sedimentation.
- Samson will utilize best management practices and materials, such as riprap, to minimize erosion from low water crossings and other drainages.

3.4 Water Resources

- Samson will line all reserve pits and pad them as necessary to prevent tearing or puncturing of the liner and fluid migration to the subsurface.
- The appropriate mitigation will be addressed for the drainages in the Project Area.

3.5 Visual Resources

- The entire Project Area will be managed consistent with the Class II visual resource management goals.Samson, in consultation with BLM, will develop mitigation measures to reduce visual intrusion of project infrastructure including the well and road on the landscape.
- Samson will perform final reclamation recontouring and revegetation of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography.

3.6 Vegetation

- Samson will control weeds on disturbed areas within the exterior limits of the access roads, well pads, and pipeline routes in accordance with approval from the AO.
- Surveys for federally threatened and endangered and BLM Sensitive plant species will be conducted prior to surface disturbing activities.

3.7 Paleontology

- A paleontological field survey will be conducted by a BLM-permitted paleontologist and a report submitted to BLM for review prior to surface-disturbing activities.

3.8 Other

- All garbage and non-flammable waste materials will be contained within a self-contained, portable dumpster or trash cage. As needed, the waste will be transported to an approved disposal facility.

4.0 RELATIONSHIP TO EXISTING PLANS AND DOCUMENTS

4.1 Green River Resource Management Plan

The approved Decision Record (1997) for the Green River Resource Management Plan (GRRMP) is the document that directs management of federal lands within the BLM RSFO. The objective for management of oil and gas resources, as stated in the GRRMP, is to provide for leasing, exploration, and development of oil and gas while protecting other resource values. In addition, the GRRMP states that public lands within the Monument Valley SMA, which encompasses the Project Area, are open to mineral leasing and development in order to promote mineral recovery on behalf of the United States, along with appropriate mitigation of disturbance on a case-by-case basis. The development of natural gas within the Desolation Road Unit Project Area is in conformance with the GRRMP. The environmental analysis that will be prepared for the proposed Desolation Road Unit Project Area will incorporate decisions, terms, and conditions of use as described in the GRRMP.

We will incorporate the extensive analysis of the Desolation Flats EIS into the Desolation Road EA. The EIS should give significant information and analysis regarding wildlife and other resources in the area

5.0 NATIONAL ENVIRONMENTAL POLICY ACT

The proposed project will be analyzed in accordance with the requirements of the National Environmental Policy Act (NEPA). To comply with NEPA and applicable Council on Environmental Quality (CEQ) regulations that implement NEPA, the BLM is required to prepare an environmental analysis. The environmental document, which is an environmental assessment (EA) for this project, will serve the following purposes:

- Provide the public and governmental agencies with information about the potential environmental consequences of the project and alternatives;
- Identify all practicable means to avoid or minimize environmental harm from the project and alternatives; and
- Provide the responsible official with information upon which to make an informed decision regarding the project. One element of the NEPA process is "scoping." Scoping activities are initiated early in the process to:
    - Identify reasonable alternatives to be evaluated in the environmental analysis; and
    - Identify issues of environmental concern related to the Proposed Project.

To determine the depth of analysis for issues addressed in the EA, this Scoping Notice has been prepared to enable governmental agencies, the general public, and other interested parties to participate in and contribute to the analysis process. Public input is important in establishing the scope of analysis for any NEPA document, and the BLM encourages public participation.

6.0 PRELIMINARY RESOURCE MANAGEMENT ISSUES, CONCERNS, AND OPPORTUNITIES

The following issues and concerns have been identified by an interdisciplinary team of resource specialists. The issues identified below are not meant to be all-inclusive, but rather a starting point for public input.

- Potential increased traffic and associated impacts on existing county, state, and BLM roads.
- Potential socio-economic impacts to local communities.
- Potential impacts to surface and groundwater resources, including floodplains and increased surface disturbance and associated sedimentation and salinity to the Green River.
- Potential impacts from emissions resulting from additional drilling and production activities.
- Potential impacts related to reclamation of disturbed areas and control of invasive plants.
- Potential conflicts with livestock management operations in the Project Area.
- Potential impacts to cultural, historical, and paleontological resources within the Project Area.
- Potential impacts to wildlife habitats and populations within the Project Area, including big game and raptors.
- Potential impacts to threatened, endangered, or candidate plant and animal species, including potential Colorado River depletions and effects on downstream listed fish species.
- Potential conflicts between mineral development activities and recreational opportunities.
- Potential cumulative effects of drilling and development activities when combined with other ongoing and proposed developments on lands adjacent to the Desolation Road Unit Project Area.

7.0 INTERDISCIPLINARY TEAM

Based upon current understanding of issues, concerns, and opportunities, an interdisciplinary team (IDT) made up of resource specialists within the BLM Rock Springs Field Office has been identified. The following disciplines are represented on the IDT.

Interdisciplinary Team Leader/Environmental Scientist (Surface Protection)

Range Management Specialist
Archaeologist
Archaeologist
Geologist
Realty Specialist
Recreation Planner
Hydrologist
Petroleum Engineer
Wildlife Biologist
Wildlife Biologist
Public Affairs Specialist
Planning

7.2 Initial Mailing List

The initial mailing distribution for theis Scoping Noitice includes the following agencies, organizations, and media, inaddition to leaseholders and individuals.

Local Government

City of Rock Springs
Sweetwater County
Sweetwater County Conservation District
Sweetwater County Extension
Sweetwater County Weed and Pest

Libraries, Educational Institutions
Sweetwater County Library System
University of Wyoming Library
University of Wyoming Natural Diversity Database
Western Wyoming Community College
Wyoming Association of Professional Archaeologists
Wyoming Association of Professional Historians

Environmental or Conservation Groups
American Lands Alliance
Animal Protection Institute of America
Biodiversity Conservation Alliance
Defenders of Wildlife
Earthjustice Legal Defense Fund
Environmental Defense Fund
Land and Water Fund for the Rockies
Mormon Trails Association
National Pony Express Association
National Wildlife Federation
People for the USA
People for Wyoming
Predator Project
Public Lands Foundation
Rocky Mountain Elk Foundation
Sierra Club
Southwest Wyoming Mule Deer Foundation
The Alliance for Historic Wyoming
The Nature Conservancy
The Wilderness Society
Theodore Roosevelt Conservation Partnership
Trout Unlimited
Western Watersheds Project, Wyoming Office
Western Wyoming Mule Deer Foundation
Wyoming Advocates for Animals
Wyoming Outdoor Council
Wyoming Wilderness Association
Wyoming Wildlife Federation
Federal Agencies
Federal Energy Regulatory Commission
U.S. Army Corps of Engineers

U.S. Department of Energy
U.S. EPA, Region 8
U.S. Natural Resources Conservation Service
U.S. NRCS, Western Wyoming Resource Conservation & Development
USDI Bureau of Reclamation
USDI Minerals Management Service
USDI National Park Service, Long Distance Trail Office
USDI Office of Environmental Policy and Compliance
USDI Office of Surface Mining

Federal Elected Officials
U.S. Representative Cynthia Lummis
U.S. Senator John Barrasso
U.S. Senator Mike Enzi

Media
Casper Star-Tribune
Green River Star
Rock Springs Daily Rocket-Miner

Miscellaneous Groups
Advisory Council on Historic Preservation
Bjork, Lindley, Little, P.C.
Independent Petroleum Association of Mountain States
Natural Resources Defense Council
Oregon-California Trail Association
Petroleum Association of Wyoming
Public Lands Advocacy
Rock Springs Grazing Association
Southwest Wyoming Industrial Association
Wyoming Association of Municipalities
Wyoming Business Alliance
Wyoming Farm Bureau Federation
Wyoming Mining Association
Wyoming Public Lands Council
Wyoming Sportsman's Association
Wyoming State Grazing Board
Wyoming Wool Growers Association

State Agencies/Boards
Department of Agriculture
Department of Environmental Quality
Department of Game and Fish
Department of Revenue
Department of Transportation
Geological Survey
Oil and Gas Conservation Commission
Planning Office
State Engineer's Office
State Historic Preservation Office
State Lands and Investments
Wyoming Business Council
Wyoming State Library

State Elected Officials
Governor Dave Freudenthal
Representative Allen Jaggi
Representative Bernadine Craft
Representative Bill Thompson
Representative Joe Barbuto
Representative Kathy Davison
Representative Stan Blake
Senator John Hastert
Senator Marty Martin
Senator Stan Cooper

Tribal Nations
Eastern Shoshone
Northern Arapaho
Northern Ute
Shoshone-Bannock

Appendix B

Public Comments and Response to Comments

Although not specifically required by the Council on Environmental Quality Regulations, the Department of the Interior Regulations or BLM policies when an environmental assessment is prepared, this section has been provided for the convenience of the public and the BLM decisionmakers.

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Table B-1. List of Commentors and Comment Letter Numbers

Commenter Name/Agency	Comment Letter Number
Wyoming Outdoor Council (Pendery, Bruce)	NGO-01
Biodiversity Conservation Alliance (Molvar, Erik)	NGO-02
Dominick, Bettye and Marshall	P-01
Hafnor, John	P-02
Frincke, Dale	P-03
Hansen, Ronald	P-04
Marquart, Ron	P-05
Budenske, Mary Ann	P-06
Katherman, Maria	P-07
Smith, Bill	P-08
Stoltenberg, John P. and Martha J.	P-09
Beach, Charleen	P-10
Zajac, Kenneth E.	P-11
Harper, Ron	P-12
Thoney, Larry J.	P-13
Ysebaert, John	P-14
LaPoint, Peggy	P-15
Downer, Craig	P-16
Kubichek, Robert	P-17
Pierce, Susan and Roger	P-18
Neal, Charles R.	p-19
Geerts, Bart	P-20
Evans, Dinda	P-21
Shively, Kim	P-22
Mayer, James	P-23
Patterson, Cynthia	P-24
Garvey, Lydia	P-25
Driese, Ken	P-26
Dale, Daniel	P-27
Showalter, Dave	P-28
Lillegraven, Jason A. and Linda E.	P-29

P – Public citizen; NGO – Non-governmental organization

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
1.	Dominick, Bettye and Marshall; Biodiversity Conservation Alliance/Molvar, Erik; Frincke, Dale; Hansen, Ronald; Budenske, Mary Ann; Harper, Ron; Ysebaert, John; LaPoint, Peggy; Pierce, Susan and Roger; Neal, Chuck; Evans, Dinda; Shively, Kim; Mayer, James: Patterson, Cynthia; Garvey, Lydia; Driese, Ken; Dale, Daniel; Showalter, Dave; Lillegraven, Jason A. and Linda E.	P-01.1; NGO-02.2, NGO-02.6; P-03.2; P-04-2; P-06-1; P-12.4; P-14.2; P-15-5; P-18.2; P-19.1; P-21.2; P-22-2; P-23.3; P-24.2; P-25.1; P-26.4; P-27.1; P-28.3; P-29.5	Recommends that BLM require a full Environmental Impact Statement (EIS) due to the wilderness qualities, wildlife, wild horse, potential designation as Area of Critical Environmental Concern, and open space values of the Adobe Town area and MVMA.	An Environmental Assessment (EA) has been prepared for the proposed project. BLM will issue a Decision Record based on the impact analysis. If BLM determines that a Finding of No Significant Impact (FONSI) cannot be issued, a full EIS will be conducted.
2.	Dominick, Bettye and Marshall; Katherman, Maria; Beach, Charleen	P-01.2; P-07.6; P-10.3	Recommends that BLM require a full EIS due to the cumulative effects of energy developments on resources in the vicinity of the Adobe Town area.	The EA will contain a section that will evaluate the cumulative effects of human activity in the vicinity of the Proposed Project Area.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
3.	Dominick, Bettye and Marshall; Biodiversity Conservation Alliance/Molvar, Erik; Ysebaert, John; Pierce, Susan and Roger; Evans, Dinda; Shively, Kim: Mayer, James; Patterson, Cynthia; Driese, Ken; Dale, Daniel	P-01.3; NGO-02-14; P-14.5; P-18.5; P-21.5; P-22.5; P-23.2; P-24.5; P-26.7; P-27.2	Recommends limiting drilling to a single exploratory well.	A single exploratory well (DRU #34-21) will be drilled on federal surface with federal mineral rights. Except for access across federal lands, if necessary, the BLM has no jurisdiction over the drilling of the second well, which will be drilled on private land with private minerals. The drilling of the second well is under the jurisdiction of the Wyoming Oil and Gas Conservation Commission (WOGCC). To the extent the BLM has control over the access route to the second well, BLM policy allows owners of non-federal lands surrounded by public lands to enjoy reasonable access to non-federal lands. BLM Manual 2801.08.F. In conformance with the requirements of the Desolation Road Unit Agreement, the project proponent has proposed two single exploratory wells due to the geological and subsurface technological challenges associated with drilling exploratory wells in the Fort Union formation. Information gained from drilling the two exploratory wells will help determine whether natural gas is technically and economically recoverable within the DRU.
4.	Dominick, Bettye and Marshall: Biodiversity Conservation Alliance/Molvar, Erik; Frincke, Dale; Beach, Charleen: Ysebaert, John; Pierce, Susan and Roger; Evans, Dinda; Shively, Kim; Mayer, James; Patterson, Cynthia; Driese, Ken	P-01.4; NGO-02-14; P-03.1; P-10.2; P-14.4; P-18.4; P-21.4; P-22.4; P-23.4; P-24.4; P-26.6;	Recommends that helicopters be used to transport drilling equipment and crews to eliminate construction of new roads through potential wilderness areas.	The BLM RSFO believes that the use of helicopters would be unnecessary in the area where there is existing human intrusion and a checkerboard surface ownership pattern. There is also no indication use of helicopters would significantly reduce impacts, as access for production pipelines would still be necessary to adequately test production. Therefore, the BLM has determined that the use of heliportable drilling is not a reasonable alternative.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
5.	Dominick, Bettye and Marshall: Biodiversity Conservation Alliance/Molvar, Erik; Ysebaert, John; Pierce, Susan and Roger; Evans, Dinda; Shively, Kim; Patterson, Cynthia; Driese, Ken	P-01.5: NGO-02.14; P-14.3; P-18.3; P-21.3; P-22.3; P-24.3; P-26.5;	Recommends wooden mats be used in lieu of traditional drill pad construction methods.	Field site visits were conducted by the BLM RSFO staff, and determined that wooden mats would not be necessary or economically feasible for a single exploratory well project on federal land. Interim reclamation efforts would reduce impacts from drilling and construction activities.
6.	Dominick, Bettye and Marshall	P-01.6	Recommends baseline studies and monitoring be required for the life of the project for air quality, soils, and surface and subsurface water be conducted prior to permitting project activities.	The BLM has required that the project proponent work cooperatively with the BLM to conduct assessments for wildlife and other special status plant and animal species, as well as evaluating the need for implementing avoidance of sensitive areas (e.g., dunes and large drainages). These surveys were conducted in 2009 prior to permitting any project activities. The BLM may require more extensive baseline studies pending the outcome of the project proponent's two exploratory wells.
7.	Dominick, Bettye and Marshall; Biodiversity Conservation Alliance	P-01.7; NGO-02.36	Recommends baseline studies and monitoring be required for the life of the project for archaeological and paleontological resources be required prior to permitting project activities.	Archaeological and paleontological baseline surveys were conducted in 2008 and 2009 by a licensed and BLM-permitted archaeologist and a licensed and BLM-approved paleontologist to locate and avoid important archaeological and paleontological resources. Prior to approval of the Application for Permit to Drill (APD) and prior to commencing any project activities, BLM will determine the Conditions of Approval (COAs) that will be required to protect these resources in addition to any recommended mitigation measures. If cultural or paleontological resources are encountered during construction

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
				operations, all construction operations will immediately cease until appropriate review by BLM personnel and further direction from the BLM AO. Additional surveys, relocation of project activities, or mitigation may be required prior to reinitiating activities.
8.	Dominick, Bettye and Marshall	P-01.8	Recommends that baseline studies for microbial soils be required and that reclamation restore soils to their original condition.	The BLM has located the project to minimize impacts to sensitive soils within the Proposed Project Area. The Conditions of Approval for the Proposed Project would require the project proponent to conduct interim reclamation during project operations. Final reclamation of disturbed soils and associated vegetation would require restoration to pre-project condition. Baseline surveys of microbial surveys are not necessary, although soil samples may be taken prior to construction activities to assist with successful reclamation.
9.	Dominick, Bettye and Marshall	P-01.9	Recommends that a high enough bond be set to ensure restoration and reclamation.	Prior to permitting any project activities, a Plan of Development (POD), including a Reclamation Plan, will be required to be submitted by the operator to the BLM RSFO. Reclamation cost calculations will also be submitted will be evaluated for adequacy by the BLM State Engineer and the RSFO Civil Engineer to determine bonding requirements for the project. The BLM regulations specify national bonding policies and dictate when bonds should be increased. 43 CFR 3104. The BLM has determined, in conformance with 43 CFR 3104.5 that an increased bond amount is not required for the Proposed Action.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
10.	Wyoming Outdoor Council/Pendery, Bruce; Biodiversity Conservation Alliance/Molvar, Erik; Lillegraven, Jason A. and Linda E.	NGO-01.1; NGO-02; P-29.2	States that BLM should recognize and protect the MVMA, and the SMA, according to the Green River Resource Management Plan (RMP), should be designated as an Area of Critical Environmental Concern (ACEC).	BLM recognizes the importance of the MVMA and the EA will evaluate the impacts of the proposed project on the resource values for which the SMA was established. Project approval will be contingent on protecting these resource values. The BLM RSFO does not intend to designate the MVMA as ACEC at this time. The Proposed Action, with the mitigation prescribed herein, conforms to the guidance and objectives for the MVMA in the Green River RMP. See Response to Comment Nos. 4 and 10.
11.	Wyoming Outdoor Council/Pendery, Bruce/Biodiversity Conservation Alliance/Molvar, Erik	NGO-01.2: NGO-02.12	Recommends recognition and protection of the cultural and paleontological values of the MVMA according to the management recommendations of the Green River RMP. BLM must ensure all requirements are met prior to approving the project.	See Response to Comment Nos. 4 and 10.
12.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.3	States that project activities should meet all relevant policies to protect the Adobe Town Wilderness Study Area (WSAs), and that all wilderness qualities should be recognized and retained.	No oil and gas activities are proposed within the Adobe Town WSA. The BLM recognizes the importance of the area wilderness, and has developed and analyzed alternatives in the EA to determine the necessary mitigation measures to protect the wilderness values of Adobe Town WSA. See Response to Comment No. 4.
13.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.4	Recommends that the cumulative effects of project activities on wilderness values be considered.	See Response to Comment No. 2.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
14.	Wyoming Outdoor Council/Pendery, Bruce; Biodiversity Conservation Alliance/Molvar, Erik; Katherman, Maria; Harper, Ron;	NG0-01.5; NGO-02.11; P-07-3; P-12.3	States that while oil and gas development is not precluded from the area, the State of Wyoming has designated the area as "Very Rare and Uncommon" due to the area's historical, geological, wildlife, and scenic values. The proposed project would represent an intrusion on these values, and Wyoming's prioritization should be recognized by BLM.	The BLM RSFO acknowledges the State's designation of the Project Area and agrees that oil and gas development is not precluded by the WEQC's designation. The Environmental Assessment (EA) being prepared will be conducted to analyze the impacts from the proposed project activities on the area resource values that the State has recognized. These values are similar to the values for which the MVMA was designated by BLM in the Green River RMP. The State's designation, however, specifically indicates that it does not impact or prohibit oil and gas development. (WEQC Order, ¶ 34, 35, 36). Further, the Designation does not prevent construction of roads or other changes in current allowable uses. The Designation only impacts non-coal mining operations. (Order, ¶ 45). See also Response to Comment No. 4 and 10.
15.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.6	States that the BLM Rock Springs Field Office should recognize the BLM Rawlins RMP designation of the Project Area within the Western Extensive Recreation Management Area and as part of the Adobe Town Dispersed Recreation Use Area.	The BLM RSFO has included discussion and analysis of the recreational designations in the EA in sections 3.7 and ~~.~~4.7.
16.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.7	States that BLM has significant "retained rights" regarding oil and gas leasing in the area, including: 1) the authority to impose "reasonable measures," including but not limited to timing restrictions on the lease, particularly as it pertains to "special values;" 2) the National Environmental Policy Act (NEPA) and BLM's multiple use	The BLM is aware of its regulatory authority with respect to oil and gas and rights-of-way activities. The BLM RSFO is undertaking the NEPA process to determine if the proposed project would result in significant impacts to the human and natural environment. To this end, the BLM RSFO staff and Samson, the project proponent, conducted one site visit in 2008 and two site visits in 2009 to evaluate the Proposed Project Area. Mitigation measures and design features that were proposed in the field, which would protect and conserve area resource values. These measures will also be evaluated

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
			mandate under the Federal Land Policy and Management Act (FLPMA), which stipulate that the BLM has "retained rights" for reducing impairment of the productivity of the land and quality the quality of the environment, and taking the necessary action to prevent both unnecessary and undue degradation of the public lands; 3) the authority under 43 CFR 3101.1-2 to establish mitigation and protection measures that exceed the definition of "reasonable measures; and 4) The right to determine site-specific mitigation measures (time, manner, place, and pace), as deemed necessary to protect resource values. These measures may include paced or phased development, clustered development or directional drilling, lease suspension, requiring conditions of development, and enforcement of lease stipulations.	in the EA. Additional information was obtained from the cultural, paleontological, wildlife, and plant field surveys that BLM required. As a result, access roads and the proposed well site on federal land were rerouted and relocated to mitigate possible impacts that may result in undue degradation to Project Area resource values, including visual resources. Timing restrictions for sage-grouse, migratory birds, raptors, and pronghorn crucial winter range will be implemented. These measures will further restrict project construction and exploratory activities to the period from August 1-November 14. The BLM has also developed Conditions of Approval (COAs, see Appendix C of the EA) in addition to the applicant-committed environmental protection measures to protect surface and subsurface water sources, wildlife, soils, and cultural and paleontological resource values for which the MVMA was established. See also Response to Comment No. 4 and 10.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
17.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.8	States that environmental protection of sensitive areas can be accomplished using phased and/or paced development.	The Proposed Project is an exploratory drilling program consisting of a single well on federal land, and potentially an additional well on private north of the federal land. The detailed consideration of phased or paced development is not required at this time as the project is still in the earliest stages of initial exploration. Timing stipulations imposed by BLM due to wildlife concerns will limit the construction and drilling to the period from August 1-November 14. The project proponent will drill the federal first to evaluate whether it is economically feasible to drill the second well on private land. Consequently, drilling and any subsequent development of the two wells will be phased in over a one to two year period.
18.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.9	States that environmental protection of sensitive areas can be accomplished using directional drilling, and that BLM require the project proponent to directionally drill from the adjacent private land surface.	See Response to Comment No. 3. Because the Proposed Action consists of wildcat exploration, there is no indication the wells can be economically or technologically drilled from a location on private surface. Even if technologically or economically feasible, the planned drilling location on private surface can only be accessed via federal lands, see Figure 2-1, thus the impacts from access would be virtually identical. Further, requiring directional drilling is not a reasonable alternative for this project because the purpose of the project is to gather and determine the economic feasibility of more extensive development. At this preliminary stage it would be very difficult to evaluate the feasibility of directional drilling as little data or information regarding the geology or feasibility of production is available. Require directional or horizontal drilling techniques would complicate the Proposed Action because the purpose of the exploratory project is to

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
				collect reliable information on reservoir heterogeneity, reservoir characteristics, gas chemistry and content, recovery efficiency, reservoir permeability, plus drilling, completion, and processing costs. This data must be collected before an assessment of the feasibility of directional drilling methods can be properly evaluated. Neither directional drilling nor horizontal methods have been successfully used in the immediate vicinity of the Proposed Action. Due to these factors, requiring directional drilling from private lands is not feasible, a reasonable alternative, or consistent with the purpose of the Proposed Action.
19.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.10	States that environmental protection of the environmentally sensitive MVMA could be accomplished by BLM using its authority to suspend the lease.	The BLM does not believe a lease suspension is warranted or required, and that pending the results of the impact analysis in the Environmental Assessment will determine any additional mitigation measures or Conditions of Approval to protect the resource values of the MVMA. Oil and gas development is authorized within the MVMA under the terms of the Green River RMP. Additionally, the BLM must honor, consistent with its other multiple-use obligations under FLPMA, Samson's rights under its existing Federal oil and gas lease. The BLM has determined that oil and gas development as proposed by Samson is consistent with its multiple use obligations and the requirements of the Green River RMP. See also Response to Comment Nos. 4, 10, and 16.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
20.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.11	States that environmental protection could be accomplished if BLM required conditions of development, including limitations on well pad size, requiring closed-loop drilling fluids system, remote well monitoring, crew carpooling and other traffic reduction techniques, and the requirement to bury utility lines.	BLM and the project proponent have met throughout 2008 and 2009 in Rock Springs and at the field site to discuss the location of project components and the necessary mitigation measures that will be required. The project proponent's commitment to environmental protection measures and other additional mitigation measures the BLM may deem necessary will be evaluated in the EA. Requirements for the implementation of these protection measures will be issued as part of the BLM Conditions of Approval (COA).
21.	Wyoming Outdoor Council/Pendery, Bruce	NGO-01.12	States that the BLM should enforce and retain established lease stipulations (e.g., timing stipulations) to protect crucial ranges for wildlife, and not grant waivers.	See Response to Comment No. 17. BLM will also consider any waiver request individually and not issue a decision until evaluating the various environmental factors that would be affected by approving the waiver. At this time, no exceptions, waivers, or modifications to lease stipulations have been received with respect to the Proposed Action.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
22.	Wyoming Outdoor Council/Pendery, Bruce: Biodiversity Conservation Alliance/Molvar, Erik	NGO-01.13: NGO-02.28	States that the maps of the proposed wells that BLM has provided makes it clear the 3 1-28 well is only located less than a mile from the 34-21 well that is proposed on private lands. Further states that given this close proximity the BLM must fully consider requiring that the 3 1-28 well be drilled directionally from the 34-21 well pad. This distance is well within the "reach" of current directional drilling technology and the BLM has sufficient '"retained rights" to make requirements such as this. States that completely eliminating the well pad from being drilled in the MVMA would meet the BLM's management objectives for this area much more fully than allowing a well pad to be constructed in the middle of it, yet the natural gas could still be explored. Also states that this is a fully reasonable alternative approach that must be fully considered by the BLM.	At pre-project planning meetings held between BLM and Samson in late 2008 and early 2009, the use of a single directional well drilled from the adjacent private land was discussed. However, the depth of drilling planned (11,000 feet) in the Fort Union Formation would make directional drilling technically, geologically, and economically challenging. Please refer to Response to Comment No. 3 and 18 for a more detailed explanation.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
23.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.1	States that the proposed project was not clearly defined in the Notice of Staking (NOS) and that the maps showing the proposed project did not give the exact location of proposed project components. Should the project proponent request a waiver, BLM will consider the feasibility and effect of the waiver before issuing a decision to approve the waiver.	The BLM updated the proposed project by providing an additional 15-day scoping period in June 2009. Proposed project components were updated on the BLM RSFO Web site. At this time, no exceptions, waivers, or modifications to lease stipulations have been received with respect to the Proposed Action.
24.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.3	Recommends that the proposed action consider all "connected actions" in a single NEPA analysis, including the formation of the Desolation Road Unit. And not conducting such a NEPA analysis would be clearly illegal.	The BLM previously approved the creation of the desolation Road Unit. The National Environmental Policy Act of 1969 (NEPA) and its implementing regulations require that agencies evaluate the impacts of “major federal action significantly affecting the quality of the human environment” in either an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). 42 U.S.C. § 4332(2)(C); 40 CFR 1501.3, 1501.4. The Council on Environmental Quality (CEQ) regulations, however, permits agencies “categorical exclusions” or classes of actions that “normally do not require” an EIS or EA. 40 CFR 1507.3(b)(2)(ii). In accordance with this provision, the Department of the Interior Department Manual includes the approval of unitization agreements in its list of categorical exclusions available to the BLM. 516 DM 11.9.B(3). 72 Fed. Reg. 45504, 45539 (Aug. 14, 2007). The approval of unitization agreements is categorically excluded review under NEPA because, as described above, a Unit Agreement is a legal instrument allowing for development without respect to lease boundaries, but does not directly authorize oil and gas development or otherwise cause

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
				a change in the human environment. Please also note that the BLM approval of the Unit is discussed in Section 1.2.1 of this EA.
25.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.4	States that due to limited annual rainfall and length of time required to recover, reclamation and restoration of native vegetation is often unsuccessful, may take decades, or even centuries, to recover, and disturbance my lead to invasion of non-native noxious weeds, Considers such impacts to be a significant environmental impact.	The BLM and the project proponent conducted three field site visits to evaluate potential well sites and road locations. The Proposed Action analyzed in the EA contains well site locations and a road alignment that would, to the extent possible, avoid heavily vegetated areas, including sagebrush stands. Interim reclamation will be required and monitored by the BLM AO. If initial interim reclamation efforts, or complete reclamation efforts after the federal well is plugged and abandoned, or not successful, the BLM may impose additional reclamation requirements and activities to ensure success.
26.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.5	States that an EIS is required in the case of significant Environmental Impact	See Response to Comment No. 1.
27.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.6; P-12.1-1	States that the proposed for drilling is within an area found by BLM to have wilderness qualities rendering significant impact certain.	See Response to Comment no. 4. Oil and gas development is consistent with the BLM guidelines and objectives for the MVMA in the Green River RMP. See also Response to Comment No. 4, 10, 16, and 19.
28.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.7	States that the BLM has a Congressional mandate and an obligation under FLPMA to maintain a current inventory of lands with wilderness quality characteristics, including roadless areas.	See Response to Comment No. 4, 10, 16, 19, and 27.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
29.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.8	States that roadless areas and other potential wilderness areas are known to be a significant resource and to possess significant recreation, wilderness, and scenic values.	Comment noted. The impacts of the Proposed Action, including impacts to recreation, wilderness characteristics, and scenic values were analyzed in Sections 3.1, 3.2, 3.7, 3.12, 4.1, 4.2, 4.7, and 4.12 of this EA. See Response to Comment No. 4, 10, 16, 19, and 27.
30.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.9	States that Instruction Memorandum (IM) 2003-274 does not absolve the BLM of its NEPA responsibility to carefully consider and objectively evaluate impacts to wilderness qualities brought to light in the context of citizens' wilderness proposals.	See Response to Comment Nos. 4, 10, 12, 16, 19, 27, and 29.
31.	Biodiversity Conservation Alliance/Molvar, Erik	NG0-02.10	States that because the drilling and construction activities entailed in the approval of the four NOSs proposed by Samson Resources entails long term (essentially permanent) facilities and surface disturbance, they cannot meet BLM's standard for nonimpairment of wilderness character, and therefore constitute impairment of wilderness qualities which is a significant impact to the human environment under NEPA. As a result of these impacts to wilderness character, the BLM may not issue a Finding of No Significant Impact (FONSI) for the project(s) as proposed and must therefore complete an Environmental Impact Statement prior to issuing a decision.	See Response to Comment Nos. 1, 4, 12, 16, and 29. Although four Notice of Staking (NOS) were originally filed with the BLM, only two wells have actually been proposed by Samson as part of the Proposed Action. The other two locations were removed from further consideration after review of the locations with BLM personnel. Only two wells have been proposed at this time.

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32.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.13	States that according to the Green River RMP, the entire MVMA will be managed consistent with the Class II visual resource management classification. Casual observers atop the Haystacks or along the old Manuel Gap Road would be in full view of the proposed roads and well site facilities, which would be difficult to hide from view.	Visual impacts from wells during drilling would be short term; that is, visible during the 35-65 day period when rig construction and drilling would occur. Well sites were placed and the new access road aligned to use the area's topography to create natural barriers to minimize the ability of the casual observer to see them. This is consistent with VRM Class II guidelines. The potential impacts to visual resources were analyzed in Sections 3.2 and 4.2 of this EA.
33.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.15	Recommends that helicopter access or existing two-tracks be used for well site access in lieu of gravel roads.	See Response to Comment No. 4. BLM considered the use of existing two-tracks pr jeep roads to access the well sites under Alternative 2 in the EA, but determined that use of that route would be more likely to impact the wilderness qualities of the Adobe Town WSA.
34.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.16	Recommends that wellheads and all well site equipment be countersunk below grade.	Well site placement was designed to use the areas topography to provide natural barriers to the well site equipment. Production equipment, if the well site produces, will be placed at height to minimize visual impacts. Tanks and other aboveground facilities would be painted with BLM-approved colors to provide further visual obstruction. The potential impacts to visual resources were analyzed in Sections 3.2 and 4.2 of this EA.
35.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.17	Recommends abandoned well markers be applied at grade level.	Comment noted.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
36.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.18	Recommends that pipelines be placed on the surface and camouflaged, and rights-of-way should not be bladed to avoid disturbance to the area vegetation and soils.	BLM will require the project proponent to use surface pipelines that are suitably camouflaged. Surface pipelines would only be permitted for a period of up to three years to test the feasibility of production and to minimize potentially unnecessary surface disturbing operations. Blading and grading will be minimized, to the extent possible, to protect vegetation and soils.
37.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.19	States that BLM should craft the proposed action to be consistent with the December 16, 2008 Sweetwater County Commissioners' resolution that urges BLM to minimize intrusions to wildlife and landscapes on existing leases for much of Adobe Town, for those areas of state and federal ownership.	See Response to Comment No. 1 and 14. The Proposed Action is in so-called “Area A” and the County Commissioners have not formally adopted a resolution regarding these lands, although the County did hold a “workshop” regarding the area on November 18, 2009, that BLM and Samson attended.
38.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.20	States that the Green River RMP states that a paleontological survey is required in the MVMA prior to surface disturbing activities, and the survey should be conducted by a credentialed paleontologist.	A pre-project survey was conducted in August 2009 by Gus Winterfeld, Ph.D. and a report prepared prior to the preparation of the EA. Recommendations for avoiding, mitigating, and monitoring potential impacts to paleontological resources were included in a written report accepted by the BLM Rock Springs Field Office. Dr. Winterfield is a BLM-permitted paleontologist. See Response to Comment No. 7.
39.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.21	States that site surveys for archaeological resources should be conducted consistent with Section 106 of the National Historic Preservation Act	The BLM complied with its obligations under Section 106 of NHPA. Field surveys for archaeological and cultural surveys were conducted by Current Archaeological Services and submitted to BLM for concurrence. No sites or significant archaeological resources were located. The Wyoming State Historic Preservation Officer concurred with these findings.

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40.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.22	Recommends that BLM work with the operator to reduce visual impacts, and where possible, avoid construction in scenic areas.	See Response to Comment Nos. 7, 15, 34, and 36. The potential impacts to visual resources were analyzed in Sections 3.2 and 4.2 of this EA.
41.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.23	States that area proposed for drilling is substantially undeveloped, possessing wilderness qualities, and that under such circumstances, legal precedence has been established requiring an EIS.	The BLM respectfully disagrees that the area is "substantially undeveloped." A number of existing approved and unapproved two-track roads exist in the Proposed Project Area. Grazing also occurs in the area. The EA and subsequent Decision Record will discuss BLM decision regarding the significant irreversible and irretrievable commitment of resources. Under such conditions, the Decision Record would render the need to conduct an EIS. See Response to Comment No. 1. See also Response to Comment Nos. 4, 10, 12, 16, 19, 27, and 29.
42.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.24	States that substantial controversy (80,000 public comments on the Rawlins RMP) exists supporting withdrawal of Adobe Town from oil and gas development; opposition by Wyoming newspapers, the AFL-CIO, Wyoming Governor Freudenthal) surrounds drilling in Adobe Town, and the BLM should require a full-scale EIS.	See Response to Comment No. 1. The approval of the Rawlins RMP is beyond the purview of this document.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
43.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.25	State that proposed drilling activities would have substantial impacts on wildlife including pronghorn antelope crucial winter range, mountain plover nesting habitat, sage-grouse, nesting raptors, white-tailed prairie dog colonies, key sage-grouse habitats, and mule deer crucial winter range.	Wildlife field surveys were conducted from March-August 2009 to locate important federally listed, BLM sensitive, and big game wildlife habitats and species. A field survey report was submitted to BLM in September 2009, which resulted in changes to the alignment of the proposed access road. As part of the Conditions of Approval, BLM will also apply established and appropriate spatial buffers and timing stipulations to project activities for pronghorn antelope winter range (November 15-April 30), mountain plover nesting (March 1-August 30), sage-grouse leks (No Surface Occupancy [NSO] within 1/4 mile) and nesting (March 1-July 31), burrowing owl nesting (NSO 1/4 mile, April 1-September 10). No active white-tailed prairie dog colonies or mule deer crucial winter range occur within the Project Area. Project activities will avoid inactive white-tailed prairie dog colonies. The BLM determined that no significant impacts to the species identified in the comment will occur.
44.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.26	Recognizes that under the Mineral Leasing Act (MLA) the project proponents have the privilege to explore and develop on their leasehold subject to the BLM-administered Conditions of Approval, but the MLA does not confer the right to construct a road to the leasehold. Consequently, ~~and~~ the project cannot be approved by BLM using standard industry practices, without triggering a full-scale EIS.	Comment noted. See Response to Comment No. 1.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
45.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-02.27	Requests that BLM undertake an EIS, deny approval of an oil and gas unit, and approve a single exploratory well using heliportable drilling and transport, wooden mats for the well pad, and other appropriate mitigation measures.	Comment noted. See also Response to Comment Nos.1, 3, 4, 5, 18, 31, 33, and 34.
46.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.29	Drilling two exploratory wells is inconsistent with the Purpose and Need Furthermore, there would be no particular reason to permit to exploratory wells so close together, as either could in theory hold the unit by production, and the results of either would determine the prospective production for the area in question. Therefore, the drilling of two exploratory wells by the same company in such close proximity results in unnecessary impacts to lands of wilderness character and undue degradation to BLM lands and wildlife pursuant to FLPMA.	See Response to Comment Nos. 3, 10, 12, 16, 18, 22, and 31.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
47.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.30	States that the Access Road should not be permitted inside Lands of BLM's 'Area A.' Both access road alternatives outlined in the Scoping Notice for this project will cross substantial tracts of Area A as outlined in the BLM's Wilderness Inventory Evaluation. These lands have been determined by the agency to possess wilderness characteristics, and the construction of an improved gravel road for well access will have significant impacts on the wilderness qualities that BLM has identified in earlier documents. If an improved gravel access road is approved for this project (and it should not be), impacts would be reduced if the access route were restricted to the checkerboard area to the north of Area A to the greatest extent possible. This could be accomplished by beginning from BLM road 4411 from T16N R 95W Section 17 and running it westward; as a portion of the reclaimed road that once accessed the Amoco Jeep Trail Unit and the Spike No. 1 well is planned for reconstruction as a part of this project, the net mileage of such an alternate route would likely be quite similar to the existing two options, and would keep	See Response to Comment Nos. 4, 10, 12, 16, 19, 27, 29, 30, and 41.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
48.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.31	Recommends that closed-loop or "pitless" drilling should be required in lieu of utilizing reserve pits, which unnecessarily increase the initial footprint of the well pad. Also states that the elimination of reserve pits reduces the surface footprint of each well location, reduces toxic waste pits on the surface, reduces well field truck traffic, reduces water consumption, and is less costly than constructing and maintaining a reserve pit (according to Longwell and Hertzler 1997).	Drilling two exploratory wells does not necessitate the construction of a closed-loop system. The Proposed Action includes design features for reserve pits that would be lined if required by BLM. Standard drilling techniques (including isolating all water-bearing formations in the well bore with pipe and cement) will adequately protect aquifers and substantially reduce the risk of groundwater contamination in the MVMA. In addition, all groundwater resources in the area are at a depth of approximately 600-700 ft below ground surface. There are no known water wells near the Project Area. The Proposed Action states that drill cuttings would be contained in the pit and buried on location, and pits would be fenced, netted, and continuously inspected and maintained to reduce the risk to wildlife.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
49.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.32	States that flaring and leakage of natural gas (CO_2 and methane) should be forbidden during completion (and potentially drilling) operations because these gases are significant contributors to climate change in the world's ecosystems and more locally to the Wind River Range. Further states that this practice is a waste of natural gas resources and leads to unnecessary impacts to atmospheric levels of $C0_2$ without yielding any energy benefit. States that green completions and specific measures should be required to minimize the waste of natural gas as well, and would render impacts insignificant.	The BLM recognizes that rig workovers and completions result in methane and condensate losses to the atmosphere. Green completion practices are generally not feasible for exploratory wells where there is no associated sales line because such pipelines are necessary for green completion techniques. The installation of a sales pipeline prior to exploratory drilling activities would be economically imprudent and could cause unnecessary ground-disturbing activities. The Proposed Project would utilize a flare stack with a minimum height of 40 feet is expected to be used during testing and completion operations. Because no pipelines would be in place at this point in the operations, flaring is the only practical means of burning off natural gas that is produced during testing operations. The BLM and WOGCC both have policies regarding the quantity and timing gas can be flared.
50.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.33	States that the area south of the Haystacks, which includes the Proposed Project Area, is a trophy pronghorn antelope hunting destination, and includes crucial winter range that could be negatively impacted by proposed project activities.	Impacts to recreationists hunting in pronghorn antelope in Hunt Unit 57 (South Wamsutter) would be short term, occurring locally for one, but possibly two hunting seasons. Direct Impacts to crucial pronghorn winter range would be the removal of some sagebrush located at the well pad location for the federal Desolation Road Unit Well No. 31-28. Project activities related to human disturbances would be prohibited during the crucial winter season (Nov. 15 - April 30). The BLM does not anticipate significant impacts to hunting in the area.

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51.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.34	States concern that the Proposed Project's access road would cross documented mountain plover nesting habitat, which could create a "biological trap" for nesting plovers and collisions with well field vehicles could occur. Further states that impacts to nesting birds could significantly affect the local breeding plover population.	Impacts to nesting plovers would be avoided because construction and drilling activities would be prohibited during the crucial breeding and nesting period (June 1 - July 10).
52.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.35	States concern that the Proposed Project would impact a sage-grouse lek located within 2 miles of the Proposed Project Area, and also impact nesting sage-grouse within 3 miles of the Proposed Project Area.	Impacts to sage-grouse nesting plovers would avoided because construction and drilling activities would be prohibited during the crucial breeding and nesting period (February 1 - July 31). In addition, the Proposed Access Road was relocated by more than 1/4 mile from a new sage-grouse lek located in an aerial survey conducted in 2009 within the Project Area. The Wyoming Game and Fish Department (WGFD) recommends no surface disturbance and a No Surface Occupancy (NSO) for the area within 1/4 mile of sage-grouse leks.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
53.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.37	States that new legal precedent requires consideration of protecting wilderness qualities as referenced by a recent decision by the U.S. Court of Appeals finding that in the context of oil and gas decisions the BLM is still required to consider alternatives to protect other values. The court's discussion of the importance of conservation as part of BLM's "multiple use" mandate is important for all of the ongoing approvals. Further states that In the context of the leased lands at issue in this project, we (BCA) recognize that the BLM may not be able to simply protect or manage for other values by closing certain areas to leasing, but could close areas to development concluding the agency must also consider imposing restrictions on existing leases. Also reference two recent decisions from the Interior Board of Land Appeals (IBLA) interpreting that they confirm the BLM's authority to use conditions of approval to require protection of natural resources, such as wildlife, from oil and gas development, including on already leased lands.	See Response to Comment Nos. 4, 10, 14, 16, 19, 22, 27, 28, 29, 30, 41, and 47.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
54.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.38	States that the entire Adobe Town area, including the proposed project site, which is noted for having an unusually high density of archaeological sites. Further states a through field inventory by a trained archaeologist should be conducted within 2 miles of any proposed surface disturbing activity to determine the location of any sites eligible for the National Register of Historic Places as required under the National Historic Preservation Act (NHPA). Also states that BLM must consult directly with all tribes with a past history of occupying or traveling through this area, to identify Traditional Cultural Properties (TCPs) that require additional protection or mitigation measures.	See Response to Comment Nos. 38 and 39.
55.	Biodiversity Conservation Alliance/Molvar, Erik	NGO-2.38	States concern that the BLM has recently been "confused about the location of Adobe Town and seems to be misapplying the moniker 'Adobe Town to include only currently designated Wilderness Study Area to the exclusion of other Adobe Town lands, including the Adobe Town Very Rare or Uncommon Area and the Adobe Town Citizens' Proposed Wilderness.	See Response to Comment Nos. 4, 10, 12, 14, and 15.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
56.	Hafnor, John; Hansen, Ronald; Zajac, Kenneth E.	P-02.1; P-04-3; P-11.2	States opposition to pushing for wildcat wells in the heart of the Adobe Town area, and that drilling rigs and bulldozers don't belong in wilderness-quality lands.	See Response to Comment Nos. 4, 10, 12, 14, and 15.
57.	Hansen, Ronald	P-04.1	Adobe Town area, please note that my friends and I would say drilling rigs and bulldozers don't	Comment noted.
58.	Marquart, Ron; Katherman, Maria; Zajac, Kenneth E.	P-05.1; 07-1; P-11.1	States opposition to wildcat wells being permitted in wilderness-quality lands.	See Response to Comment Nos. 4, 10, 12, 14, and 15.
59.	Marquart, Ron	P-05.2	States that the Adobe Town area is a unique among Wyoming' desert wilderness with a wild and pristine landscape that needs to preserved for future generations.	Comment noted. See Response to Comment Nos. 4, 10, 12, 14, and 15.
60.	Katherman, Maria	P-07.2	The first mustang I adopted, many mustangs & years ago, was from the Red Desert Adobe Town herd so I went to see the horses there that summer. It was great to see the horses! I was lucky to get to see them running in the dry bed of the Sand River through binoculars from the rim, but truthfully the wonder of that trip was not primarily the horses, rather it was the place itself. I have gone back every year since then to camp, watch the stars, look at the fossils, and of course the horses. It is, as you know, a	Comment noted. No impacts to wild horses are anticipated as a result of the Proposed Action.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
			wonderfully unique and wild place.	
61.	Katherman, Maria	P-07.4	States that the only way to keep the values intact for the State designation of the area as Very Rare and Uncommon is to prohibit drilling in the area. Further states that it is not just the well pads, but the roads, the traffic & the no-account short term labor that have poached more game in the energy areas than ever recorded before.	Comment noted. See Response to Comment Nos. 4, 10, 12, 14, 15, and 37.
62.	Katherman, Maria	P-07.5	States that there should definitely be no production unit associated with this and no well-field roads in this pristine area. I also worry about the wild-cat driller. In the Powder River area the wild-cat drillers have been the smaller, fly-by-night companies that have caused the most problems for land owners and have been the slowest to respond to DEQ compliance requests. The idea of letting another such company onto a very special area of Wyoming is just wrong.	Comment noted. Also, see Response to Comment no. 4. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
63.	Smith, Bill	P-08.1	States that air quality (ozone), water quality, game herds, and sage-grouse have diminished human health and decimated game herds.	Comment noted.

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64.	Smith, Bill	P-08.2	The BLM is mandated to provide "multiple-use" opportunities but for the last 5 years, in this part of the state, all decisions have been more than favorably weighted for the gas extraction industry, to the detriment of all and any other uses.	Comment noted.
65.	Smith, Bill	P-08.3	States that further leasing will continue to denigrate air quality and habitat loss, while continuing the diminution of wildlife species; and therefore, demands that no further leasing be approved until the current Administration has had an opportunity to review leasing decisions made since 2000.	Comment noted. No leasing is proposed as part of the Proposed Action.
66.	Stoltenberg, John P.	P-09.1	States support for the position of the Biodiversity Conservation Alliance.	Comment noted.
67.	Beach, Charleen	P1-10.1	States that BLM must stop granting drilling permits in areas with wilderness qualities because the proposed Samson wells south of the Haystacks would be in an area the BLM has admitted is wilderness.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
68.	Harper, Ron	P-12.2	I strongly disapprove of allowing Samson Resources to drill two new wells in the heart of northern Adobe Town (the Desolation Road project). Indeed this special area should be a National Conservation Area.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
69.	Thoney, Larry J.	P-13.1	States that he is supportive of multiple uses but strongly disagrees with the "dominant use approach" to leasing and drilling.	Comment noted.
70.	Thoney, Larry J.	P-13.2	States concern about the irretrievable loss of the unique characteristics inherent to these "special places" in Wyoming as the result of drilling and resultant infrastructure.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
71.	Thoney, Larry J.	P-13.3	States that energy development, regardless of mitigating measures, is simply not compatible with some of Wyoming's special places.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
72.	Thoney, Larry J.	P-13.4	I respectfully totally disagree with your seemingly frantic rush to lease and drill in all of Wyoming's "special places." What can possibly be wrong with delaying action in these places and letting the future dictate the greatest need, the areas surface uniqueness or whatever is buried underneath?	The lease where the proposed project would occur within the Desolation Road Unit has existed for nine years. Under the Mineral Leasing Act, the leaseholder has ten years to take action on the lease, and during that time, have the legal right to explore and develop their lease. Exploration and development are, however, subject to environmental analysis under the National Environmental Policy Act (NEPA) and the terms and conditions of the lease, and Conditions of Approval. The Environmental Assessment (EA) will assist the BLM in making a decision whether the project can proceed, as proposed, without significant impact to the environment. If the BLM determines in the Decision Record, significant impacts would occur, a more comprehensive environmental analysis, or Environmental Impact Statement (EIS), would be prepared to further evaluate the project and any significant impacts identified in the EA.

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73.	Thoney, Larry J.	P-13.5	States that energy companies have plenty of areas already under lease and future alternative energy sources may negate the need or desire to destroy these special places.	Comment noted. See Response to Comment No. 72.
74.	Thoney, Larry J.	P-13.6	I hope you (BLM) have the administrative courage to resist the obvious political pressure to maximize lease sales and do what's right by the land and save those "special places" yet remaining in our Great State.	Comment noted.
75.	Ysebaert, John; LaPoint, Peggy; Pierce, Susan and Roger; Evans, Dinda; Shively, Kim; Mayer, James; Patterson, Cynthia; Driese, Ken; Lillegraven, Jason A. and Linda E.	P-14.1; P-15-5; P-18.1; P-21.1: P-22.1; P-23.1; P-24.1; P-26.3; P-29.1	States that they would like the BLM to deny permits to drill inside lands with wilderness qualities.	See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
76.	LaPoint, Peggy	P-15.1	States that the proposed project is in complete opposition to the wilderness characteristics that the BLM identified for the area.	See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
77.	LaPoint, Peggy	P-15.2	States that it would be impossible to avoid destruction of wilderness character with one directional well, let alone two.	See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 46, 37 and 47.

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78.	LaPoint, Peggy	P-15.3	States that unless the wells are heliported, the necessary roads will permanently exclude the area from wilderness consideration.	See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 46, 37 and 47.
79.	LaPoint, Peggy	P-15.4	As a native Wyoming, I have seen your agency allow far too much destruction of the landscape, and I demand that this stupid rush to drill be stopped.	Comment noted.
80.	Downer, Craig	P-16.1	States opposition to proposed drilling in Adobe Town, and that the project would create destruction ecological disruption.	Comment noted.
81.	Kubichek, Robert F.	P-17.1	States that with the many thousands of wells approved for drilling in Wyoming, the idea that a few more wells in Adobe Town can be a significant contributor to the Nation's energy problem is not credible. Also, states the project appears only to be a way to "get a foot in the door," and is not justifiable, and that the only significant effect will be to impact a very delicate and pristine area. Further states that he has never hunted there, has hiked and camped there multiple time and believes that the area's quiet isolation and beauty should be preserved for later generations, not sacrificed for some near-term energy company profits.	Comment noted. See Response to Comment Nos. 1 and 2.

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82.	Geerts, Bart	P-20.1	States concern over BLM consideration for allowing drilling in one of Wyoming's most beautiful and pristine desert areas (Adobe Town). Also states that the area may become a National Park.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
83.	Mayer, James	P-23.5	The desert wilderness areas of Wyoming are rapidly disappearing. Please don't allow this area to be industrialized as has happened to so much of Wyoming's landscape.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
84.	Garvey, Lydia	P-25.2	States that bulldozers and drilling rigs should not be allowed in Adobe Town.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
85.	Garvey, Lydia	P-25.3	States that it is highly inappropriate to destroy wilderness-quality lands, and that BLM should protect wildlife, water, and public lands.	Comment noted. See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.
86.	Driese, Ken	P-26.1	Requests that BLM not to allow any oil and gas drilling or road building in the greater Adobe Town area including the checkerboard area in and south of the Haystacks and areas close to the Manuel Gap jeep trail.	Comment noted.

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87.	Driese, Ken	P-26.1	States that the entire Adobe Town area is rare and special in many ways - visually, archaeologically, ecologically and spiritually. Also states that drilling anywhere in this great area will detract from the entire area, even away from the actual drill sites, and that visitors can enjoy views from the Adobe Town rim and other rims in the area that are not broken by significant human activity. Further states that Adobe Town is a rare gif t that should not be squandered for a short term profit.	Comment noted. See Response to Comment Nos. 4 and 41.
88.	Driese, Ken	P-26.8	States that as a long-time Wyoming resident and visitor to these lands, the area is personally important, and is a favorite places that the commenter wants left alone.	Comment noted.
89.	Driese, Ken	P-26.9	States that Adobe Town is one of Wyoming's secret jewels and that it one of the extraordinary things about Adobe Town is that, unlike much of Wyoming in today's climate of rampant oil and gas industrialization, one can still stand on the Rim and look out at a landscape unmarred by drilling rigs and undamaged by the associated infrastructure.	Comment noted.
90.	Driese, Ken	P-26.10	States the BLM considers the area where drilling is proposed to have wilderness qualities.	See Response to Comment Nos. 4, 10, 14, 15, 16, 19, 22, 27, 28, 29, 30, 41, 37 and 47.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
91.	Driese, Ken; Lillegraven, Jason A. and Linda E.	P-26.11; P-29.6	States that the desire for BLM to recognize that the entire greater Adobe Town area be preserved as an island of untouched land for Wyomingites and U.S citizens to enjoy in perpetuity.	Comment noted. See Response to Comment Nos. 4 and 41.
92.	Dale, Daniel	P-27.2	States that his family has loved the open spaces of Adobe Town, which are characteristic of the better parts of Wyoming, and desires to have the BLM proceed slowly and carefully on the proposed development.	See Response to Comment No. 1.
93.	Showalter, Dave	P-28.1	States opposition to Proposed Project because it will threaten geologic features, world-class pronghorn and wild horse habitat; and some of the wildest land in the region	Comment noted.
94.	Showalter, Dave	P-28.2	States that the importance of weighing the special qualities of wild lands against single-land use management for short term gain.	Comment noted.
95.	Lillegraven, Jason A. and Linda E	P-29.3	States that in the absence of a full environmental review, it does not make sense to scar such an environmentally sensitive area for short term gain.	See Response to Comment No. 1.

Comment Number	Name/Organization/ Agency	Letter Comment Number	Comment	Response
96.	Lillegraven, Jason A. and Linda E	P-29.4	State the area deserves recognition and protection on the basis of its scenic qualities, irreplaceable geological/paleontological record, critical wildlife habitat, hunting, and the entire area has been designated as "Very Rare and Uncommon" by the State of Wyoming.	Comment noted. See Response to Comment No. 14.

Appendix C

USFWS Concurrence – Black-Footed Ferret

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

RECEIVED JUN 10 2009

JUN 11 2009
Bureau of Land Management
Rawlins Field Office

In Reply Refer To:
ES-61411/W.02/WY09I0255

Memorandum

To: Field Manager, Bureau of Land Management, Rawlins Field Office, Rawlins, Wyoming

From: for Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming Scott Hicks

Subject: Single natural gas well and access road in Sweetwater County, Wyoming (Desolation Road Unit #31-28)

Thank you for your letter of May 5, 2009 (6840, WYD04) received in our office on May 5, 2009, regarding the proposed development of a single natural gas well and access road in Sweetwater County, Wyoming (Desolation Road Unit #31-28). We understand that road construction will result in approximately 13.7 acres of disturbance; pad development will disturb approximately 4.8 acres. The proposed project will occur within black-footed ferret (*Mustela nigripes*) non-block cleared areas in Sections 25-28, T16N, R96W.

The U.S. Fish and Wildlife Service previously consulted on the Desolation Flats Natural Gas Field Development Project EIS (WY8087, March 26, 2004). At that time, prairie dog towns and complexes within the Desolation Flats project area had not been "block cleared" from the need for black-footed ferret surveys and therefore may have warranted surveys pursuant to the Black-Footed Ferret Survey Guidelines (April 1989). The Service concurred with your "may affect, but not likely to adversely affect" determination for the black-footed ferret based on your commitment to conduct surveys prior to disturbance.

As you have noted, we are in the process of updating the list of areas "block-cleared," and in the interim are providing project specific recommendations on the need for surveys. Based on information we received on June 9, 2009 from the Wyoming Game and Fish Department and our previous site visits to the area in 2006, we have determined that the black-footed ferret is unlikely to occur within the project area. Therefore, black-footed ferret surveys are no longer recommended for this project area.

We appreciate your efforts to ensure the conservation of endangered species. If you have further questions regarding this letter or your responsibilities under the Act, please contact our office at the letterhead address or phone Clark McCreedy at (307) 772-2374 ext. 228.

cc: WGFD, Statewide Habitat Protection Coordinator, Cheyenne (M. Flanderka)
WGFD, Non-Game Coordinator, Lander (B. Oakleaf)

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Appendix D

Lease Stipulations

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WYW147885

MULTIPLE MINERAL DEVELOPMENT STIPULATION

Operations will not be approved which, in the opinion of the authorized officer, would unreasonably interfere with the orderly development and/or production from a valid existing mineral lease issued prior to this one for the same lands.

WYW147885

LEASE NOTICE NO. 1

Under Regulation 43 CFR 3101.1-2 and terms of the lease (BLM Form 3100-11), the authorized officer may require reasonable measures to minimize adverse impacts to other resource values, land uses, and users not addressed in lease stipulations at the time operations are proposed. Such reasonable measures may include, but are not limited to, modification of siting or design of facilities, timing of operations, and specification of interim and final reclamation measures, which may require relocating proposed operations up to 200 meters, but not off the leasehold, and prohibiting surface disturbance activities for up to 60 days.

The lands within this lease may include areas not specifically addressed by lease stipulations that may contain special values, may be needed for special purposes, or may require special attention to prevent damage to surface and/or other resources. Possible special areas are identified below. Any surface use or occupancy within such special areas will be strictly controlled or, if absolutely necessary, prohibited. Appropriate modifications to imposed restrictions will be made for the maintenance and operation of producing wells.

1. Slopes in excess of 25 percent.

2. Within 500 feet of surface water and/or riparian areas.

3. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.

4. Within 500 feet of Interstate highways and 200 feet of other existing rights-of-way (i.e., U.S. and State highways, roads, railroads, pipelines, powerlines).

5. Within 1/4 mile of occupied dwellings.

6. Material sites.

GUIDANCE:

The intent of this notice is to inform interested parties (potential lessees, permittees, operators) that when one or more of the above conditions exist, surface disturbing activities will be prohibited unless or until the permittee or the designated representative and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development and become a condition for approval when authorizing the action.

Specific threshold criteria (e.g., 500 feet from water) have been established based upon the best information available. However, geographical areas and time periods of concern must be delineated at the field level (i.e., "surface water and/or riparian areas" may include both intermittent and ephemeral water sources or may be limited to perennial surface water).

The referenced oil and gas leases on these lands are hereby made subject to the stipulation that the exploration or drilling activities will not interfere materially with the use of the area as a materials site/free use permit. At the time operations on the above lands are commenced, notification will be made to the appropriate agency. The name of the appropriate agency may be obtained from the proper BLM District Office.

WYW147885

CONTROLLED SURFACE USE STIPULATION - CSU

Surface occupancy or use is subject to the following special operating constraints.

(1) Surface occupancy or use will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts;

On the lands described below:

(2) entire lease;

For the purpose of:

(3) protecting Class I and II Visual Resource Management Areas.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

WYW147885

CONTROLLED SURFACE USE STIPULATION - CSU

Surface occupancy or use is subject to the following special operating constraints.

(1) Surface occupancy or use within the Monument Valley Management Area will be restricted or prohibited unless the operator and surface managing agency arrive at an acceptable plan for mitigation of anticipated impacts;

On the lands described below:

(2) entire lease;

For the purpose of:

(3) protecting wildlife, geologic, cultural, watershed, scenic, and paleontological values.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

WYW147885

NOTICE TO LESSEE

Provisions of the Mineral Leasing Act (MLA) of 1920, as amended by the Federal Coal Leasing Amendments Act of 1976, affect an entity's qualifications to obtain an oil and gas lease. Section 2(a)(2)(A) of the MLA, 30 U.S.C. 201 (a)(2)(A), requires that any entity that holds and has held a Federal coal lease for 10 years beginning on or after August 4, 1976, and who is not producing coal in commercial quantities from each such lease, cannot qualify for the issuance of any other lease granted under the MLA. Compliance by coal lessees with Section 2(a)(2)(A) is explained in 43 CFR 3472.

In accordance with the terms of this oil and gas lease, with respect to compliance by the initial lessee with qualifications concerning Federal coal lease holdings, all assignees and transferees are hereby notified that this oil and gas lease is subject to cancellation if: (1) the initial lessee as assignor or as transferor has falsely certified compliance with Section 2(a)(2)(A), or (2) because of a denial or disapproval by a State Office of a pending coal action, i.e., arms-length assignment, relinquishment, or logical mining unit, the initial lessee as assignor or as transferor is no longer in compliance with Section 2(a)(2)(A). The assignee, sublessee or transferee does not qualify as a bona fide purchaser and, thus, has no rights to bona fide purchaser protection in the event of cancellation of this lease due to noncompliance with Section 2(a)(2)(A).

Information regarding assignor, sublessor or transferor compliance with Section 2(a)(2)(A) is contained in the lease case file as well as in other Bureau of Land Management records available through the State Office issuing this lease.

Appendix E

Applicant-Committed Environmental Protection Measures

1. In Potential Fossil Yield Classification (PFYC) Class III, IV, and V areas, a BLM permitted paleontologist must conduct a pre-surface disturbance paleontological field study. A written report of the findings by the paleontologist must be submitted to the BLM Authorized Officer with recommendations for mitigation or avoidance. Authorization for an activity to proceed cannot be given by a consulting paleontologist. Performance of the survey, either by a consulting paleontologist or BLM staff or submission of the report DOES NOT constitute approval for the activity to proceed. The BLM must review the report, including adequacy of the field methods and findings. The Authorized Officer must approve the findings and determine the need for monitoring prior to approval to proceed. See IM-2009-011 and attachments for more information.

2. Spot inspection of the access road and well pad by a professional paleontologist following construction and prior to the installation of the reserve pit liner on the well pad is required in order to account for impacts, negative or positive, to potential buried paleontological resources which might be exposed by ground disturbing construction activities.

3. Disruptive activities to seasonal Greater Sage-Grouse Breeding Habitat are prohibited during the period of March 1 to July 15.

4. Disrupting activities to big game crucial winter range are prohibited from November 15 through April 30.

5. Construction, drilling and other activities disruptive to identified sage brush obligates: Sage Thrasher, Brewer's Sparrow and Sage Sparrow known habitat are prohibited during the period of March 1 to July 15.

6. Construction, drilling, and other activities disruptive to identified Mountain Plover habitat are prohibited during the period of April 10 to July 10.

7. A No Surface Occupancy restriction exists within an 800-foot radius of the burrowing owl nest site identified during the 2009 field survey.

8. The BLM requires a 0.5-mile radius buffer around the active burrowing owl nest during the nesting season from April 1 to September 10.

9. If well is producing, all facilities placed on the well site will be painted Shale Green or Sudan Brown.

10. This project/action will require water usage from the Colorado River drainage from > 0.1 to < 100 acre-feet. Therefore, this action is considered a May affect, likely to adversely affect situation for threatened or endangered species within the Colorado River System and formal consultation is required with the USFWS. As required by the Green River RMP and the USFWS agreement, formal consultation consists of a review by the USFWS and a letter of concurrence and/or recommendations provided within 30 days regarding the proposed project. For depletions <100 acre-feet a depletion fee will not be required.

11. A class III cultural inventory of all areas of potential effect has been conducted for the proposed undertaking. It has been determined that there will be no adverse effect on historic properties within the area of potential effect. The undertaking is within the BLM standard stipulation regarding the discovery of unanticipated cultural resources as applied to this APD.

12. Due to the sand accumulations construction of the well pad will be monitored by an archaeologist who meets or exceeds the qualification standards recommended by the Secretary of the Interior.

13. The western boundary for the cultural site 48SW9328 will be fenced off by an archaeologist who meets or exceeds the qualification standards recommended by the Secretary of the Interior during the reconstruction of the reclaimed access road to prevent potential impacts to the site.

14. Due to erosive and saline soils in the area, the BLM determined that a low water crossing approach would be used to reduce the risk of stream bank and stream bottom erosion.

15. In order to minimize visual resource impacts, low profile tanks, less than 12 feet in height, would be used during production.

16. The BLM is allowing a higher cut bank for the construction of the reserve pit in order to move the reserve pit off the nearby vegetated dunes.