

**U.S. Department of the Interior
Bureau of Land Management**

Environmental Assessment

**Rosewood's Atchee Oil and Gas Development Project
DOI-BLM-UT-G010-2014-0018-EA**

May 2015

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Prepared by
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Chapter 1. Introduction

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1.1. Identifying Information:

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Atchee Oil and Gas Field Development Project as proposed by Rosewood Resources Inc. (Rosewood). The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 Code of Federal References (CFR) 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact” (FONSI). A FONSI documents the reasons why implementation of the selected alternative would not result in “significant” environmental impacts (effects) beyond those already addressed in the Vernal Resource Management Plan (*October 2008*). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an Environmental Impact Statement (EIS) would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA approving the selected alternative, whether the proposed action or another alternative.

1.1.1. Title, EA number, and type of project:

Atchee Oil and Gas Field Development Project Environmental Assessment

DOI-BLM-UT-G010–2014–0018–EA

Rosewood has proposed a conceptual plan to expand and fully develop gas production in the Atchee Project Area (APA). This plan includes the directional drilling of 151 wells from 38 existing and 30 new well pads. This plan also includes 7.5 miles of new road, up to 15 miles of new or replacement surface gas lines and water lines, and the construction of 3 to 9 new compressor stations with the expansion of 3 existing compressor stations. Rosewood proposes to drill between 8 and 20 wells per year over the next 8 to 20 years until the resource base is fully developed.

1.1.2. Location of Proposed Action:

The project area is located in Uintah County, about 40 miles south of Vernal, Utah. All project activities would be located within Township 11 South, Range 23 East, Sections 1, 3-5, 8-17, 21-24 and Township 11 South Range 24 East, Sections 18 and 19. The project area encompasses 11,109 acres of which 10,420 acres are BLM-administered, 640 acres are State-administered, and 49 acres are privately owned.

1.1.3. Background Information

In 1997, the Vernal Field Office (VFO) formed a Resources Development Group (RDG) comprised of several oil and gas companies, including Rosewood, to facilitate preparation of an EA to analyze oil and gas development in Townships 11 and 12 South, Ranges 23 and 24 East, south of the White River. A DR/FONSI for that EA was signed in January 1999. Subsequent to its decision, the BLM received 12 requests for a State Director Review and one request for a stay

of the DR/FONSI. A stay was issued pending a thorough review of the requests received. Those requesting the review and stay questioned the nature and extent of impacts disclosed in the EA and the validity of the DR/FONSI. In May 1999 the DR/FONSI was vacated and the proposal was remanded to the BLM Vernal Field Office (VFO) for the preparation of an EIS.

A Notice of Intent for the RDG EIS was published in the Federal Register on October 22, 1999 (64 FR 57122). The proposed action analyzed by the EIS included the drilling of up to 423 gas wells from as many well pads in the RDG project area. A Record of Decision (ROD) was signed for the selected alternative in August 2006. A protest of the ROD was filed with the Interior Board of Land Appeals. However, the IBLA dismissed the protest stating that the State Director Review process should have been utilized first. Subsequently, a request for a State Director Review was filed with a request for stay, which was granted. In April 2012, the BLM Green River District Manager recalled the ROD due to changes in existing conditions which rendered further analysis necessary.

Over time, the members of the RDG have changed due to lease rights acquisition or other circumstances. Upon the recall of the RDG EIS ROD, the VFO contacted the remaining RDG members and asked them if the proposed action still described their development plans for the leases in the area. It was determined that the proposed action did not reflect the current plans or practices of the remaining RDG members. The VFO then asked the RDG members to submit their plans for the area, if any. Rosewood is the only company as of November 2013 who has submitted a plan in response to the VFO's inquiry.

Rosewood's plan for the Atchee area voluntarily incorporated a smaller project area, a reduced number of wells, and the use of directional drilling, these combined measures significantly reduce the surface footprint of the project. The VFO Interdisciplinary Team has reviewed Rosewood's proposal, as documented in Appendix A, *Interdisciplinary Team Checklist* (p. 97), and has determined to analyze those impacts through an EA.

1.2. Purpose and Need for Action:

The BLM's need for the action is to respond to Rosewood's proposal to develop their existing leases in the project area. Private exploration and development of federal, domestic oil and gas reserves are integral parts of BLM's oil and gas leasing mandates, under the authority of the Mineral Leasing Act of 1920, as amended by the Federal Land Policy and Management Act of 1976, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. The BLM purpose in considering approval of the proposed wells is to be consistent with the lease rights granted to the Operator and to prevent unnecessary or undue degradation of the public lands by minimizing impacts to the affected resources.

1.3. Decision to Be Made

This EA analyzes a conceptual project. Although the maps cite locations, and the tables analyze disturbance, these are assumptions for analysis purposes only. Any decision reached as a result of this analysis will apply only to the level and general location of the project. Should the plan be approved, Rosewood would have to submit Applications for Permit to Drill (APD), Right of Way (ROW) Applications, and Sundry Notice Applications to the BLM for approval prior to construction or drilling on BLM administered lands and minerals. Prior to approving an APD, ROW, or Sundry Notice, the BLM would consider the site specific environmental impacts of

the application(s), in compliance with NEPA. The site specific environmental review would include an onsite inspection of the proposed well, access road, pipeline, and associated facilities to determine site-specific impacts. Through this process, additional mitigation measures may be added as conditions of approval to protect affected resources.

1.4. Scoping, Public Involvement and Issues:

The BLM conducted internal reviews to identify environmental issues and concerns associated with the Proposed Action. A BLM interdisciplinary team (IDT) meeting was held on April 22, 2013 to identify issues and concerns, as documented in Appendix A, *Interdisciplinary Team Checklist* (p. 97). The VFO posted a public notice of the Proposed Action on the BLM e-planning NEPA Register on October 31, 2013, to inform the public of the project.

The identified issues and concerns as a result of the scoping and public involvement process are summarized below:

1.4.1. Air Quality

- Potential degradation of local air quality from emissions associated with construction, drilling, and production.
- Potential emissions of greenhouse gases into the atmosphere from construction, drilling, and production.

1.4.2. Cultural Resources

- Cultural Resources could be impacted by surface disturbing activities.

1.4.3. Invasive Plants/Noxious Weeds, Soils & Vegetation, including Woodlands

- Establishment and spread of invasive species
- Disturbance of native vegetation and soils.

1.4.4. Lands with Wilderness Characteristics

- Wilderness character inventoried for the proposed project area included the White River, West Fork Saddletree Draw, West Asphalt Draw and Archy Bench A units. Wilderness character was found within the project area only in the White River unit. The White River unit was inventoried in 1999 and again in 2007 as part of the review for the Vernal Resource Management Plan Record of Decision. Approximately 1,570 acres (GIS estimate) were identified within the proposed project area. Eight new well pads are proposed within the wilderness characteristics and approximately 0.25 miles of new road per new well pad is anticipated.

1.4.5. Plants

1.4.5.1. Threatened, Endangered, Proposed, or Candidate Species

- Uinta Basin hookless cactus potential habitat could be impacted.
- Grahams penstemon suitable habitat could be impacted.
- White River penstemon suitable habitat could be impacted.

1.4.5.2. Wetland/Riparian

- The mapped wetland/riparian areas could be damaged by surface disturbing activities.

1.4.6. Water

1.4.6.1. Floodplains

- Floodplains could be damaged by the placement of well pads, access roads, and pipelines in them.

1.4.7. Wildlife

1.4.7.1. Migratory Birds (Including Raptors)

- Displacement of individuals or damage to habitat of Utah Partners In Flight Species (UPIF) could occur from construction and production activities.
- Displacement of individuals or damage to nests or habitat of golden eagle, bald eagle, or red-tailed hawk could occur from construction and production activities.

1.4.7.2. Non-USFWS Designated Species

- Displacement of individuals or damage to habitat of mule deer, Rocky Mountain big horn sheep, or elk could occur from construction and production activities.

1.4.7.3. Threatened, Endangered, Proposed or Candidate Species

- Water depletion activities could harm special status fish species and their habitat including the Colorado River fish and their designated critical habitat.

Chapter 2. Proposed Action and Alternatives

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2.1. Description of the Proposed Action:

Rosewood proposes to expand and fully develop gas production in the existing Atchee Project Area through the use of vertical and directional drilling. Figure 2.1, “Proposed Action Map” (p. 8) illustrates the locations of the existing well pads, and approximate the locations of the new well pads and new wells included in the Proposed Action. The Atchee Project includes the drilling of up to 151 additional wells, all of which would be directionally drilled. Specifically, Rosewood’s Proposed Action includes the following primary components:

- Directional drilling of up to 72 natural gas wells from 38 existing well pads (well pads would be expanded by up to 1.5 acre per pad);
- Vertical and directional drilling of up to 79 new natural gas wells from 30 new pads: It is estimated that 15 new pads would be constructed adjacent to existing roads, and 15 new pads would require new road construction;
- Construction of an estimated 7.5 miles of new road;
- Depending upon well production, installation of up to 15 miles of new or replacement surface gas lines and water lines that would transport gas and water produced from both existing and proposed wells to the main gathering lines and water to disposal wells, and;
- Construction of 3 to 9 new compressor stations (2 acres each) and expansion of 3 existing compressor stations (1 acre each) that would increase field compression and dehydration to 5,000 horsepower and 75 million cubic feet per day (MMcfd).

Rosewood proposes to drill between 8 and 20 wells per year until the resource base is fully developed. Under this drilling scenario, construction, drilling, and completion of all 151 proposed wells would occur in approximately 8 to 20 years. The total number of wells drilled would depend largely on production success, engineering technology, reservoir characteristics, economic factors, commodity prices, rig availability, and lease stipulations. The anticipated life of an individual well is 10 to 20 years. Therefore, the anticipated life of the project under the Proposed Action would be up to 25 years after the drilling of the first wells, assuming favorable economic conditions.

Development assumptions and surface disturbance anticipated under the Proposed Action is shown in Table 2.1, “Surface Disturbance Under the Proposed Action” (p. 9). Initial surface disturbance for well pads, access roads, pipeline ROWs, and other surface facilities would equal approximately 161 acres. Those portions of the well pads, access road ROWs, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons. Residual surface disturbance would be approximately 150 acres which would remain for the life of the well(s).

Specific details of project activities, including design features and surface disturbance assumptions for the Proposed Action are described in the following sections.

BLM



Alternative A - Proposed Action

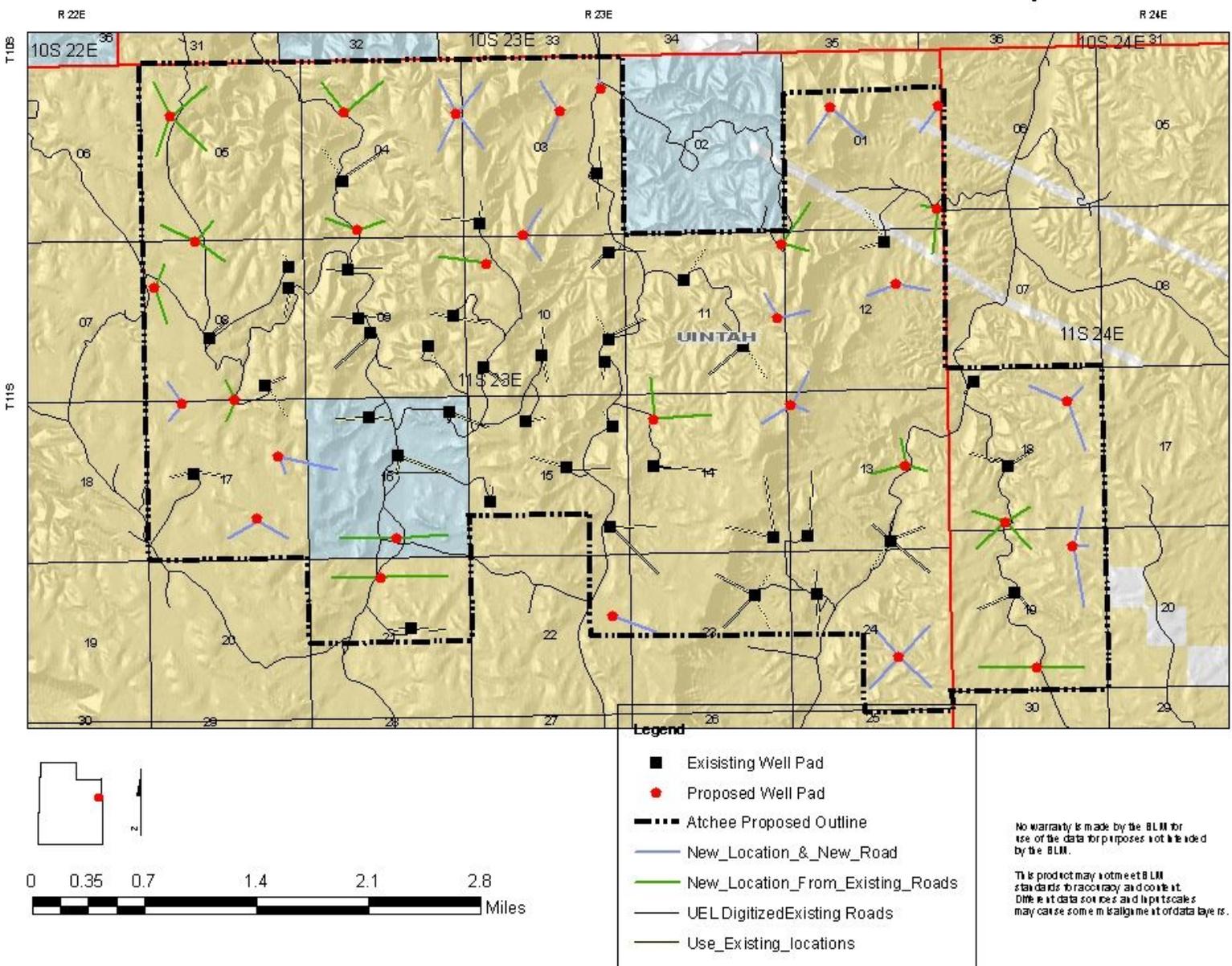


Figure 2.1. Proposed Action Map

2.1.1. Well Pad Construction and Expansion

The proposed action would include the construction of 30 new well pads and the expansion of 38 existing well pads. All well pad construction and expansion would be conducted using guidelines described in the “Gold Book,” *Surface Operating Standards for Oil and Gas Extraction and Development 4th Edition* (BLM and USFS 2007), as appropriate. Construction or expansion of a typical well pad would involve the use of heavy equipment, but equipment needs would vary depending on the site-specific conditions. All surface disturbing activities would be supervised by a qualified company representative who is familiar with the terms and conditions in the approved EA and site-specific permits. The existing topsoil and vegetation would be cleared and topsoil would be stockpiled along the side of the proposed well pad. All cut and fill slopes would be constructed to maintain stability for the life of the well(s). As determined necessary on a site specific basis, best management practices (BMPs) to prevent erosion (i.e., energy dissipaters such as straw bales and silt fences) would be installed and maintained until the disturbed slopes have re-vegetated and stabilized. A new reserve pit would be excavated on each of the 30 new well pads and a previously utilized reserve pit would be re-opened and enlarged on 38 existing well pads. The reserve pit would be lined with 16-millimeter thick synthetic reinforced material. If rock is encountered during excavation, the pit would be lined with a felt liner pad to protect the liner from punctures. The pit liner would overlap the pit walls and be covered with dirt and/or rocks to secure it in place. The pit liner would be resistant to deterioration by hydrocarbons. The reserve pit would be fenced to prevent access by wildlife and unauthorized personnel. The reserve pit fencing would be installed on three sides during drilling operations and on the fourth side when the rig moves off location and until the pit is backfilled.

On average, each newly constructed well pad would initially occupy approximately 2.5 acres. Each existing well pad utilized for proposed directional drilling would be expanded by 0.5 acre per pad. This acreage would include reopening previously utilized reserve pits and expanding the existing pads to accommodate drilling equipment and additional well heads and production facilities.

Once all of the proposed directional wells have been drilled from a single well pad location, the rig would be dismantled and moved to another location, and the reserve pit would then be drained and emptied of drilling fluids within 90 days of final well completion. If a well is productive, the reserve pit and areas not required for production would be reclaimed. Topsoil previously stockpiled adjacent to the well pad would be re-spread across the disturbed areas, and each of these areas would then be seeded with a seed mixture approved by the AO of the appropriate SMA. If a well is unproductive, all areas not required for production of existing wells would be reclaimed following well plugging and abandonment. In the case of either a productive or unproductive well, reclamation activities would take place within 180 days of final drilling activities, weather permitting.

Table 2.1. Surface Disturbance Under the Proposed Action

Project Features	Number	Size (Disturbance width [feet] or acres/facility)	Initial Surface Disturbance (Acres)
Proposed Directional Wells From Existing Well Pads	72 Wells / 38 Existing Pads	Up to 1.5 acres per pad	48
Proposed Directional Wells From New Well Pads	79 Wells / 30 New Pads	2.5 acres per pad	75
Subtotal	151 Wells	--	123
Upgraded Roads	--	10 feet wide	--

Project Features	Number	Size (Disturbance width [feet] or acres/facility)	Initial Surface Disturbance (Acres)
New Roads	7.5 miles	30 ft.	27.3
Subtotal	7.5	--	27.3
New or Replacement Surface Gas Pipelines	15 miles	35 feet wide	63.6
Subtotal	15	--	63.6
New Compressor Stations	3 to 9	2 acres	6 to 18
Upgraded Compressor Stations	3	1 acre	3
Subtotal	6 to 12	--	9 to 21
Total	--	--	223 to 235

2.1.2. Access Roads

Approximately 7.5 miles of new road would be built under the Proposed Action. On a site specific basis, when site conditions are appropriate, the proponent and the BLM will consider the creation or use of "primitive" two-track roads or overland route corridors to meet the operator's access needs. Primitive roads and route corridors may serve as appropriate access to exploration drilling locations where it is not certain if the well will be productive, or to producing wells where vehicle traffic is infrequent due to the use of off-site production facilities and automated well monitoring. (Gold Book pg 23) However, for analysis purposes, it is assumed that a 30-foot width would be needed for road construction. Existing roads would be utilized to the extent possible to minimize new surface disturbance.

To ensure operational safety during drilling and completion, no roads would be constructed through the middle of well pads. In an effort to reduce erosion, vegetation removed during construction would be windrowed or scattered over adjacent disturbance as directed by the AO of the appropriate SMA based on site-specific review. New access roads would be crowned (2 to 3 percent), ditched, and constructed to meet the standards of the anticipated traffic flow and all weather requirements and to provide a well-constructed and safe road. Surface materials would consist of native soil whenever possible. If additional surfacing materials are required, they would be purchased from a local contractor having a permitted source of materials. Prior to construction, the ground would be allowed to dry completely, and no road construction would take place when soils are frozen. If deemed necessary by the Army Corps of Engineers, Rosewood would prepare stream alteration permits for associated drainage crossings. Timing of new road construction would depend on the drilling schedule, topographic constraints, and weather conditions. Roads would generally be constructed two to three weeks prior to well pad construction. All roads would have a design speed of approximately 20 miles per hour (mph).

Utilized roads would be maintained in good repair during all drilling, completion, and testing operations. No road improvements would be made by Rosewood within other entities' existing road ROWs without prior written approval from the ROW owner. All road maintenance activities implemented by Rosewood on county roads would be coordinated with the Uintah County Public Lands Department. Road construction and maintenance would follow guidelines described in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* "Gold Book" 4th Edition (BLM and USFS 2007), as appropriate.

2.1.3. Natural Gas Pipelines

Fifteen miles of new or replacement surface gas pipeline would be installed under the proposed action. It is assumed that a 35-foot width would be needed for construction. These collection gas lines would be constructed of 4 to 8 inch outer diameter pipe. Natural gas produced at existing wells is currently transported by approximately 50 miles of 4 inch surface gas lines which extend throughout the Atchee Project Area. Where existing gas lines are in place, the current system would be used to transport gas to market as feasible. However, as the proposed directional wells come on-line and pipeline capacities of existing surface pipelines start to maximize, they would be replaced with larger diameter (up to 8-inch) gas lines, depending upon well production.

2.1.4. Produced Water and Produced Water Pipelines

Currently produced water and condensate is decanted into external steel tanks that are located on each existing well pad. Containment dikes constructed either of compacted subsoil or metal barriers surround these facilities and can hold 110 percent of the capacity of the largest tank. Each tank is pumped periodically as needed, and water is transported outside the Atchee Project Area and disposed of in certified disposal sites. The majority of the produced water will be disposed of via an injection well. The rest would be utilized for drilling additional wells as described in Section 2.1.8, “Water Requirements” (p. 13). As additional wells come online in the Atchee Project Area, the amount of water produced from downhole formations would increase. To decrease the amount of truck traffic that would be needed to transport and dispose of such water, Rosewood proposes to install (if necessary) one produced water line from each existing and proposed well pad to central tank facilities. All proposed produced water lines would be no larger than 8-inches in outer diameter and located within the 35-foot pipeline construction width described in Section 2.1.3, “Natural Gas Pipelines” (p. 11).

2.1.5. Compressor Stations

Currently there are three existing compressor stations located in the Atchee Project Area. If the proposed wells are productive, natural gas would be transported from each wellhead via gathering gas lines to the existing compression and treatment facilities. To support the proposed development, three to nine additional compressor stations would be constructed and installed in T11S, R23E, and all three existing compressor stations would be expanded to support the additional compression facilities. Total surface disturbance associated with expansion of the three existing and construction of the new compressor stations would be up to 21 acres. Details regarding the surface disturbance associated with each facility are presented in Table 2.1, “Surface Disturbance Under the Proposed Action” (p. 9).

2.1.6. Drilling Operations

Once construction or expansion of an individual well pad is completed, drilling equipment would be moved onto the new well pad. Wells would be drilled utilizing a conventional, mechanically-powered mobile drilling rig. The exact type and size of drilling rig would be dependent upon rig availability at the time of project implementation. Rosewood anticipates that no more than two drilling rigs would be operating in the Atchee Project Area at any one time. Each well would take approximately 14-21 days to drill. Rosewood expects to drill between 8 and 20 wells per year (Table 2.2, “Estimated Drilling Schedule” (p. 12)).

Table 2.2. Estimated Drilling Schedule

Year	Number of Wells ¹			
	19-yr Estimate		11-yr Estimate	
	Annual	Cumulative	Annual	Cumulative
1	8	8	15	15
2	8	16	15	30
3	8	24	15	45
4	8	32	15	60
5	8	40	15	75
6	8	48	15	90
7	8	56	15	105
8	8	64	15	120
9	8	72	15	135
10	8	80	15	150
11	8	88	1	
12	8	96		
13	8	104		
14	8	112		
15	8	120		
16	8	128		
17	8	136		
18	8	144		
19	7	151		

¹ Assumes up to 2 drill rigs operating annually.

The proposed wells would target sandstone intervals within the Mesaverde Group, and the average depth of each well would be approximately 8,500 feet. Drilling operations would consist of drilling the hole, running and cementing surface casing, drilling the production hole, and running and cementing production casing. Any shallow water zones or near surface aquifers encountered during drilling would also be isolated by both casing and cement as directed by *BLM Utah Instruction Memorandum 2010-055*.

The casing and cementing program would also be designed to isolate and protect the shallower formations encountered in the well bore and to prohibit pressure communication or fluid migration between zones. The cement would protect the well by preventing formation pressure from damaging the casing, and by retarding corrosion by minimizing contact between the casing and formation fluids. The type of casing used and the depth to which it is set would depend upon the physical characteristics of the formations that are drilled. All casing would be new or reconditioned and tested in accordance with applicable regulations. Site-specific descriptions of drilling procedures would be included in the APD and the COAs for each well.

Drilling operations would utilize an open-loop circulation system with reserve pits. Construction of the reserve pits was discussed previously in Section 2.1.1, "Well Pad Construction and Expansion" (p. 9). As several directional wells would be drilled from individual well pads, a reserve pit may be utilized for more than one well. Once all of the proposed directional wells have been drilled from a single location, the rig would be dismantled and moved to another location, and the reserve pits would then be drained and emptied of drilling fluids within 90 days of final well completion as required by *Oil and Gas Onshore Order No. 7*.

2.1.7. Well Completion and Production

If testing indicates economic potential, completion operations would set production casing to the total drilled depth, perforate the casing in target production zones, and hydraulically fracture (fracing) the productive formation under high pressure. The fracing material would likely contain sand or other proppant material to keep the fractures open, thereby allowing hydrocarbons to flow more freely into the casing. The next phase would be to flow and test the well to determine rates of production. Completion and testing would take approximately 7 to 10 days.

Should testing suggest the potential for commercial production, facilities including a wellhead, pumping unit, separator, dehydrator, condensate tanks, and gas meter would be installed at each well location. All permanent (on site for 6 months or longer) structures constructed or installed would be painted a flat, non-reflective, earth tone color using one of the standard environmental colors, as determined by the AO of the appropriate SMA. All facilities would be painted within 6 months of installation.

Periodically, a workover or recompletion on a well may be required to ensure that efficient production is maintained. Workovers can include repairs to the well bore equipment (casing, tubing, rods, or pump), the wellhead, or the production facilities. These repairs would usually be completed in 7 days per well, during daylight hours. The frequency for this type of work cannot be accurately projected because workovers vary by well; however, an average work time may be one workover per well per year after about 5 years of production. In the case of a recompletion, where the wellbore casing is worked on or valves and fittings are replaced to stimulate production, all byproducts would be stored in tanks and hauled from the location. For workover operations, it may be necessary to rework the surface location to accommodate equipment. At the completion of the work, the surface location would be re-graded and reclaimed to pre-existing conditions.

2.1.8. Water Requirements

Water required for the drilling and completion of the proposed gas wells would be hauled by truck from a combination of the permitted water sources described in Table 2.3, “Water Sources Utilized for the Proposed Action” (p. 14).

The needed water volume would depend on the depth of the well and any losses that might occur during drilling. Based on previous experience with wells drilled in the area, approximately 20,000 barrels (2.6 acre-feet) of water would be needed to drill and complete each well. In addition to water for drilling and completion, approximately 775 barrels (0.1 acre-feet) of water per well pad would be utilized for dust abatement each year during the drilling phase. Table 2.4, “Estimated Annual Water Consumption During Drilling Phase” (p. 14) displays the estimated annual water consumption based on Rosewood’s proposed drilling schedule(s). Following drilling and completion activities, water usage would be primarily limited to dust abatement for the remainder of the project life. While a portion of the water used for drilling and completion of wells would be recycled from other Rosewood wells (e.g., produced water), the majority of water used would be fresh water hauled to the wells from the sources listed in Table 2.3, “Water Sources Utilized for the Proposed Action” (p. 14).

Table 2.3. Water Sources Utilized for the Proposed Action

Water Right Number	Filing Date	Source	Location	Allowed Annual Withdrawal (acre-feet)
49-1620	March 25, 2009	Underground Water Well	S 112 ft.; E 617 ft. from NW corner, Sec. 01-12S-22E	22
49-1620	April 27, 1995	Underground Water Well	N 400 ft; W 1700 ft from SE corner, Sec. 13-11S-23E; 2) N 1700 ft; W 2500 ft from SE corner, Sec. 06-11S-24E; 3) S 300 ft; E 2400 ft from W4 corner, Sec. 08-11S-24E; 4) S 400 ft; E1950 ft from W4 corner, Sec. 18-11S-24E	20

Table 2.4. Estimated Annual Water Consumption During Drilling Phase

Year	19-yr Estimate				11-yr Estimate			
	Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)	Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)
1	8	20.8	1	21.8	15	39.0	2.0	41.0
2	8	20.8	1	21.8	15	39.0	2.0	41.0
3	8	20.8	1	21.8	15	39.0	2.0	41.0
4	8	20.8	1	21.8	15	39.0	2.0	41.0
5	8	20.8	1	21.8	15	39.0	2.0	41.0
6	8	20.8	1	21.8	15	39.0	2.0	41.0
7	8	20.8	1	21.8	15	39.0	2.0	41.0
8	8	20.8	1	21.8	15	39.0	2.0	41.0
9	8	20.8	1	21.8	15	39.0	2.0	41.0
10	8	20.8	1	21.8	15	39.0	2.0	41.0
11	8	20.8	1	21.8	1	2.6	.125	2.725
12	8	20.8	1	21.8				

Year	19-yr Estimate				11-yr Estimate			
	Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)	Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)
13	8	20.8	1	21.8				
14	8	20.8	1	21.8				
15	8	20.8	1	21.8				
16	8	20.8	1	21.8				
17	8	20.8	1	21.8				
18	8	20.8	1	21.8				
19	7	18.2	1	19.2				
TOTAL	151	392.6	19	411.7	151	392.6	20.125	412.725

2.1.9. Spill Procedures

As each new well is completed on existing pads, Rosewood would update all existing Spill Prevention Control and Countermeasure (SPCC) plans. New SPCC plans would be developed for all proposed well pads. If spills of condensate, produced water, or other fluids were to occur in reportable amounts, as defined in BLM Notice to Lessees (NTL) 3A, Rosewood or their contractors or sub-contractors would immediately contact the BLM and any other regulatory agencies (e.g., EPA National Response Center, State of Utah) as required by law or regulation. Strict cleanup efforts would be initiated immediately.

2.1.10. Hazardous Materials and Solid Wastes

Drilling fluids, including salts and chemicals, would be contained in the reserve pits. 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. Upon well completion, any residual hydrocarbons in the pit would be removed in accordance with 43 CFR 3162.7-1. Upon termination of drilling and completion operations, the liquid contents of the reserve pits would be used at the next drill site or would be removed and disposed of at an approved waste disposal facility within 90 days, weather permitting.

Self-contained, chemical portable toilets would be provided for human waste disposal. Upon completion of operations, or as needed, the toilet holding tanks would be pumped and the contents disposed of in the nearest approved sewage disposal facility.

Garbage, trash, and other waste materials would be collected in portable, self-contained, fully enclosed trash cages during operations. Accumulated trash would be disposed of at an authorized sanitary landfill. Trash would not be burned on location.

All debris and other waste materials not contained in the trash cage would be cleaned up and removed from the location promptly after removal of the completion rig (weather permitting).

2.1.11. Reclamation

To assure surface reclamation would occur on Federal leases at the end of the productive life of each well, Rosewood would maintain a reclamation bond with the BLM. Bonding is required for oil and gas lease operations in order to indemnify the U.S. government against losses from failure to meet royalty obligations, wells plugged improperly and abandoned on lease, and/or surface restoration and clean-up on abandoned operations (BLM and USFS 2007).

Site preparation and reclamation activities on BLM lands would follow the *Green River District Reclamation Guidelines for Reclamation Plans* (BLM 2009a) and Rosewood Energy's Reclamation Plan for Roosevelt and Orangeville, Utah (2010).

2.1.11.1. Construction Phase Reclamation

Prior to construction of new well pads, roads and pipelines, or the expansion of existing well pads, Rosewood would conduct a noxious weed inventory in accordance with the *VFO Surface Disturbance Weed Policy* (BLM 2009b). Once baseline conditions have been documented, up to 12 inches of topsoil material (if present) would be stripped and stockpiled for future reclamation efforts. Placement of the topsoil would be noted on the location plat attached to the site-specific APD. Topsoil would be stockpiled separately from subsoil materials. If previously utilized reserve pits have been reclaimed, topsoil salvaged from these areas would be removed and stockpiled separately near the reserve pit.

2.1.11.2. Production Phase Reclamation

Upon well completion, the well locations and surrounding area(s) would be cleared of all unused tubing, materials, trash, and debris not required for production. In accordance with *Oil and Gas Onshore Order Number 1*, within 180 days after completion activities have been finalized for the last proposed well on the well pad, Rosewood would reduce the size of the well pad to the minimum surface area needed for production facilities and adequate room for trucks to turn around, while providing for reshaping and stabilization of cut and fill slopes. Reseeding would be completed in accordance with the timeframe outlined in the *Green River District Reclamation Guidelines*. Reclamation activities would take no more than 30 days.

Prior to backfilling the reserve pits, the fence surrounding the pits and all debris in the pits would be removed, and the reserve pits would be as dry as possible. The pit liners would be folded into the pit prior to backfilling. After backfilling, salvaged topsoil (if any) would be placed on top of the backfill material. After the reserve pits have been reclaimed, no depressions in the soil covering the reserve pit would be allowed. The objective is to keep seasonal rainfall and runoff from standing or pooling over the reserve pit and seeping into the soil. Diversion ditches and water bars would be used to divert surface runoff from the reserve pit area, if needed.

Upon completion of backfilling and leveling, the stockpiled topsoil would be evenly spread over the portion of the well pads not required for production, the reserve pits, and access road cuts and shoulders. These disturbed areas would then be reseeded with the SMA approved seed mixture. Reclamation would not be deemed successful until approved by the AO of the appropriate SMA.

2.1.11.3. Final Reclamation

For dry holes or following the plugging of the final well on the pad, final reclamation of surface disturbances would take place within 180 days after the well is plugged. At the end of the productive lives of successful wells, all production equipment and surface pipelines (if any) would be removed and the well locations, access roads, and other disturbed areas would be restored to their approximate original condition. Road reclamation would be coordinated with Uintah County or other ROW holder as appropriate.

At final abandonment, all well casings would be cut off and capped according to SMA requirements as directed by the AO. The cap would be welded in place and the well location and identity would be permanently inscribed on the cap. The cap would also be constructed with a weep hole. If requested, GPS coordinates of the cap would be provided to the SMA.

Well locations, associated roads that would no longer be used, and other disturbed areas would be restored as near as practical to their original condition. All disturbed areas would be re-contoured to the approximate natural contours. Road reclamation would be coordinated with Uintah County or other ROW holder as appropriate.

2.1.12. Applicant Committed Environmental Protection Measures

Rosewood has committed to the following measures that are designed to reduce impacts to existing resources, and are integral to this alternative.

2.1.12.1. Air Quality

- Rosewood would comply with all applicable local, State, and Federal air quality laws, statutes, regulations, standards, and implementation plans.
- Rosewood would employ the following stationary engine standards:
 - Engines <300 hp = <2.0 g/hp-hr NO_x; Engines >300 hp = <1.0 g/hp-hr NO_x
 - All internal combustion equipment would be kept in good working order.
 - Drill rigs used would be equipped with Tier II or better diesel engines.
 - An oxidation catalyst would be used on all natural gas fired engines.
 - Lean burn natural gas fired stationary engines would be installed.
- Vent emissions from stock tanks and natural gas TEG dehydrators would be controlled by routing the emissions to a flare or similar control device which would reduce emissions by 95% or greater.
- Low or no bleed pneumatic valves would be installed on separator dump valves and other controllers.
- Low-bleed or no-bleed pneumatic devices would be installed on existing and future compressor stations and production wells.

- During completion operations, flaring would be limited to clean up and production equipment and gathering lines would be installed as soon as possible.
- Well site telemetry would be utilized to minimize pumper travel to the well site.
- Electric compression, if and where feasible.
- Vapor recovery systems would be installed on production tanks with the potential to emit more than 20 tons per year.
- Green completions would be utilized for all completion activities.
- During drilling operations, temporary worker housing would be located on-site.
- Water or other approved dust suppressants would be used at construction sites and along roads.
- No open burning of garbage or refuse at well sites or other facilities would be allowed.
- Centralized fracing operations would be used where possible.
- Centralized water storage and delivery would be used where possible.
- Off-site centralization of production facilities would be used where possible.
- Off-site centralization of liquids gathering systems would be used where possible.

2.1.12.2. Cultural Resources

- A Class III inventory would be conducted in all previously unsurveyed areas proposed for surface disturbance. Surveys will also be conducted in areas where the previous survey is more than 10 years old. All cultural surveys would be conducted on a site-specific basis prior to the initiation of construction activities. At each proposed well and compressor station location, a 10-acre square parcel would be defined, centered on the well pad center stake. The 10-acre parcel would be examined for cultural resources by an archaeologist walking parallel transects spaced no more than 30 feet apart. All access, gas line, and water line routes would be surveyed to a width of 200 feet.
- Prehistoric and historic sites documented during the Class III inventory as eligible for listing on the National Register of Historic Places (NRHP), as well as areas identified as having a high probability of significant subsurface materials, would be avoided by development. Specifically, well pad locations and access/gas and water line routes would be altered or rerouted as necessary to avoid impacting NRHP-eligible sites.
- If cultural resources are uncovered during surface-disturbing activities, Rosewood would suspend operations at the site and immediately contact the AO, who would arrange for a determination of eligibility in consultation with the SHPO, and, if necessary, recommend a recovery or avoidance plan.
- Rosewood would inform their employees, contractors, and subcontractors about relevant Federal regulations intended to protect archaeological and cultural resources. All personnel would be informed that collecting artifacts is a violation of Federal law and that employees engaged in this activity would be subject to disciplinary action.

2.1.12.3. Fish and Wildlife Including Special Status Fish and Wildlife Species

- As required by the ESA, no activities would be permitted that would jeopardize the continued existence of threatened or endangered fish and wildlife species.
- As required by *Oil and Gas Onshore Order No. 1*, Rosewood would remove any visible accumulation of oil from the reserve pit immediately upon release of the drilling rig to prevent exposure of migratory birds and other wildlife to petroleum products.
- To minimize impacts to elk and deer, Rosewood would refrain from drilling and construction within the designated elk and deer winter habitat from December 01 through April 30.
- To minimize wildlife mortality due to vehicle collisions, Rosewood would advise project personnel regarding appropriate speed limits in the Atchee Project Area.
- The County would be contacted regarding the presence of carrion within or along roadways.
- Employees and contractors would be educated about anti-poaching laws.
- If wildlife law violations are discovered, the offending employee would be subject to disciplinary action by Rosewood.
- To prevent the potential contamination of fish habitat from spills of petroleum products, Rosewood would utilize closed-loop drilling techniques for all proposed wells located in the 100-year floodplain of Atchee Wash and in all named drainages within five miles of the White River.

2.1.12.4. Soil Resources

- During project construction, surface disturbance and placement of gas and water lines would be limited to the approved location and access routes.
- No oil, lubricants, or toxic substances would be drained onto the ground surface.
- Areas used for soil storage would be stripped of topsoil before soil placement.
- Appropriate erosion control and re-vegetation measures would be employed.
- In areas with unstable soils where seeding alone may not adequately control erosion, grading would be used to minimize slopes and water bars would be installed on disturbed slopes.
- Erosion control efforts would be monitored by Rosewood and, if necessary, modifications would be made to control erosion.

2.1.12.5. Vegetation Including Special Status Plant Species and Invasive or Noxious Weeds

- As required by the Endangered Species Act of 1973 (ESA), as amended, no activities would be permitted that would jeopardize the continued existence of threatened or endangered plant species.

- As required by the Noxious Weed Act of 1974 as amended and Executive Order 13112-1999, noxious weeds would be controlled in the Project Area by the Rosewood on all disturbances associated with their existing well pads, road, and pipeline routes as well as infestations that would occur as a result of the project.
- Removal and disturbance of vegetation would be kept to a minimum through construction site management (e.g., using previously disturbed areas and existing easements where feasible, placing pipelines adjacent to roads, limiting well pad expansion, etc.). In addition, all areas not utilized for the operational phase of the project would be reclaimed.
- In an effort to ensure that project activities do not increase the existence of invasive or noxious weeds in the Atchee Project Area, Rosewood would comply with all guidelines set forth in the Vernal Field Office – Surface Disturbing Weed Policy, November 2009. As required by said Policy, Rosewood would also prepare a Weed Control Plan. Specific components of the plan would include:
 - Conducting individual noxious weed inventories on a well by well basis prior to construction activities. The inventories would include examination of all proposed surface disturbance (i.e., roads, pipelines, and well pads) associated with each well. The results of these inventories would include GPS locations indicating the type and size of each infestation. This data would be formulated into a report and submitted with the associated APD.
 - Preparation of a Pesticide Use Proposal.
 - Following the construction phase and drilling phase for each well, all disturbed surface would be monitored annually for the presence of noxious weeds. If monitoring shows increases in presence of noxious weeds, Rosewood would be responsible for treating these areas. Noxious plant control measures (mechanical, cultural, chemical) would be conducted before seed set annually. Monitoring and treatment would be conducted annually until reclamation and weed eradication was deemed successful by the AO of the appropriate SMA.
 - All herbicide use will be in conformance with national and local guidance, including approved chemicals, rates, and appropriate best management practices.
- To prevent further spread of noxious weeds, all vehicles and equipment would be power washed at designated washing locations to remove seed and plant materials before entering the Atchee Project Area from outside of the Uinta Basin.
- Prior to any surface-disturbing activities on federal and non-federal lands that contain potential habitat for the Uinta Basin hookless cactus, White River penstemon, and Graham’s penstemon a BLM-approved botanist would survey proposed development sites plus a 300-foot avoidance buffer. If individuals of these species are present, Rosewood would implement appropriate avoidance or mitigation measures, including relocation of the proposed well pad construction/expansion or pipeline and/or design modifications to limit the potential impacts to this plant and their habitat. Specific details regarding avoidance and mitigation measures are included in Appendix B, *Conservation Measures for Special Status Plant Species* (p. 107). All surveys would be conducted within the proper seasonal timeframe, as determined by the AO of the appropriate SMA and USFWS.
- Prior to any surface-disturbing activities on BLM lands that contain suitable habitat for BLM Sensitive plant species, a BLM-approved botanist would survey proposed development sites

plus a 150-foot avoidance buffer. If any BLM Sensitive plant species are present, Rosewood would implement appropriate avoidance or mitigation measures, including relocation of the proposed well pad construction/expansion or pipeline and/or design modifications to limit the potential impacts to the plants and their habitat. Specific details regarding avoidance and mitigation measures are included in Appendix B, *Conservation Measures for Special Status Plant Species* (p. 107). On non-BLM lands, the appropriate SMA would determine survey needs and methodologies. All surveys would be conducted within the proper seasonal timeframe, as determined by the BLM AO.

2.1.12.6. Water Resources

- As required under 40 CFR 112.3(e), Rosewood would revise and update all existing SPCC plans for each new directional well drilled on a well pad.
- Rosewood would prepare SPCC plans for all new proposed well pads.
- Rosewood would maintain a copy of the newly created or revised SPCC plan at each facility, if the facility is normally attended at least 8 hours per day, or at the nearest field office if the facility is not so attended. Rosewood would also implement and adhere to SPCC plans in a manner such that any spill or accidental discharge of oil or condensate would be reported and remediated.
- Rosewood would inform their employees, contractors and subcontractors of the potential impacts that can result from accidental spills, as well as the appropriate actions to take if a spill did occur.
- Within the 100-year floodplain, Rosewood would drill only from currently existing well pads. New well pads would be constructed outside the 100-year floodplain.
- Rosewood would utilize closed-loop drilling techniques for all proposed wells located in the 100-year floodplain of Atchee Wash and in all named drainages within five miles of the White River.
- Newly constructed gas and water lines would be pressure tested to evaluate structural soundness and reduce the potential for leaks.

2.1.12.7. Health and Safety/Hazardous Materials

- Rosewood would institute a Hazard Communication Program for its employees and require the subcontractor to operate in accordance with Occupational Safety and Health Administration (OSHA) (29 CFR 1910.1200).
- As required by OSHA, Rosewood would place warning signs near hazardous areas and along roadways.
- In accordance with 29 CFR 1910.1200, a Material Safety Data Sheet (MSDS) for every chemical or hazardous material brought on-site would be kept on file in Rosewood's field office.
- Rosewood would transport and/or dispose of any hazardous wastes, as defined by the Resource Conservation and Recovery Act of 1976 (RCRA), as amended, in accordance with all applicable Federal, State, and local regulations.

- All storage tanks that contain produced water, or other fluids which may constitute a hazard to public health or safety, would be surrounded by a secondary means of containment for the entire contents of the tank, plus freeboard for precipitation, or 110 percent of the capacity of the largest tank. Production facilities that have the potential to leak produced water, or other fluids which may constitute a hazard to public health or safety, would be placed within appropriate containment and/or diversionary structure to prevent spilled or leaking fluid from reaching groundwater or surface waters.
- Notice of any reportable spill or leakage, as defined in BLM NTL 3A, would be immediately reported by Rosewood to the AO of the appropriate SMA as required by law. Oral notice would be given as soon as possible, but within no more than 24 hours, and those oral notices would be confirmed in writing within 72 hours of any such occurrence.
- Rosewood would provide portable sanitation facilities at drill sites, place trash cages at each construction site to collect and store garbage and refuse, and ensure that all garbage and refuse is transported to a State-approved sanitary landfill for disposal.

2.1.12.8. Livestock Grazing

- Rosewood would repair or replace any fences, cattleguards, gates, drift fences, and natural barriers that are damaged as a result of the Proposed Action. Cattleguards or gates would be installed for livestock control on roads when fences are crossed and these structures would be maintained by Rosewood for the life of the road. Rosewood does not anticipate any proposed pipelines cross a fence without being accompanied by a road. If a pipeline does cross a fence without an accompanying road, the pipeline would be located in such a manner as to maintain the integrity of the fence.

2.1.12.9. Paleontological Resources

- Because of the potential for fossil resources to occur in the Uinta Formation in the Atchee Project Area, paleontological surveys would be conducted by an BLM-approved paleontologist prior to any surface disturbance.
- If significant fossils are encountered during the survey, the paleontologist would assess and document the discovery, and either collect the fossils or recommend the area be avoided so as not to destroy the resource.
- The AO of the SMA would determine the need for further monitoring of the area or mitigation of the site during ground-disturbing activities.
- If fossils are encountered during excavation, construction would be suspended, and the AO of the SMA would be notified. Construction would not resume until the fossils are assessed by the AO of the SMA, and appropriate mitigation measures are developed and implemented.

2.2. Description of Alternatives Analyzed in Detail:

The BLM Interdisciplinary Team determined that Alternative B, the No Action Alternative, and Alternative C, No New Well Pads in Lands with Wilderness Characteristics would be analyzed in detail for this EA.

2.2.1. Alternative B: No Action Alternative

Alternative B, the No Action Alternative represents the continuation of existing management activities within the Project Area. The No Action alternative serves as a baseline against which to evaluate the environmental consequences of the Proposed Action and any other alternatives. Under this alternative, Rosewood's Atchee Project on Federal lands and minerals would not be approved, but activities on state lands and minerals and production activities for the existing wells in the project area would continue.

Under Alternative B, one new well pad would be installed in Township 11 South, Range 23 East, Section 16. It is assumed that up to eight wells would be drilled from the new and three existing well pads in that section. Figure 2.2, "No Action Alternative Map" (p. 24) illustrates the locations of the existing well pads, and approximates the locations of the new well pad and new wells included in Alternative B. Specifically, Alternative B includes the following primary components:

- Directional drilling of up to six natural gas wells from 3 existing well pads (well pads would be expanded by up to 1.5 acre per pad);
- Directional drilling of up to two new natural gas wells from one new pad constructed adjacent to an existing road; and
- Depending upon well production, installation of up to one mile of new or replacement surface gas lines and water lines that would transport gas and water produced from both existing and proposed wells to the main gathering lines and water to disposal wells.

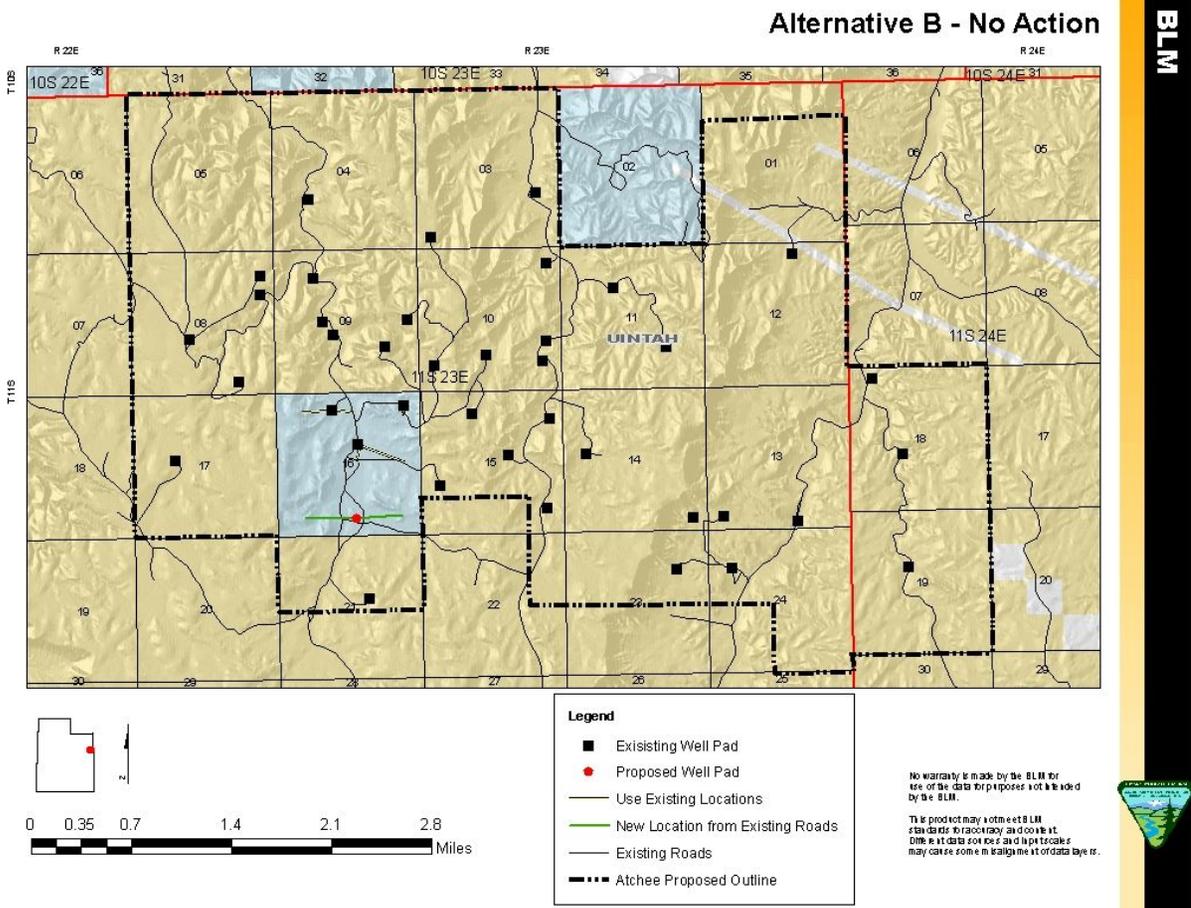


Figure 2.2. No Action Alternative Map

Under this drilling scenario, construction, drilling, and completion of all eight proposed wells would occur in one year. The total number of wells drilled would depend largely on production success, engineering technology, reservoir characteristics, economic factors, commodity prices, rig availability, and lease stipulations. The anticipated life of an individual well is 10 to 20 years. Therefore, the anticipated life of the project under the Proposed Action would be up to 25 years after the drilling of the first wells, assuming favorable economic conditions.

Development assumptions and surface disturbance anticipated under Alternative B is shown in Table 2.5, “Surface Disturbance Under Alternative B” (p. 25). Initial surface disturbance for well pads, access roads, pipeline ROWs, and other surface facilities would equal approximately 11 acres. Those portions of the well pads, access road ROWs, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons. Residual surface disturbance would be approximately 7 acres which would remain for the life of the well(s).

Specific details of project activities, including design features and surface disturbance assumptions for Alternative B are described in the following sections.

2.2.1.1. Well Pad Construction and Expansion

Alternative B would include the construction of one new well pad and the expansion of three existing well pads. All construction would be conducted similar to that described for the proposed action in Section 2.1.1, “Well Pad Construction and Expansion” (p. 9). The newly constructed well pad would initially occupy approximately 2.5 acres. Each existing well pad utilized for proposed directional drilling would be expanded by 1.5 acre per pad. This acreage would include reopening previously utilized reserve pits and expanding the existing pads to accommodate drilling equipment and additional well heads and production facilities.

Table 2.5. Surface Disturbance Under Alternative B

Project Features	Number	Size (Disturbance width [feet] or acres/facility)	Initial Surface Disturbance (Acres)
Proposed Directional Wells From Existing Well Pads	6 Wells / 3 Existing Pads	Up to 1.5 acres per pad	4.5
Proposed Directional Wells From New Well Pads	2 Wells / 1 New Pad	2.5 acres per pad	2.5
Subtotal	8 Wells	--	7
Upgraded Roads	--	10 feet wide	--
New Roads	--	--	--
Subtotal	--	--	--
New or Replacement Surface Gas Pipelines	1 mile	35 feet wide	4.2
Subtotal	1	--	4.2
New Compressor Stations	--	--	--
Upgraded Compressor Stations	--	--	--
Subtotal	--	--	--
Total	--	--	11.2

2.2.1.2. Access Roads

It is estimated that no new roads would be needed under Alternative B. Utilized existing roads would be maintained in good repair during all drilling, completion, and testing operations. No road improvements would be made by Rosewood within other entities' existing road ROWs without prior written approval from the ROW owner. All road maintenance activities implemented by Rosewood on county roads would be coordinated with the Uintah County Public Lands Department. Road construction and maintenance would follow guidelines described in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* "Gold Book" 4th Edition (BLM and USFS 2007), as appropriate.

2.2.1.3. Natural Gas Pipelines

One mile of new or replacement surface gas pipeline would be installed under Alternative B. It is assumed that a 35-foot width would be needed for construction. These collection gas lines would be constructed of 4 to 8 inch outer diameter pipe. Natural gas produced at existing wells is currently transported by approximately 50 miles of 4 inch surface gas lines which extend throughout the Atchee Project Area. Where existing gas lines are in place, the current system would be used to transport gas to market as feasible. However, as the proposed directional wells come on-line and pipeline capacities of existing surface pipelines start to maximize, they would be replaced with larger diameter (up to 8-inch) gas lines, depending upon well production.

2.2.1.4. Produced Water and Produced Water Pipelines

Currently produced water and condensate is decanted into external steel tanks that are located on each existing well pad. Containment dikes constructed either of compacted subsoil or metal barriers surround these facilities and can hold 110 percent of the capacity of the largest tank. Each tank is pumped periodically as needed, and water is transported outside the Atchee Project Area and disposed of in certified disposal sites. The majority of the produced water will be disposed of via an injection well. The rest would be utilized for drilling additional wells as described in Section 2.2.1.8, "Water Requirements" (p. 27). As additional wells come online in the Atchee Project Area, the amount of water produced from downhole formations would increase. To decrease the amount of truck traffic that would be needed to transport and dispose of such water, Rosewood proposes to install (if necessary) one produced water line from each existing and proposed well pad to central tank facilities. All proposed produced water lines would be no larger than 8-inches in outer diameter and located within the 35-foot pipeline construction width described in Section 2.2.1.3, "Natural Gas Pipelines" (p. 26).

2.2.1.5. Compressor Stations

Currently there are three existing compressor stations located in the Atchee Project Area. If the proposed wells are productive, natural gas would be transported from each wellhead via gathering gas lines to the existing compression and treatment facilities. Under Alternative B, it is assumed that no new compressor stations or expansion of existing compressors would occur.

2.2.1.6. Drilling Operations

Once construction or expansion of an individual well pad is completed, drilling equipment would be moved onto the new well pad. Wells would be drilled utilizing a conventional, mechanically-powered mobile drilling rig. The exact type and size of drilling rig would be dependent upon rig availability at the time of project implementation. Under Alternative B, it is anticipated that no more than two drilling rigs would be operating in the Atchee Project Area at any one time. Each well would take approximately 14-21 days to drill. It is anticipated that all eight wells would be drilled within one year. Drilling operations would occur similar to those described in Section 2.1.6, “Drilling Operations” (p. 11)

2.2.1.7. Well Completion and Production

Well completion and production operations under Alternative B would occur similar to those described in Section 2.1.7, “Well Completion and Production” (p. 13).

2.2.1.8. Water Requirements

Water required for the drilling and completion of the proposed gas wells would be hauled by truck from a combination of the permitted water sources described in Table 2.3, “Water Sources Utilized for the Proposed Action” (p. 14).

The needed water volume would depend on the depth of the well and any losses that might occur during drilling. Based on previous experience with wells drilled in the area, approximately 20,000 barrels (2.6 acre-feet) of water would be needed to drill and complete each well. In addition to water for drilling and completion, approximately 775 barrels (0.1 acre-feet) of water per well pad would be utilized for dust abatement each year during the drilling phase. Table 2.6, “Estimated Annual Water Consumption During Drilling Phase” (p. 27) displays the estimated annual water consumption for Alternative B. Following drilling and completion activities, water usage would be primarily limited to dust abatement for the remainder of the project life. While a portion of the water used for drilling and completion of wells would be recycled from other Rosewood wells (e.g., produced water), the majority of water used would be fresh water hauled to the wells from the sources listed in Table 2.3, “Water Sources Utilized for the Proposed Action” (p. 14).

Table 2.6. Estimated Annual Water Consumption During Drilling Phase

Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)
8	20.8	1	21.8

2.2.1.9. Spill Procedures

As each new well is completed on existing pads, Rosewood would update all existing Spill Prevention Control and Countermeasure (SPCC) plans as described in Section 2.1.9, “Spill Procedures” (p. 15).

2.2.1.10. Hazardous Materials and Solid Wastes

Hazardous materials and solid wastes would be handled as described in Section 2.1.10, “Hazardous Materials and Solid Wastes” (p. 15).

2.2.1.11. Reclamation

The State of Utah would set reclamation requirements for any wells on State lands or minerals. Although compliance with Vernal or Green River District guidelines would not be required under Alternative B, for analysis purposes it is assumed that the State would require measures similar to those described in Section 2.1.11.3, “Final Reclamation ” (p. 17).

2.2.1.12. Applicant Committed Environmental Protection Measures

It is assumed that under Alternative B, that Rosewood would apply their applicant committed measures as described in Section 2.1.12, “Applicant Committed Environmental Protection Measures” (p. 17).

2.2.2. Alternative C: No New Well Pads in Lands with Wilderness Characteristics

Under Alternative C, the No New Well Pads in Lands with Wilderness Characteristics Alternative, BLM would follow Rosewood’s plan for development except that the eight new well pads and 19 wells located on lands reviewed by the BLM and found to have wilderness characteristics would be dropped from this alternative. The eight well pads are found in the north half of sections 1, 3, 4, 5, and on the section line between sections 5 and 8, as depicted in Figure 2.1, “Proposed Action Map” (p. 8). The leases proposed to be developed by these eight well pads and 19 wells are valid existing rights that are held by production. If BLM were to select this alternative in the Decision Record for this document, Rosewood could still pursue other development plans for those leases.

Figure 2.3, “Alternative C Map: No New Well Pads in Lands with Wilderness Characteristics” (p. 30) illustrates the locations of the existing well pads, and approximates the locations of the new well pad and new wells included in Alternative C. Specifically, Alternative C includes the following primary components:

- Directional drilling of up to 72 natural gas wells from 38 existing well pads (well pads would be expanded by up to 1.5 acre per pad);
- Vertical and directional drilling of up to 60 new natural gas wells from 22 new pads: It is estimated that 12 new pads would be constructed adjacent to existing roads, and 10 new pads would require new road construction;
- Construction of an estimated 5 miles of new road;
- Depending upon well production, installation of up to 10 miles of new or replacement surface gas lines and water lines that would transport gas and water produced from both existing and proposed wells to the main gathering lines and water to disposal wells, and;

- Construction of 3 to 9 new compressor stations (2 acres each) and expansion of 3 existing compressor stations (1 acre each) that would increase field compression and dehydration to 5,000 horsepower and 75 million cubic feet per day (MMcfd).

BLM

Alternative C - No Well Pads in Wilderness Characteristics

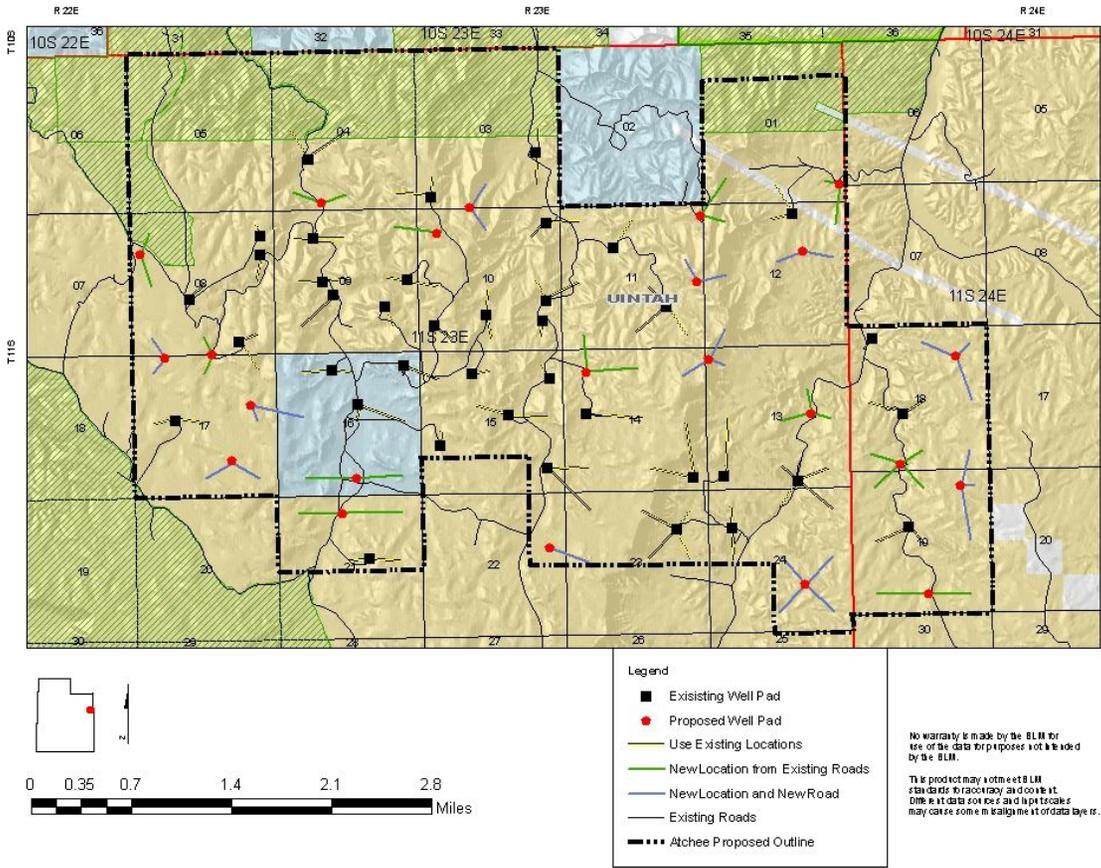


Figure 2.3. Alternative C Map: No New Well Pads in Lands with Wilderness Characteristics

Rosewood proposes to drill between 8 and 20 wells per year until the resource base is fully developed. Under this drilling scenario, construction, drilling, and completion of all 132 proposed wells would occur in approximately 8 to 20 years. The total number of wells drilled would depend largely on production success, engineering technology, reservoir characteristics, economic factors, commodity prices, rig availability, and lease stipulations. The anticipated life of an individual well is 10 to 20 years. Therefore, the anticipated life of the project under the Proposed Action would be up to 25 years after the drilling of the first wells, assuming favorable economic conditions.

Development assumptions and surface disturbance anticipated under Alternative C is shown in Table 2.7, “Surface Disturbance Under Alternative C” (p. 31). Initial surface disturbance for well pads, access roads, pipeline ROWs, and other surface facilities would equal approximately 187 acres. Those portions of the well pads, access road ROWs, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons. Residual surface disturbance would be approximately 135 acres which would remain for the life of the well(s).

Specific details of project activities, including design features and surface disturbance assumptions for Alternative C are described in the following sections.

2.2.2.1. Well Pad Construction and Expansion

Alternative C would include the construction of one new well pad and the expansion of three existing well pads. All construction would be conducted similar to that described for the proposed action in Section 2.1.1, “Well Pad Construction and Expansion” (p. 9). The newly constructed well pad would initially occupy approximately 2.5 acres. Each existing well pad utilized for proposed directional drilling would be expanded by 1.5 acre per pad. This acreage would include reopening previously utilized reserve pits and expanding the existing pads to accommodate drilling equipment and additional well heads and production facilities.

Table 2.7. Surface Disturbance Under Alternative C

Project Features	Number	Size (Disturbance width [feet] or acres/facility)	Initial Surface Disturbance (Acres)
Proposed Directional Wells From Existing Well Pads	72 Wells / 38 Existing Pads	Up to 1.5 acres per pad	85.5
Proposed Directional Wells From New Well Pads	60 Wells / 22 New Pads	2.5 acres per pad	55
Subtotal	8 Wells	--	104.5
Upgraded Roads	--	10 feet wide	--
New Roads	5	30 feet wide	18.8
Subtotal	--	--	18.8
New or Replacement Surface Gas Pipelines	10 miles	35 feet wide	42.4
Subtotal	1	--	42.4
New Compressor Stations	3 to 9	2 acres	6 to 18
Upgraded Compressor Stations	3	1 acre	3
Subtotal	6 to 12	--	9 to 21
Total	--	--	174.7 to 186.7

*Chapter 2 Proposed Action and Alternatives
Alternative C: No New Well Pads in Lands
with Wilderness Characteristics*

2.2.2.2. Access Roads

It is estimated that 5 miles of new roads would be needed under Alternative C. Construction would occur as described in Section 2.1.2, “Access Roads” (p. 10). Utilized existing roads would be maintained in good repair during all drilling, completion, and testing operations. No road improvements would be made by Rosewood within other entities’ existing road ROWs without prior written approval from the ROW owner. All road maintenance activities implemented by Rosewood on county roads would be coordinated with the Uintah County Public Lands Department. Road construction and maintenance would follow guidelines described in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* “Gold Book” 4th Edition (BLM and USFS 2007), as appropriate.

2.2.2.3. Natural Gas Pipelines

Ten miles of new or replacement surface gas pipeline would be installed under Alternative C. It is assumed that a 35-foot width would be needed for construction. These collection gas lines would be constructed of 4 to 8 inch outer diameter pipe. Natural gas produced at existing wells is currently transported by approximately 50 miles of 4 inch surface gas lines which extend throughout the Atchee Project Area. Where existing gas lines are in place, the current system would be used to transport gas to market as feasible. However, as the proposed directional wells come on-line and pipeline capacities of existing surface pipelines start to maximize, they would be replaced with larger diameter (up to 8-inch) gas lines, depending upon well production.

2.2.2.4. Produced Water and Produced Water Pipelines

Currently produced water and condensate is decanted into external steel tanks that are located on each existing well pad. Containment dikes constructed either of compacted subsoil or metal barriers surround these facilities and can hold 110 percent of the capacity of the largest tank. Each tank is pumped periodically as needed, and water is transported outside the Atchee Project Area and disposed of in certified disposal sites. The majority of the produced water will be disposed of via an injection well. The rest would be utilized for drilling additional wells as described in Section 2.2.2.8, “Water Requirements” (p. 33). As additional wells come online in the Atchee Project Area, the amount of water produced from downhole formations would increase. To decrease the amount of truck traffic that would be needed to transport and dispose of such water, Rosewood proposes to install (if necessary) one produced water line from each existing and proposed well pad to central tank facilities. All proposed produced water lines would be no larger than 8-inches in outer diameter and located within the 35-foot pipeline construction width described in Section 2.2.2.3, “Natural Gas Pipelines” (p. 32).

2.2.2.5. Compressor Stations

Currently there are three existing compressor stations located in the Atchee Project Area. If the proposed wells are productive, natural gas would be transported from each wellhead via gathering gas lines to the existing compression and treatment facilities. To support the proposed development, three to nine additional compressor stations would be constructed and installed in T11S, R23E, and all three existing compressor stations would be expanded to support the additional compression facilities. Total surface disturbance associated with expansion of the three existing and construction of the new compressor stations would be up to 21 acres. Details

regarding the surface disturbance associated with each facility are presented in Table 2.7, “Surface Disturbance Under Alternative C” (p. 31).

2.2.2.6. Drilling Operations

Once construction or expansion of an individual well pad is completed, drilling equipment would be moved onto the new well pad. Wells would be drilled utilizing a conventional, mechanically-powered mobile drilling rig. The exact type and size of drilling rig would be dependent upon rig availability at the time of project implementation. Under Alternative C, it is anticipated that no more than two drilling rigs would be operating in the Atchee Project Area at any one time. Each well would take approximately 14-21 days to drill. It is anticipated that Rosewood would drill between 8 and 20 wells per year Table 2.8, “Estimated Drilling Schedule” (p. 33). Drilling operations would occur similar to those described in Section 2.2.2.6, “Drilling Operations” (p. 33).

Table 2.8. Estimated Drilling Schedule

Year	Number of Wells ¹			
	19-yr Estimate		11-yr Estimate	
	Annual	Cumulative	Annual	Cumulative
1	8	8	15	15
2	8	16	15	30
3	8	24	15	45
4	8	32	15	60
5	8	40	15	75
6	8	48	15	90
7	8	56	15	105
8	8	64	15	120
9	8	72	12	132
10	8	80		
11	8	88		
12	8	96		
13	8	104		
14	8	112		
15	8	120		
16	8	128		
17	4	132		

¹ Assumes up to 2 drill rigs operating annually.

2.2.2.7. Well Completion and Production

Well completion and production operations under Alternative C would occur similar to those described in Section 2.1.7, “Well Completion and Production” (p. 13).

2.2.2.8. Water Requirements

Water required for the drilling and completion of the proposed gas wells would be hauled by truck from a combination of the permitted water sources described in Table 2.3, “Water Sources Utilized for the Proposed Action” (p. 14).

The needed water volume would depend on the depth of the well and any losses that might occur during drilling. Based on previous experience with wells drilled in the area, approximately 20,000

barrels (2.6 acre-feet) of water would be needed to drill and complete each well. In addition to water for drilling and completion, approximately 775 barrels (0.1 acre-feet) of water per well pad would be utilized for dust abatement each year during the drilling phase. Table 2.9, “Estimated Annual Water Consumption During Drilling Phase” (p. 34) displays the estimated annual water consumption for Alternative C. Following drilling and completion activities, water usage would be primarily limited to dust abatement for the remainder of the project life. While a portion of the water used for drilling and completion of wells would be recycled from other Rosewood wells (e.g., produced water), the majority of water used would be fresh water hauled to the wells from the sources listed in Table 2.3, “Water Sources Utilized for the Proposed Action” (p. 14).

Table 2.9. Estimated Annual Water Consumption During Drilling Phase

Year	19-yr Estimate				11-yr Estimate			
	Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)	Estimated Number of Wells	Estimated Annual Water Use for Drilling (acre-feet)	Estimated Annual Water Use for Dust Abatement (acre-feet)	Total Water Use per Year (acre-feet)
1	8	20.8	1	21.8	15	39.0	2.0	41.0
2	8	20.8	1	21.8	15	39.0	2.0	41.0
3	8	20.8	1	21.8	15	39.0	2.0	41.0
4	8	20.8	1	21.8	15	39.0	2.0	41.0
5	8	20.8	1	21.8	15	39.0	2.0	41.0
6	8	20.8	1	21.8	15	39.0	2.0	41.0
7	8	20.8	1	21.8	15	39.0	2.0	41.0
8	8	20.8	1	21.8	15	39.0	2.0	41.0
9	8	20.8	1	21.8	12	31.2	2.0	33.2
10	8	20.8	1	21.8				
11	8	20.8	1	21.8				
12	8	20.8	1	21.8				
13	8	20.8	1	21.8				
14	8	20.8	1	21.8				
15	8	20.8	1	21.8				
16	8	20.8	1	21.8				
17	4	10.4	1	11.4				
TOTAL	132	343.2	17	411.7	132	343.2	18	361.2

2.2.2.9. Spill Procedures

As each new well is completed on existing pads, Rosewood would update all existing Spill Prevention Control and Countermeasure (SPCC) plans as described in Section 2.1.9, “Spill Procedures” (p. 15).

2.2.2.10. Hazardous Materials and Solid Wastes

Hazardous materials and solid wastes would be handled as described in Section 2.1.10, “Hazardous Materials and Solid Wastes” (p. 15).

2.2.2.11. Reclamation

Reclamation under Alternative C would occur as described in Section 2.1.11.3, “Final Reclamation ” (p. 17).

2.2.2.12. Applicant Committed Environmental Protection Measures

It is assumed that under Alternative C, that Rosewood would apply their applicant committed measures as described in Section 2.1.12, “Applicant Committed Environmental Protection Measures” (p. 17).

2.3. Alternatives Considered but not Analyzed in Detail

2.3.1. Full Development as Described in the RDG EIS

The VFO considered an alternative that would include full development as described in the RDG EIS. It was determined this alternative would not be analyzed in detail in this EA because it does not reflect the current plans of Rosewood or any of the other operators in the area, and because it does not reflect current best management practices such as directional drilling.

2.4. Conformance

The proposed action and alternatives would be in conformance with the Vernal Field Office Resource Management Plan/Record of Decision (RMP/ROD) (BLM, 2008) and the terms of the existing leases. The RMP/ROD management objectives for Minerals encourage the drilling of oil and gas wells by private industry to meet local and national energy needs (RMP/ROD, p. 31, 97).

The RMP/ROD allows for the processing of applications and permits on public lands in accordance with policy and guidance (RMP/ROD, p. 86). It has been determined that the Proposed Action and alternative(s) would not conflict with other decisions throughout the plan.

2.4.1. Relationship to Statutes, Regulations, or Other Plans

The subject lands were leased for oil or gas development under authority of the Mineral Leasing Act of 1920, as modified by the Federal Onshore Oil and Gas Leasing Reform Act of 1987, the Energy Policy Act of 2005, and the Federal Land Policy and Management Act of 1976. Rosewood has the right to explore for oil and gas on the lease(s) as specified in 43 CFR 3103.1-2, and if a discovery is made, to produce oil and/or natural gas for economic gain consistent with the rights contained in its valid existing leases and BLM’s oil and gas regulations (43 CFR Part 3160).

There are no comprehensive State of Utah plans for the vicinity of the Proposed Action. The State of Utah School and Institutional Trust Lands Administration (SITLA) has leased much of the nearby state land for oil and gas production. Because the objectives of SITLA are to produce funding for the state school system, and because production on Federal leases could further interest in development on state leases in the area, it is assumed that the alternatives analyzed, except the No Action Alternative, are consistent with the objectives of the state.

The proposed project is consistent with the *Uintah County General Plan, 2012 as amended* that encompasses the location of the proposed project. In general, the Plan indicates support for development proposals such as the Proposed Action through the Plan's emphasis on multiple-use public land management practices, responsible use and optimum utilization.

Chapter 3. Affected Environment

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3.1. Introduction

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified in Appendix A, *Interdisciplinary Team Checklist* (p. 97) and presented in Chapter 1, *Introduction* (p. 1) of this assessment. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4, *Environmental Effects* (p. 55).

3.1.1. Air Quality

The Project Area is located in the Uinta Basin, a semiarid, mid-continental climate regime typified by dry, windy conditions, limited precipitation and wide seasonal temperature variations subject to abundant sunshine and rapid nighttime cooling. The Uinta Basin is designated as unclassified/attainment by the EPA under the Clean Air Act. This classification indicates that the concentration of criteria pollutants in the ambient air is below National Ambient Air Quality Standards (NAAQS), or that adequate air monitoring is not available to determine attainment.

3.1.1.1. Ambient Air Quality

NAAQS are standards that have been set for the purpose of protecting human health and welfare with an adequate margin of safety. Pollutants for which standards have been set include ground level ozone, (O³), sulfur dioxide (SO²), nitrogen dioxide (NO²), and carbon monoxide (CO), and particulate matter less than 10 microns in diameter (PM₁₀) or 2.5 microns in diameter (PM_{2.5}). Airborne particulate matter consists of tiny coarse-mode (PM₁₀) or fine-mode (PM_{2.5}) particles or aerosols combined with dust, dirt, smoke, and liquid droplets. PM_{2.5} is derived primarily from the incomplete combustion of fuel sources and secondarily formed aerosols, whereas PM₁₀ is primarily from crushing, grinding, or abrasion of surfaces. Table 3.1, “Ambient Air Quality Background Values” (p. 39) lists ambient air quality background values for the Uinta Basin and NAAQS standards.

Table 3.1. Ambient Air Quality Background Values

Pollutant	Averaging Period(s)	Uinta Basin Background Concentration (µg/m ³)	NAAQS (µg/m ³)
SO ₂	Annual	0.8 ²	--1
	24-hour	3.9 ²	--1
	3-hour	10.1 ²	1,300
	1-hour	19.0 ²	197
NO ₂	Annual	8.1 ³	100
	1-hour	60.2 ³	188
PM ₁₀	Annual	7.0 ⁴	--6
	24-hour	16.0 ⁴	150
PM _{2.5}	Annual	9.4 ³	15
	24-hour	17.8 ³	35

CO	8-hour	3,450 ⁴	10,000
CO	1-hour	6,325 ⁴	40,000
O ₃	8-hour	100.0 ^{3,5}	75
1 – The 24-hour and annual SO ₂ NAAQS have been revoked by USEPA			
2 – Based on 2009 data from Wamsutter Monitoring Station Data (USEPA AQS Database)			
3 – Based on 2010/2011 data from Redwash Monitoring Station (USEPA AQS Database)			
4 – Based on 2006 data disclosed in the Greater Natural Buttes FEIS. (BLM, 2012)			
5 – Ozone is measured in parts per billion (ppb)			
6 – The annual PM ₁₀ NAAQS has been revoked by USEPA			

Existing point and area sources of air pollution within the Uinta Basin include the following:

- Exhaust emissions (primarily CO, NO_x, PM_{2.5}, and HAPs) from existing natural gas fired compressor engines used in transportation of natural gas in pipelines;
- Natural gas dehydrator still-vent emissions of CO, NO_x, PM_{2.5}, and HAPs;
- Gasoline and diesel-fueled vehicle tailpipe emissions of VOCs, NO_x, CO, SO₂, PM₁₀, and PM_{2.5};
- Oxides of sulfur (SO_x), NO_x, fugitive dust emissions from coal-fired power plants, and coal mining/ processing;
- Fugitive dust (in the form of PM₁₀ and PM_{2.5}) from vehicle traffic on unpaved roads, wind erosion in areas of soil disturbance, and road sanding during winter months; and,
- Long-range transport of pollutants from distant sources.

Two year-round air quality monitoring sites were established in summer 2009 near Red Wash (southeast of Vernal, Utah) and Ouray (southwest of Vernal). These monitors were certified as Federal Reference Monitors in fall of 2011, which means they can be used to make a NAAQS compliance determination. The complete EPA Ouray and Redwash monitoring data can be found at: <http://www.epa.gov/airexplorer/index.htm>

Both monitoring sites have recorded numerous exceedences of the 8-hour ozone standard during the winter months (January through March 2010, 2011, 2013, and 2014). It is thought that high concentrations of ozone are being formed under a “cold pool” process. This process occurs when stagnate air conditions form with very low mixing heights under clear skies, with snow-covered ground, and abundant sunlight. These conditions, combined with area precursor emissions (NO_x and VOCs), can create intense episodes of ozone. The high numbers did not occur in January through March 2012 due to a lack of snow cover. This phenomenon has also been observed in similar locations in Wyoming. Winter ozone formation is a newly recognized issue, and the methods of analyzing and managing this problem are still being developed. Existing photochemical models are currently unable to reliably replicate winter ozone formation. This is due to the very low mixing heights associated with unique meteorology of the ambient conditions. Further research is needed to definitively identify ozone precursor sources that contribute to observed ozone concentrations.

The UDAQ conducted limited monitoring of PM_{2.5} in Vernal, Utah in December 2006. During the 2006-2007 winter seasons, PM_{2.5} levels were higher than the PM_{2.5} health standards that became effective in December 2006. The PM_{2.5} levels recorded in Vernal were similar to other areas in northern Utah that experience wintertime inversions. The most likely causes of elevated PM_{2.5} at the Vernal monitoring station are those common to other areas of the western U.S. (combustion and dust) plus nitrates and organics from oil and gas activities in the Basin. PM_{2.5} monitoring that has been conducted in the vicinity of oil and gas operations in the Uinta Basin by the Red Wash and Ouray monitors beginning in summer 2009 have not recorded any exceedences of either the 24 hour or annual NAAQS.

HAPs are pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental impacts. The EPA has classified 187 air pollutants as HAPs. Examples of listed HAPs associated with the oil and gas industry include formaldehyde, benzene, toluene, ethylbenzene, isomers of xylene (BTEX) compounds, and normal-hexane (n-hexane). There are no applicable Federal or State of Utah ambient air quality standards for assessing potential HAP impacts to human health.

3.1.1.2. Greenhouse Gases

Greenhouse gases keep the planet's surface warmer than it otherwise would be. According to NOAA and NASA data, the Earth's average surface temperature has increased by about 1.2 to 1.4° F in the last 100 years. The eight warmest years on record (since 1850) have all occurred since 1998, with the warmest year being 1998. However, according to the British Meteorological Office's Hadley Centre (BMO 2009), the United Kingdom's foremost climate change research center, the mean global temperature has been relatively constant for the past nine 18 years after the warming trend from 1950 through 2000. Predictions of the ultimate outcome of global warming remain to be seen.

The analysis of the Regional Climate Impacts prepared by the U.S. Global Change Research Program (USGCRP) in 2009 suggests that recent warming in the region (including the project area) was nationally among the most rapid. Past records and future projections predict an overall increase in regional temperatures, largely in the form of warmer nights and effectively higher average daily minimum temperatures. They conclude that this warming is causing a decline in spring snowpack and reduced flows in the Colorado River. The USGCRP projects a region-wide decrease in precipitation, although with substantial variability in interannual conditions. For eastern Utah, the projections range from an approximate 5 percent decrease in annual precipitation to decreases as high as 40 percent of annual precipitation.

Equilibrium climate sensitivity quantifies the response of the climate system to constant radiative forcing on multicentury time scales. It is defined as the change in global mean surface temperature at equilibrium that is caused by a doubling of the atmospheric CO₂ concentration. Equilibrium climate sensitivity is likely in the range 1.5°C to 4.5°C (high confidence), extremely unlikely less than 1°C (high confidence), and very unlikely greater than 6°C (medium confidence). The lower temperature limit of the assessed likely range is thus less than the 2°C in the AR4, but the upper limit is the same. This assessment reflects improved understanding, the extended temperature record in the atmosphere and ocean, and new estimates of radiative forcing. No best estimate for equilibrium climate sensitivity can now be given because of a lack of agreement on values across assessed lines of evidence and studies (IPCC, 2013).

3.1.2. Cultural Resources

Federal historic preservation legislation provides a legal environment for documentation, evaluation, and protection of archaeological and historic sites that may be affected by federal undertakings, or by private undertakings operating under federal license or on federally managed lands. These include the Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 13007, the National Historic Preservation Act (NHPA) of 1966, as amended; the American Indian Religious Freedom Act (AIRFA) of 1978; and the Archaeological Resource Protection Act (ARPA) of 1979. Executive Order 11593 also provides necessary guidance on protection and enhancement of cultural resources.

The NHPA requires agencies to take into account the effects of their actions on properties listed or eligible for listing in the National Register of Historic Places (NRHP). The assessment of impacts to cultural resources follows a review process as outlined in Section 106 of the NHPA (36 CFR Part 800). The process consists of four primary sequential steps: 1) determine the

Area of Potential Effect (APE) of the Proposed Action in consultation with the appropriate State Historic Preservation Office (SHPO) and/or Indian Tribes; 2) identify cultural resources within the APE that are either listed in or eligible for listing in the NRHP; 3) assess the extent and type of impacts the Proposed Action may have upon cultural resources; and 4) resolve adverse impacts in consultation with the SHPO and/or tribes. The regulations require that federal agencies initiate the Section 106 process early in the project planning, when a broad range of alternatives can be considered (36 CFR § 800.1[c]).

The study area extends one mile outside of Atchee's Unit Proposed Development Area (Atchee's Unit). A total of 109 projects have been conducted within one mile of the current project area. Thirty-eight cultural resource sites have been identified within the study area, nine of which are located within Atchee's Unit. There are four sites recommended Eligible to the NRHP within the Atchee's Unit, and another six Eligible sites recorded within one mile of the project area.

Historic plat maps of the project area were examined for possible historic resources in the project area. Historic resources were plotted on several of the Government Land Office (GLO) plat maps (GLO 1905a, 1905b, 1905c, 1923). All, or most of the historic features on the maps are related to the Gilsonite mining industry which flourished in the region from the 1880s into the 1950s. There are two Gilsonite veins in the project area, the Harrison and South Harrison Lodes (GLO: 1905a, 1905b, 1905c, 1923). In addition to the lodes and associated mining claims, there were several dirt roads accessing some of these areas, a small Gilsonite vein, a house and shaft, and a prospect hole noted on the historic maps.

Less than twenty-five percent of the Atchee's Unit has been surveyed for cultural resources. Additionally, the majority of these inventories was completed over ten years ago, and as such, would need to be resurveyed to the current required methodological standards. Because a limited portion of the proposed development area has been inventoried for cultural resources, it is difficult to predict what types of cultural resources will be present in the Atchee's Unit. The information collected in this analysis provides some sense of the types of sites and density that could be expected within the Atchee's Unit. There is no certainty, but professional experience plus information obtained from this analysis helps provide the likelihood of the expected types and approximate density of sites in the project area. A total of nine archaeological sites have been recorded within the project unit. These sites include four prehistoric sites and five European American sites. The prehistoric sites include a Fremont era rockshelter occupation site, a lithic

scatter and two quarry/lithic scatter sites. The historic sites include a rock alignment of unknown function, two campsites, and one grave.

In addition, the GLO map shows an additional 16 historic sites, most of which will likely be found within the unit because most are either Gilsonite loads or features associated with such mine sites. Unlike roads and other more ephemeral cultural features, mine sites are more impressed upon the landscape, thus lasting much longer.

Using these data as a guide, it is likely that 15 to 20 more prehistoric sites will be located within the full project area. The majority of these will likely be either small lithic quarry sites or lithic scatter sites, some of the latter associated with ephemeral campsites. The presence of a significant rockshelter occupation site within the area also suggests that additional sites of this type could be identified. The presence of a Fremont occupation site in the project area suggests that there are other, similar, sites of Fremont affiliation in the vicinity.

As many as 30 to 40 more historic sites could also be identified within the project unit. Half of the historic sites will likely be Gilsonite lodes and related features, while most of the remainder of the historic sites will likely consist of campsites and trash deposits. There is always the possibility of some unique and unanticipated site types that also may be encountered.

All ground disturbing proposed undertakings outside of previous project areas less than ten years of age will require a Cultural Resource Inventory to document the presence, or not, of any cultural resources. All identified cultural resources will be evaluated for eligibility of inclusion to the NRHP. All eligible cultural properties will be avoided by any proposed ground disturbing action.

3.1.3. Invasive Plants/Noxious Weeds, Soils & Vegetation

3.1.3.1. Soils

Soils in the project area are extremely variable and include loam, sandy loam, clay loam, silt loam, and stony and gravelly loam, with rocky outcrops and badlands. These soils tend to be shallow and well-drained, but can be up to 60 inches deep in places. The dominant soils in the Project Area are described in the table below.

Dominant Soils in Project Area

Soil Type and Slope	Landform and Elevation	Parent Material(s)	Surface Layer and Depth	Permeability and Drainage Class	Land Capability Classification	Ecological Site Classification
Badland-Rock outcrop complex (12), 1-100 % slopes	Badland: Erosion remnant, hill, ridge Rock Outcrop: Cliff, erosion remnant, escarpment, ledge 4,700-7,000 ft.	Badland: Soft geologic materials of the Duchesne River, Green River, Mancos, Morrison and Uinta formations. Rock Outcrop: shale, siltstone, sandstone, limestone, and quartzite of the Browns Park,	N/A	Very slow permeability; somewhat excessively drained	Badland: 8e nonirrigated Rock Outcrop: 8s nonirrigated	N/A

		Duchesne River, Green River, Mancos, Park City and Uinta formations.				
Gilston sandy loam (78), 2-8 % slopes	Drainageways 5,700-6,400 ft.	Alluvium derived from sandstone	A—0 to 4 inches; sandy loam	Moderately rapid permeability; well drained	7e nonirrigated	Semidesert Gravelly Sandy Loam (Wyoming Big Sagebrush)
Walknolls extremely channery sandy loam-Gilston association (257), 2-50 % slopes	Walknolls:Hills Gilston: Drainageways 6,000 -6,300 ft.	Walknolls: Slope alluvium and colluvium derived from sandstone Gilston: Alluvium derived from sandstone	Walknolls: A—0 to 2 inches; extremely channery sandy loam Gilston: A—0 to 4 inches; sandy loam	Moderately rapid permeability; well drained	Walknolls: 7s nonirrigated Gilston: 7e nonirrigated	Walknolls: Semidesert Shallow Loam (Utah Juniper-Pinyon) Gilston: Semidesert Gravelly Sandy Loam (Wyoming Big Sagebrush)
Walknolls-Gilston association (262), 2-25% slopes	Walknolls:Hills Gilston: Drainageways 5,300 -5,900 ft.	Walknolls: Slope alluvium derived from sandstone Gilston: Alluvium derived from sandstone	Walknolls: A—0 to 3 inches; very channery loam Gilston: A—0 to 4 inches; sandy loam	Walknolls: Moderate permeability; well drained Gilston: Moderately rapid permeability; well drained	Walknolls: 7s nonirrigated Gilston: 7e nonirrigated	Walknolls: Semidesert Shallow Loam (Wyoming Big Sagebrush) Gilston: Semidesert Gravelly Sandy Loam (Wyoming Big Sagebrush)
Walknolls-Uendal association (266), 2-25% slopes	Hills 5,200 -6,300 ft.	Slope alluvium derived from sandstone	Walknolls: A—0 to 3 inches; very channery sandy loam Uendal: A—0 to 4 inches; gravelly sandy loam	Moderately rapid permeability; well drained	Walknolls: 7s nonirrigated Uendal: 7e nonirrigated	Walknolls: Semidesert Shallow Loam (Black Sagebrush) Uendal: Semidesert Gravelly Sandy Loam (Wyoming Big Sagebrush)

A level 7 classification indicates that the soils are not generally suited for the mechanized production of field crops without special management, but they are suitable for plants that provide a permanent cover, such as grasses and trees. Areas in class 8 are not suitable for crops, pasture, or forestland without a level of management that is impractical. These areas have potential for other uses, such as recreational facilities and wildlife habitat. The *e* capability subclass shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained. The *s* capability subclass shows that the soil is limited mainly because it is salty, shallow, droughty, or stony.

The dominant and representative species of vegetation for the ecological site classifications of soils in the Project Area are listed in the table below.

3.1.3.2. Vegetation

Dominant Vegetation in Project Area

Ecological Site Classification	Dominant/Representative Vegetation
Semidesert Gravelly Sandy Loam (Wyoming Big Sagebrush)	Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>), rubber rabbitbrush (<i>Chrysothamnus nauseosus</i>), spiny hopsage (<i>Grayia spinosa</i>), Indian ricegrass (<i>Achnatherum hymenoides</i>), bluegrass (<i>Poa</i> sp.), bottlebrush squirreltail (<i>Elymus elymoides</i>), horsebrush (<i>Tetradymia</i> sp.), shadscale saltbush (<i>Atriplex confertifolia</i>)
Semidesert Shallow Loam (Wyoming Big Sagebrush)	Wyoming big sagebrush (<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>), Indian ricegrass (<i>Achnatherum hymenoides</i>), bluegrass (<i>Poa</i> sp.), shadscale saltbush (<i>Atriplex confertifolia</i>), bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>), yellow rabbitbrush (<i>Chrysothamnus viscidiflorus</i>)
Semidesert Shallow Loam (Black Sagebrush)	black sagebrush (<i>Artemisia nova</i>), Indian ricegrass (<i>Achnatherum hymenoides</i>), galleta (<i>Pleuraphis jamesii</i>), shadscale saltbush (<i>Atriplex confertifolia</i>), blue grama (<i>Bouteloua gracilis</i>), bud sagebrush (<i>Picrothamnus desertorum</i>), slender buckwheat (<i>Eriogonum microthecum</i>)
Semidesert Shallow Loam (Utah Juniper-Pinyon)	Utah juniper (<i>Juniperus osteosperma</i>), twoneedle pinyon (<i>Pinus edulis</i>), black sagebrush (<i>Artemisia nova</i>), saline wildrye (<i>Leymus salinus</i>), Mormon tea (<i>Ephedra viridis</i>), bluebunch wheatgrass (<i>Pseudoroegneria spicata</i>), galleta (<i>Pleuraphis jamesii</i>)

3.1.3.3. Invasive Plants and Noxious Weeds

The Utah Class B noxious weed Russian knapweed (*Acroptilon repens*) has been previously documented in the Project Area, and the Utah Class C noxious weed saltcedar (*Tamarix ramosissima*) has previously documented nearby. Although the invasive species cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola iberica*), and halogeton (*Halogeton glomeratus*) have not been documented within the Project Area, they are common across the VFO and are likely to occur in the Project Area. Any observed instances of noxious weed growth in the Project Area during the life of the project would also be controlled by the operator.

3.1.4. Lands with Wilderness Characteristics (LWC)

3.1.4.1. White River Inventory Area

The White River Inventory Area is located in eastern Uintah County about 30 air miles south-southeast of Vernal, Utah (see Figure 3.1, “White River Inventory Area” (p. 47) and Table 3.2, “White River Wilderness Characteristics Acres” (p. 46)). Steep-walled, deep canyons and alternating ridges dominate the terrain in the area. The White River Canyon is the major canyon in the area that trends east to west. Several side canyons containing White River tributaries are present. These side canyons contain numerous pinnacles and colorful rock outcrops.

Vegetation north of the Whiter River is a desert shrub community and includes saltbush, sagebrush, rabbit brush and other shrubs, grasses, and forbs. Higher elevations south of the river support pinion and juniper woodlands along the ridge lines. Cottonwood trees and other riparian plants are present along the river floodplain. Vegetation in the side canyons is mainly sagebrush and rabbit brush.

Appearance of Naturalness:

The rugged topography and size of the area diminishes any human-made developments to be unnoticeable except for three small portions of the area. The terrain also separates the area from nearby oil and gas activity which has increased in activity since 2002. A historic structure called the Rock House is located in Atchees Wash in NWSENE, Section 33, T10S, R23E. The structure is being reviewed to determine stabilization and fencing methods. This will not affect the appearance of naturalness or wilderness characteristics of the area.

Usage of the Atchees Wash Road, the Asphalt Wash Road, and the Saddletree Wash Road has increased since the 1999 inventory and the UWC submissions in 2000 and 2001. The roads are now being regularly used by trucks hauling water from the white river for oil and gas exploration and development. These roads to the White River have been cherry-stemmed out of the acreage described for the White River Unit.

Solitude, Primitive and Unconfined Recreation:

The size of the wilderness inventory area as described under Appearance of Naturalness, is large enough to ensure opportunities for solitude and primitive and unconfined recreation. Visitors to the area take advantage of hiking, floating, camping, and photography. The most noteworthy recreation opportunity is to float the White River via canoes, kayaks, or rafts.

Supplemental Values:

The area's geologic and topographic features provide scenic views for the visitor. The Powell Expedition of the Green and Colorado Rivers highlighted an area known as "Goblin City" found in the inventory area. Antelope, mule deer and elk are common in the area. A variety of birds are found along the river and the canyon walls. Habitat for sensitive plant and animal species is present.

Table 3.2. White River Wilderness Characteristics Acres

WHITE RIVER AREA			
Type of Lands	Non WSA Lands With Wilderness Characteristics (acres)	Non WSA Lands Without Wilderness Characteristics (acres)	Total (acres)
UWC, Externally Nominated	7,408	8,474	15,882
WIA, BLM Identified	13,803	90	13,893
Total Acres	21,211	8,564	29,775

Southern Utah Wilderness Alliance submitted a wilderness character area addition for the White River Unit on July 14, 2014. This addition has not yet been reviewed by the Vernal Field Office. The area submitted for review is outside of the project area and is therefore not affected by this action.

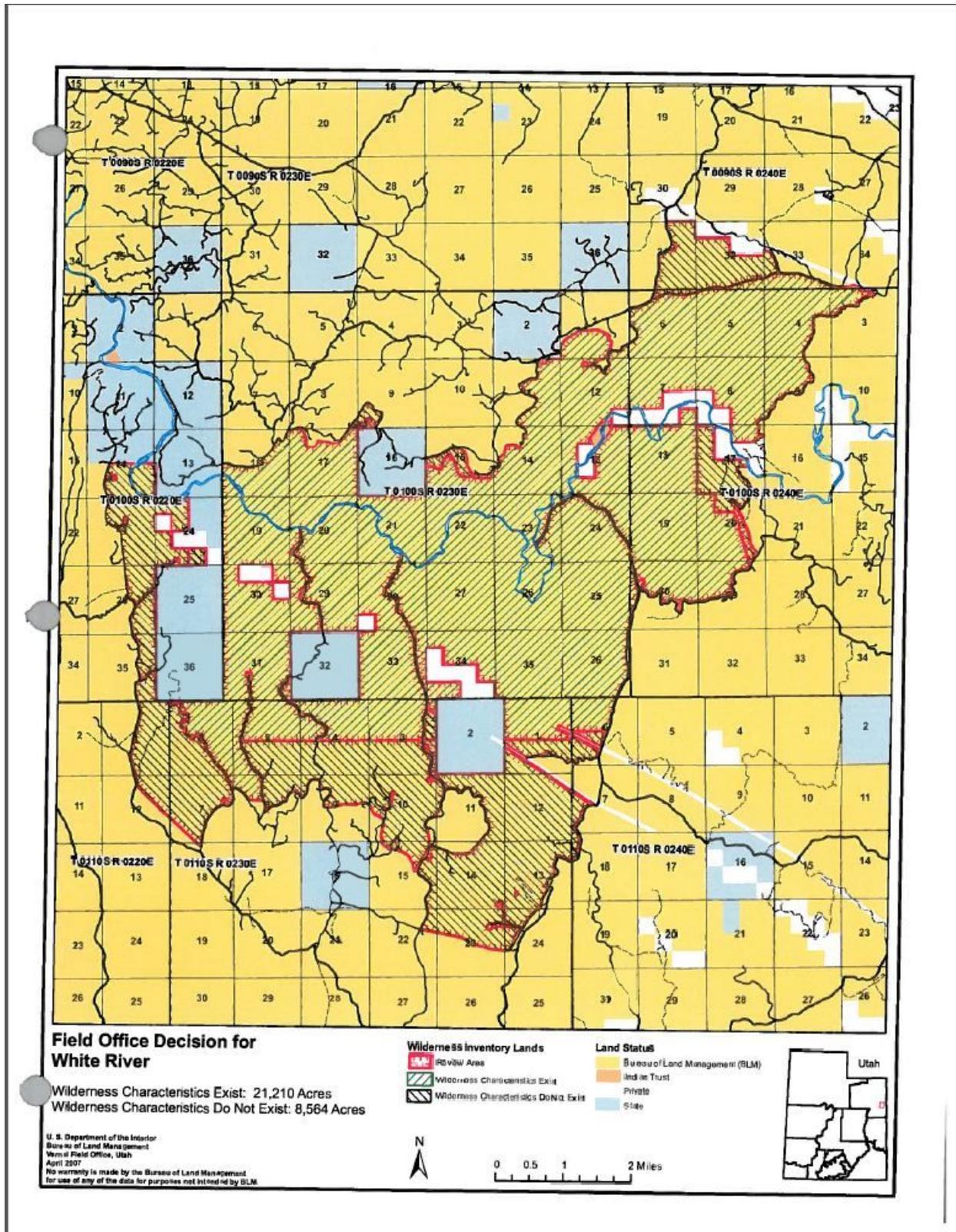


Figure 3.1. White River Inventory Area

3.1.5. Plants

3.1.5.1. Threatened, Endangered, Proposed, or Candidate Species

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)

The Uinta Basin hookless cactus (*S. wetlandicus*) is a perennial that occurs as a solitary, unbranched, round-to-elongate/cylindric succulent stem usually 1.25–3.5 inches in diameter by 2 to 5 inches tall that produces pink to violet flowers from late April to May (Heil and Porter 2004). Observed pollinators include bees, beetles, ants, and flies. Seed dispersal vectors include gravity, ants, birds, rodents, precipitation, and surface water flows. It is theorized that seed dispersal is a limiting factor in the distribution of the species (USFWS 1990). Very little is known about the factors affecting the distribution and long-term population dynamics of the Uinta Basin hookless cactus.

Information on the habitat requirements and distribution of this species has been rapidly changing as more studies and surveys are conducted in the Uinta Basin. Currently, the species is known to occur on Quaternary and Tertiary alluvium soils overlain with cobbles and pebbles of the Duchesne River, Green River, and Uinta Formations between 4,500 to 6,600 feet amsl (BLM 2008b, UNPS 2007). It is also found on gravelly hills and terraces, river benches, valley slopes, and rolling hills along the Green, White, and Duchesne Rivers. Preferred habitat is generally associated with Pleistocene outwash terraces with coarse-textured, alkaline soils overlain by a surficial pavement of large, smooth, rounded cobble. It can be found in a range of vegetative communities including clay badlands, salt desert shrub, and pinyon-juniper woodlands. Associated species include black sagebrush, shadscale saltbush, James' galleta, and Indian ricegrass.

Uinta Basin hookless cactus is listed as threatened under the Endangered Species Act, and has potential habitat in the Project Area. In 2010, the USFWS developed a potential habitat polygon for *Sclerocactus ssp.* to better assess possible impacts to the species within its range. Although *S. wetlandicus* populations can be found outside of these areas, they tend to occur at greater numbers and at higher densities within these polygons. The potential habitat polygon is updated annually and was last updated in March 2013 (USFWS 2013a). Part of the Project Area is located within the 2013 polygon established by USFWS as potential habitat for *Sclerocactus ssp.* The Project Area does not occur within designated core habitat for the species. Individuals or populations of *Sclerocactus wetlandicus* have not been previously documented in the Project Area; the nearest documented occurrence is located approximately 4.7 miles outside the Project Area.

Graham's Penstemon (*Penstemon grahamii*)

Graham's beardtongue is an herbaceous perennial flowering plant in the plantain family (Plantaginaceae). The species was described by D. D. Keck in 1937 based on specimens collected by Graham in 1933 (Graham 1937). Graham's beardtongue plants spend much of the year as small basal rosettes from taproots. From May through June, individual plants produce up to 20 or more pink to lavender flowers on one or more stems that are as high as 20 centimeters (cm; 8 inches) tall (Welsh et al. 2008). Detailed descriptions are provided in *A Utah Flora* (Welsh et al. 2008) and on the Utah rare plant guide website (Utah Native Plant Society [UNPS] 2003–2013).

The species occurs at an elevation range of 1,426–2,128 meters (4,678–6,981 feet). The currently known range of Graham's beardtongue is an approximately 80-mile long, 6-mile-wide "horseshoe-shaped band" that occurs from Rio Blanco County in Colorado south/southwest to the

southeastern border of Duchesne County in Utah (USFWS 2013b). Currently, there are 24 known sub-populations of Graham's beardtongue, with an estimated total number of 40,333 plants across their range (USFWS 2013b). Graham's beardtongue occurs on federal and non-federal lands. No plants are currently known to exist on tribal lands (USFWS 2013b), but tribal lands between known populations have not yet been surveyed and there is potential for plants to occur in these areas.

Graham's beardtongue occupies white to tan shale-derived soils of the Green River Formation. Graham's beardtongue typically inhabits shallow, calcareous soils on southwest-facing steep, semi-barren slopes, knolls, and ridges (USFWS 2013b). The soil surface consists of small, shale channers (thin, flat coarse shale fragments) that are high in organic carbon and occur where there is little soil horizon development (USFWS 2013b). Most of the known Graham's beardtongue occurs on soils derived from the Mahogany ledge member of the Green River Formation, known for rich oil shale outcrops (USFWS 2013b).

Graham's beardtongue is found in sparsely vegetated pinyon-juniper woodlands and desert shrub plant communities. The species' habitats typically comprise sparse or no tree cover, sparse shrub cover, and scattered to dense grass and forb cover. Commonly associated plant species include pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), Utah serviceberry (*Amelanchier utahensis*), alder-leaved mountain-mahogany (*Cercocarpus montanus* var. *alnifolius*), shadscale (*Atriplex confertifolia*), spiny greasebush (*Glossopetalon spinescens* var. *meionandra*), ephedra buckwheat, big buckwheat (*Eriogonum corymbosum*), salina wildrye (*Leymus salina*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Indian ricegrass (*Achnatherum hymenoides*) (USFWS 2013b, 2013c; Welsh et al. 2008).

Graham's beardtongue commonly occurs with other Uinta Basin oil shale endemic plant species, including White River beardtongue, ephedra buckwheat, dragon milkvetch, Barneby's catseye, Barneby's thistle, oil shale columbine (*Aquilegia barnebyi*), and shrubby reed-mustard (USFWS 2013b, 2013c; Welsh et al. 2008). Suitable habitat for the species is present throughout the Project Area; however, a complete inventory of the Project Area has not been completed, and the species has not been previously documented in the Project Area. In 2014, a multi-agency Conservation Agreement and Strategy for Graham's Beardtongue and White River Beardtongue was completed which established designated Core Conservation Areas for Graham's beardtongue (SWCA 2014). The Project Area is not located within one of the designated Core Conservation Areas.

White River Penstemon (*Penstemon scariosus* var. *albifluvis*)

White River beardtongue is a member of the *P. scariosus* species complex, which comprises four varieties of the species found in the Uinta Basin of Utah (Welsh et al. 2008). White River beardtongue can be distinguished from the closely related Garrett's beardtongue (*P. scariosus* var. *garrettii*) by leaf width (less than 7 millimeters [mm] vs. greater than 7 mm), corolla color (pale blue to lavender vs. blue), and habitat (calcareous shale vs. non-shale habitats), respectively (Welsh et al. 2008). White River beardtongue and Garrett's beardtongue are suspected to intergrade near the western edge of White River beardtongue's range, and distinguishing the "weakly differentiated varieties" is recognized to be difficult (Welsh et al. 2008).

White River beardtongue occupies similar habitats as Graham's beardtongue. The species occurs on calcareous, shallow soils derived from shales in the Mahogany Ledge member of the Green River Formation, and the two beardtongue species' ranges partially overlap (USFWS 2013b). Similar to Graham's beardtongue, individuals of White River beardtongue generally tend to occupy slopes, ridges, and knolls on southwest-facing slopes (USFWS 2013b).

White River beardtongue also occurs in association with sparsely vegetated pinyon-juniper woodlands and desert shrub plant communities. The plant species associated with White River beardtongue include pinyon pine, Utah juniper, Utah serviceberry, alder-leaved mountain-mahogany, broom snakeweed (*Gutierrezia sarothrae*), shadscale, spiny greasebush, salina wildrye, bluebunch wheatgrass, and Indian ricegrass (USFWS 2013c; Welsh et al. 2008).

Uinta Basin oil shale endemic plant species associates consist of ephedra buckwheat, Barneby's thistle, Graham's cryptantha, many-stem blazingstar (*Mentzelia multicaulis*), and oil shale columbine (USFWS 2013c; Welsh et al. 2008).

Suitable habitat for the species is present throughout the Project Area; however, a complete inventory of the Project Area has not been completed, and the species has not been previously documented in the Project Area. In 2014, a multi-agency Conservation Agreement and Strategy for Graham's Beardtongue and White River Beardtongue was completed which established designated Core Conservation Areas for White River beardtongue (SWCA 2014). The Project Area is not located within one of the designated Core Conservation Areas.

3.1.5.2. Wetland/Riparian

The Project Area has a limited number of riparian and/or wetland areas within its boundary. There are two wetland areas of note in the Project Area. One is located in the main Asphalt Wash drainage downstream from an artesian well. Wetland vegetation extends for 0.61 mile downstream of the artesian well and comprises approximately 2.4 acres. This wetland is rated as being in "Non Functioning Condition." The other wetland area is located in the center fork of Asphalt Wash and is also the result of surface water flowing downstream from an artesian well in the drainage. Riparian vegetation extends downstream from the well for approximately 0.55 mile and comprises approximately 1.13 acres. This wetland area is rated as being in a "Functioning at Risk Condition with upward trend." Other small wetland areas occur near springs and seeps throughout the Project Area.

In the Project Area, these riparian/wetland areas are disproportionately more important to the proper functioning ecosystem of which they are a part than their relative size would indicate. They are especially important in the relatively dry and arid landscape, as they support a diverse population of plant and animal life.

Plant species found within Project Area's riparian/wetland areas include cattails (*Typha* spp.), common reed (*Phragmites australis*), willow (*Salix* spp.), and saltcedar (*Tamarix ramosissima*), as well as characteristic sedges (*Carex* spp.), (*Scirpus* spp.), and saltgrass (*Distichlis spicata*). Riparian zones and wetlands within the Project Area are dispersed, and total acreages for them have not been determined.

3.1.6. Water

3.1.6.1. Floodplains

The U.S. Department of Housing and Urban Development (HUD) and the Federal Emergency Management Agency (FEMA) have designated three drainages within the Project Area as 100-year floodplains. The floodplains include Saddletree Wash, Atchees Wash, and Asphalt Wash.

During flow events that exceed bankfull height, the 100-year floodplains store sediment that has been eroded from upland areas. Most of the sediment transported to and through these washes to the White River is due to infrequent, high-intensity, convective storm events. At one time, the valley floor was the active floodplain for these ephemeral drainages now designated as 100-year floodplains. As a result of downcutting, the once active floodplain is now a terrace positioned 5-6 feet above the channel floor, and a new floodplain is being formed within the channel bottoms. It should be noted that during heavy storm events, the terraces are likely to be inundated and therefore should be considered part of the existing 100-year floodplain.

Executive Order 11988 requires federal agencies to make decisions in a manner that promotes avoidance of adverse impacts and reduces the risk of property loss and human safety due to floodplain development/modification and preserve the natural and beneficial values of floodplains. Floodplain development/modification is allowed only if there are no other feasible alternatives.

3.1.7. Wildlife

3.1.7.1. Migratory Birds (Including Raptors)

The Migratory Bird Treaty Act (MBTA) was implemented for the protection of migratory birds. Unless permitted by regulations, the MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition to the MBTA, Executive Order 13186 sets forth the responsibilities of Federal agencies to further implement the provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of actions and agency plans on migratory birds.

The Utah Partners In Flight (UPIF) has prioritized migratory birds that are considered “most in need of conservation action, or at least need to be carefully monitored throughout their range within Utah. “These are also the species “that will be most positively influenced by management as well as those species with the greatest immediate threats” accords to UPIF (Parrish et al. 2002). In addition, the Utah Steering Committee has identified approximately 542,967 acres of Bird Habitat Conservation Area’s (BHCA) within the VPA (USC 2005). No BHCA's have been identified have been identified in the area.

Numerous species may migrate through, or nest within the project area. This section identifies migratory birds that may inhabit the project area such as BHCA’s or those that are classified, as High-Priority birds by Partners in Flight*, according to the habitat types found within the project area:

Sagebrush-steppe: horned lark, sage sparrow, sage thrasher*, Brewer’s sparrow*, western kingbird, Say’s phoebe, prairie falcon, and green-tailed towhee*

Pinyon-Juniper Woodlands: black-chinned hummingbird*, gray flycatcher*, gray vireo*, Lewis’ woodpecker, Clark’s nutcracker, pinyon jay, western scrub jay, black-throated gray warbler, bushtit, juniper titmouse*, northern shrike, Virginia’s warbler*, broad-tailed hummingbird*, mountain bluebird*, and Say’s phoebe.

3.1.7.1.1.

Raptors

Some of the more visible birds in and near the project area include golden eagles, red-tailed hawks, turkey vultures, northern harrier, prairie falcon, American kestrel, long-eared owl, and great-horned owl. Bald eagles can also be observed wintering in the project area November through March. The species utilizes the cottonwood bottomland along the White River, directly north of the project area, and will forage in the upland habitat located in the project area. The BLM raptor database was reviewed and there are known golden eagle and red-tailed nests identified within the project area. Habitats in and around the project area provide diverse breeding and foraging habitat for raptors. These habitats include rocky outcrops, pinyon-juniper woodlands, and sagebrush shrub lands.

3.1.7.2. Non-USFWS Designated Species

Mule deer, pronghorn antelope, and Rocky Mountain elk are the primary big game species found within the project area. Use typically occurs through the winter, when elk and deer utilize the project area for foraging, thermal cover, and escape cover (UDWR 2010).

3.1.7.2.1. Pronghorn

Pronghorn primarily occur on Archy Bench, to the west of the project area, but have been observed occasionally within the project area. No pronghorn seasonal ranges (e.g., winter range, fawning areas) have been designated or identified by the BLM within the project area. Pronghorn populations are very low throughout the Northeastern Region.

3.1.7.2.2. Mule Deer

Historically mule deer populations throughout Utah, as well as throughout the West, have fluctuated due to environmental factors (e.g., drought, severe winters). The project area is within the Book Cliffs Herd Unit, classified by UDWR and BLM as substantial winter range for mule deer. The currently identified substantial winter range includes approximately 10,420 acres of habitat within the project area. Crucial winter range has been identified south of the project area. Habitat value and associated big game densities decline to the north. Mule deer migration within the region predominantly occurs on a north-south axis, as the ridges provide optimal travel corridors (Karpowitz 1984). The current population estimate for deer in the herd unit is 7,850, which is well below the plan objective of 15,000.

3.1.7.2.3. Elk

Elk occur year-round in the project area in low numbers but are most common south of Kings Well Road (BLM 1984; Karpowitz 1984). The project area is still within the Book Cliffs Herd Unit, classified by UDWR and BLM as substantial winter range for elk. There is approximately 10,420 acres of substantial elk winter habitat within the project area. Resident elk use the area low elevation water resources, such as the flowing water wells associated with Bitter Creek and Asphalt Wash (UDWR 1998). The current population estimate for elk in the herd unit is 4,800, which is well below the plan objective of 7,500.

3.1.7.2.4. Rocky Mountain Big Horn Sheep

Approximately 3,253 acres have been identified as crucial yearlong habitat for Rocky Mountain Big Horn Sheep (UDWR 2013). Historically there has been some evidence of Big Horn Sheep using the White River Corridor. Currently, the Utah Division of Wildlife Resources is not managing the area for big horn sheep due to potential conflicts with domestic sheep. UDWR(Sampson, 2014) was consulted on potential impacts to big horn sheep, and no potential conflicts or impacts were identified between sheep and the proposed project, therefore, big horn sheep will not be analyzed further in this document.

Substantial deer and elk winter habitat, and year long crucial big horn sheep habitat has been designated within the project area, these designations were made in the Vernal Field Office RMP.

3.1.7.3. Threatened, Endangered, Proposed, or Candidate Species

Colorado River Fish Species

The USFWS has identified four Federally listed fish species historically associated with the Upper Colorado River Basin, including the Green River: Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*). These fish are Federally and State-listed as endangered and have experienced severe population declines due to flow alterations, habitat loss or alteration, and introduction of non-native fish species. Portions of the Green River and White River and their 100-year floodplains have been designated Critical Habitat for these four endangered fish species (USFWS 1994). The Project Area does not occur within critical habitat for the Colorado endangered fish species. Three additional species are endemic to the Colorado River Basin: roundtail chub (*Gila robusta*), flannelmouth sucker (*Catostomus latipinnis*), and bluehead sucker (*Catostomus discobolus*). The roundtail chub is a State-listed threatened species, while the two suckers are species of special concern due to declining population numbers and distribution.

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Chapter 4. Environmental Effects

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4.1. Introduction

This chapter discusses the environmental consequences of implementing the alternatives described in Chapter 2, *Proposed Action and Alternatives* (p. 5) to the resources described in Chapter 3, *Affected Environment* (p. 37). Under NEPA, actions with the potential to affect the quality of the human environment must be disclosed and analyzed in terms of direct and indirect effects—whether beneficial or adverse and short or long term—as well as cumulative effects. Direct effects are caused by an action and occur at the same time and place as the action. Indirect effects are caused by an action but occur later or farther away from the resource. Beneficial effects are those that involve a positive change in the condition or appearance of a resource or a change that moves the resource toward a desired condition. Adverse effects involve a change that moves the resource away from a desired condition or detracts from its appearance or condition. Cumulative effects are the effects on the environment that result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions.

4.1.1. Proposed Action

4.1.1.1. Air Quality

4.1.1.1.1. Ambient Air Quality

This Proposed Action is considered to be a minor air pollution source under the Clean Air Act at present control technology on some emissions sources (e.g. drill rigs) is not required by regulatory agencies. The Proposed Action would result in different emission sources associated with two project phases: well development and well production. . Annual estimated emissions from the Proposed Action are summarized in Table 4.1, “Proposed Action Annual Emissions (tons/year) 11–Year Estimate (tons/year)¹” (p. 57).

Table 4.1. Proposed Action Annual Emissions (tons/year) 11–Year Estimate (tons/year)¹

Pollutant	Development	Production	Total
NO _x	33.46	17.94	51.40
CO	38.13	23.64	61.77
SO _x	0.14	0.04	0.18
PM ₁₀	16.68	1.22	17.90
PM _{2.5}	2.48	1.14	3.62
VOC	3.04	30.24	33.28
Benzene	0.05	0.28	0.33
Toluene	0.02	0.30	0.32
Ethylbenzene	0.00	0.02	0.02
Xylene	0.01	0.24	0.26
n-Hexane	0.00	4.64	4.64
Formaldehyde	0.02	1.31	1.33

¹ Emissions include 151 producing well(s) and associated operations traffic during the year in which the project is developed.

Table 4.2. Proposed Action Annual Emissions (tons/year) 19–Year Estimate (tons/year)¹

Pollutant	Development	Production	Total
NO _x	19.3688	10.39	29.76
CO	22.0705	13.69	35.76

Pollutant	Development	Production	Total
SO _x	0.0791	0.02	0.10
PM ₁₀	9.6578	0.70	10.36
PM _{2.5}	1.4368	0.66	2.10
VOC	1.7598	17.51	19.27
Benzene	0.0284	0.16	0.19
Toluene	0.0107	0.18	0.19
Ethylbenzene	0.0000	0.01	0.01
Xylene	0.0074	0.14	0.15
n-Hexane	0.00	2.69	2.69
Formaldehyde	0.0090	0.76	0.77

¹ Emissions include 151 producing well(s) and associated operations traffic during the year in which the project is developed.

Well development includes NO_x, SO₂, and CO tailpipe emissions from earth-moving equipment, vehicle traffic, drilling, and completion activities. Fugitive dust concentrations would occur from vehicle traffic on unpaved roads and from wind erosion where soils are disturbed. Drill rig and fracturing engine operations would result mainly in NO_x and CO emissions, with lesser amounts of SO₂. These emissions would be short-term during the drilling and completion phases.

During well production, continuous NO_x, CO, VOC, and HAP emissions would originate from well pad separators, condensate storage tank vents, and daily tailpipe and fugitive dust emissions from operations traffic. Road dust (PM₁₀ and PM_{2.5}) would also be produced by vehicles servicing the wells.

Under the proposed action, emissions of NO_x and VOC, ozone precursors, are 51.40 tons/yr for NO_x, and 33.28 tons/yr of VOC (Table 4.1, “Proposed Action Annual Emissions (tons/year) 11–Year Estimate (tons/year)¹” (p. 57)) under the 11 year drilling scenario and 29.76 tons/yr for NO_x, and 19.27 tons/yr of VOC (Table 4.2, “Proposed Action Annual Emissions (tons/year) 19–Year Estimate (tons/year)¹” (p. 57)) under the 19 year drilling scenario. Emissions would be dispersed and/ or diluted to the extent where any local ozone impacts from the Proposed Action would be indistinguishable from background conditions.

The primary sources of HAPs are from oil storage tanks and smaller amounts from other production equipment. Small amounts of HAPs are emitted by construction equipment. These emissions are estimated to be minor and less than 1 ton per year.

4.1.1.1.2. Greenhouse Gases

The assessment of greenhouse gas emissions and climate change remains in its earliest stages of formulation. Applicable EPA rules do not require any controls and have yet to establish any emission limits related to GHG emissions or impacts. The lack of scientific models that predict climate change on regional or local level prohibits the quantification of potential future impacts of decisions made at the local level, particularly for small scale projects such as the Proposed Action. Drilling and development activities from the Proposed Action are anticipated to release a negligible amount of greenhouse gases into the local air-shed.

4.1.1.2. Cultural Resources

Direct disturbance could occur to cultural resources, if present in the proposed areas of disturbance. Ground-disturbing activities associated with the Proposed Action could result in

adverse effects to prehistoric, proto-historic, and historic sites. Adverse effects on cultural resources include, but are not limited to, physical destruction or damage to all or part of the site; alteration of a site, including restoration, rehabilitation, repair, maintenance, or stabilization; removal of the site from its prehistoric/historic location; change of the character of the site's use or physical features within the site's setting that contribute to its historic significance; and introduction of visual, atmospheric, or audible elements that diminish the integrity of the site's prehistoric/historic features.

No surface disturbing activities would be authorized in this document. Additional NEPA would be required prior to disturbance. The applicant has committed to conduct cultural surveys prior to surface disturbance. When the committed Cultural Resource Inventories are completed, they will be reviewed by the BLM Archaeologist, and he/she will initiate further consultation with the SHPO and/or tribes on eligibility evaluation determinations and recommended mitigation measures. Site avoidance measures would eliminate any adverse effects to NRHP-eligible sites.

Mitigation Measures

- All prehistoric and historic sites documented during the Class III inventory as eligible for listing on the National Register of Historic Places (NRHP), as well as areas identified as having a high probability of significant subsurface materials, would be avoided by development by at least 100'. Specifically, well pad locations and access/gas and water line routes would be altered or rerouted as necessary to avoid impacting NRHP-eligible sites.

4.1.1.3. Invasive Plants/Noxious Weeds, Soils & Vegetation

The Proposed Action would disturb approximately 223 to 235 acres of soils and vegetation. Disturbed areas would be reclaimed after the project is completed. If reclamation efforts are successful, direct long-term impacts to soils and vegetation would not occur. If reclamation efforts are not successful, the entire area could remain disturbed for the long term.

Direct impacts to soils include mixing of soil horizons, soil compaction, short-term loss of topsoil and site productivity, and loss of soil/topsoil through wind and water erosion. Loss of soil/topsoil in disturbed areas would reduce the success of seeded native species due to increased competition by annual weeds. Annual weeds are adapted to disturbed conditions and out-compete native perennial species for soil moisture and nutrients.

Additional direct impacts to vegetation are primarily associated with clearing of vegetation during the project. Indirect impacts to vegetation resources include the invasion and establishment of introduced, undesired plant species. The severity of these invasions would depend on the success of reclamation and revegetation, and the degree and success of noxious weed control efforts.

The area's poor soil reclamation potential has made successful reclamation efforts challenging. BLM field inspections indicate that what was previously considered short-term impacts may be more accurately portrayed as long-term impacts.

Impacts to soils and vegetation would be partially mitigated by implementing the following mitigation measures:

Mitigation Measures:

- The project reclamation would be conducted in conformance with the Green River District Reclamation Policy.
- The following measures from the Vernal Field Office Weed Policy would apply to this project:
 - A pre-disturbance noxious weed inventory shall be conducted on all surface disturbing projects to determine the presence of noxious weeds prior to beginning the project, and to determine whether treatment is needed prior to disturbance (see the VFO Surface Disturbance Weed Policy, Table 1 for the Utah Noxious Weed List). If noxious weeds are found, a report including: 1) location (GPS if possible); 2) species; 3) canopy cover or number of plants; 4) and size of infestation (estimate of square feet or acres) shall be provided to the BLM Weed Coordinator prior to disturbance occurring. Information can be recorded on a data sheet or in a GPS using a data dictionary. See the VFO Surface Disturbance Weed Policy, Appendix E for a sample data sheet and data dictionary elements. (PM, PAW)
 - All vehicles and equipment shall be cleaned either through power-washing or other approved method prior to entering the project area from outside the Uinta Basin.
 - All vehicles and equipment shall be power-washed after driving through a noxious weed infestation.
 - Certified noxious weed free seed and mulch shall be used in all reclamation projects.
 - All projects involving surface disturbance shall include a weed management plan. The weed management plan may be integrated into an overall reclamation plan if desired.
 - All herbicide treatments shall be applied by a Utah-licensed Pesticide Applicator. If licensed in another state, a reciprocal license may be obtained through the Utah Department of Agriculture website.
 - Weeds shall be controlled within the disturbance areas, including borrow areas along roads. Reseed if feasible to promote competition for weeds.
 - All disturbance areas shall be monitored for noxious weeds annually, for a minimum of three growing seasons following completion of project or until desirable vegetation is established. Monitoring reports should include a shapefile (compatible with ArcMap) of all noxious weed species found. When possible, data shall include cover, size of infestation, and treatment applied.
 - The use of mechanical dragging (before seed set), manual control, and biological control shall be considered before the use of chemicals. Dragging shall not occur after seed set.
 - All surface disturbing projects shall have an approved Pesticide Use Proposal (PUP) prior to chemical application on BLM lands. See Appendix B of the VFO Surface Disturbance Weed Policy for a PUP form and instructions. Note: A PUP can take months to be approved, so plan accordingly.

4.1.1.4. Lands with Wilderness Characteristics (LWC)

Approximately 1,570 acres (GIS estimate) of the White River unit is located within this project area. Wilderness character was found within the project area only in the White River unit. The Vernal Resource Management Plan (2008) identified the White River unit as Non-WSA lands

with wilderness characteristics that would be managed for other resource values and uses. This area was identified as being located in an oil and gas development area with moderate to high potential for further development. Given the resource potential, level of past production, existing leases, and ongoing exploration and development, it was anticipated that the White River unit would lose all or most of its wilderness characteristics. New development is planned within 1,570 acres (GIS estimate) found to have wilderness character.

Appearance of Naturalness:

The appearance of Naturalness within the 1,570 acres would be degraded by the sights and sounds of the proposed development (see Figure 4.1, “Wilderness Characteristics Impacted Acres” (p. 62)). Road widening, new road construction and maintenance (where viewable) would show man’s imprint on the land clearly within the lands with wilderness character. The 8 wells and anticipated 7.5 miles of road would be an intrusion within the wilderness character that would leave evidence of man’s endeavours for the life of the wells through the reclamation process. After reclamation, current technology generally leaves a capped well, and a contour that is readily noticeable when compared to the existing landscape.

Solitude, Primitive and Unconfined Recreation:

Visitors to the area would have a loss to solitude, primitive and unconfined recreation, however, access to the White River would improve. More people would likely be able to enjoy the river, however the experience would likely change with heavy truck traffic regularly frequenting the river, and the sounds and sights of development would be present for the life of the proposed wells.

Supplemental Values:

The area’s geologic and topographic features provide scenic views for the visitor. Antelope, mule deer, and elk are common in the area. A variety of birds are found along the river and the canyon walls. Habitat for sensitive plant and animals species is present. It is not likely that the supplemental values identified would have large impacts from the visitors perspective. See ID Team checklist for Wildlife and Botany impacts.

It is not likely that the lands with wilderness character would be found to have wilderness character in future planning efforts with the infrastructure proposed for sections 1,3,4,5 and 8 T11S R23E.

Wilderness Character would likely be lost in all of the 1,570 acres identified within the proposed project area, and would potentially affect the surrounding wilderness character in section ,31–36 T10S, R23E, and section 6, T11S, R23E.

Though the Saddle Tree Draw Wash road and the Atchees Wash road are cherry stemmed, it is clear that additional heavy truck traffic would have impacts to wilderness character through their northern terminus points at the White River.

As proposed, the project will be in conformance with the Vernal RMP and will have anticipated impacts to wilderness characteristics in areas not designated or identified for protection.

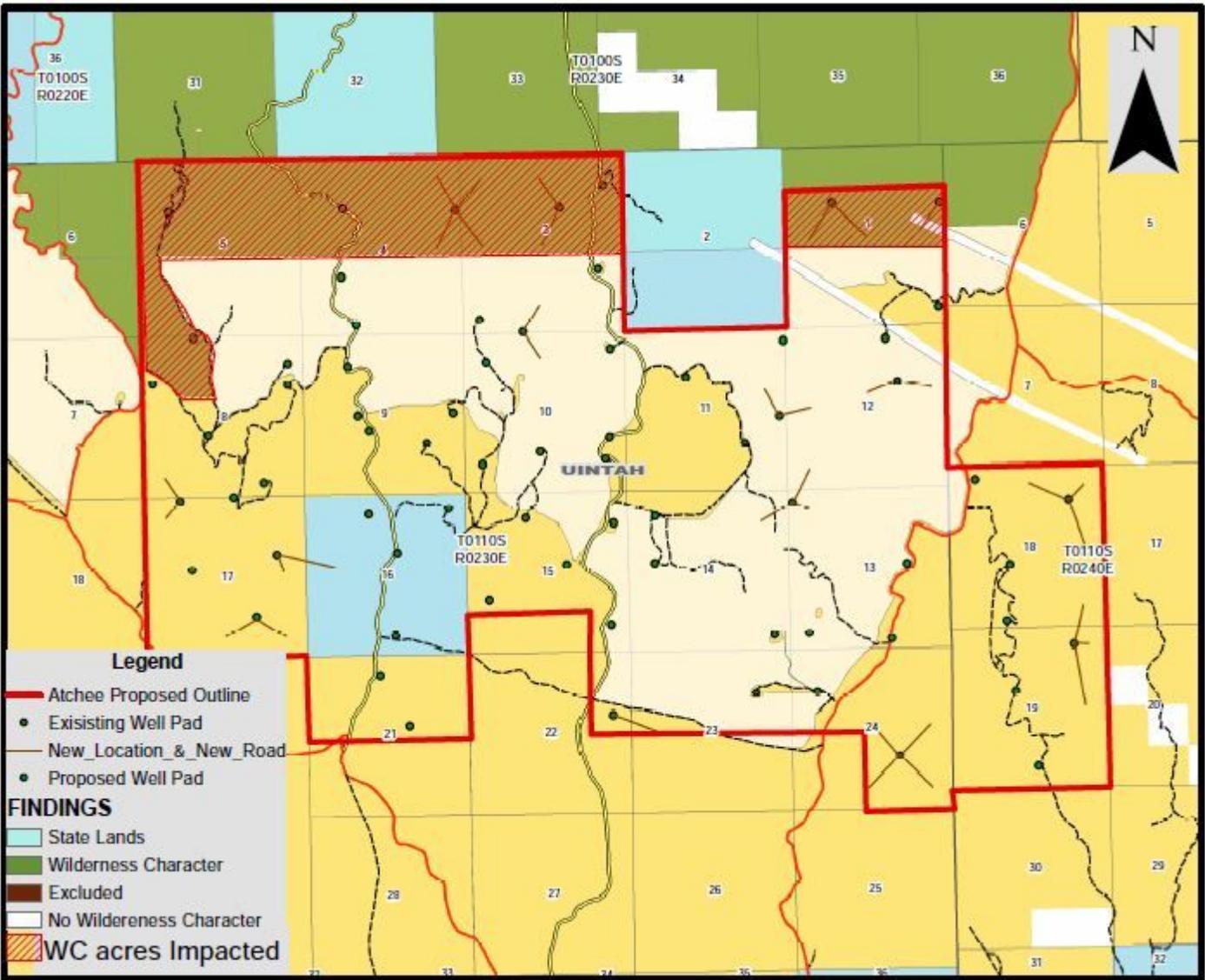


Figure 4.1. Wilderness Characteristics Impacted Acres

4.1.1.5. Plants

4.1.1.5.1. Threatened, Endangered, Proposed, or Candidate Species

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)

The Project Area is located partially within the 2013 polygon established by U.S. Fish and Wildlife Service (USFWS) as potential habitat for *Sclerocactus ssp.* The Project Area is not located within core habitat for the species.

Complete inventory surveys of the Project Area have not been completed at this time. However, site-specific inventories of the proposed well pads and associated infrastructure would be required before ground disturbing activities could commence. No individuals or populations of *S.wetlandicus* have been previously documented in the Project Area.

Possible dispersed direct and indirect negative impacts to *S.wetlandicus* which may result from implementation of the Proposed Action include: loss of suitable habitat, habitat modification by invasive weed species which may compete with individuals, accidental spray or drift of herbicides used during invasive plant control, and deposition of fugitive dust from construction activities and vehicle traffic on unpaved roads. If plants are present, direct damage could occur if these plants are not avoided during construction activities. Due to these indirect and direct negative impacts the Proposed Action warrants a “*may affect, is not likely to adversely affect*” determination for *S. wetlandicus*. Section 7 consultation under the Endangered Species Act with USFWS would be completed prior to the signing of this document or approval of the proposed project.

Mitigation: All applicable ACEPMs listed in Chapter 2 for special status plant species would apply. In addition, the following mitigation measures will be applied as either part of the Proposed Action or a Condition of Approval (COA):

- Site inventories (100% clearance surveys) would be conducted in potential habitat for Uinta Basin hookless cactus within the survey window for the species established by USFWS and BLM (the *S. wetlandicus* survey period is defined as anytime without snow cover prior.). Surveys would be conducted by qualified personnel and would adhere to the survey protocols for the species established by USFWS and the BLM. Site inventories would be performed within a 300-foot buffer around all proposed surface disturbance.
- Site inventory surveys would be valid for 4 years from the survey date. If more than 4 years pass between the original survey date and construction, a new clearance survey/site inventory would be required. If construction is to occur within the 4 year window, and at least 1 year after the initial survey date, an additional spot check survey would be required following the methodology established in the 2010 Memorandum of Understanding (MOU) between USFWS and BLM regarding *Sclerocactus* survey data use timing restrictions. Review of spot checks may result in requirements for additional pre-construction plant surveys or other requirements as directed by USFWS and the BLM Authorized Officer (AO).
- Documented cactus within the 300 foot survey buffers would be flagged for avoidance during construction and drilling activities.
- When cactus are present within 300 feet of proposed surface disturbance, a qualified biological monitor would be present during construction and drilling activities to ensure that documented individual cactus are not disturbed.

- The operator would perform ground disturbing activities in *Sclerocactus ssp.* potential habitat outside of the flowering period, (April 1 through May 30). This applies to all ground disturbing activities, including those on previously disturbed areas on existing well pads.
- Only water (no chemicals, reclaimed production water or oil field brine) will be used for dust abatement measures within all cactus habitats.
- Dust abatement will be employed in suitable *Sclerocactus ssp.* habitat over the life of the project during the time of the year when *Sclerocactus ssp.* species are most vulnerable to dust-related impacts (March through August) within all cactus habitats.
- Reclamation seed mixes would exclude introduced and non-native species if used in *Sclerocactus ssp.* potential habitat.
- Erosion control measures (i.e. silt fencing) would be implemented to minimize sedimentation to *Sclerocactus ssp.* plants and populations located down slope of proposed surface disturbance activities when working in all cactus habitats.
- Application for Pesticide Use Permit would include provisions for mechanical removal, as opposed to chemical removal, for Utah Class A, B and C noxious weeds within 50 feet of individual/populations of *Sclerocactus*.

Discovery Stipulation: Re-initiation of Section 7 consultation with the USFWS would be sought immediately if any loss of plants or occupied habitat for Uinta Basin hookless cactus is anticipated as a result of project activities.

Graham’s Penstemon (*Penstemon grahamii*) and White River Penstemon (*Penstemon scariosus* var. *albifluvis*)

The Project Area is partially located within suitable habitat for *P. grahamii* and *P. scariosus* var. *albifluvis*. No individual plants or populations of *P. grahamii* or *P. scariosus* var. *albifluvis* have been previously documented in the Project Area; however, the Project Area has not been fully surveyed. The closest documented plants of either species to the Project Area are located approximately 5.7 miles away. In addition, the Project Area is not located within one of the Core Conservation Areas for the two species established by the 2014 Conservation Agreement and Strategy for Graham’s Beardtongue and White River Beardtongue. Site-specific construction activities in the Project Area that are proposed within suitable habitat for *P. grahamii* and/or *P. scariosus* var. *albifluvis* would require 100% clearance surveys, including a 300 foot buffer around all proposed surface disturbance. Because the Proposed Action would be located in an area where plants have not been documented, no direct loss to individual *P. grahamii* or *P. scariosus* var. *albifluvis* plants is anticipated, although indirect impacts may occur.

Possible dispersed direct and indirect negative impacts to both species which may result from implementation of the Proposed Action include: loss of suitable habitat, loss of habitat and forage opportunities for pollinators of the species, habitat modification by invasive weed species which may compete with individuals, accidental spray or drift of herbicides used during invasive plant control, and the deposition of fugitive dust from construction activities and vehicle traffic on unpaved roads.

Because of these indirect negative impacts, the Proposed Action is “**not likely to jeopardize the continued existence of or destroy or adversely modify the proposed critical habitat**” of *P.*

grahamii and *P. scariosus* var. *albifluvis*. Prior to the signing of this document or approval of the associated project, section 7 conference with the USFWS will be completed.

Mitigation Measures: All applicable ACEPMs listed in Chapter 2 for special status plant species would apply. In addition, the following mitigation measures will be applied as either part of the Proposed Action or a Condition of Approval (COA):

- Site inventories (100% clearance surveys) would be conducted in suitable habitat for *P. grahamii* and/or *P. scariosus* var. *albifluvis* within the survey window for the two species established by USFWS and BLM. Surveys would be conducted by qualified personnel and would adhere to the survey protocols for the two species established by USFWS and the BLM. Site inventories would be performed within a 300-foot buffer around all proposed surface disturbance.
- Documented plants within the 300 foot survey buffers would be flagged for avoidance during construction and drilling activities.
- When plants are present within 300 feet of proposed surface disturbance, a qualified biological monitor would be present during construction and /or drilling activities to ensure that documented individual plants are not disturbed.
- The operator would perform ground disturbing activities in *P. grahamii* and/or *P. scariosus* var. *albifluvis* suitable habitat outside of the flowering period, (May 1 to June 30). This applies to all ground disturbing activities, including those on previously disturbed areas on existing well pads.
- Only water (no chemicals, reclaimed production water or oil field brine) will be used for dust abatement measures within all penstemon habitats.
- Dust abatement will be employed in all suitable *P. grahamii* and/or *P. scariosus* var. *albifluvis* habitat over the life of the project during the time of the year when the two species are most vulnerable to dust-related impacts (May through August).
- Reclamation seed mixes would exclude introduced and non-native species if used in *P. grahamii* and/or *P. scariosus* var. *albifluvis* suitable habitat.
- Erosion control measures (i.e. silt fencing) would be implemented to minimize sedimentation to *P. grahamii* and/or *P. scariosus* var. *albifluvis* plants and populations located down slope of proposed surface disturbance activities when working in all suitable habitat.
- Application for Pesticide Use Permit would include provisions for mechanical removal, as opposed to chemical removal, for Utah Class A, B and C noxious weeds within 50 feet of individual/populations of *P. grahamii* and/or *P. scariosus* var. *albifluvis*.

Discovery Stipulation: Re-initiation of Section 7 conference with the USFWS would be sought immediately if any loss of plants or occupied habitat for *P. grahamii* and/or *P. scariosus* var. *albifluvis* is anticipated as a result of project activities.

4.1.1.5.2. Wetland/Riparian

There are two mapped wetland/riparian areas in the project area. The mapped wetland/riparian area is approximately 1.4 acres in size. Both wetland/riparian areas were created by wells that flowed back water. There are two existing well pads next to the mapped wetland/riparian areas.

The expansion of these well pads (to drill new wells) could effect the surface and subsurface water flow. Any disturbance of the water flow could cause the wetland/riparian area to dry up.

Disturbance (removal or filling) of riparian vegetation for well pad/road facilities in these areas would result in the long-term loss of riparian vegetation, allowing potential opportunities for noxious weeds and undesirable plants, especially tamarisk, to invade when reclamation is implemented. Invasion of noxious weeds and undesirable plants would decrease the available area for the more desirable wetland species, resulting in an overall decrease in the diversity of native vegetation and a decrease in the functional value of the wetland area by wildlife species that use these areas as important habitat.

4.1.1.5.2.1. Mitigation

The operator will not interrupt the water flow from the artesian wells.

4.1.1.6. Water

4.1.1.6.1. Floodplains

As stated in Section 2.1.12.6, within the 100-year floodplain, Rosewood would drill only from currently existing well pads. New well pads would be constructed outside the 100-year floodplain. It is expected that there will be 10 directional wells drilled from four existing well pads. There would be a short-term period during the drilling phase of construction in which the reserve pit could be flooded and the fluids within the pit could contaminate the stormwaters. Since the velocity of flood events is expected to be quite low, the risk of pollution from overtopping or rupture and resultant spillage is expected to be minimal on well pads in a production mode.

4.1.1.6.1.1. Mitigation

All wells that are drilled within the 100-year flood plain will be drilled with a closed loop system (i.e. not pit)

4.1.1.7. Wildlife

4.1.1.7.1. Migratory Birds (Including Raptors)

Migratory bird species may be present during the breeding/nesting season from May 1- August 1. If construction and/or drilling operations were to take place during the breeding/nesting season, individual bird species could be impacted. Impacts may include; destruction of nests, eggs, and nesting habitat, fragmentation of habitat, reduction of habitat patch size, and nest abandonment. The proposed project would result in a initial loss of 235 acres of habitat. Nesting species associated with those habitat types would most likely move to adjacent areas to nest. The fragmented and direct loss of habitat would remove some specific habitat that may provide future nesting opportunities for bird species. The Proposed Action may preclude some use of wintering areas, particularly within pinyon-juniper woodlands that provide high-quality cover and prey species. These impacts would continue through project operation, particularly from increased vehicles use and human presence along project roadways. Loss of habitat for the prey base of raptors would directly impact birds foraging in the Project Area. Grant et al. (1991) suggest that

incremental destruction of habitat for raptors' prey base (e.g., ground squirrels, rabbits, mice) has had the largest effects on raptor populations in the Uinta Basin. A slight reduction in cottontail and small mammal populations would be anticipated from the Proposed Action

Raptors

Impacts to raptor species would be similar to the impacts to migratory birds. All occupied nest sites will be buffered by 0.5 miles during the nesting season. No construction/drilling operations would be allowed during the nesting season. Species specific timing restrictions would be placed on any development proposed within 0.5 mile of an occupied nest site. The raptor species and associated timing restriction can be found in Appendix A (Best Management Practices for Raptors and Their Associated Habitats in Utah, August 2006) of the Vernal ROD and RMP.

Red-Tailed Hawk (*Buteo jamaicensis*), Golden Eagles (*Aquila chrysaetos*)

There are known red-tailed hawk nests and golden eagle nests within the project area. Nest sites are found in Juniper trees and cliff ledges. The nest sites have not been inventoried for activity for the past few years. Human activities associated with oil and gas development could potentially impact breeding success, nest site selection, and preclude future use of the nest by a nesting pairs, if the nest site is active. Long-term use of the nest would likely be impacted if the proposed wells become producing wells. Preclusion of construction and drilling activities during the breeding season decreases the likelihood of direct mortality and nest abandonment, and increases the likelihood of breeding success. Direct impacts to red-tailed hawks, and Golden eagles would be mitigated by restricting new construction or drilling activities within 0.5 mile of active nests during the breeding season.

4.1.1.7.2. Non-USFWS Designated Species

The primary, direct impact to wintering deer and elk would be immediate loss of forage and wintering habitat. The Project Area contains approximately 10,420 acres of substantial winter range habitat, of which 235 acres of habitat would be directly impacted and forage production for wintering deer and elk would be lost for the life of the project. This habitat represents approximately 0.023% of the winter habitat available within the project area. A loss in habitat value would result from fragmentation of continuous habitats, and increased human access into the region. Indirect impacts include: disturbance of large, unbroken blocks of native habitat, animal displacement, increased human presence from project operations and increased road access, increased vehicle-related mortalities resulting from an increase in roads and vehicular traffic, improved hunter access, increased disturbance or harassment of deer from noise, illegal shooting, and off-highway vehicle (OHV) use. Habitat fragmentation and associated displacement of animals would result in a reduction in habitat use near disturbed areas (a loss of habitat value), increased animal densities on adjoining habitat (which may be of poorer quality), increased stress from both intra- and interspecific competition and increased human-induced harassment, particularly along existing and proposed new access roads. The degree of displacement and reduction in habitat value would vary, depending on the habitat types, vegetative cover, topography, existing herd size, winter snow conditions, animal health, traffic levels, and future road use. It has been shown that increasing road densities can reduce the habitat effectiveness and value for both elk and deer. Development of wells and roads in low-elevation drainages with surface water resources, including Asphalt Wash, would result in animal avoidance, decreased water availability, and adversely impact elk and deer. However, the numbers of impacted elk and deer would likely be low due to the low number of elk and deer in the project area. Rosewood

Resources has committed to no construction or drilling within the winter habitat from December 1 through April 30. The applicant committed measure will reduce impacts that would occur from construction/drilling activities.

4.1.1.7.3. Threatened, Endangered, Proposed, or Candidate Species

Colorado River Fish Species

The Proposed Action would result in 21.8 acre-feet of water depletion per year from removal of water from the Upper Colorado River Drainage System for construction and drilling operations. Water depletions reduce the ability of the river to create and maintain the primary constituent elements that define critical habitats.

Water depletions from the Upper Colorado River Drainage System, along with a number of other factors, have resulted in such drastic reductions in the populations of the Colorado pikeminnow, humpback chub, bonytail, and razorback sucker that the USFWS has listed these species as endangered and has implemented programs to prevent them from becoming extinct.

Food supply, predation, and competition are also important elements of the biological environment. Food supply is a function of nutrient supply and productivity, which could be limited by reduction of high spring flows brought about by water depletions. Predation and competition from nonnative fish species have been identified as factors in the decline of the endangered fishes. Water depletions contribute to alterations in flow regimes that favor nonnative fishes.

Therefore, the Proposed Action would have a “*may affect, likely to adversely affect*” determination for the endangered Colorado pikeminnow, humpback chub, bonytail, and razorback sucker. The Proposed Action would also adversely affect the bluehead sucker, flannelmouth sucker, and the roundtail chub. Water for drilling the proposed wells would come from an underground water well (Rosewood Water Right #49–1620). The Rosewood water right would be considered a new depletion (permitted after January 1988). As such, Section 7 consultation with the USFWS would be required based on the estimated new water depletion to the Upper Colorado River Basin; however, a one-time depletion fee would not be required because of the estimated 21.8 acre feet needed by the proposed project would be less than the USFWS threshold of 100 acre-feet/year (USFWS 1995, as amended).

4.1.2. Alternative B: No Action Alternative

Under the No Action Alternative, the proposed well(s) would not be permitted. Impacts expected under this alternative are summarized in the following sections.

4.1.2.1. Air Quality

Under the No Action Alternative, the proposed well(s) would not be permitted, so no emissions would occur.

4.1.2.2. Cultural Resources

Under the No Action Alternative, cultural resources would remain as they currently are.

4.1.2.3. Invasive Plants/Noxious Weeds, Soils & Vegetation

Under the No Action Alternative, there would be no direct disturbance or indirect effects to soils and vegetation from surface-disturbing activities associated with the proposed project. In addition, invasive plants and noxious weeds would continue to establish, spread and be treated at current levels. Current land use trends in the area would continue, including increased industrial development, increased off-highway vehicles (OHV) traffic, and increased recreation use.

4.1.2.4. Lands with Wilderness Characteristics (LWC)

Under the No Action Alternative, no impacts would occur to lands with wilderness characteristics.

4.1.2.5. Plants

4.1.2.5.1. Threatened, Endangered, Proposed, or Candidate Species

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)

Under the No Action Alternative, there would be no direct disturbance or indirect effects to *Sclerocactus wetlandicus* or associated habitat from surface-disturbing activities associated with the proposed project. Current land use trends in the area would continue, including increased industrial development, increased off-highway vehicles (OHV) traffic, and increased recreation use.

Graham's Penstemon (*Penstemon grahamii*) and White River Penstemon (*Penstemon scariosus* var. *albifluvis*)

Under the No Action Alternative, there would be no direct disturbance or indirect effects to *Penstemon grahamii*, *Penstemon scariosus* var. *albifluvis* or associated habitat from surface-disturbing activities associated with the proposed project. Current land use trends in the area would continue, including increased industrial development, increased off-highway vehicles (OHV) traffic, and increased recreation use.

4.1.2.5.2. Wetland/Riparian

Under the No Action Alternative, no impacts to wetlands or riparian areas would occur.

4.1.2.6. Water

4.1.2.6.1. Floodplains

Under the No Action Alternative, the existing impacts to the floodplains would still exist, but no new impacts would be created.

4.1.2.7. Wildlife

4.1.2.7.1. Migratory Birds (Including Raptors)

Under the no action alternative, no impacts to migratory birds and raptors or their habitat would occur from the proposed wells.

4.1.2.7.2. Non-USFWS Designated Species

Under the no action alternative, no impacts to deer or elk or their habitat would occur from the proposed wells.

4.1.2.7.3. Threatened, Endangered, Proposed, or Candidate Species

Under the No Action Alternative, no impacts to Colorado River Fish or their habitat would occur from the drilling of the proposed wells.

4.1.3. Alternative C: No New Well Pads in lands with Wilderness Characteristics

4.1.3.1. Air Quality

The impacts under this alternative would be similar to those described under the Proposed Action.

4.1.3.2. Cultural Resources

Under this alternative, the Cultural Resources will be impacted as described in the proposed action.

4.1.3.3. Invasive Plants/Noxious Weeds, Soils & Vegetation

Direct and indirect impacts to soils, vegetation and invasive plants/noxious weeds under Alternative C would be similar to those under Alternative A. All applicant committed environmental protection measures would remain in place under Alternative C, and additional required mitigation would be the same, where applicable.

4.1.3.4. Lands with Wilderness Characteristics (LWC)

Under this alternative, no new well pads would be built on lands with wilderness characteristics. The impacts under this alternative would be similar to those under the no action alternative.

4.1.3.5. Plants

4.1.3.5.1. Threatened, Endangered, Proposed, or Candidate Species

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)

Chapter 4 Environmental Effects
Alternative C: No New Well Pads in lands with
Wilderness Characteristics

Impacts to *S. wetlandicus* under Alternative C would be similar to those under Alternative A. The types of potential direct and indirect impacts would remain the same; however, a smaller area of potential habitat for the species would be impacted under Alternative C, as the potential habitat polygon overlaps part of the lands with wilderness characteristics that would not be developed under this alternative.

Graham's Penstemon (*Penstemon grahamii*) and White River Penstemon (*Penstemon scariosus* var. *albifluvis*)

Impacts to *P. grahamii* and *P. scariosus* var. *albifluvis* under Alternative C would be similar to those under Alternative A. The types of potential direct and indirect impacts would remain the same; however, a smaller area of suitable habitat for the two species would be impacted under Alternative C, as suitable habitat for the two species overlaps part of the lands with wilderness characteristics that would not be developed under this alternative.

4.1.3.5.2. Wetland/Riparian

The impacts to wetland/riparian under Alternative C: No New Well Pads in lands with Wilderness Characteristics would be the same as under the Proposed Action.

4.1.3.5.2.1. Mitigation

The operator will not interrupt the water flow from the artesian wells.

4.1.3.6. Water

4.1.3.6.1. Floodplains

The impacts to floodplains under Alternative C: No New Well Pads in lands with Wilderness Characteristics would be the same as under the Proposed Action.

4.1.3.6.1.1. Mitigation

All wells that are drilled within the 100-year flood plain will be drilled with a closed loop system (i.e. not pit)

4.1.3.7. Wildlife

Impacts would be the same as the proposed action, but with fewer acres of habitat disturbed.

4.1.3.7.1. Migratory Birds (Including Raptors)

Impacts would be the same as the proposed action, but with fewer acres of nesting habitat disturbed.

4.1.3.7.2. Non-USFWS Designated Species

Impacts to big game species habitat and distribution would be the same as the proposed action.

4.1.3.7.3. Threatened, Endangered, Proposed, or Candidate Species

Impacts to Colorado fish species would be similar to those identified in the proposed action, except there would be fewer well pads, 8 pads, and fewer wells, 19, which would lead to a lower amount of water depletion from the Green River system.

4.1.4. Cumulative Impacts

A cumulative impact is defined in CEQ regulations (40 CFR §1508.7) as “the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.” Cumulative impacts can result from individually minor but collectively major actions taking place over a period of time. The cumulative impact area varies by resource.

Past, present, and reasonably foreseeable impacts may occur from a variety of activities. Dispersed recreation activities, such as sightseeing, biking, camping, and hunting, have occurred and are likely to occur in the project area; these activities likely result in negligible impacts to resources because of their dispersed nature. Other land use activities, such as livestock grazing, vegetation projects, oil and gas development, and wildland fire, have also occurred within the leases and are likely to occur in the future. These types of activities are likely to have a greater impact on resources in the project area because of their more concentrated nature.

4.1.4.1. Air Quality

The cumulative impact area for air quality is the Uinta Basin, plus all regional Class I areas and other environmentally sensitive areas (e.g., national parks and monuments, wilderness areas, etc.) near the Uinta Basin. The Air Resource Management Strategy (ARMS) Modeling Project is a cumulative assessment of potential future air quality impacts associated with predicted oil and gas activity in the Uinta Basin (BLM, 2011). Consequently, past, present and reasonably foreseeable wells in the Uinta Basin are a part of the cumulative actions considered in this analysis. The ARMS is incorporated by reference and summarized below.

The ARMS Modeling Project predicted the following impacts to air quality and air quality related values for the 2010 typical year and four 2021 future year scenarios: 2021 on-the-books (OTB); 2021 Scenario 1 (NO_x controls); 2021 Scenario 2 (VOC controls); and 2021 Scenario 3 (NO_x and VOC controls).

- Ozone
 - The highest modeled ozone occurs in the Uinta Basin study area regardless of model scenario, and all scenarios predict exceedences of the ozone NAAQS and state AAQS in the Uinta Basin.
 - In the Uinta Basin, the ozone concentrations are highest during the winter period. In Class I and Class II areas outside the Uinta Basin study area, ozone concentrations are highest during the summer period.
 - During non-winter months in the Uinta Basin the model predicts that ozone may exceed the NAAQS and state AAQS (Ambient Air Quality Standards); however, model-adjusted

results from the MATS tool (which accounts for model performance biases) indicate that non-winter ozone concentrations are below the NAAQS and state AAQS for all monitors and areas analyzed. Also, the 2021 scenarios have minimal effect on model-predicted ozone concentrations during non-winter months.

- 2021 Scenario 2 tends to have the lowest 8-hour ozone concentration relative to all other 2021 scenarios (4th highest daily maximum is 3 ppb lower compared to the 2021 OTB Scenario). When comparing Scenario 2 to the OTB Scenario, a potential reduction in ozone concentrations occurs in the vicinity of the Ouray site (where the concentrations are already largest). There is no predicted ozone disbenefit associated with Scenario 2 mitigation measures (i.e., there is no area with predicted ozone increases relative to the OTB Scenario). This supports the assessment that peak ozone impacts are in VOC-limited areas.
- 2021 Scenarios 1 and 3 are predicted to have higher ozone impacts than either the 2010 Typical year and the 2021 OTB Scenario. Both scenarios predict a relatively large increase in ozone concentrations within the vicinity of Ouray indicating potential ozone disbenefits associated with NO_x control mitigation measures.
- NO₂, CO, SO₂, PM_{2.5}, and PM₁₀
 - There are seven monitoring stations within the 4- km domain with daily PM_{2.5} concentrations that exceed the NAAQS and state AAQS in the baseline emissions inventory.
 - All modeled NO₂, CO, SO₂, PM_{2.5}, and PM₁₀ values are well below the NAAQS and state AAQS in the Uinta Basin.
 - The model-predicted PM_{2.5} and PM₁₀ concentrations may underestimate future impacts due to a negative model bias throughout the year in the 4-km domain with the largest bias occurring in summer (AECOM and STI 2014).
 - Results from the MATS tool (which accounts for model performance biases) indicate that PM_{2.5} concentrations may exceed the NAAQS and state AAQS for select monitors and assessment areas in the 2010 Typical year. All 2021 scenarios predict that only one of these monitoring station would continue to exceed the NAAQS and state AAQS.
 - No monitoring stations within the 4-km domain exceed the annual PM_{2.5} NAAQS and state AAQS during the 2010 typical or 2021 Scenarios.
 - Two unmonitored areas within the Uinta Basin exceed the annual PM_{2.5} NAAQS and state AAQS during the 2010 typical year, and impacts in these areas tend to increase under 2021 Scenarios 1 and 2. Under 2021 Scenario 3, the annual PM_{2.5} impacts decrease in the Uinta Basin due to combustion control measures.
 - The 2021 scenarios generally have lower NO₂, CO, SO₂, PM_{2.5}, and PM₁₀ concentrations than the 2010 Typical Year scenario, except for within the Uinta Basin.
 - Under the 2021 scenarios, all assessment areas are within the PSD (Prevention of Significant Deterioration) increments for annual NO₂, 3-hour SO₂, annual SO₂, and annual PM₁₀.
 - Under the 2021 scenarios, most assessment areas exceed the 24-hour PM_{2.5} PSD increment.
- Visibility

- Visibility conditions in Class I and sensitive Class II areas generally show improvement in the 2021 Scenarios relative to the 2010 Typical Year.
- There also are no substantial differences in the 20th percentile best and worst visibility days between the 2021 Scenarios.
- Deposition and Acid Neutralizing Capacity
 - Results generally show a decrease in deposition for the 2021 Scenarios relative to the 2010 Typical Year.
 - The differences in estimated deposition between the 2021 Scenarios are generally very small.
 - Acid Neutralizing Capacity change at all seven sensitive lakes exceeds the 10 percent limit of acceptable change for all model scenarios.

It is anticipated that the impact to ambient air quality and air quality related values associated with the Proposed Action and Alternative C would be indistinguishable from and dwarfed by the model and emission inventory scope and margin of error. The No Action alternative would not result in an accumulation of impacts.

4.1.4.1.1. Greenhouse Gases

It is not currently possible to determine a climate change impact from project specific GHG emissions, nor is it possible to assign a significance value to project specific GHG emissions. GHG emissions will be reported per guidance established by CEQ and the Interagency Air Quality MOU (USDA/USDOJ, 2011). Drilling and development activities from the Proposed Action and Alternative C are anticipated to release a negligible amount of greenhouse gases, into the local airshed, resulting in a negligible cumulative impact. The No Action Alternative would not result in an accumulation of impacts.

4.1.4.2. Cultural Resources

Cumulative impacts to cultural resources are defined as any damage to, or destruction of, cultural resources which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). For this document, the cumulative impact area is defined as the immediate project development area. Cumulative impacts to the cultural resources could result from past, present, and reasonably foreseeable activities associated with surface and subsurface disturbances such as exploratory drilling, associated buried pipeline installation, livestock grazing, agriculture, and transportation projects. The magnitude of the impacts may be greater or lesser depending on 1) the cultural resource site densities present in the areas of project-related activity; 2) the significance of the cultural resources present; and 3) the final magnitude and scope of reasonable future actions. Many potential cumulative impacts to cultural resources would be reduced through implementation of mitigation measures and conditions of approval and adherence to Federal regulatory laws, actions, and guidelines designed to protect cultural resources. However, it is anticipated that such measures would not prevent all cumulative impacts from occurring. Additionally, at this time, none of the tribes participating in the Native American consultation have identified any traditional cultural properties within the study. The No Action alternative would not result in an accumulation of impacts for the proposed action and alternative C.

4.1.4.3. Invasive Plants/Noxious Weeds, Soils & Vegetation

The cumulative impact area for Invasive Plants/Noxious Weeds, Soils, and Vegetation is the boundary of the Saddle Tree Draw-White River and West Fork Asphalt Wash subwatersheds, encompassing a total of 52,967 acres. Cumulative impacts include soil disruption, dust impacts, plant and pollinator habitat destruction, and weed invasion. Surface disturbance is a good indicator of the extent of these cumulative impacts.

Within the cumulative impact area, past, present and reasonably foreseeable actions include the construction of well pads, access roads, pipelines, and other surface disturbing activities which move or destroy topsoil, destroy vegetation and introduce and spread invasive plants and noxious weeds within the cumulative impact area. There are currently no other proposed field developments within the cumulative impact area. Alternative A would add between 223 to 235 acres of new surface disturbance. Alternative B (No Action alternative) would not result in an additional accumulation of impacts. Alternative C would add between 210.7 to 222.7 acres of new surface disturbance.

4.1.4.4. Lands with Wilderness Characteristics (LWC)

The White River inventory unit (29,775) was selected as the Cumulative Impacts Area (CIA) (see Figure 4.2, "Wilderness Characteristics Cumulative Impact Area" (p. 76)). Past present, and reasonably foreseeable actions are..... Cumulative impacts include the likely removal wilderness characteristics from 1,570 (GIS estimate) acres that border the 2008 RMP identified White River Natural Area (WRNA) on the south and west. The WRNA is not likely to be impacted because it is outside the project area. The White River Inventory Unit identified in 2007 would be reduced from 21,211 acres to 19,641 acres (GIS estimate). It is likely that minerals extraction and other potential projects will continue to be proposed in areas with wilderness character. The No Action alternative and Alternative C would not result in an accumulation of impacts.

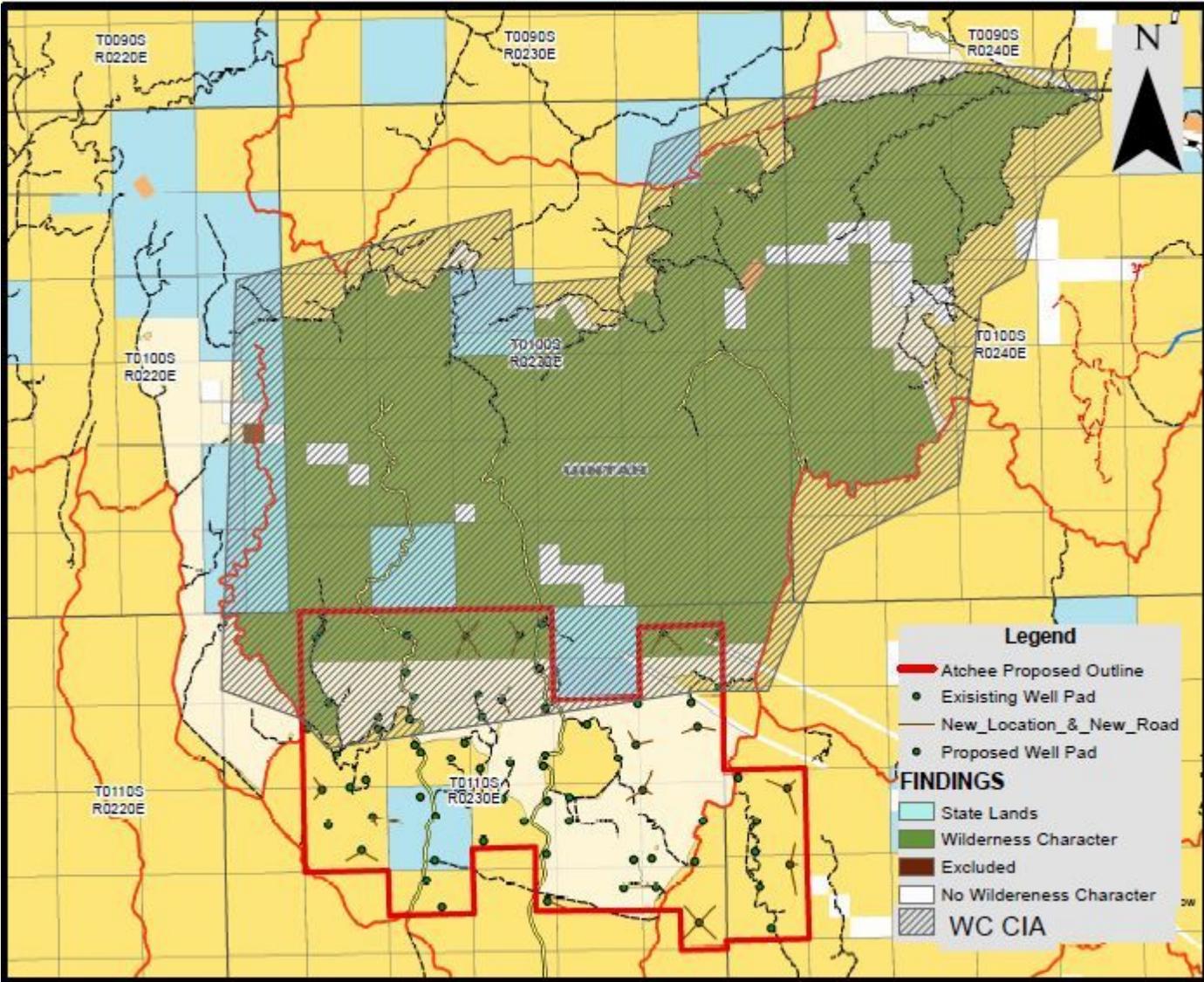


Figure 4.2. Wilderness Characteristics Cumulative Impact Area

4.1.4.5. Plants

4.1.4.5.1. Threatened, Endangered, Proposed, or Candidate Species

Uinta Basin Hookless Cactus (*Sclerocactus wetlandicus*)

The Project Area is partially located within an area that the USFWS has identified as potential habitat for *Sclerocactus* species. The Cumulative Impact Area for Uinta Basin hookless cactus is the area delineated by the USFWS as potential habitat for the species. This area covers approximately 537,564 acres on BLM, Ute tribal, state of Utah, and privately held lands. Due to inclusions of areas of unsuitable habitat within the potential habitat area, the total acreage of suitable habitat is less than 537,564 acres. However, a complete survey of suitable habitat has not been performed and thus the amount of suitable habitat has not been quantified. Impacts to the species from past, current, and reasonably foreseeable actions may be greater or smaller than those described for the total area depending upon the exact distribution of actions relative to suitable habitat.

Within the cumulative impact area, there are approximately 1,875 miles of roads. Past, present and reasonably foreseeable disturbance from oil and gas will affect 44,698 acres (8.3% of the cumulative impact area), as shown in the table below. Cumulative impacts include dust impacts to plants, and plant and pollinator habitat destruction. Surface disturbance is a good indicator of the extent of these cumulative impacts; an estimate of the surface disturbance within the cumulative impact area proposed under each of the alternatives is provided in the table below.

Cumulative Impacts Analysis for Uinta Basin Hookless Cactus

Table 4.3. Cumulative Impacts Analysis for Uinta Basin Hookless Cactus

	Project Area Acreage	Surface Disturbance Analyzed	Project Area Acreage within the CIAA	Surface Disturbance within the CIAA ¹
Ongoing Field Development				
Chapita Wells-Stagecoach Area	31,872	1,735	22,678	1,235
Gasco Natural Gas Field Development EIS	236,165	3,604	77,339	1,180
Greater Deadman Bench Oil and Gas Producing Region EIS	98,785	1,239	22,444	282
Greater Natural Buttes Project EIS	162,911	8,147	97,529	4,877
North Alger Natural Gas Expansion Project EA	2,320	192	943	78
North Chapita Natural Gas Well Development Project EA	31,872	1,735	9,191	500
River Bend Unit Infill Development EA	17,719	924	14,892	823

Rock Point EDA Leasing and Exploratory Drilling EA	92,098	340	11,344	42
Saddletree Draw Leasing and Rock House Development EA	4,826	106	4,774	105
West Bonanza Area Natural Gas Well Development Project EA	24,813	608	1,070	26
West Tavaputs EIS	137,930	1,603	30,704	357
Past Developments and Current and Future Developments Not Covered by a Field Development NEPA Document				
729 abandoned wells, ³	NA ⁴	NA	NA	3,565 acres
5,239 existing wells, ³	NA	NA	NA	19,158 acres
752 proposed wells ³	NA	NA	NA	2,377 acres
Field Development Proposals				
Greater Chapita Wells Natural Gas Infill Project EIS	40,027	3,696	31,741	2,931
Monument Butte Area Oil and Gas Development Project EIS	119,850	15,612	43,964	5,727
Randlett EDA Area Programmatic Leasing and Exploration Project	53,380	2,613	28,817	1,411
Total CIAA disturbance from oil and gas				
	--	--	--	44,698 acres (8.3%)
Current Project				
Alternative A	11,278	223 to 235	~1908	~60.9 acres
Alternative B	11,278	11.2	0	0
Alternative C	11,278	210.7 to 222.7	~	~37.1 acres
Total CIAA disturbance from oil and gas under the proposed Alternatives				
Alternative A	--	--	--	44,759 acres (8.33%)
Alternative B	--	--	--	44,698 acres (8.3%)
Alternative C	--	--	--	44,735 (8.32%)
¹ Assumes surface disturbance was authorized evenly across the analysis area of the document.				
² Uses the assumption contained within the Greater Uinta Basin Cumulative Impacts Technical Support Document.				
³ As of 4/8/2013				
⁴ NA = not applicable				

Graham's Penstemon (*Penstemon grahamii*) and White River Penstemon (*Penstemon scariosus* var. *albifluvis*)

The cumulative impact area for Graham's and White River beardtongues is the outcrops of oil shale. This area covers approximately 1,146,390 acres on BLM, Ute tribal, state of Utah, and privately held lands. Within the cumulative impact area, there are approximately 2,096 miles of roads. Past, present and reasonably foreseeable disturbance from oil and gas will affect 3,430 acres (0.3% of the cumulative impact area). Cumulative impacts include dust impacts to plants,

habitat fragmentation, and plant and pollinator habitat destruction. Surface disturbance is a good indicator of the extent of these cumulative impacts.

Due to inclusions of areas of unsuitable habitat within the potential habitat area, the total acreage of suitable habitat is less than 1,146,390 acres. Additionally, it is highly unlikely that the range of the species is as large as that associated with the oilshale outcrops in Utah. However, a complete survey of suitable habitat has not been performed and thus the amount of suitable habitat has not been quantified. Impacts to the species from past, current, and reasonably foreseeable actions may be greater or smaller than those described for the total area depending upon the exact distribution of actions relative to suitable habitat. Alternative A would add between 223 to 235 acres of new surface disturbance. Alternative B (No Action alternative) would not result in an additional accumulation of impacts. Alternative C would add between 210.7 to 222.7 acres of new surface disturbance.

4.1.4.5.2. Wetland/Riparian

The Cumulative Impact Area for Wetland/Riparian is the Saddle Tree Draw-White River, Lower Center Fork Asphalt Wash-Asphalt Wash, and West Fork Asphalt Wash Hydrologic Unit Boundaries. Cumulative impacts include siltation and drying of wetland/riparian areas. The cumulative impact areas is 74,154 acres in size, with 1,111 acres of wetlands or riparian areas. With the majority of wetland/riparian be along the White River. The proposed action has the potential to impact 1.4 acres of wetland/riparian areas. Where the no action would not result in impacts to wetland/riparian areas. Cumulative impacts for Alternative C would be the same as the proposed action.

4.1.4.6. Water

4.1.4.6.1. Floodplains

The Cumulative Impact Area for Wetland/Riparian is the Saddle Tree Draw-White River, Lower Center Fork Asphalt Wash-Asphalt Wash, and West Fork Asphalt Wash Hydrologic Unit Boundaries. The past, present, and reasonable foreseeable actions include building well pads, access roads, pipelines, and traveling through the floodplains. The cumulative impact area is 74,154 acres in size, with 2659 acres of mapped floodplain. With the majority of floodplains being along the White River, Saddle Tree Draw, Atchee Wash, and Asphalt Wash. The proposed action has the potential to impact 326 acres of mapped floodplain with 17.5 acres being disturbed by the construction of well pads. Where the no action would not result in impacts to mapped floodplains. Cumulative impacts for Alternative C would be the same as the proposed action with 12.5 acres being disturbed by the construction of well pads.

4.1.4.7. Wildlife

4.1.4.7.1. Migratory Birds (Including Raptors)

The Cumulative Impact Area for Migratory Birds and Raptor Species is the Book Cliffs, North hunt boundary, which is approximately 945,706 acres. It is expected that oil and gas development will continue throughout the cumulative impact area. With the continued development, disturbances will continue throughout species habitats. Cumulative impacts would

include temporary individual displacement, crushing of sagebrush vegetation, and removal of pinyon-juniper habitat types. Current and reasonably foreseeable actions in the cumulative impact area include; energy development, management activities, and recreational activities. Alternative A would add between 223 to 235 acres of new surface disturbance. Alternative B (No Action alternative) would not result in an additional accumulation of impacts. Alternative C would add between 210.7 to 222.7 acres of new surface disturbance.

4.1.4.7.2. Non-USFWS Designated Species

The Cumulative Impact Area for wildlife is the Book Cliffs, North deer hunt boundary, which is approximately 945,706 acres. The Project Area contains approximately 10,420 acres of substantial winter range habitat, of which 235 acres of deer and elk substantial winter habitat would be disturbed. Currently, the estimated population of mule deer is 7,850, well below the objective of 15,000. The estimated population of elk is 4,800 below the objective of 7,500. Presently, the project area is open to limited permits for deer and elk. This habitat represents approximately 0.023% of the winter habitat available within the project area. A loss in habitat value would result from fragmentation of continuous habitats, and increased human access into the region. Current and reasonably foreseeable actions within the CIAA include; energy development, management activities, and recreational activities which include hunting. Alternative A would add between 223 to 235 acres of new surface disturbance. Alternative B (No Action alternative) would not result in an additional accumulation of impacts. Alternative C would add between 210.7 to 222.7 acres of new surface disturbance.

4.1.4.7.3. Threatened, Endangered, Proposed, or Candidate Species

Cumulative effects include the effects of future actions that are reasonably certain to occur in the action area. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Declines in the abundance or range of the four endangered and three special status fish have been attributed to various human activities on federal, state, and private lands, such as human population expansion and associated infrastructure development; construction and operation of dams along major waterways; water retention, diversion, or dewatering of springs, wetlands, or streams; recreation, including off-road vehicle activity; expansion of agricultural or grazing activities, including alteration or clearing of native habitats for domestic animals or crops; and introduction of non-native plant, wildlife, or fish or other aquatic species, which can alter native habitats or out-compete or prey upon native species.

Reasonably foreseeable future activities that may affect river-related resources in the area include oil and gas exploration and development, recreational activities, and activities associated with the Upper Colorado River Endangered Fish Recovery Program. Implementation of all or any of these projects has affected and continues to affect the environment including but not limited to water quality, water rights, socioeconomics and wildlife resources. Cumulative effects to these species would include the following types of impacts; changes in land use patterns that would further fragment, modify, or destroy potential spawning sites or designated critical habitat, shoreline recreational activities and encroachment of human development that would remove upland or riparian/wetland vegetation and potentially degrade water quality, competition with and predation by exotic fish species, introduced by anglers or other sources. Alternative A would add between 223 to 235 acres of new surface disturbance. Alternative B (No Action alternative) would not

result in an additional accumulation of impacts. Alternative C would add between 210.7 to 222.7 acres of new surface disturbance.

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Chapter 5. Tribes, Individuals, Organizations, or Agencies Consulted

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Table 5.1. List of Persons, Agencies and Organizations Consulted

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
U.S. Fish & Wildlife Service (US FWS)	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	Consultation will be completed prior to issuance of a Decision Record.
Utah State Historic Preservation Office (SHPO)	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	Sagebrush Consultants conducted a Class I cultural resource literature search over the project area. They discovered that there are nine known sites in the project area and that 25% of the area has been surveyed. A consultation letter was sent to the State Historic Preservation Officer (SHPO) on November 24, 2014 recommending a "no adverse effect" determination due to the requirement of having Class III surveys before ground disturbing activities. We received their concurrence to our determination on December 8, 2014.
Ute Mountain Ute Tribe Ute Indian Tribe Goshute Indian Tribe Zia Pueblo Tribe White Mesa Ute Tribe Navajo Nation Laguna Pueblo Tribe Northwest Band of Shoshone Tribe Southern Ute Tribe Eastern Shoshone Tribe Ute Indian Tribe Eastern Shoshone Tribe Santa Clara Pueblo Tribe Ute Mountain Ute Tribe Hopi Tribe Jemez Pueblo Tribe	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	Tribal consultation was initiated on March 19, 2015 and will conclude on April 24, 2015. On March 30, 2015, the Santa Clara Pueblo asked for additional information regarding the identified cultural resources. The BLM provided additional information on the nature of the cultural resources on March 31, 2015. On April 1, 2015, the BLM discussed the concerns that the Hopi have raised throughout the consultation period for this undertaking. The BLM archaeologist explained where contradictions in any of the correspondence may have arisen from and fully explained the nature of the undertaking. The Hopi request a copy of all future Class III reports conducted in the Rosewood-Atchee development area to be mailed to them. The Hopi asked for continuing consultation and raised concerns about the nature of the applicant committed measures on April 3, 2015.
Utah Div. of Wildlife Resources	Coordination with UDWR as the agency with expertise on impacts on game species per Washington Office Instruction Memorandum 2012-043.	No sage-grouse habitat is present within the project area. Consultation through emails took place with Clint Sampson, DNR Wildlife Biologist, about mule deer winter range. There were no concerns about deer winter range.

5.1. Section 106 Summary

Section 106 Timeline for Past Action

- February 19, 2014: BLM initiated Utah State Historic Preservation Office (SHPO) consultation.
- March 14, 2014: SHPO concurs with the proposed consulting parties list.
- April 3, 2014: BLM initiated Section 106 process with consulting parties.
- April 10, 2014: Southern Utah Wilderness Alliance requested continued consultation.
- April 21, 2014: Hopi requested continued consultation, copies of cultural resources survey report and draft EA.
- April 21, 2014: Rosewood Resources requested participation.
- April 24, 2014: Utah Public Lands Policy Coordination Office requested continued consultation.
- April 30, 2014: Uintah County had no comments.
- May 1, 2014: ACHP requested additional information to determine if their participation is warranted.
- May 20, 2014: ACHP declined to participate at this time.
- July 29, 2014: BLM announced August 6, 2014 meeting.
- August 6, 2014: The consulting parties defined the Area of Potential Effect as the project area, and determined that a Programmatic Agreement was not needed.
- August 28, 2014: The interested parties were asked to assist with identification of the area of potential effect and highlight any potential cultural resource issues associated with the project. At that time, no cultural resource issues were brought forward and it was determined that a Programmatic Agreement was not needed.
- November 24, 2014: BLM consulted with SHPO on the determination of "No Adverse Effect."
- December 4, 2014: SHPO concurred with BLM determinations.
- January 28, 2015: BLM closed the Section 106 process with the consulting parties.
- January 30, 2015: SUWA responded and requested additional information as required in 36 C.F.R. § 800.11(e).
- March 18, 2015: BLM concluded the Section 106 process with the consulting parties.
- March 19, 2015: BLM initiated tribal consultation.
- March 30, 2015: The Santa Clara Pueblo asked for additional information regarding the identified cultural resources.

- March 31 2015: The BLM provided additional information on the nature of the cultural resources.
- April 1, 2015: The BLM discussed the concerns that the Hopi have raised throughout the consultation period for this undertaking. The BLM archaeologist explained where contradictions in any of the correspondence may have arisen from and fully explained the nature of the undertaking. The Hopi request a copy of all future Class III reports conducted in the Rosewood-Atchee development area.
- April 3, 2015: The Hopi asked for continuing consultation and raised concerns about the nature of the applicant committed measures.
- April 24, 2015: Tribal consultation is concluded.

Future Section 106 Actions

All future Section 106 actions in the Rosewood-Atchee development area would be conducted on a site specific basis and will be subject to a separate NEPA action. A Class III inventory would be conducted in all previously unsurveyed areas proposed for surface disturbance. Surveys will also be conducted in areas where any existing survey is more than 10 years old. At each proposed well and compressor station location, a 10-acre square parcel would be defined, centered on the well pad center stake. The 10-acre parcel would be examined for cultural resources by an archaeologist walking parallel transects spaced no more than 30 feet apart. All access, gas line and water line routes would be surveyed to a width of 200 feet.

Any prehistoric and historic sites documented during the Class III inventory as eligible for listing on the National Register of Historic Places (NRHP), as well as areas identified as having a high probability of significant subsurface materials, would be avoided by development. Specifically, well pad locations and access/gas and water line routes would be altered or rerouted as necessary to avoid impacting NRHP-eligible sites.

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Chapter 6. List of Preparers

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Table 6.1. List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Stephanie Howard	Environmental Coordinator	Team Lead, Air Quality
Christine Cimiluca	Natural Resource Specialist	Invasive Plants/Noxious Weeds, Soils, Vegetation, TECP Plant Species
David Gordon	Natural Resource Specialist	Floodplains, Plants Wetland/Riparian
Erin Goslin	Archaeologist	Cultural Resources
Jason West	Recreation Planner	Lands With Wilderness Characteristics
Dixie Sadlier	Wildlife Biologist	Migratory Birds, Non-USFWS Designated, Wildlife Threatened, Endangered, Proposed or Candidate

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Chapter 7.

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Appendix A. Interdisciplinary Team Checklist

Project Title: Rosewood's Atchee Oil and Gas Field Development Project

NEPA Log Number: DOI-BLM-UT-G010-2012-0018

File/Serial Number:

Project Leader: Stephanie Howard

Determination of Staff: (Choose one of the following abbreviated options for the left column)

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impact that need to be analyzed in detail in the EA

NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form. The Rationale column may include NI and NP discussions.

Determination	Resource/Issue	Rationale for Determination	Signature	Date
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)				
PI	Air Quality & Greenhouse Gas Emissions	Potential impacts from emissions during construction, drilling, and production	Stephanie Howard	4-19-2013
NP	BLM Natural Areas	None Present as per GIS and RMP review	Jason West	April 10, 2013
PI	Cultural: Archaeological Resources	The entire proposed APE has not been covered by Class III cultural resource inventories. Based on current data, sites exist in the area and could be avoided. Class III cultural surveys need to be completed before any ground disturbing activities. Sagebrush Consultants conducted a Class I cultural resource literature search over the project area. They discovered that there are nine known sites in the project area and that 25% of the area has been surveyed. A consultation letter was sent to the State Historic Preservation Officer (SHPO) on November 24, 2014 recommending a "no adverse effect" determination. We received their concurrence to our determination on December 8, 2014.	Erin Goslin	3/20/2015

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Cultural: Native American Religious Concerns	Tribal consultation was initiated on March 19, 2015 and will conclude on April 24, 2015. If any tribes have comments during this period, another 30 day period will be started to respond to their concerns.	Erin Goslin	3/20/2015
NP	Designated Areas: Areas of Critical Environmental Concern	No ACECs are present in the project area per GIS review of Vernal RMP decisions.	Stephanie Howard	10/31/2013
NP	Designated Areas: Wild and Scenic Rivers	No WSRs are present in the project area per GIS review of Vernal RMP decisions.	Stephanie Howard	10/31/2013
NP	Designated Areas: Wilderness Study Areas	None Present as per GIS and RMP review	Jason West	April 10, 2013
NP	Environmental Justice	No minority or poverty populations are present in or near the project area.	Stephanie Howard	4-19-2013
NP	Farmlands (prime/unique)	No prime or unique farmlands as designated by the NRCS are present in the project area.	Stephanie Howard	4-19-2013
NI	Fuels/Fire Management	Disturbance in Wyoming big sagebrush vegetation type will increase the amount of invasive plants, specifically <i>Bromus tectorum</i> . The increase of <i>Bromus tectorum</i> could lead to an increase in fire frequency and rate of spread. Applying the Green River District Reclamation Guidelines may decrease the risk of additional hazardous fuels.	Blaine Tarbell	4/18/13
NI	Geology/Minerals/ Energy Production	About 10-13 known gilsonite veins trend through this area in sections 1, 3, 4, 5, 10, 11, 12, 13, 14, 15, 17, 21, 22, 23 & 24 of T11S, R23E; and sections 18 & 19 of T11S, R24E, of the project area. If gilsonite is encountered during drilling or construction, please report that information to BLM VFO. The depth and thickness of the vein is important information that should be provided to BLM. Operator must notify any active Gilsonite operation within 2 miles of the location 48 hours prior to any blasting for this well. Natural gas, oil, gilsonite, oil shale and tar sand are the only mineral resources that could be impacted by the project. Production of natural gas or oil would deplete reserves, but the proposed project allows for the recovery of natural gas and oil per 43 CFR 3162.1(a), under the existing Federal lease. Compliance	Andrew McCormick	4/15/2013

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<p>with “Onshore Oil and Gas Order No. 2, Drilling Operations” would assure that the project would not adversely affect Gilsonite, oil shale, or tar sand deposits. Due to the state-of-the-art drilling and wells completion techniques, the possibility of adverse degradation of tar sand or oil shale deposits by the proposed action would be negligible.</p> <p>Wells completion must be accomplished in compliance with “Onshore Oil and Gas Order No. 2, Drilling Operations”. These guidelines specify the following: <i>... proposed casing and cementing programs shall be conducted as approved to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use.</i></p>		
PI	Invasive Plants/ Noxious Weeds, Soils & Vegetation	The proposed alternatives would result in disturbance to soils in the Project Area, as well as disturbance/removal of native vegetation. The proposed alternatives may also result in the introduction or spread of invasive plants/noxious weeds in the Project Area, although adherence to the applicant-committed environmental protection measures for invasive plants/noxious weeds, as outlined in ch. 2, would reduce the potential for the establishment/spread of invasive plants/noxious weeds in the Project Area.	Aaron Roe, Christine Cimiluca	04/19/2013, 1/14/2015
NI	Lands/Access	<p>The proposed area is located within the VFO RMP/ROD area, which allows for oil and gas development with associated road, pipeline and power line right-of-ways. The project is not expected to affect access to public lands. All right-of-ways would be subject to all valid pre-existing rights.</p> <p>Any proposals for future projects within the oil and gas development area would be reviewed on a site-specific basis and other right-of-way holders in the area would also be notified, as per regulations, when an application for right-of-way is received by this office.</p>	Katie White Bull	02/18/2014

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Lands with Wilderness Characteristics (LWC)	Wilderness Character found in Sections 1, 3, 4, 5, and 8. Approximately 1,600 acres identified in the White River inventory unit as having wilderness character.	Jason West	April 10, 2013
NI	Livestock Grazing & Rangeland Health Standards	The proposed project would be located in the Olsen AMP Sheep Grazing Allotment. The allotment is a fall winter and spring use allotment from November 1 through June 15. The project is in an area that is heavily bisected by oil and gas roads, above ground pipelines and oil pads. The proposed project is not expected to affect livestock movement patterns, access to water or to largely affect the allotment with the loss of AUMS. In addition the relatively low impacts are foreseen to Rangeland Health Standards due to the small disturbance of the proposed project.	Craig Newman	May 16, 2013
NI	Paleontology	<p>The project area is underlain by the Uinta Formation (PFYC 5) and projects entailing unmitigated disturbance of this formation will have a high potential to impact paleontological resources.</p> <p>Considering the applicant committed measures listed below, no significant impact to paleontological resources should be expected.</p> <ul style="list-style-type: none"> ● Paleontological surveys will be conducted by an BLM-approved paleontologist prior to any surface disturbance. ● If significant fossils are encountered during the survey, the paleontologist will assess and document the discovery and either collect the fossils, or recommend the area be avoided so as not to destroy the resource. ● The AO of the SMA will determine the need for further monitoring of the area or mitigation of the site during ground-disturbing activities. ● If fossils are encountered during excavation, construction will be suspended and the AO of the SMA notified. Construction will not resume until the fossils are assessed by the AO of the SMA and appropriate mitigation measures are developed and implemented. 	Justin Snyder	3/16/2015

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Plants: BLM Sensitive	<p>Suitable habitat for the following UT BLM sensitive plant species is present in the same or adjacent subwatershed as the proposed project: Barneby’s catseye (<i>Cryptantha barnebyi</i>), and sterile yucca (<i>Yucca sterilis</i>).</p> <ul style="list-style-type: none"> ● The Parachute Creek Member of the Green River Formation is present within the proposed Project Area. Therefore, suitable habitat is present for Barneby’s catseye in the Project Area. However, this species has not been previously documented in the Project Area and the nearest known points were documented approximately 6.3 miles from the Project Area per BLM GIS data review. ● Any sandy soils present within the proposed Project Area may provide suitable habitat for <i>Yucca sterilis</i>. However, this species has not been previously documented in the Project Area, per BLM GIS review. <p>Prior to ground disturbing activities, clearance surveys within suitable habitat for either of these species (or any species add to the BLM list in the future) would be required and documented populations would be avoided by at least 150 feet.</p>	Aaron Roe, Christine Cimiluca	4/19/2013, 1/14/2015
PI	Plants: Threatened, Endangered, Proposed, or Candidate	<p>The following federally listed, proposed, or candidate plant species are present in the same or adjacent subwatershed as the proposed project: Uinta Basin hookless cactus (<i>Sclerocactus wetlandicus</i>), Graham’s penstemon (<i>Penstemon grahamii</i>), and White River penstemon (<i>Penstemon scariosus</i> var. <i>albifluvis</i>).</p> <ul style="list-style-type: none"> ● Part of the Project Area is within the 2013 polygon established by U.S. Fish and Wildlife Service as potential habitat for Uinta Basin hookless cactus per BLM GIS review. In addition, suitable habitat may be present elsewhere in the Project Area. No individual plants or populations of the species have been previously documented in the Project Area, and the nearest documented points are approximately 4.7 miles outside the Project Area, per BLM GIS review. The Project Area is not within designated core habitat for the species. 	Aaron Roe, Christine Cimiluca	4/19/2013, 1/14/2015

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		<ul style="list-style-type: none"> ● The Parachute Creek Member of the Green River Formation is present within the proposed Project Area. Therefore, suitable habitat for Graham's penstemon may be present. The species has not been previously documented in the Project Area; the nearest documented occurrence is approximately 5.7 miles from the Project Area, per BLM GIS review. In addition, the Project Area is not within one of the Core Conservation Areas established by the 2014 Conservation Agreement for Graham's penstemon. ● The Parachute Creek Member of the Green River Formation is present within the proposed project area. Therefore, suitable habitat for White River penstemon may be present. The species has not been previously documented in the Project Area; the nearest documented occurrence is approximately 5.8 miles from the Project Area, per BLM GIS review. In addition, the Project Area is not within one of the Core Conservation Areas established by the 2014 Conservation Agreement for White River penstemon. <p>Avoidance of populations by 300 feet is required for all new surface disturbance.</p>		
PI	Plants: Wetland/Riparian	There are two wetlands/riparian areas in the project area. The wetlands/riparian areas could be impacted by well pad expansions.	Dave Gordon	04/22/2013
NI	Recreation	The proposed project area is within a current developed Oil and Gas field. Field review conducted 2/26/2014 with Dixie Sadlier and Jason West noted that the proposed development locations were more than 2 miles away from the White river and screened by topography. The area is part of the Vernal Extensive Recreation Management Area (ERMA) which is managed with primitive recreation in mind with minimal facilities development.	Jason West	2/27/2014
NI	Socio-Economics	No measureable impacts to the social or economic status of the County are anticipated due to the small size of the project in relation to ongoing activities throughout the basin.	Stephanie Howard	4-19-2013

Determination	Resource/Issue	Rationale for Determination	Signature	Date
NI	Visual Resources	<p>VRM Class IV identified. The objective of Class IV is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. The proposed project meets VRM Class IV objectives. VRI Baseline (November 2011, Logan Simpson) indicates a class A quality rating for the White River inventory unit as a whole of which sections 1, 3, 4, 5 and 8 are a part. Page A-93 narrative reads “The unit is a flat valley and river unit with steep to vertical walls and buttes. Vegetation includes pinyon juniper, sage, cottonwood, tamarisk, and olive. There are also seasonal flowers, globe mallow and cheat grass. Development includes bridges, pipelines, 2-track road with pockets of oil and gas development. Most of the development is not visible. Depending on locations and visibility, the scenic quality rating in a future VRI would be impacted, but the project is within the scope of Class IV objectives. For purposes of transparency, the existing landscape and proposed changes will be tracked through the document. Field Visit was conducted 2/26/2014 by Jason West and Dixie Sadlier.</p>	Jason West	2/27/2014
NI	Wastes (hazardous/solid)	<p>Hazardous materials above reportable quantities will not be produced by drilling or completing the proposed well(s) or constructing the pipelines/facilities. The term “hazardous materials” as used here means: (1) any substance, pollutant, or containment listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended 42 U.S.C 9601 et seq., and the regulations issued under CERCLA; and (2) any hazardous waste as defined in RCRA of 1976, as amended. In addition, no extremely hazardous substance, as defined in 40 CFR 355, in threshold planning quantities, would be used, produced, stored, transported, or disposed of while producing any well.</p> <p>Trash and other waste would be contained in appropriate containers and then disposed in approved locations.</p>	Dave Gordon	04/22/2013

Determination	Resource/Issue	Rationale for Determination	Signature	Date
PI	Water: Floodplains	There are three HUD inventoried floodplains within the project area. There are proposed and existing well pads in the floodplains. Floodplains would be avoided wherever possible. However, when they can't be, mitigation or avoidance measures would be implemented by applying appropriate Best Management Practices (BMPs), Applicant Committed Measures, or as part of Conditions of Approval (COAs).	Dave Gordon	04/22/2013
NI	Water: Groundwater Quality	<p>Compliance with Federal regulations contained in 43 CFR Part 3160, as implemented by the BLM Onshore Oil and Gas Orders, will assure that down-hole operations, "protect and/or isolate all useable water" and that surface operations provide for, "adequate protection of groundwater."</p> <p>Specifically considering the following items, no significant impact to groundwater should be expected.</p> <ul style="list-style-type: none"> ● BLM's site specific APD review process and requirement to case and cement through all useable water ● Applicant committed measures described in this EA (esp. those regarding Soil Resources, Water Resources and Hazardous Materials) ● Lack of any EPA designated Sole Source Aquifers or State of Utah Drinking Water Protection Zones underlying the project 	Justin Snyder	3/16/2015
NI	Water: Hydrologic Conditions (stormwater)	The current hydrologic conditions that exist in the area are mainly dry ephemeral washes inside a Semi-desert loam environment. These conditions usually exhibit large pulses of water during flood events that occur. During these flood events the area can see large pulses of water flowing in these ephemeral drainages. These drainages all flow into the White River approximately 5 miles to the north of the project. Applicant committed measures are in place to help prevent the proposed 235 acres of total proposed disturbance from reaching these systems. A stormwater control plan would be implemented to address these issues. At a minimum the plan would be site specific and address drainage concerns, and erosion concerns, with a strong	James Hereford II	3/14/2014

Determination	Resource/Issue	Rationale for Determination	Signature	Date
		focus on site stabilization, which would include the reclamation that is required.		
NP	Water: Surface Water Quality	No perennial surface waters exist on the current proposed project area. The area is mostly dry ephemeral washes that flash during high precipitation events. The closest surface water is the White River approximately 5 miles to the North of the project.	James Hereford II	3/14/2014
NP	Water: Waters of the U.S.	No waters of the U.S. exist on the current proposed project area as per GIS review and on the ground observations of the area. The closest water of the U.S. is the White River, which is approximately 5 miles to the North of the project.	James Hereford II	3/14/2014
NI	Wild Horses	There are no Wild Horses present in the project area; however, occasional feral and /or estray horses may be observed and are considered under the management jurisdiction of the County	Dusty Carpenter	1/29/2014
PI	Wildlife: Migratory Birds (including raptors)	Migratory birds are present. Several raptor nests exist within project area.	Dixie Sadlier	4/22/2013
PI	Wildlife: Non-USFWS Designated	Substantial elk and deer winter habitat present. Sensitive fish species would be affected by water depletions.	Dixie Sadlier	4/22/2013
PI	Wildlife: Threatened, Endangered, Proposed or Candidate	Project is outside of occupied sage grouse habitat. Water depletion will occur therefor T&E fish will need to be analyzed. Is the proposed project in sage grouse PPH or PGH? Yes No <input checked="" type="checkbox"/> If the answer is yes, the project must conform with WO IM 2012-043.	Dixie Sadlier	4/22/2013
NI	Woodlands/Forestry	No impacts beyond those addressed in the vegetation section.	David Palmer	04/22/2013 3/11/2015

FINAL REVIEW:			
Reviewer Title	Signature	Date	Comments
Environmental Coordinator			
Authorized Officer			

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Appendix B. Conservation Measures for Special Status Plant Species

Uinta Basin hookless cactus (*Sclerocactus wetlandicus*)

In order to minimize effects to the federally threatened Uinta Basin hookless cactus, the BLM in coordination with the U.S. Fish and Wildlife Service (Service), developed avoidance and minimization measures. Integration of and adherence to these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance) are in compliance with the Endangered Species Act (ESA). The following avoidance and minimization measures would be included in the Plan of Development:

1. Pre-project habitat assessments will be completed across 100 percent of the project disturbance area within potential habitat¹ prior to any ground disturbing activities to determine if suitable Uinta Basin hookless cactus habitat is present.
2. Within suitable habitat², site inventories will be conducted to determine occupancy. Inventories:
 - a. Must be conducted by qualified individual(s) and according to BLM and USFWS accepted survey protocols;
 - b. Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected, and during appropriate flowering periods. For this species, surveys can be done any time of the year, provided there is no snow cover;
 - c. Will occur within 300 feet from the edge of the proposed ROW for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad,;
 - d. Will include, but not be limited to, plant species lists and habitat characteristics; and
 - e. Will be valid until one year from the survey date.
3. Design project infrastructure to minimize impacts within suitable habitat:
 - a. Reduce well pad size to the minimum needed, without compromising safety;
 - b. Limit new access routes created by the project;
 - c. Roads and utilities should share common ROWs where possible,;
 - d. Reduce width of ROWs and minimize the depth of excavation needed for the road bed, where feasible use the natural ground surface for the road within habitat;

¹*Potential habitat* is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by a preliminary, in-house assessment.

²*Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Uinta Basin hookless cactus. Habitat descriptions can be found in the U.S. Fish and Wildlife Service's 2010 Recovery Outline and Federal Register Notices for the Uinta Basin hookless cactus (74 Federal Register 47112 47117).

- e. Place signing to limit off-road travel in sensitive areas;
 - f. Stay on designated routes and other cleared/approved areas; and
 - g. All disturbed areas will be re-vegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.
4. Within occupied habitat³, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants. When and where practicable:
- a. Follow the above (#3) recommendations for project design within suitable habitats;,
 - b. Buffers of 300 feet minimum between the edge of the ROW (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated;
 - c. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right-of-way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat to ensure the pipelines don't move towards the population;
 - d. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.;
 - e. Where technically and economically feasible, use directional drilling or multiple wells from the same pad;
 - f. Designs will avoid concentrating water flows or sediments into occupied habitat;
 - g. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat; and
 - h. Minimize the disturbed area of producing well locations through interim and final reclamation, and reclaim well pads following drilling to the smallest area possible.
5. Occupied Uinta Basin hookless cactus habitats within 300 feet of the edge of the surface pipelines' ROWs, 300 feet of the edge of the roads' ROWs, and 300 feet from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service.
6. Reinitiation of Section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the Uinta Basin hookless cactus is anticipated as a result of project activities.

Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the Service to ensure continued compliance with the ESA.

³Occupied habitat is defined as areas currently or historically known to support Uinta Basin hookless cactus; synonymous with "known habitat."

Graham's beardtongue (*Penstemon grahamii*)

In order to minimize effects to the federally proposed Graham's beardtongue, the BLM in coordination with the U.S. Fish and Wildlife Service (Service) developed the following avoidance and minimization measures. Integration of and adherence to these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance) are in compliance with the Endangered Species Act (ESA) and will not result in a trend toward federal listing of the species. The following avoidance and minimization measures should be included in the Plan of Development:

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat⁴ prior to any ground disturbing activities to determine if suitable Graham's beardtongue habitat is present.
2. All surface disturbing activities having potential direct or indirect impacts on proposed critical habitat⁵ are prohibited.
3. Within suitable habitat⁶, site inventories will be conducted to determine occupancy. Inventories:
 - a. Must be conducted by qualified individual(s) and according to BLM and Service accepted survey protocols;
 - b. Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15th to May 20th in the Uinta Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or FWS botanist or demonstrating that the nearest known population is in flower);
 - c. Will occur within 300' from the centerline of the proposed right-of-way for surface pipelines or roads; and within 300' from the perimeter of disturbance for the proposed well pad including the well pad;
 - d. Will include, but not be limited to, plant species lists and habitat characteristics; and
 - e. Will be valid until April 15th the following year.
4. Design project infrastructure to minimize impacts within suitable habitat:
 - a. Reduce well pad size to the minimum needed, without compromising safety;
 - b. Limit new access routes created by the project;
 - c. Roads and utilities should share common right-of-ways where possible;

⁴ *Potential habitat* is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment.

⁵ *Proposed critical habitat* is defined as habitat proposed in the Federal Register (78 FR 47590) to be designated as critical habitat under Section 4 of the Endangered Species Act.

⁶ *Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Graham's beardtongue plants; detailed habitat and plant descriptions can be found in the Federal Register 78: 47590 -47611.

- d. Reduce the width of right-of-ways and minimize the depth of excavation needed for the road bed, where feasible use the natural ground surface for the road within habitat;
 - e. Place signing to limit off-road travel in sensitive areas; and
 - f. Stay on designated routes and other cleared/approved areas.
5. Within occupied habitat⁷, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:
- a. Follow the above (#4) recommendations for project design within suitable habitats;
 - b. Construction of roads will occur such that the edge of the right of way is at least 300' from any plant;
 - c. Roads will be graveled within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15th to May 20th (flowering period), dust abatement applications will be comprised of water only;
 - d. The edge of the well pad should be located at least 300' away from plants;
 - e. Surface pipelines will be laid such that a 300 foot buffer exists between the edge of the right of way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat (exposed raw shale knolls and slopes derived from the Parachute Creek and Evacuation Creek members of the geologic Green River Formation) to ensure pipelines don't move towards the population;
 - f. Construction activities will not occur from April 15th through May 30th within occupied habitat;
 - g. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.;
 - h. Where technically and economically feasible, use directional drilling or multiple wells from the same pad;
 - i. Designs will avoid concentrating water flows or sediments into occupied habitat;
 - j. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat; and
 - k. Minimize the disturbed area of producing well locations through interim and final reclamation; and reclaim well pads following drilling to the smallest area possible.
6. Occupied Graham's beardtongue habitats within 300' of the edge of the surface pipelines' right-of-ways, 300' of the edge of the roads' right-of-ways, and 300' from the edge of well pads shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be

⁷Occupied habitat is defined as areas currently or historically known to support Uinta Basin hookless cactus; synonymous with "known habitat."

changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service.

7. Reinitiation of Section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the Graham's beardtongue is anticipated as a result of project activities.

Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in consultation with the Service to ensure continued compliance with the ESA.

White River's beardtongue (*Penstemon scariosus* var. *albifluvis*)

In order to minimize effects to the federal candidate White River beardtongue, the Bureau of Land Management (BLM) in coordination with the U.S. Fish and Wildlife Service (Service) developed the following avoidance and minimization measures. Integration of and adherence to these measures will help ensure the activities carried out during oil and gas development (including but not limited to drilling, production, and maintenance) will not result in a trend toward federal listing of the species. The following avoidance and minimization measures should be included in the Plan of Development:

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat⁸ prior to any ground disturbing activities to determine if suitable White River beardtongue habitat is present.
2. All surface disturbing activities having potential direct or indirect impacts on proposed critical habitat⁹ are prohibited.
3. Within suitable habitat¹⁰, site inventories will be done to determine occupancy. Inventories:
 - a. Must be conducted by qualified individual(s) and according to BLM and Service accepted survey protocols;
 - b. Will be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually May 1st to June 30th in the Uinta Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or FWS botanist or demonstrating that the nearest known population is in flower),
 - c. Will occur within 300' from the centerline of the proposed right-of-way for surface pipelines or roads; and within 300' from the perimeter of disturbance for the proposed well pad including the well pad;
 - d. Will include, but not be limited to, plant species lists and habitat characteristics; and
 - e. Will be valid until May 20th the following year.

⁸ *Potential habitat* is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment.

⁹ *Proposed critical habitat* is defined as habitat proposed in the Federal Register (78 FR 47590) to be designated as critical habitat under Section 4 of the Endangered Species Act.

¹⁰ *Suitable habitat* is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain White River penstemon; detailed habitat and plant descriptions can be found in the Federal Register 78: 47590 -47611.

4. Design project infrastructure to minimize impacts within suitable habitat:
 - a. Reduce well pad size to the minimum needed, without compromising safety;
 - b. Limit new access routes created by the project;
 - c. Roads and utilities should share common right-of-ways where possible;
 - d. Reduce the width of right-of-ways and minimize the depth of excavation needed for the road bed, where feasible use the natural ground surface for the road within habitat;
 - e. Place signing to limit off-road travel in sensitive areas; and
 - f. Stay on designated routes and other cleared/approved areas.
5. Within occupied habitat¹¹, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:
 - a. Follow the above (#3) recommendations for project design within suitable habitats;
 - b. Construction of roads will occur such that the edge of the right of way is at least 300' from any plant;
 - c. Roads will be graveled within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from May 20th to June 30th (flowering period), dust abatement applications will be comprised of water only;
 - d. The edge of the well pad should be located at least 300' away from plants;
 - e. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat (sparsely vegetated shale slopes of the Green River Formation) to ensure the pipelines don't move towards the population;
 - f. Construction activities will not occur from May 20th to June 30th within occupied habitat;
 - g. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.;
 - h. Where technically and economically feasible, use directional drilling or multiple wells from the same pad;
 - i. Designs will avoid concentrating water flows or sediments into occupied habitat;
 - j. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat; and
 - k. Minimize the disturbed area of producing well locations through interim and final reclamation, and reclaim well pads following drilling to the smallest area possible.
6. Occupied White River beardtongue habitats within 300' of the edge of the surface pipelines' right-of-ways, 300' of the edge of the roads' right-of-ways, and 300' from the edge of the

¹¹ *Occupied habitat* is defined as areas currently or historically known to support White River penstemon; synonymous with "known habitat."

well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service.

Additional site-specific measures may also be employed to avoid or minimize effects to the species. These additional measures will be developed and implemented in coordination with the Service to ensure continued compliance with the ESA.