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North Alger Project

Proposed by Koch Exploration Company LLC
Township 10 S Range 19 E Section 27-28, 33-35
Uintah County, Utah

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BLM

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1.0 PURPOSE AND NEED

1.1 Introduction

Koch Exploration Company, LLC (Koch, "the Operator") proposes to drill and produce up to 124 wells on 19 well pads to develop its underlying federal oil and gas leases in the North Alger area of Uintah County, Utah. The Vernal Field Office (FO) manages the Bureau of Land Management (BLM) surface lands and federal mineral estate in the project area. The BLM and State of Utah, have authority over various aspects of oil and gas development in the project area.

This Environmental Assessment (EA) assists the 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 Regulation (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). If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an 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.

This EA is a conceptual analysis of potential impacts that could result from the implementation of the Proposed Action or alternatives to the Proposed Action. The Operator has not yet determined the precise location of the well pads or the exact number of wells that may be drilled from each pad. It is not a site-specific EA, which associates well pads and wells with precise locations. The Operator has not submitted Applications for Permit to Drill (APD). Therefore, this EA considers and analyzes potential impacts to resources within the entire North Alger project area (NAPA). Additional site-specific environmental documentation would be required prior to approval of an APD.

1.2 Background

A proposal for an action in the North Alger area was initiated in 2005 by EOG Resources, Inc. (EOG), which owned mineral leases in the NAPA. This action was originally analyzed in EA #UT-080-2006-099. The BLM posted EOG's proposed project on the Environmental Notification Bulletin Board (ENBB) on December 15, 2005, and identified concerns and issues. A public comment period for the draft EA, #UT-080-06-099, was conducted from June 12 to July 19, 2006, after which the BLM responded to the public comments and made changes to the EA. EA #UT-080-2006-099 was finalized in October 2007 with the issuance of a DR. A request for a State Director Review of the EA was filed on November 14, 2007. The Utah State BLM Office remanded the EA to the Vernal Field Office on December 12, 2007. The BLM Utah State office provided four recommendations that referred to cumulative air impacts and quality, wilderness characteristics, the Four Mile Wash Area of Critical Environmental Concern, and directional drilling considerations. During this time, EOG's Proposed Action changed. A second EA, #DOI-BLM-UT-G010-2009-0089-EA, was prepared that incorporated the revisions to the initial EA based on public comments, changes directed by State Director review, the

revised Proposed Action, and conditi ons in the A pproved Resource Management Plan (App roved RMP) (BLM, 2008). This EA was not finalized because of a change in EOG's priorities.

On Septem ber 1, 201 1, EOG transferred so me of its leas es in the North Alger area to Koch. Koch expanded the scope of the action prev iously proposed by EOG. Figure 1 display s the proj ect area and conceptual well pad locations.

The Operator's objectives for the project are to:

- Allow it to exercise its valid and existing lease rights by extracting the subsurface hydrocarbons;
- Add to the existing knowl edge of the r eservoir char acteristics of the southern Monum ent Butte-Red Wash area;
- Evaluate drilling and completion techniques yet to be used in the North Alger area;
- Provide additional data to evaluate future well spacing and optimal drilling density for successful production from tight gas sands; and
- Contribute to available natural gas and oil supply, if the wells are productive.

1.3 Need for the Action

The BLM's i ssuance of fede ral leases conve yed to t he Operator legal contractual and pro perty rig hts to explore for and develop t he underl ying oil and nat ural gas reso urces (See S ection 1.6). The Operator plans to file up to 124 APDs in the Vernal FO. Th e underlying need for the Proposed Action is for th e BLM to respond to the operator's proposal to develop valid existing leases by drilling the proposed wells, and to produce, if successful, federal minerals in the form of commercial quantities of gas and/or oil.

1.4 Purpose for the Proposed Action

The BLM is considering approval of private exploration and production from federal oil and gas leases as an integral p art of BLM's leasing program . The authority for these action s falls under the Mineral Leasing Act of 1920 (ML A), as amen ded by the Federal Land Policy and Management Act of 1976 (FLPMA) an d the Federal Onshore Oil and Gas L easing Reform Act of 1987 (FOOGLRA). The BL M purpose in considering approval of the proposed wells is to be consistent with the lease rights granted to the Operator and to prevent unnecess ary or undue de gradation of the public lands avoid by reducing impacts to the affected resources.

1.5 Conformance with BLM Land Use Plans

The Proposed Action has been reviewed for conformance with the Approved RMP (43 CFR 1610.5, BLM 1617.3)**.** The BLM Vern al FO Record of Decisio n (ROD) and Approved RMP (BLM, 2008) pro vide management direction for the public lands that incl ude the project area. Oil and gas exploration and development are recognized as appropri ate uses of pub lic lands. Management decisions in t he ROD and Approved RMP provide for:

- Energy resource exploration and developm ent surface-disturbing activities unless pr ecluded by other program prescriptions and surface-disturbance related stipulations (page 96).

- A variety of oil and gas operations and geophysical explorations unless precluded by other program prescriptions and surface-disturbance related stipulations (page 97).
- Recognition that the Approved RMP does not affect valid existing rights (page 21).

This proposal does not conflict with other decisions within the ROD. It is therefore in conformance with the Land Use Plan.

The Operator's oil and gas leases were issued prior to the issuance of the ROD and will continue to be managed under the stipulations in effect when the leases were issued; however, resources and resource values will be managed in consideration of protection measures included in the Approved RMP. Environmental best management practices (BMPs) will be incorporated into permits and authorizations as necessary to mitigate impacts and possible conflicts with other uses.

1.6 Relationship to Statutes, Regulations, or Other Plans

This EA was prepared in accordance with the NEPA and with all applicable regulations subsequently passed, including Council of Environmental Quality regulations (40 CFR Parts 1500-1508) and U.S. Department of the Interior requirements (Department Manual 516, Environmental Quality). The Proposed Action is consistent with federal laws and citations. Key authorizations that may be applicable to this project are summarized in Table 1-1. The exploration for and production of domestic oil and gas reserves are consistent with the President's National Energy Policy, set forth in Executive Order (EO) 13212 (2001), and with the Energy Policy Act of 2005.

National mineral leasing laws, regulations, and policies recognize the statutory rights of lessees to develop federal mineral resources to meet continuing national needs and economic demands, "in a manner which ensures the proper handling, measurement, disposition, and site security of leasehold production; which protects other natural resources and environmental quality; which protects life and property; and which results in maximum ultimate economic recovery of oil and gas with minimum waste and with minimum adverse effect on ultimate recovery of other mineral resources (43 CFR Part 3162.1)." Lease development is subject to stipulations that may be attached to the leases.

MLA, FLPMA, and FOOGLRA provide the authority for the BLM oil and gas leasing program. FLPMA directs the BLM to manage federal lands under principles of multiple use and sustained yield. Multiple use is defined as the "management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people [§ 1702(c)]." Pursuant to FLPMA, the BLM has the authority to protect the environmental resources associated with federal oil and gas leases.

The BLM Onshore Oil and Gas Orders, as authorized by 43 CFR 3160, would be applied to this project: Onshore Order No. 1 - Approval of Operations; Onshore Order No. 2 - Drilling Operations; Onshore Order No. 3 - Site Security; Onshore Order No. 4 - Measurement of Oil; Onshore Order No. 5 - Measurement of Gas; Onshore Order No. 6 - Hydrogen Sulfide Operations; Onshore Order No. 7 - Disposal of Produced Water; Onshore Order No. 8 - Well Completions/Workovers/Abandonment (Proposed Rule); and Onshore Order No. 9 - Waste Prevention and Beneficial Use of Oil and Gas (Not

Published). Oil and gas operations are also subject to Notices to Lessees and BLM General Requirements for Oil and Gas Operations on Federal and Indian Lands.

Table 1-1: Key Federal, State, and County Permits, Approvals, and Authorizing Actions

Issuing Agency	Name and Nature of Permit/Approval/Responsibility	Requirement
Federal Agency		
US Department of the Interior - BLM	Permit to drill, deepen, or plug back on BLM-managed land or minerals (APD approval process).	MLA (30 USC 181 et seq.); Requirements for Operating Rights Owners and Operators, as amended (43 CFR 3162); FOOGLRA (30 USC § 181 et seq.); Onshore Orders; Gold Book.
	Consistency with rangeland standards in grazing allotment.	BLM Rangeland Health Standards and Guidelines.
	Native American consultation regarding possibly affected traditional cultural properties.	BLM Native American Trust Resource policies as provided in H-8120-1 and Manual 8120; Department of the Interior Policy on Consultation with Indian Tribes (2011).
	Antiquities, cultural and historic resource permits to inventory, excavate, or remove such resources from federal lands; initiation of Section 106 consultation.	Antiquities Act of 1906, as amended (16 USC 431-433); Archaeological Resources Protection Act of 1979, as amended (16 USC Sections 470aa-47011); Preservation of American Antiquities, as amended (43 CFR 3); Section 106 of the National Historic Preservation Act (16 USC 470 et seq.); Executive Order 11593--Protection and enhancement of the cultural environment.
	Procedures relating to the discovery of human remains.	Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001, 43 CFR 10).
	Initiation of Section 7 consultation.	Section 7 of the Endangered Species Act, as amended (16 USC et seq.).
	Conservation of special status plant and wildlife species.	Special Status Species Management Manual 6840.
	Conservation of migratory birds.	Memorandum of Understanding (MOU) MOU-WO-230-2010-04; IM 2008-050.
	Paleontological resource permits to inventory or collect data from federal lands.	FLPMA (43 USC §1701 et seq.); BLM 2007 General Procedural Guidance for Paleontological Resource Management; Paleontological Resources Preservation Act of 2009.
	Grant for right-of-way through federal lands for transportation of oil and gas (SF 299).	Mineral Leasing Act of 1920, as amended (30 USC 185.); 43 CFR 2880; FLPMA (43 USC 17611771); 43 CFR 2800; Hydraulic Considerations for Pipeline Crossings of Stream Channels.
	Management of noxious and invasive plant species.	Plant Protection Act of 2000 (PL 106-224; 7 USC 7701); Federal Noxious Weed Act of 1974 (USC 2801-2814); Executive Order (EO) 13112 (1999).
	Pesticide Use Permit and application record.	BLM authorization for herbicide applications on federal lands.
	Authorization for flaring and venting of natural gas on BLM-managed land or minerals	Mineral Leasing Act of 1920, as amended (30 U.S.C. 181 et seq.); Requirements for Operating Rights Owners and Operators, as amended (43 CFR 3162); NTL-4A.
	Mineral material sales permit to obtain construction materials from BLM-managed borrow pits.	Materials Act of 1947, as amended (30 USC 601 et seq.)
US Fish and Wildlife Service	Coordination, consultation and impact review on federally listed threatened and endangered species.	Section 7 of the Endangered Species Act of 1973, as amended (16 USC. 1536).
	Consultation on protection of bald and golden eagles.	Bald and Golden Eagle Protection Act of 1940, as amended (16 USC 668-668d).

Issuing Agency	Name and Nature of Permit/Approval/Responsibility	Requirement
	Consultation on protection of migratory birds.	Migratory Bird Treaty Act of 1918, as amended (16 USC 703); Fish and Wildlife Coordination Act (16 USC 661-666c); MOU-WO-230-2010-04.
US Army Corps of Engineers	Section 404 permit (nationwide and individual) controlling discharge of dredged or fill materials into waters of the US.	Clean Water Act of 1972 (33 USC 1344).
US Environmental Protection Agency	Compliance with national ambient air quality standards.	Clean Air Act (42 USC 7401 et seq.).
	Issuance of emissions permits to construct and operate, including authorization for flaring or venting gas.	Clean Air Act, as amended (42 USC 7401 et seq.).
	Permits for discharge into waters of the US; protection of drinking water supplies.	Federal; Water Pollution Control Act, as amended by the Clean Water Act (33 USC Section 1251-1376; PL 92-500, PL 95-217); Safe Water Drinking Act (42 USC Section 300F-300J-10, PL 93-523).
	Compliance with regulations to prevent and contain accidental releases.	Oil Pollution Act of 1990 (33 USC 2701 et seq.)
	Permits for produced water disposal.	Underground Injection Control (40 CFR 146.21-146.24).
US Department of Transportation	Approval of construction and operations of natural gas pipelines.	Pipeline safety regulations (49 CFR 190-199).
State Agency		
Utah State Historic Preservation Office	Cultural resource protection, programmatic agreements, consultation.	Section 106 of National Historic Preservation Act of 1966, as amended (16 USC 470 et seq.); Advisory Council Regulations on the Protection of Historic and Cultural Properties, as amended (36 CFR Part 800).
Utah Division of Oil, Gas and Mining	Permit to drill, deepen, or plug back (APD process).	Utah Division of Oil, Gas, and Mining (UDOGM) Rules, R649-3-4 et seq.
Utah Division of Wildlife Resources	Management of big game, wildlife fish, wildlife habitat, and state-listed species.	UDWR Rules and Regulations, Rule 657 series; Utah Administrative Code (UAC) Title 23, Wildlife Resources of Utah (as adopted by the BLM).
Utah Division of Public Utilities	Approval of construction and operations of natural gas pipelines.	UAC Title 54 Chapter 13 Natural Gas Pipeline Safety; Utah Regulation R746-409-1 through R746-409-8.
Utah Department of Transportation	Permit issuance for oversize, overlength, and overweight loads.	Utah Regulations for Legal and Permitted Vehicles, Sections 400, 500 and 600.
Utah State Institutional Trust Lands Administration	Right-of-way grant/permit for construction and use activities on state/trust lands.	Right-of-Entry rules, Utah R850-41.
Utah Division of Water Rights	Approval to appropriate water.	UAC 73-3-2.
Local Authorities		
Uintah County	Construction/use permits.	County Code and Zoning Resolution.
	Conditional use permits.	County Code and Zoning Resolution.
	Road use agreements/oversize trip permits.	County Code.
	County road crossing/access permits.	County Road Department.
	Noxious weed control.	County Code.

The Proposed Action would be consistent with the Uintah County General Plan (Uintah County Plan) (UCPC, 2005). The Uintah County Plan, which was amended in 2010 and 2011 to address land use issues, emphasizes multiple-use public land management practices, responsible use, and optimum utilization of public land resources. Multiple-use is defined in the plan as including, but not limited to, the following historically and traditionally practiced resource uses: grazing, recreation, timber, mining, oil

and gas development, agriculture, wildlife habitat, and water resources. The county goals related to oil and gas development include continuing Uintah County's progressive, proactive approach to economic growth and development through natural resource exploration and development and encouraging responsible natural resource use and development. The Uintah County Plan supports the development of natural resources.

This EA tiers to the data and analyses contained in the documents listed below, which pertain to resources in the vicinity of the proposed wells. These documents are available at the Vernal FO. This EA incorporates the following documents by reference:

- Greater Natural Buttes Final Environmental Impact Statement FES 12-8. UT-080-07-807. Vernal Field Office. Vernal, Utah (BLM, 2012).
- Gasco Uinta Basin Natural Gas Development Project Final Environmental Impact Statement FES2-5, UT-080-06-253. Vernal Field Office. Vernal, Utah (BLM, 2012a).

1.7 Identification of Issues

The BLM conducted internal reviews to identify environmental issues and concerns associated with the Proposed Action. BLM interdisciplinary team (IDT) meetings were held with resource specialists to identify issues and concerns and document them in Appendix A. The Vernal FO posted a notice of the Proposed Action on the ENBB on February 6, 2012, to inform the public regarding the project. No comments or inquiries were from the public in response to the ENBB posting. The draft EA is being released to the public for a 30-day public comment period beginning October 12, 2012.

The identified issues and concerns are summarized below:

Air Quality:

- Potential effects on air quality from drilling, truck traffic, and production operations.

BLM Sensitive Plant Species:

- Potential impacts to *Cryptantha barnebyi, Cryptantha grahamii, Yucca sterilis, and Townsendia strigosa* var. *prolixa* (BLM sensitive species).
- Potential effects to currently unidentified or future populations of Utah BLM sensitive plant species.

Cultural Resources and Native American Religious Concerns:

- Potential effects of road, pipeline, and well pad construction to cultural resource sites eligible for registration on the National Register of Historic Places (NRHP).
- Potential effects to Native American religious concerns from project development.

Fish and Wildlife Except for USFWS Designated Species:

- Potential impacts to white-tailed prairie dogs and pronghorn antelope from surface disturbance and human activity.

- Potential effects to Conservation Agreement fish, including bluehead sucker (*Catostomus discobolus)*, flannelmouth sucker (*Catostomus latipinnis)*, and roundtail chub (*Gila robusta*), from water depletion and habitat degradation.

Greenhouse Gas Emissions:

- Potential effects of greenhouse gas emissions (GHGs) to the area from project development.

Invasive Plants/Noxious Weeds, Soils, and Vegetation:

- Possible creation of suitable habitat for the growth of invasive plants/noxious weeds, including *Halogeton glomeratus, Bromus tectorum*, *Salsola kali*, and *Sisymbrium altissimum.*
- Potential effects to soils from surface disturbance.
- Potential effects to vegetation as a result of surface disturbance.

Livestock Grazing and Rangeland Health Standards:

- Potential effects of project-related activities on the livestock that graze the Wild Horse Bench Allotment.
- Potential effects of additional disturbance to rangeland health in the Wild Horse Bench allotment.

Migratory Birds

- Effects to migratory bird foraging and nesting habitat.
- Possible destruction of nests, eggs, or fledglings if construction operations occur in the spring.

Paleontology:

- The potential effects of surface disturbance to fossil resources.

Threatened, Endangered, or Candidate Animal Species:

- Potential impacts to Endangered Colorado River Fish: *Gila elegans*, *Ptychocheilus lucius*, *Gila cypha*, and *Xyrauchen texanus*.

Threatened, Endangered, Proposed, or Candidate Plant Species:

- Potential effects to individuals of the following threatened species and their habitats: *Sclerocactus wetlandicus* and *Schoenocrambe argillacea*.
- Potential effects to individuals of the following Proposed for listing species and its habitat: *Penstemon grahamii*.

Water Resources/Quality (surface) and Waters of the U.S.:

- Alteration of water quality due to sedimentation resulting from erosion and surface disturbance.
- Effects to water quality from chemical spills due to vehicle lubricants, fuels, and industrial chemicals.
- Effects to Kings Canyon as a water of the U.S., particularly from sedimentation and surface disturbance.

Wild Horses:

- Effects wild horses in the Hill Creek Herd Area.

1.8 Summary

This chapter presents the purpose and need for 124 wells as well as the relevant issues; i.e., those elements or resources that could be affected by the implementation of the Proposed Action. The Proposed Action and one alternative are described in Chapter 2. A description of the affected environment is in Chapter 3. The potential environmental impacts or consequences resulting from the implementation of each alternative are analyzed in Chapter 4 for each of the identified issues.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 Introduction

Chapter 2 includes the description of the Proposed Action (Alternative A) and the No Action Alternative (Alternative B). Because the Proposed Action incorporates BMPs identified by the BLM to minimize impacts to affected resources, no other action alternatives were considered for analysis. These BMPs include the use of shared well pads, directionally drilled wells, use of emissions control equipment, and incorporation of Gold Book procedures for construction, production, and maintenance operations.

2.2 Alternative A – Proposed Action

The Operator proposes to drill, complete, produce, and eventually decommission 124 oil and gas wells to the Green River, Wasatch, and/or Mesaverde formations to develop potentially productive natural gas or oil reservoirs at depths ranging from 8,000 to 11,000 feet. The productive life of each successful well is estimated to be 40 years. Although actual operations are subject to change as conditions warrant, the Operator's plan is to drill approximately 3 to 4 wells per month over three years. The wells would be drilled on up to 19 well pads constructed on a 40-acre surface density or on expansions of existing well pads. Well pads would be reclaimed after production operations are complete for all wells on a pad or if a well pad is no longer needed. The Operator anticipates drilling from 1 to 16 vertical or directional wells on a well pad; however, the number of wells that would actually be drilled on a pad would be determined from the results of initial production. Approximately 6.7 miles of new access roads and up to 15 miles of lateral and gathering pipelines would be constructed. Gathering lines would be installed to connect the proposed wells to lateral lines. New lateral lines may be installed and/or existing lateral lines replaced/upgraded.

All operations would be conducted in compliance with Federal Oil and Gas Onshore Orders, Utah Division of Oil, Gas, and Mining (UDOGM) rules and regulations, and applicable local rules and regulations. Descriptions of the project location, lease stipulations, and project operations are contained in the following sections.

2.2.1 Location, Access, and Lease Stipulations

2.2.1.1 Location and Access

The North Alger project area (NAPA) is located approximately 40 miles southwest of Vernal and 13 miles south-southwest of Ouray in Uintah County, Utah. The NAPA consists of approximately 2,640 acres located in T 10S-R19E, S.L.M. The proposed well pads would lie within the federal lease boundaries; however, rights-of-way (ROW) would be obtained, if needed, for access roads and pipeline routes after final well pad locations are determined.

Conceptual locations of the well pads, roads, and pipelines that comprise the project are shown on Figure 1. Although the project area includes all of Section 28, T10S-R19E, the Operator has applied a self-imposed "no surface occupancy (NSO)" condition on the western half of Section 28. Surface disturbing operations connected with the Proposed Action would not be conducted in the western half of Section 28. Therefore, the NAPA effectively consists of 2,320 acres.

Table 2-1: Location of NAPA in T10S-R19E

Section	Portion of Section in NAPA
Section 27	All
Section 28	All (surface disturbance on the east half *only* of Section 28)
Section 33	E/2 NE/4
Section 34	All
Section 35	All

The well locations would be reached by traveling west from Vernal on U.S. Highway 40, south on State Highway 88, south on the Seep Ridge Road and southwest on a network of other roads to Wild Horse Bench west of Hill Creek and finally to the proposed well access roads.

2.2.1.2 Lease Stipulations

Most leases within the NAPA were issued before 1985 and contain standard lease terms and conditions. The Operator is responsible for ensuring that applicable lease stipulations are followed during well development. Leases are available for review at the BLM's Vernal FO and the Utah State BLM Office.

2.2.2 Well Development

2.2.2.1 Construction Operations

Construction of new roads and well sites would conform to standards described in the BLM/Forest Service publication *Surface Operating Standards for Oil and Gas Exploration and Development, 4th Edition* (Oil & Gas Gold Book) (USDI and USDA, 2007). Construction or surface disturbing activities would occur only after approval of an APD is obtained from the BLM and UDOGM. Construction operations would generally occur during daylight hours only. Infrequent circumstances may require construction to occur outside of daylight hours. A man camp would not be constructed.

The Operator and the BLM would schedule on site inspections prior to construction operations. The objective of the onsite inspection would be to review the locations of the well pad, access road route, pipeline route, and top soil/subsoil stockpiles in consideration of topography, natural drainage and erosion control, flora, fauna, cultural resources, paleontological resources, and other surface considerations. Site-specific BMPs would be developed at this time.

Access Roads. All roads would meet standards appropriate to the anticipated use. Bulldozers, graders, and other types of heavy equipment would be used to upgrade, construct, and maintain the roads. Construction would not be performed during wet conditions when soils are saturated.

Where they are available, existing roads would be used to access all well locations. Existing roads would be upgraded as necessary to accommodate anticipated traffic loads and all-weather use requirements.

Upgrading may include ditching, drainage, graveling, crowning, and capping the roadbed as necessary to provide a well-constructed and safe roadway.

Approximately 6.7 miles of new access roads with an average length of 0.35 mile for each of 19 pads would be constructed to access the proposed well locations where existing roads are not present. Up to a 30-foot width may be required to construct an all-weather access road to a productive well; however, the Operator would reclaim an access road back to a 16-foot running surface during initial reclamation after road construction is complete. All travel during construction would be restricted to the 30-foot ROW.

The access roads would typically be surfaced with native material; however a road's running surface may be graveled, depending upon weather conditions. Materials outside of the 30-foot construction width would not be removed from BLM lands. If materials other than native materials found on the well pad would be needed to surface a road, the Operator would obtain materials from permitted gravel pits. An access road would typically be crowned and rolled so that precipitation would run off the road surface. Culverts and low water crossings would be installed where necessary to control drainage and would be designed to prevent the accumulation of silt or debris. Drainages would not be blocked by a roadbed. Water would be diverted from the roadway at frequent intervals. While a well is on production, the Operator would grade the access roads as needed and perform all necessary maintenance.

Well Pads. The 19 well pads would typically be constructed or expanded from the native sand/soil/rock materials present. Well pad location and orientation would be chosen to balance cut and fill to the maximum extent possible and minimize the location footprint. Construction practices may include blasting or ripping near-surface bedrock to achieve a level pad or construct a reserve pit. A 6 to 8-foot wide cellar would also typically be constructed to allow access to casing heads.

During drilling operations, the Operator plans to utilize a temporary reserve pit, which would be excavated within the pad. A reserve pit would be constructed to prevent leaks or accidental discharges. One reserve pit would be used for all wells drilled on a pad. Reserve pits would not remain open for more than six months. The Operator would evaluate the use of a closed loop drilling system on a case-by-case basis (See Section 2.2.2.2).

Suitable soil would be removed, segregated, and stockpiled for subsequent use in reclamation operations. Suitable soils are those soils that would facilitate reclamation. Suitable soil would be stored in piles around the perimeter of a well pad for use during reclamation activities.

2.2.2.2 Drilling, Completion, and Testing Operations

Drilling Operations. Drilling operations would consist of drilling the surface hole, running and cementing surface casing, drilling the production hole, and running and cementing production casing. Following construction of the access road and well pad, conductor pipe would be set, and a drilling rig would be transported to the well site and erected on the well pad. A well would be drilled utilizing a conventional, mechanically-powered mobile drilling rig. The Operator plans to use two drill rigs to drill the proposed wells over three years.

During drilling operations, a blowout preventer would be installed on the surface casing to provide protection against uncontrolled entry of reservoir fluids into the well bore, should reservoir pressures exceed the hydrostatic pressure of the well bore fluid. In addition, a flow control manifold consisting of manual and hydraulically operated valves would be installed.

Drilling fluids would consist of a water/gel mixture, with water being the main constituent. In order to achieve borehole stability and minimize possible damage to the gas producing formations, a potassium chloride substitute and commercial clay stabilizer may be added to the drilling fluid. Drilling fluids and cuttings would be contained entirely within the reserve pit. After drilling operations are finished for a particular well, the liquid contents of the drilling mud may be used for drilling other wells where practical. Trucks would transport the used drilling fluid between well pads. No hazardous substances would be placed in the reserve pit. Drill cuttings would be left to dry in the reserve pit after drilling is complete (See Section 2.2.4.1).

A closed loop drilling system may be used if the Operator determines that maintaining a reserve pit is impractical. For example, the use of a closed loop system may be considered if an additional well(s) were to be drilled on a pad at a later date. In a closed loop drilling system, all drilling fluids would be contained entirely within temporary aboveground tanks. Drill cuttings would be separated from the drilling mud and then deposited in a steel catch tank. As drilling continues, the cuttings would be removed from the tank to a cuttings pile on the well pad. Cuttings from a closed loop system would be spread on the well pad and/or access road after drilling is complete, according to applicable regulatory requirements.

Prior to setting casing, open hole well logs may be run to evaluate the well's production potential. If the evaluation concludes that sufficient gas is present and recoverable, steel production casing would be run and cemented in place.

The casing and cementing program would be designed to isolate and protect the shallower formations encountered in the well bore and to prevent pressure communication or fluid migration between zones. In addition, the cement would protect the well by preventing formation pressure from damaging the casing and retarding corrosion by minimizing contact between the casing and formation fluids. The types of casing used and the depths to which it is set would depend upon the physical characteristics of the formations that are drilled. Surface casing would be installed to protect near-surface aquifers. Intermediate and/or production casing would subsequently be run to attain total depth. All casing would be new or reconditioned and tested, in accordance with applicable regulations.

After production casing has been cemented in place, the drilling rig would be dismantled and demobilized from the location, and a completion rig would be moved in. A cement bond log would be run subsequent to setting and cementing the production casing. Additional evaluation logs may also be run.

Completion Operations. The completion of a well would generally consist of perforating the production casing, stimulating the formation(s) utilizing hydraulic fracturing technology, flow back of fracturing fluids, flow testing to determine post-fracture productivity, and installation of production equipment. The Operator plans to use one completion crew.

The fracturing fluid would consist of fresh water and sand augmented with gels and other chemical additives. The fluid would be pumped down the well bore through the perforations in the casing and into the formation. Sufficient rate and pressure would be reached to induce a fracture in the target formation. Fracture proppants, such as sand, would provide the bridging for increased permeability necessary for productivity improvement. Diesel would not be used for completion operations.

Testing Operations. Post stimulation flow tests allow for recovery of stimulation fluids and evaluation of well productivity. Flow testing duration would vary depending on individual well performance but typically would be conducted only long enough for fluid rates to drop to a level that permanent production equipment can safely process. During flow testing, most wells may initially produce large volumes of fluids. The primary constituent of the fluids is water. Small volumes of natural gas and condensate may also be produced. Portable and/or permanent production equipment would be utilized to separate gas from the flow back stream, allowing recovered fluids to be directed to storage tanks and gas to a sales outlet or to a flare. Containment and immediate sale of natural gas may not always be practical. If necessary, temporary venting or flaring of gas would be performed at a distance from the wellhead and surface equipment to ensure personnel safety. Flaring would be facilitated through the use of vertical flare stacks or authorized temporary surface pits designed specifically for that purpose. Following the initial flow period, if permanent production equipment has yet to be installed, the well would be shut in until the installation of permanent production equipment.

If the production stream does not initially contain natural gas, the fluids would be routed directly to temporary tanks on the well pad rather than through a separator. Fluids recovered during flow back operations would be transported from the storage tanks to an approved disposal facility. Condensate would be retained in tanks and ultimately sold.

2.2.2.3 Materials Management during Well Development

Water Use. Each well would require approximately 10,000 barrels of fresh water for drilling operations and 10,000 barrels for completion operations. Approximately 320 acre-feet of water would be needed to drill and complete 124 wells. Water use for drilling and completion operations would be transported to well pads via licensed truck. Fresh water used for drilling and completion purposes would be obtained from the sources listed in Table 2-2.

Table 2-2: Water Sources

Permittee	Permit Number	Source	Priority Date	Location
Deseret Generation and Transmission (Bonanza power plant)	49-225	Green River	8/31/59	Sec. 1, T6S-R22E; Sec. 6, T6S-R23E
Nile Chapman	49-2231	Well	6/13/06	Sec. 33, T8S-R20E
A-1 Tank Rental & Brine Service	43-8496	Well	8/17/79	Sec. 32, T4S-R3E (USBM)
R. N. Industries	49-1645	Well	4/10/00	Sec. 5, T9S-R22E

Source: UT. Div. Water Rights, 2011

Materials Used for Well Development. A variety of chemicals, including lubricants, paints, and additives would be used to drill and produce a well. Some of these chemicals can contain constituents that are hazardous. The transport, use, storage and handling of hazardous materials would be performed in accordance with all applicable federal, state, and local regulations. Transportation of the materials to the well location would be regulated by the Department of Transportation (DOT) under 49 CFR, Parts 171–180. DOT regulations pertain to the packing, container handling, labeling, vehicle placarding, and other safety aspects associated with transportation of hazardous materials. Materials used in the development or operation of wells would be kept in limited quantities on well sites and at the production facilities for short periods of time. They would not be stored at well pads.

Chemicals meeting the criteria for being an acutely hazardous material/substance or meeting the quantities criteria per BLM Instruction Memorandum No. 93-344 would not be used. Chemicals subject to reporting under Title III of the Superfund Amendments and Reauthorization Act of 1986 in quantities of 10,000 pounds or more would not be used, produced, stored, transported, or disposed of annually during the drilling, completion, or operation of a well. 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.

Waste Management. Hazardous waste would not be generated in association with drilling the proposed wells. Most wastes that would result from drilling and operating the proposed wells are excluded from regulation by the Resource Conservation and Recovery Act under the exploration and production exemption in Subtitle C [40 CFR 261.4(b)(5)] and are considered solid wastes. Such wastes include those generated at the well head and through the production stream. Exempt wastes include produced water, production fluids such as drilling mud or well stimulation flow-back fluids, and soils affected by spills of these fluids.

The Operator would develop and maintain Spill Prevention Control and Countermeasure Plans (SPCCPs) for all NAPA wells, as required by regulation. Accidental spills of oil, produced water, or other produced fluids would be cleaned up and disposed of in accordance with appropriate regulations and the SPCCP. An accidental leak or spill in excess of the reportable quantity established by 40 CFR Part 117.3 would be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, Section 102(b).

2.2.2.4 Personnel Requirements and Schedule

Construction, drilling, completion, and maintenance operations personnel would commute from the Vernal area daily during the 3-year drilling period. Approximately five trailers would remain on location for use by the drilling crew supervisor, mudlogger, operations personnel, and equipment storage.

A typical access road and/or new/expanded well pad would be constructed within 5 to 7 days. Six to 8 men would comprise the construction crew, accessing the location using an average of three light trucks. Three to 4 pieces of heavy equipment, such as bulldozers and motor graders, would be used to perform the earth-moving operations.

Eight to 20 men would be transported to a location in four to 10 vehicles during a period of approximately 14 days to drill to total depth. Four to 30 men using 2 to 20 vehicles to access a location would be needed

to perform completion operations. Five to 7 days would typically be needed to complete each well in the project area.

2.2.3 Production and Maintenance Operations

2.2.3.1 Well Pad Facilities and Maintenance

Well Pad Facilities. Well production facilities would be installed on a well pad after a successful completion. Facilities on a well pad would include wellhead valves and piping, a combination separator/dehydrator/meter run that would be housed in buildings, a gas pipeline, and fluid storage tanks. Each well would require the use of one separator, one dehydrator, and one (approximate) 300-barrel tank for storing condensate. Distinct separators and dehydrators would be needed for each well to retain separation of the production streams prior to measurement. Produced water from all wells on a pad may be stored in a single tank, depending on the quantities produced. All condensate and water tanks would be surrounded by a berm of sufficient capacity to contain 110 percent of the storage capacity of the largest tank in the battery. The Operator would continually maintain the integrity of the berm. Production pits would not be used. Plunger lift equipment would typically be installed to provide artificial lift when production volumes drop to a level that prevents efficient removal of liquids from the well bore using reservoir energy alone. Methanol tanks and pumps may be required on some well pads. All gas would be measured electronically, and telemetry equipment would be used.

All permanent structures (on site six months or longer) constructed or installed would be painted a flat, non-reflective, earth-tone color as specified by the Authorized Officer (AO). All facilities requiring painting would be painted within six months of installation.

Maintenance. Producing wells would typically be visited daily by a pumper, but possibly less frequently, depending upon well performance and maintenance requirements. Vehicle travel would be restricted to the running surface of a road. Use of telemetry would reduce the need for daily visits.

Maintenance on access roads would be the Operator's responsibility and performed as needed to ensure safe conditions. The Operator would perform dust abatement measures to a well access road when conditions warrant.

The Operator would control invasive and noxious weeds along road routes, pipelines, and well pads according to procedures for the site-specific reclamation plan. Invasive and noxious weeds would be identified by lists obtained from the Vernal Field Office. The Operator would determine the presence of weeds by site evaluation and monitoring. The Operator would submit a Pesticide Use Proposal (PUP) to the BLM for its approval prior to the application of herbicides. The Operator would follow guidance contained in the ROD for the BLM's "Vegetation Treatments Using Herbicides (BLM, 2007b)."

2.2.3.2 Pipelines

Up to 15 miles of steel pipelines may be installed on the surface to transport the gas from the new wells to new/upgraded lateral lines. Pipelines diameters would range from 3 to 10 inches. Production from each well would be measured individually prior to being consolidated for transport into a single gathering line leaving a well pad. Lateral lines would be constructed or upgraded as needed to transport the gas to existing centralized compression and treatment facilities. Well site compression would not be needed.

Pipelines would generally be installed parallel to an access road; however, the exact location of a pipeline would be determined during an onsite inspection. Ramps would be constructed where necessary to maintain vehicle access.

2.2.3.3 Produced Water and Condensate Management

Produced water would be confined to a storage tank prior to being transported by truck to one or more approved produced water disposal wells or to commercially-owned evaporation ponds. Condensate would be contained in tanks on the well pads and transported by truck from the locations.

2.2.3.4 Workovers

A workover operation may be periodically required to sustain production and keep a well operating as efficiently as possible. Workovers can include repairs to the well bore equipment (casing, tubing, pump, etc.), the well head, or the producing formation itself. Up to 200 thousand cubic feet of gas per event may be flared during workover events. A workover would use a rig similar to a completion rig. Workover operations would not require additional surface disturbance.

Workover operations generally occur only during daylight hours. A typical workover would require approximately three days; however, length of workover operations can range from 1 to 10 days, with a small number requiring more than 10 days. Workover operations may require 4 to 30 men, with an average manpower requirement of six persons.

2.2.4 Reclamation

As per BLM Instructional Memorandum (IM) UTG000-2011-003, reclamation would be conducted in accordance with the Green River District Reclamation Guidelines and applicable conditions of approval (COA). The Operator has developed a reclamation plan specifically for the Green River District that outlines the goals and procedures for initial and final reclamation activities specifically developed for the NAPA. The reclamation plan describes short-term, long-term, and final reclamation goals that address stabilization, revegetation, and return of the land to a self-sustaining and productive condition (See Appendix D). Seed mixes would be determined in cooperation with the AO and in consideration of a reference site vegetation community. They would contain native plant species designed to stabilize soils, restore production, and provide wildlife habitat.

2.2.4.1 Initial Reclamation

Initial reclamation would occur as soon as possible after a well is put on production and would include the portion of the project area not needed for daily production operations, including roads, well pads and pipeline routes. Cuttings would be mixed with spoils and left in the reserve pit to dry. The plastic pit liners would be cut off at the mud line and disposed of according to direction from the AO. The remaining liner would be left in the pit, which would be backfilled with stockpiled subsoil and rock and re-contoured. The Operator would assess the well pad area for slope stability and erosion features and would determine if additional dirt work or soil stabilization measures would be needed prior to seeding. Stockpiled topsoil from construction would be spread over areas to be reclaimed and broadcast seeded with the prescribed seed mixture. The seeded area would be walked down and compacted.

2.2.4.2 Final Reclamation and Abandonment

The Operator would cut off the casing at the base of the cellar or three feet below the final graded ground level, whichever is deeper, and cap the casing with a metal plate with a minimum thickness of 0.25 inch. The cap would be welded in place with the well name and location engraved on the top. The cap would be constructed with a weep hole.

All surface equipment, including pipelines, would be removed from the site. The surface would be re-contoured to its original appearance to the extent possible. Topsoil would be distributed above the former location to blend the appearance of the site with its natural surroundings before reseeding. Reclamation activities would be considered complete when vegetation has reached a minimum of 75 percent of background vegetation (undisturbed areas), or as approved by the AO.

2.2.5 Surface Disturbance Summary

Surface disturbance would result from the construction and use of new roads, the construction/expansion of well pads, and the installation of abovegrund pipelines. Initial well pad disturbance includes the surface needed for construction of a reserve pit, placement of stock piles, temporary use by trailers and vehicles, and the area needed by a drilling rig. Short-term surface disturbance would be reduced after initial reclamation reestablishes desired vegetation, approximately five years. Residual or long-term disturbance consists of the bare ground remaining on a well pad or access road after successful initial reclamation. It consists of the amount of surface needed to conduct production operations for the lives of the wells. Surface disturbance was estimated using the following assumptions:

Access roads:

- 30-foot construction width and a 16-foot running surface;
- 19 new access roads;
- Approximate total distance of 6.7 miles for 19 access roads, or an average of 0.35 mile for a new access road;
- Initial reclamation to the running surface.

Well pads:

- Five acres initially used to construct each new or expanded well pad;
- Long-term disturbance of 3.5 acres for each well pad after initial reclamation.
- 19 new well pads.

Pipelines:

- Construction width of 40 feet for a pipeline.
- Pipelines installed adjacent to access roads;
- Up to 15 miles of new and/or upgraded pipelines.
- No long-term disturbance from pipelines after initial reclamation.

Initial disturbance would consist of 191.9 acres. Long-term disturbance would be reduced to 79.4 acres due to successful initial reclamation. Approximately 3.0 percent of the NAPA would be disturbed for the productive lives of the wells after successful initial reclamation. Most of the long-term surface disturbance would result from the construction and/or expansion of well pads to accommodate multiple wells.

Table 2-3: Surface Disturbance Summary

Type of Disturbance	Initial Amount of Surface Disturbance (acres)	Initial Reclamation (acres)	Long-Term Disturbance (acres)
Roads	24.2 11.3		12.9
Well Pads	95.0 28.5		66.5
Pipelines	72.7 72.7		0
Total Disturbance	191.9 112.5		79.4

2.2.6 Applicant-Committed Design Features

As an integral part of its proposal, the Operator commits to perfor ming all actions described in this section.

General:

According to BLM IM No . 2004-194, best management practices (BMPs) to be considered in nearly all circumstances include the following:

- Initial reclamation of well locations and access roads soon after the well is put into production;
- Painting of all new facilities a color which best a llows the facility to blend wi th the background, typically a vegetated background;
- Design and construction o f all new roads to a safe and appropri ate standard, "no higher t han necessary" to accommodate their intended use; and
- Final recla mation re-contouring of all disturbe d areas, including access roa ds, to the original contour or a contour that blends with the surrounding topography.

Measures described in the Proposed Action include the following commitments:

- Construction of new roads and well sites would conform to standard s described in the BLM/Forest Service publication *Surface Operating Standards for Oil and Gas Exploration and Development, 4th Edition* (Oil & Gas Gold Book).
- Emissions from completion operations (hydraulic fracturing) will be mitigated as required by New Source Perfo rmance Stan dard (NSPS) Subpa rt OOOO (EPA, 2 011f). NSPS Subpart OOOO requires th at we lls co mpleted prior to 1/1/2015 direct flowback emission s to a flo wline o r combustion device. Wells completed on or after 1/1/2015 must route recovered liquids into one or more storage vessels or re-inject the recovered liquid s into the well or ano ther well, and route th e recovered gas into a gas flow line or collection system, re-inject the recovered gas into the well or another well, use recovered gas as an on-site fuel source, or use the recovered gas for another useful purpose that a purchased fuel or raw material would serve, with no direct release to the atmosphere (EPA, 2011f).
- Surface distu rbance would take plac e only in the eastern half of Section 28, T10S-R19E. The western half of Section 28 would remain undisturbed from project operations.

In addition to these and other measures described in the Proposed Action, the following Operator-committed design features would apply to project development unless the measures are superseded or modified by COAs. The Operator would also adhere to all procedures contained in its APD submissions.

Air Quality:

- The Operator will utilize drilling rig engines of Tier 2 quality or better.
- The Operator will install dehydrator volatile organic compound (VOC) emission controls to attain +90 percent efficiency.
- If needed, the Operator will install stationary internal combustion engines that meet an emissions standard of 2 grams/BHP-hour for engines less than 300 horsepower (HP) and 1 gram/BHP-hour (base horsepower-hour) for engines greater than or equal to 300 HP. *Note: No stationary internal combustion engines are proposed for this project*.
- The Operator will install 95 percent efficient VOC emission controls on production tanks with the potential to emit more than 6 tons per year (TPY) VOCs, as required by NSPS Subpart OOOO (EPA, 2011f).
- The Operator will utilize low-bleed (or equivalent device that does not exceed the EPA low-bleed emissions thresholds of 6 scfh) pneumatic devices at all new and existing production facilities (EPA, 2011f).
- The Operator will establish a thief hatch/Enardo inspection and replacement program to minimize tank losses.
- The Operator will utilize telemetry to minimize well visits.
- The Operator will install solar-powered chemical pumps on production facilities.

The Operator will employ measures to mitigate any potential exceedance of the 1-hour NO2 standard during drilling operations by employing effective public health buffer zones out to 200 meters (m) from the nearest emission source. Examples of an effective public health protection buffer zone include the demarcation of a public access exclusion zone by signage at intervals of every 250 feet that is visible from a distance of 125 feet during daylight hours, and a physical buffer such as active surveillance to ensure the property is not accessible by the public during drilling operations.Additionally, the applicant commits to developing a project-specific adaptive management strategy, to be informed by periodic emission inventory updates. Implementation of this strategy and associated application of "enhanced" ozone mitigation measures would be required once the proposed project is initiated if:

1) USEPA designates the area "nonattainment" for ozone;

2) There is a monitored ozone standard exceedance;

3) The ARMS modeling shows that additional mitigation is needed to prevent future ozone exceedances; or

4) The ARMS group establishes industry-wide mitigation requirements through ongoing modeling.

If implementation of this adaptive management strategy is triggered, the applicant commits to working with the BLM to analyze project-specific "enhanced" mitigation measures and employ them within 1 year. The measures to be considered could include, but would not be limited to, the following:

- Reducing the total number of drill rigs.
- Installing Tier 4 or better drill rig engines.
- Seasonally reducing or ceasing drilling during specified periods.
- Using only lower-emitting drill and completion rig engines during specified time periods.
- Using natural gas-fired drill and completion rig engines.
- Replacing internal combustion engines with gas turbines for natural gas compression.
- Using electric drill rig or compression engines.
- Centralizing gathering facilities.
- Limiting blowdowns or restricting them during specified periods.
- Installing plunger lift systems with smart automation.
- Employing a monthly Forward Looking Infrared, or FLIR, monitoring program to reduce VOCs.
- Enhancing a direct inspection and maintenance program.
- Employing tank load out vapor recovery.
- Employing enhanced VOC emission controls with 95 percent control efficiency on additional production equipment having a potential to emit of greater than 5 tons per year.

In addition to the commitments discussed above, the applicant commits to complying with applicable air pollution control rules and regulations.

Air quality issues are being addressed on a Utah-wide basis through the Utah Air Resource Technical Advisory Group (UTAG) and the BLM's ARMS. The actions outlined below have been designed to address ozone levels possibly associated with oil and gas operations in the Uinta Basin. The actions consist of the following elements:

- Refine air quality modeling predictions;
- Develop a Uinta Basin ozone action plan; and
- Implement a regional ozone action plan.

The first two elements of this strategy are being implemented by the BLM and other agency stakeholders, independent of the decision to be made regarding further development in the Uinta Basin. Regional operators may participate in these initial planning steps, thereby having the opportunity to contribute to the outcome of the process. The third element would require specific action by the applicant and other oil and gas operators in the Uinta Basin following the approval of the Decision Record. All three elements are described in more detail in the following paragraphs.

Refine Air Quality Modeling Predictions

The ARMS adaptive management strategy involves conducting a regional photochemical modeling analysis to compare and evaluate the effect of different mitigation activities on the ozone levels in the Uinta Basin. This modeling would be conducted in consultation with appropriate federal, Tribal, and state stakeholders as well as with regional oil and gas operators. The aim of the modeling effort would be to compare the effect of changes in VOC and NOX emissions, under various control strategies, to model-predicted change in ozone levels. Separate comparisons may be made for winter and summer periods. An updated emissions inventory, observed ozone levels within the basin, and corresponding meteorological data would be used.

Modeling results would provide an estimate of ozone region-wide and depict spatially the effectiveness of different emission controls on ozone formation in the Uinta Basin. The BLM would isolate project-specific incremental ozone increases from the ARMS modeling immediately following completion of the region-wide modeling effort. This would be accomplished by isolating project-specific impacts from the ARMS regional scale air quality modeling study, if available. The modeling would consider the current emission inventory data, to be updated periodically, current operating practices, applicant committed mitigation, and any applicable Best Available Control Technology (BACT) requirements in place at the time the modeling is conducted. The BLM, in consultation with appropriate federal, state, and Tribal stakeholders, would evaluate the modeling results and identify any needed additional reductions in ozone precursor emissions.

As soon as possible following evaluation of the modeling results, the BLM and appropriate stakeholders would use their respective authorities to implement any needed emission control mitigation measures and/or operating limitations necessary to ensure continued compliance with applicable ambient air quality standards for ozone. Absent an effective technology to implement, reductions in the pace of development may be utilized to ensure ambient air quality standards are met.

Develop a Uinta Basin Ozone Action Plan

Based on the results of the photochemical modeling study, the BLM would develop an ozone action plan that would describe mitigation to be enacted to address observed ozone levels above the NAAQS. The plan would be developed in consultation with appropriate federal, Tribal, and state stakeholders. Regional oil and gas operators also may participate in the development of the plan. Specific criteria would be identified within the plan for determining when additional mitigation would be initiated and which measures would be recommended. Criteria also would be specified for when the use of additional mitigation could be suspended based on observed ozone concentrations. Potential mitigation strategies are included in the list of "enhanced mitigation measures" presented above.

Implement a Regional Ozone Action Plan

The BLM would evaluate monitored ozone ambient air quality data at sites in the Uinta Basin to determine when to implement the ozone action plan. Monitoring data would be obtained, summarized, and reviewed on an ongoing basis following quality assurance review of each data set. Based on the data review and the criteria set forth in the ozone action plan, the BLM, in consultation with the appropriate

federal, Tribal, and state stakeholders, would determine when to trigger implementation of the plan. Following issuance of the Decision Record for this project, the applicant and other operators in the Uinta Basin would be required to participate in the implementation of the BLM-approved ozone action plan within the Uinta Basin.

The applicant, in consultation with the BLM and appropriate federal, Tribal, and state stakeholders would employ "enhanced mitigation measures" as warranted through the Ozone Action Plan within 1 year of a nonattainment designation or monitored ozone standard exceedance.

The BLM would ensure that appropriate ambient air monitoring is occurring in the Uinta Basin. The BLM and/or the operator, in consultation with the UTAG, would establish monitoring sites in the event that additional monitored data is necessary. These monitors would conform to USEPA monitoring protocols (40 CFR Parts 50 and 58), with emphasis on obtaining measurements that contribute to the formation of secondarily formed pollutants such as PM2.5 and ozone, to ensure that monitoring data are valid and useful in calibrating the model, and determining control strategies.

Cultural Resources:

- Prior to any construction-related surface disturbance, all well pad sites and access roads will be examined by an archaeologist approved by the BLM to determine the presence of cultural resources. If any are found, recommendations will be made to avoid or recover such resources. The possible need for on-site monitoring will be addressed at the onsite inspection.
- If any historic or archaeological resources are found during operations, all operations that could further disturb such materials will be suspended, and the AO will be contacted for direction.

Livestock Grazing and Rangeland Health Standards:

- If existing range improvements were to be damaged by project operations, the Operator will contact the AO immediately for direction.
- Stock ponds in the NAPA would be avoided such that they would not be damaged by project operations. If existing stock ponds were to be functionally impaired by sedimentation resulting from project operations, the Operator will contact the AO immediately for direction and will take measures to restore the functionality of affected range improvements.

Paleontological Resources:

- In sensitive fossil areas where bedrock is exposed at or near surface (generally less than 3 feet below the soil surface), a BLM-approved paleontologist will examine well pad sites, access roads, and pipelines for paleontological resources and make recommendations regarding the disposition of such resources. The possible need for monitoring will be addressed at the onsite inspection.
- If any paleontological resources are found during operations, all operations that could further disturb such materials will be suspended, and the AO will be contacted for direction.

Raptors and Other Migratory Birds:

- Surveys for raptors and other migratory birds will be conducted as directed by the AO.
- Construction, drilling, and completion operations will be conducted in compliance with spatial offsets and timing limitations specified in Appendix A, Attachment 2, of the Approved RMP (BLM, 2008) unless waived by the AO.

Soils and Water:

- No new surface disturbance will occur in Kings Canyon proper, including side slopes, or in the active channel.
- Slopes greater than 40 percent are designated as NSO by the Approved RMP, Appendix K (BLM, 2008). These slopes may only be constructed on if it can be demonstrated that alternative disturbances would cause undue/unnecessary degradation.
- Diversion dikes or terraces, straw bales, silt fences, weed-free mulch, soil stabilizers, or sediment basins would be utilized as determined appropriate during the onsite.
- Stormwater flow and sedimentation will be controlled with the implementation of Gold Book BMPs and the Operator's Post-construction Stormwater plan (SWPPP) (See Appendix E).

Threatened, Endangered, and Candidate Species:

- The U.S. Fish and Wildlife Service (USFWS) conservation measures for the clay reed-mustard, Uinta Basin hookless cactus, and Graham's beardtongue will be followed. Site-specific inventories will be performed by a BLM-approved biologist under the direction of the AO prior to an onsite inspection.
- If an individual of a threatened, endangered, or candidate wildlife or plant species or its habitat is known to exist in the project area, or would be affected by proposed operations, the Operator will consult with the AO prior to initiating surface disturbance activities to determine appropriate procedures.
- If necessary, avoidance and/or mitigation measures will be implemented, as appropriate. As determined by the AO at the onsite inspection, site-specific mitigation measures intended to protect the clay-reed mustard, Uinta Basin hookless cactus, or Graham's beardtongue may include strategic placement of roads and facilities and/or installation of silt fencing, straw bales, and straw batting to protect individuals or habitat.
- *Although not currently planned,* if water were to be drawn from the White or Green Rivers, the conservation measures for endangered fish will be followed:
    a. The best method to avoid entrainment is to pump from an off-channel location – one that does not connect to the river during high spring flows. An infiltration gallery constructed in a USFWS-approved location is best.
    b. If the pump head is located in the river channel the following stipulations apply:
        i. Do not situate the pump in a low-flow or no-flow area as these habitats tend to concentrate larval fishes.
        ii. Limit the amount of pumping, to the greatest extent possible during that period of the year when larval fish may be present (see above).
        iii. Limit the amount of pumping, to the greatest extent possible, during the midnight hours (10pm to 2 am), as larval drift studies indicate that this is a period of greatest daily activity. Dusk is the preferred pumping time, as larval drift abundance is lowest during this time.

    c. Screen all pump intakes with 3/32" mesh material.
    d. Approach velocities for intake structures should follow the National Marine Fisheries Service's document "Fish Screening Criteria for *Anadromous Salmonids*". For projects

with an in-stream intake that operate in stream reaches where larval fish may be present, the approach velocity should not exceed 0.33 feet per second (ft/s).

e. Report any fish impinged on the intake screen or entrained into irrigation canals to the Service (801.975.3330) or the Utah Division of Wildlife Resources:
Northeastern Region
152 East 100 North
Vernal, UT 84078
Phone: (435) 781-9453

Vegetation:

- The Operator would implement site-specific reclamation activities based on a Reclamation Plan (Appendix D) and the Green River District Reclamation Guidelines
- The Operator would initiate an active weed management program in its NAPA leases in the spring of 2012. The Operator would use herbicides to control infestations of weeds, using procedures described in a weed control plan.
- All herbicide treatments will follow the guidance of the Record of Decision for the BLM Vegetation Treatments Using Herbicides (BLM, 2007b) and any future local Weed Management direction received from the FO to ensure the use of safeguards with respect to approved chemicals, application rates, and BMPs.
- Weed-free mulching or other means, as determined appropriate during the onsite or reclamation inspections, will be used.

2.3 Alternative B – No Action

Implementation of the No Action Alternative would deny the proposed construction and operation of 124 federal wells and associated facilities in the project area. Surface disturbance from Alternative A would not occur and the current condition of the environment (See Chapter 3) would likely persist. Future oil and gas activities may go forward in the vicinity of the NAPA, and existing oil and gas wells would continue to operate.

The No Action Alternative may not serve the purpose and need of the Proposed Action, given the Operator's contractual rights to develop its mineral leases and management guidance provided in the Approved RMP.

2.4 Summary Comparison of Environmental Impacts

Table 2-4 displays a quantitative comparison of the proposed new facilities among the alternatives. The quantitative comparison reflects the differences in the projected amounts of surface disturbance. A summary of the more substantial differences, as related to each alternative, is included in the column labeled "Comments." Descriptions of the impacts to specific environmental resources by alternative are discussed in detail in Chapter 4.

Table 2-4: Summary Comparison of the Alternatives

Project Component	Alternative A Proposed Action (acres)			Alternative B No Action (acres)		
	Short-term Disturbance	Initial Reclamation	Long-term Disturbance	Short-term Disturbance	Long-term Disturbance	Comments
Well Pads, 19 pads	95.0 28.5		66.5	0	0	36 active wells in the NAPA would continue to be produced under Alternative B. New wells would likely be drilled on nearby non-federal and federal leases.
Roads, 6.7 miles	24.2 11.3		12.9	0	0	Under the No Action Alternative, approximately 7.5 miles of existing roads in the NAPA would continue to be used in their current capacity.
Pipelines, 15.0 miles	72.7 72.7		0	0	0	Under the Proposed Action, long-term surface disturbance would be minimized by installation of pipelines on the surface. Successful initial reclamation would reclaim the surface used for pipeline installation. Under the No Action Alternative, existing pipelines in the NAPA would continue to be used in their current capacity.
Total	191.9 112.5		79.4	0	0	Under the Proposed Action, the amount of acreage initially disturbed would consist of 191.9 acres. After initial reclamation is complete and successful, long-term surface disturbance would consist of 79.4 acres. Under the No Action Alternative, disturbed acreage (approximately 187.2 acres) associated with 36 existing well pads, roads, and pipelines would remain for the lives of the wells, approximately 40 years.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter includes a description of the environmental resources that could be affected by the Proposed Action. Resources and resource values analyzed in this EA were identified during scoping and are presented in the Interdisciplinary Team Analysis Record, Appendix A. If a resource was not identified through scoping as potentially impacted by the proposed project, it was not brought forward for analysis.

The Operator has applied a self-imposed NSO condition for 320 acres in the western half of Section 28, T10S-R19E. Consequently, resources that may be present in this part of the project area were not considered in the analysis, and Chapter 3 describes resources in the remaining 2,320-acre NAPA.

3.2 General Setting

The NAPA is located within the northern part of the Colorado Plateau physiographic province in the central portion of the Uinta Basin on Wild Horse Bench. The Green River is approximately 1.7 miles to the west of its western boundary, and Hill Creek is approximately three miles to the east of the eastern boundary. Kings Canyon and its tributary canyons overlap the NAPA in parts of Sections 27, 28, 33, and 34. Kings Canyon is an incised ephemeral drainage exhibiting side slopes that range from 9 to 65 percent. The minimum elevation in the NAPA occurs in the bottom of Kings Canyon at approximately 4,900 feet. Above Kings Canyon, the topography is characterized by low-gradient slopes ranging from 2 to 5 percent and elevations ranging from 5,200 feet to 5,400 feet. The upland surface above the Kings Canyon is thinly covered with gray-brown soils and rocks derived from the siltstone, shale, and sandstone of the Lower Uinta Formation. Low dipping exposed sedimentary rocks form ephemeral washes that drain to the north and west toward Kings Canyon and the Green River. Living resources in the NAPA are isolated from these watercourses or are tied to seasonally variable flows of ephemeral streams.

Modern land use near the project area consists primarily of oil and gas exploration and extraction. The NAPA is located in the Monument Butte-Red Wash oil and gas development area, which has been an area of extensive development and production. The area north and east of the NAPA exhibits an industrial character resulting from oil and gas development operations. In February 2012, the NAPA contained 36 well pads containing active wells (See Table 3-1), displayed Figure 1, and an estimated 13 miles of roads and aboveground pipelines. Drilling, as described in Alternative A, would be an extension, or step-out, from heavily drilled areas. The NAPA also contains opportunities for development of mineral resources other than oil and natural gas. Gilsonite veins are present within Sections 33 and 34. Oil shale and tar sand may also be present. Historic land use in the NAPA consists of livestock grazing.

Table 3-1: Locations of Existing Well Pads in the NAPA, T10S-R19E

Location		Number of Well Pads
Section 27	All	8
Section 28	All	0
Section 33	E/2 NE/4	0
Section 34	All	12
Section 35	All	16
TOTAL 3		6

3.3 Resources Brought Forward for the Analysis

3.3.1 Air Quality

Climate. Air quality of any particular area is controlled primarily by regional climate, topography, wind speed and direction, precipitation, temperature, relative humidity, and the magnitude and distribution of pollutant emissions within the area. The NAPA exhibits a semi-arid continental steppe environment with low relative humidity, high evaporation potential, cold winters, and hot summers. Sunshine is normally abundant during the spring, summer, and fall months. Cloud cover is greatest during the winter months, November through March. Abundant sun and rapid night cooling result in a wide range of daily temperatures. Daily temperature extremes can vary as much as 40 degrees. Annual extreme temperatures in the Uinta Basin have ranged from -40 to 105°F (WRCC, 2011).

The Uinta Basin has limited precipitation. October and September display the greatest monthly average precipitation amounts at 0.89 and 0.80 inches respectively (WRCC, 2011). Winter precipitation falls mostly as snow, while thunderstorms dominate the summer season when a northerly flow of warm, moist air from the Gulf of Mexico prevails. Evaporation in the basin exceeds precipitation. Studies of tree ring data indicate that drought cycles in the Uinta Basin display decadal cycles. Since 1900, both high and low precipitation extremes within the Uinta Basin have become less severe and of a shorter duration. (Grahame and Sisk, 2002). In July 2010, the Uinta Basin in Vernal displayed slightly warmer than normal temperatures but much greater than normal precipitation levels (UCC, 2010). In May, 2011, conditions in the Uinta Basin were extremely moist. In June 2012, the drought severity indicated that the Uinta Basin was in a severe to extreme drought (NOAA, 2012).

Winds originate from the west to west-northwest over 35 percent of the time. Pacific storms cross the Sierra or Cascade Mountains, where moist air is forced to rise and a large portion of the moisture falls as precipitation; thus, the prevailing westerly air currents reaching Utah are comparatively dry. Local air movement is influenced by the proximity of the Wasatch Mountains to the north of the NAPA and the higher elevations of the Book Cliffs to the south. Climate data is summarized in Table 3-2.

Table 3-2: Climate Data Summary

Climate Component	Typical Value
Temperature	Average annual maximum: 63.9° F Average annual minimum: 31.4° F Average annual mean: 48.1° F
Precipitation	Average annual rainfall: 6.79” Average annual snowfall: 15.3”
Evaporation Average	40” annually [1]
Wind	Average wind speed: 5.3 mph, from the west

Source: WRCC, 2011; [1] Baker and Brendecke, 1983

Atmospheric dispersion is a measure of the atmosphere’s capacity to diminish the concentration of atmospheric pollutants. Atmospheric dispersion is related to prevailing wind speed and direction, atmospheric stability, and mixing heights. The gently rolling terrain above the rims of Kings Canyon and light to moderate prevailing winds that characterize the NAPA facilitate transport and dispersion of pollutants. Warmer temperatures during daylight hours also tend to facilitate atmospheric dispersion; however, calm periods and nighttime cooling enhance air stability and inhibit air pollutant transport and dilution. Temperature inversions are common during the winter months in the Uinta Basin in its lower elevations. Inversions can hinder air pollutant dispersion by preventing lower altitude air masses from mixing with higher altitude air masses. Although temperature inversions can occur during the summer, daytime ground level heating rapidly leads to inversion break-up.

Air Quality. Since the NAPA is within the restored boundary of the Uintah and Ouray Indian Reservation, termed “Indian Country”, the Environmental Protection Agency (EPA) has the primary authority to administer the Clean Air Act of 1970 (CAA). Under the CAA, federal agencies cannot authorize any activity that does not comply with applicable local, state, and federal air quality laws, statutes, regulations, standards, and implementation plans. The EPA has the responsibility to approve permit applications and require control devices prior to construction and/or operation of equipment that would release pollutants into the ambient air. Permits are issued to emissions sources that are being constructed or operating above a specified threshold. Legal requirements are enforced by the EPA to ensure air pollutant concentrations will remain within specific allowable levels. Although major source permits would apply to sources of criteria emission that would be greater or equal to 100 tons per year (TPY), wells typically emit less than that amount and are considered minor sources of pollutants. On August 30, 2011, the EPA made effective a rule establishing permit thresholds, which vary by pollutant, for new minor sources (EPA, 2011e).

The National Ambient Air Quality Standards (NAAQS) set the absolute upper limits for criteria air pollutant concentrations. The purpose of these standards is to allow an adequate margin of safety for the protection of public health and welfare from adverse effects resulting from pollutants in the ambient air. Criteria pollutants include particulate matter of 10 or 2.5 microns (µm) in aerodynamic diameter or less (PM_{10} or $PM_{2.5}$), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), and ozone (O_3). Ambient air quality in a given location is characterized by comparing the concentration of criteria pollutants in the atmosphere to the NAAQS. Areas where criteria pollutants are measured below the standards are called “attainment” areas. Prevention of Significant Deterioration (PSD) regulations limit emissions of pollutants from new major stationary sources in attainment areas. With a PSD area, specific

increments, the amount of increased pollution allowable over existing conditions, exist for PM, NO_2, and SO_2. The increments vary depending upon the pollutant and classification of an area. Allowable increments vary by location across the state. VOCs are not regulated as criteria pollutants; however, as precursors to ozone, they are regulated. Hazardous air pollutants (HAPs) are emissions that consist of 189 pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects, birth defects, or adverse environmental impacts. They are also regulated with permits.

The NAPA is located in a PSD Class II area. The Utah Division of Air Quality (UDAQ) estimates background air quality as guidance to ensure NAAQS compliance of permitted sources. Background estimates are based on monitored values where available. Table 3-3 displays the NAAQS and background pollutant concentrations. Values for NO_2, ozone, and particulate matter were obtained from monitors located in in Uintah County.

Table 3-3: NAAQS and Ambient Air Quality Data for the Uinta Basin

Pollutant	Averaging Period	NAAQS [1]	Background Concentration [2]	Year [2]	Monitor Location [2]
CO ($\mu g/m^3$)	1-hour	40,000	6,325	2006	Salt Lake City, UT
	8-hour	10,000	3,450	2006	Salt Lake City, UT
NO_2 ($\mu g/m^3$)	1-hour	188	69.6	2010	Uintah County, UT
	Annual	100	8.0	2010	Uintah County, UT
O_3 (ppb)	8-hour	75	117	2010	Uintah County, UT
PM_{10} ($\mu g/m^3$)	24-hour	150	28	2010	Uintah County, UT
$PM_{2.5}$ ($\mu g/m^3$)	24-hour	35	16.0	2010	Uintah County, UT
	Annual	15	6.0	2010	Uintah County, UT
SO_2 ($\mu g/m^3$)	1-hour	197	19.0	2009	Sweetwater County, WY
	3-hour	1,300	10.1	2009	Sweetwater County, WY
	24-hour	365	3.9	2009	Sweetwater County, WY
	Annual	80	0.8	2009	Sweetwater County, WY

Source: [1] EPA, 2011d; [2] BLM, 2012

Ozone is the primary pollutant of concern in the Uinta Basin, with a potential seasonal pattern the opposite of what is typically observed elsewhere in the U.S. Active ozone monitoring in the Uinta Basin began in the summer of 2009. While the basin monitors are not currently being operated to standards that provide adequate data for making a NAAQS determination, the data are considered viable and representative of the area. Some basin monitoring sites have recorded exceedances of the 8-hour ozone standard during the winter months (January through March) (EPA, 2011a). High winter ozone concentrations have also been observed in locations in Wyoming that share similar characteristics with the Uinta Basin and have contributed to a proposed nonattainment designation for Sublette County.

The reasons for the winter ozone exceedances remain under investigation. Winter ozone formation is a recently recognized issue, and the methods of analyzing and managing this problem are still in development. High concentrations of ozone in winter are thought to be formed under a "cold pool" process resulting from several meteorological conditions occurring simultaneously, including very low mixing heights, stagnate air, clear skies, abundant sunlight, snow-covered ground, and presence of ozone precursor emissions, such as nitrogen oxides (NO_x) and VOCs. While ozone precursors can be transported large distances, the meteorological conditions under which cold pool ozone formation is occurring tends to preclude transport. The sources of ozone precursors contributing to the observed ozone concentrations cannot yet be definitively identified. Speciation of gaseous air samples collected during periods of high ozone would help to determine which VOCs are present and their likely sources; however, existing photochemical models are currently unable to replicate winter ozone formation satisfactorily because of the unique meteorology that characterizes the ambient conditions.

Summer ozone concentrations in the Uinta Basin, while elevated above what is considered normal background levels, are below the current NAAQS threshold. The National Park Service operates an ozone monitor in Dinosaur National Monument during the summer months. No exceedances have been recorded at this site (NPS, 2011).

Monitoring for $PM_{2.5}$ is currently ongoing in the Uinta Basin. $PM_{2.5}$ monitoring that has been conducted in the vicinity of oil and gas operations in the Uinta Basin have not recorded exceedances of either the 24-hour or annual NAAQS for this pollutant (EPA, 2011a), and $PM_{2.5}$ does not appear to be an issue in rural areas of the Uinta Basin at this time. In December 2006, the UDAQ conducted limited monitoring $PM_{2.5}$ in Vernal, Utah. During the winter of 2006-2007, $PM_{2.5}$ levels measured higher than the $PM_{2.5}$ health standard 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 sources of elevated $PM_{2.5}$ concentrations during winter inversions in Vernal have yet to be specifically identified; however, the most likely causes are likely combustion products (wood stoves, vehicle emissions), fugitive dust, and nitrates and organics from oil and gas activities in the Uinta Basin.

Sources of Emissions. Existing point and area sources of air pollution within the Uinta Basin include:

- Operation of drilling and completion rig engines, producing NO_X, CO emissions, and SO_2;
- Exhaust emissions from natural gas fired compressor engines used in transportation of natural gas in pipelines, producing CO, NO_x, $PM_{2.5}$, and HAPs;
- Natural gas dehydrator still-vent emissions of CO, NO_x, $PM_{2.5}$, and HAPs;
- Working and breathing losses and flashing emissions from condensate tanks, producing CH_4;
- Gasoline and diesel-fueled vehicle tailpipe emissions of VOCs, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$;
- Coal-fired power plants and coal mining and processing, producing oxides of sulfur (SO_x), NO_x, and fugitive dust emissions;
- Vehicle traffic on unpaved roads, wind erosion in areas of soil disturbance, and road sanding during winter months, producing fugitive dust in the form of PM_{10} and $PM_{2.5}$;
- Products of combustion in the Vernal area, primarily from operation of diesel-powered vehicles and wood burning, producing $PM_{2.5}$; and

- Distant sources resulting in long-range transport of pollutants.

Utah has not historically calculated area source emissions from the oil and gas industry. Oil and gas industry operators estimated oil and gas emissions for the Uinta Basin for the year 2006 to support an emissions inventory compiled by the Western Regional Air Partnership (WRAP), called the WRAP Phase III study. Estimated emissions from oil and gas activities in the Uinta Basin are displayed in Table 3-4.

Table 3-4: Estimated Oil and Gas Emissions in the Uinta Basin in 2006

Location	NO_X (TPY)	CO (TPY)	SO_X (TPY)	VOC (TPY)	PM (TPY)
Uinta Basin	13,093	8,727 396 71	546		623

Source: ENVIRON, 2009a

3.3.2 BLM Sensitive Plant Species

Sensitive plants are those species that are designated by the BLM for special management consideration but are not federally listed as Threatened or Endangered (T&E), Candidates, or Proposed for listing under the Endangered Species Act (ESA). Sensitive plant species are not provided specific protective measures by the Approved RMP; however, in the absence of conservation strategies, the BLM incorporates BMPs, standard operating procedures, conservation measures, and design criteria to mitigate specific threats to BLM sensitive species during project planning

Barneby's catseye (Barneby's cryptanth, *Cryptantha barnebyi*) and Graham's cat seye (Graham's cryptanth, *Cryptantha grahamii*) are BLM sensitive plants endemic to the Green River shale. These BLM sensitive plants exhibit an affinity for oil-rich shale substrates (BLM, 2008a; UNPS, 2011). Suitable habitats for Barneby's cryptanth and Graham's cryptanth may be present within the NAPA where the Green River formation is exposed.

The Spanish bayonet (*Yucca sterilis)* is a BLM sensitive plant that occurs on the Uinta Formation between elevations of 4,790 to 5, 800 feet. This species is known to occur in grassland, mixed desert shrub, shadscale, and sagebrush communities. It is typically observed on bluff margins and on sandy substrates (UNPS, 2011). This species is not known to occur within the NAPA, but suitable habitat for the species may be present where the Uinta Formation is exposed.

Strigose townsendia (*Townsendia strigosa* var. *prolixa*) is a BLM sensitive plant that occurs in Daggett, Duschesne, and Uintah counties. The species is known to occur in salt desert shrub and mixed desert shrub communities at elevations ranging from 4,800 to 6,200 feet. The species is not known to occur within the NAPA, but suitable habitat may be present.

3.3.3 Cultural Resources and Native American Religious Concerns

Cultural Resources. The Uinta Basin has been a region of human activity for thousands of years. Cultural affiliations include the Paleoindian period (12,000 to 8000 B.C.); early (8000 to 5000 B.C.), middle (5000 B.C. to 700 B.C.) and late (700 B.C. to A.D. 550) Archaic periods; Formative stage or Fremont (A.D. 500 to 1300); Shoshonean stage (A.D. 1100 to the present; and the historic Euro-American period from 1776 to the present.

Evidence of Paleoindian use of the area has been limited to isolated projectile points recovered in non-stratigraphic contexts. Most Paleoindian points have been found along major tributaries of the Green River or in upper elevations near the edge of ridges overlooking springs. The Archaic period evolved from seasonal adaptations of a foraging lifestyle, to the introduction of small and big game hunting, and, finally to the development of domesticated agriculture. The development of agricultural groups led to a more sedentary lifestyle, which resulted in semi-permanent architecture, construction of storage features, and indications of complex burial practices. The Formative stage is associated with the Uinta Fremont, who inhabited the Uinta Basin from A.D. 650 to 950. This stage is characterized by foraging with a reliance on domesticated corn and squash, and increased sedentism. Substantial habitation structures, pottery, and changes in bow and arrow technology appeared later. The Ute people appeared in the region at approximately A.D. 1100. Artifacts of the early Ute culture include lithic scatters, small quantities of brown ware ceramics, rock art, and occasional wickiups. The advent of Europeans led to use of the area by trappers and the establishment of trading posts. The Uinta Basin was initially of little interest to most settlers; however, by the early 1870s, Mormon ranchers began filtering into Ashley Valley, which provided a source of excellent summer forage for grazing cattle (BLM, 2012).

Numerous Class I (file search) and Class III (field survey) cultural resource inventories have been conducted within and in the vicinity of the NAPA. The predominant site types and cultural affiliations found by field investigations consisted of unknown aboriginal and European/American lithic and trash scatters (BLM, 2012).

Federal historic preservation legislation provides a legal basis for the 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. Mitigations enacted to ensure compliance with these authorities are non-discretionary and enforceable, even if not congruent with the original stipulations attached to existing leases within the project area.

Native American Religious Concerns. Some topographic features, habitats of vegetation and wildlife that have had historic cultural uses, water features, and/or archaeological resources are considered sacred sites to some of the Indian Tribes who consider this area their ancestral homeland. Past consultations with these Indian Tribes and ethnographic studies have determined that some members still use the landscapes and resources on public lands for their traditional ceremonies and life ways. These sites are rooted in tribal history and important in maintaining the continuing cultural identities of those communities.

The BLM has issued policy and standards for consultation to ensure that tribal issues are given adequate consideration during decision-making (BLM, 2004; BLM, 2004a). This guidance was emphasized by the Department of the Interior, which recently issued a policy statement to demonstrate a meaningful commitment to government-to-government consultation and create effective collaboration with Indian Tribes (DOI, 2011). Procedural guidance was provided to field offices to facilitate compliance with agency obligations concerning Tribal consultation in 2012 (BLM, 2012d). This guidance is intended for use in the coordination of related obligations under NEPA, Section 106 of the NHPA, and Tribal consultation.

3.3.4 Fish and Wildlife Excluding USFWS Designated Species

White-tailed prairie dogs (*Cynomys leucurus*) are Utah Species of Concern and a BLM sensitive species. White-tailed prairie dogs are typically found in open shrublands, semi-desert grasslands, and mountain valleys, where they occur in loosely organized colonies that may occupy hundreds of acres in favorable sites. Similar to other prairie dogs, white-tailed prairie dogs spend much of their time in underground burrows, often hibernating during the winter. Mortality is caused by a variety of predators including eagles, hawks, badgers, coyotes, and black-footed ferrets. Prairie dog colonies provide important habitat and are an important food source for several sensitive species including black-footed ferrets, burrowing owl, and other raptor species. While white-tailed prairie dogs have been known to exist within the project area (Grasslands, 2006), the prairie dogs in the NAPA are not associated with the Coyote Basin ferret reintroduction complex approximately 40 northeast of the project area (See Appendix C).

The NAPA lies within year-long crucial habitat for the pronghorn antelope (*Antilocapra americana*), as designated by the Utah Division of Wildlife Resources (UDWR). Pronghorn inhabit open sagebrush grasslands and deserts. Pronghorn cannot survive without access to snow-free winter range.

The bluehead sucker (*Catostomus discobolus)*, flannelmouth sucker (*Catostomus latipinnis)*, and roundtail chub (*Gila robusta*) are fish species receiving special management under a Conservation Agreement in order to preclude the need for a federal listing. These fish inhabit waters of the Colorado River system, including the Green River, and may be affected by activities that deplete or degrade the flow of waters in this system.

3.3.5 Greenhouse Gas Emissions

Ozone, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are GHGs, along with naturally occurring water vapor. Tropospheric greenhouse gases and water vapor are relatively homogenous throughout the atmosphere and trap upward-directed terrestrial radiation. They migrate around the globe via wind transport and convective mixing. Although the concentrations of GHGs in the atmosphere have varied widely and have likely resulted in variations in climatic conditions over time, industrialization and burning of fossil fuels have caused the concentration of CO_2 to increase within the last 250 years and are believed to have contributed to more recent climate changes. Emissions of CO_2 represented 81 percent of total U.S. anthropogenic GHG emissions in 2008 (EIA, 2011). Total U.S. GHG emissions have risen 7.3 percent from 1990 to 2009 (EPA, 2011).

On April 2, 2007, the Supreme Court ruled that GHGs are considered regulated pollutants and are subject to the CAA amendments and associated regulatory framework (EPA, 2011b). In November 2009, the EPA issued the Final Rule for Mandatory Reporting of Greenhouse Gases from Petroleum and Natural Gas Systems – Subpart W (MRR). The MRR requires reporting of GHG emissions from large sources and suppliers in the U.S. It is intended to collect accurate and timely emissions data to inform future policy decisions regarding a potential cap and trade program. Under the rule, petroleum and natural gas systems that emit 25,000 metric tons (tonnes) or more per year of aggregated GHG emissions from all sources are required to submit annual reports to EPA. The gases covered by the rule are CO_2, CH_4, N_2O, and specific fluorinated gases (EPA, 2011c). Emissions of these gases are reported as CO_2-equivalent

(CO_2e) emissions. Flaring emissions, onshore production stationary and portable combustion emissions, and combustion emissions from stationary equipment involved in natural gas distribution would be reported.

3.3.6 Invasive Plants/Noxious Weeds, Soils, and Vegetation

Invasive Plants/Noxious Weeds. The Federal Noxious Weed Act of 1975 defines a noxious weed as any living stage (including seeds and reproductive parts) of a parasitic or other non-native plant of a kind which is of foreign origin; is new to or not widely prevalent in the U.S.; and can directly or indirectly injure crops, other useful plants, livestock, poultry or other interests of agriculture, including irrigation, navigation, fish and wildlife resources, or the public health. The State of Utah noxious weed law (Rule R68-9) defines a "noxious weed" to mean any plant determined to be especially injurious to public health, crops, livestock, land, or other property. Noxious species have few natural biological controls. Given this competitive advantage, they can dominate and crowd out native species, threatening plant diversity and ecosystem integrity. As noxious weed infestation grows, wildlife and livestock, wild horse forage and habitat deteriorate. Weeds may be spread through a variety of means, including, but not limited to, vehicles, humans, horses, livestock, wind, and water. Soil disturbance facilitates the spread of noxious weeds.

An "invasive" species is defined as a species that is non-native to an ecosystem and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO 13112). Invasive species identified within and near the NAPA include halogeton (*Halogeton glomeratus*), cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola kali*), and tumble mustard (*Sisymbrium altissimum)* (BLM, 2012c).

Halogeton is a weedy herbaceous species introduced from the cold desert regions of Eurasia. It is an annual plant that typically invades disturbed arid and semi-arid sites with alkaline to saline soils. Halogeton seeds may remain alive in soil for 10 years. The salts that leach from dead plant material increase topsoil salinity, subsequently furthering halogeton seed germination and establishment. Halogeton foliage can be toxic to livestock, particularly sheep, because it accumulates salt (CDFA, 2011). Cheatgrass is a winter annual that utilizes available moisture and nutrients while native plants are still dormant. This early season activity limits the growth of native perennials and inhibits establishment of native seedlings (UDWR, no date). Mature tumble mustard plants tend to break off at the base of the stem, drying up, and propagating as seeds are dispersed when it tumbles with the wind. Russian thistle, commonly known as tumbleweed, also spreads its seeds in a similar manner. Young tender shoots of Russian thistle plants may serve as forage for mice and pronghorn. Russian thistle grows in salty, alkaline, disturbed soils but is generally outcompeted by native plants in undisturbed habitats (Whitson, 1996). Cheatgrass, halogeton, Russian thistle, and tumble mustard are likely to occur in and near most disturbed locations. Spotted knapweed (*Centaurea stoebe*), Russian knapweed (*Acroptilon repens*), and various other thistle species may also be present in the area (BLM, 2008a).

Soils. Soils in the NAPA consist primarily of mixed colluvium and alluvium over residuum derived primarily from sandstone, shales, and colluvium-covered canyon side slopes. Bedrock exposures can be

observed near the rim of Kings Canyon where soils are thin. The colluvium originates from the white-gray, medium-grained sandstone of the Wagonhound Member of the Uinta Formation.

The NAPA is primarily comprised of three soil units: the Motto-Casmos Complex; the Cadrina Extremely Stony Loam-Rock Outcrop Complex; and the Walknolls-Rock Outcrop Complex (NRCS, 2011) (See Figure 2). Two other units, the Lanver-Walknolls Association and the Motto-Rock Outcrop Complex, are located at the extreme northeast and southeast corners of the NAPA. Combined, they comprise less than one percent of the NAPA and are not discussed further in this EA because of their small presence. Dominant NAPA soils exhibit similar characteristics (See Table 3-5).

The Motto-Casmos Complex is the primary soil unit found in the NAPA. It is found on the upland benches above Kings Canyon in the central to eastern portion of the NAPA. This complex is suitable for use as non-irrigated rangeland. It supports native vegetation such as mat saltbush, galleta, bud sagebrush, shadscale saltbush, Indian ricegrass, and Mormon tea. The Cadrina Extremely Stony Loam-Rock Outcrop Complex is found within the mid-reaches of Kings Canyon in the western portion of the NAPA. This complex is suitable for use as non-irrigated rangeland. Where soil is present, this soil supports native vegetation such as black sagebrush, shadscale, saltbush, galleta and bottlebrush squirreltail. The Walknolls-Rock Outcrop Complex is found on the upper reaches of Kings Canyon in the southwestern portion of the NAPA. This complex is suitable for use as non-irrigated rangeland. Where soil is present, this soil supports native vegetation such as black sagebrush, Indian ricegrass, blue grama, slender buckwheat, bud sagebrush (Leishman et al., 2003).

Topsoil is limited in the NAPA. Topsoil typically describes the upper 40 inches of soil material, or approximately 20 inches greater than most soils present in the NAPA. The soils in the project area are well drained, exhibit moderate to coarse textures, contain relatively large stones on or near the surface, and exhibit shallow depths to bedrock. Therefore, soils in the NAPA generally exhibit poor productivity and are difficult to reclaim.

Table 3-5: Soil Types

Soil Map Unit Name	Acres (%) in NAPA [2]	Slope Range	Landform	Depth	Surface Texture	General Characteristics
Motto-Casmos Complex	1,668 (70%)	2-25%	Structural bench; hill.	2-21”	Very flaggy[1] or very channery sandy loam; 65+% channers on the surface.	•Well drained. •High to very high water runoff. •Low permeability. •Very low water capacity. •Low organic content. •Excess sodium. •Poor for reclamation.
Cadrina Extremely Stony Loam-Rock Outcrop Complex	507 (24%)	25-50%	Hill; cliff, erosion remnant, escarpment, ledge.	5-15”	Extremely stony loam; 10% stones, 10% flagstones, 40% channers on surface; rock outcrop 20%.	•Well drained. •Very high water runoff. •No to moderate permeability. •Very low water capacity. •Low organic content. •Poor for reclamation.

Soil Map Unit Name	Acres (%) in NAPA [2]	Slope Range	Landform	Depth	Surface Texture	General Characteristics
Walknolls-Rock Outcrop Complex	125 (5%)	2-50%	Hill; cliff, erosion remnant, escarpment, ledge.	8-20”	Very channery sandy loam; 15-90% sandstone pebbles, channers, cobbles, or flagstones on surface; rock outcrop 15%.	• Well drained. • High to very high water runoff. • Moderate permeability. • Very low water capacity. • Poor for reclamation.

[1] A channery soil is, by volume, more than 15 percent thin, flat stones as much as 6 inches along the longest axis; a flaggy soil contains sedimentary rock that has split into layers from 1/2 to 2 inches thick.
[2] The remaining 20 acres of soils in the NAPA are comprised of the Lanver-Walknolls Association and the Motto-Rock Outcrop Complex.
Source: Leishman et al., 2003; NCSS, 2004; NCSS, 2000; NCSS, 1999.

Biological Soil Crusts. In arid and semi-arid regions where vegetative cover is generally sparse, open spaces are often covered by biological soil crusts. Also known as cryptogamic, microbiotic, cryptobiotic, and microphytic crusts, these crusts are highly specialized communities of cyanobacteria, green algae, mosses, lichens, microfungi, and other bacteria that create a surface crust of soil particles bound together by organic materials. The crusts promote soil stability, nitrogen fixation, nutrient contributions to plants, soil-plant-water relations, infiltration, seedling germination, and plant growth (Belnap et al., 2001). Crusts are well adapted to severe growing conditions, but poorly adapted to compressional disturbances that result from construction activities. Where undisturbed crusts are nearby, they act as an inoculum to increase the rate of recovery to disturbed areas (USGS, 2006). Full recovery of crusts from disturbance is a slow process. On the Colorado Plateau, studies of scalped plots indicated that recovery occurred within 14 to 34 years (Belnap et al., 2001).

Biological soil crusts are typically found on barren soil near shallow and surfacing bedrock. They are not present on bedrock exposures or talus slopes, cliff faces, or routes where foot travel or vehicle use discourages growth. Biological soil crusts are not well developed in the project area, inhibited by the presence of rocks, channers, and gravels that comprise project area soils.

Vegetation. Dominant vegetation communities in the NAPA are sagebrush and mixed desert shrublands (See Figure 3). The locations of the sagebrush shrublands and mixed desert shrub communities generally correspond to slopes, elevations, and soils. In the NAPA, the sagebrush community is found on the gently sloping uplands above Kings Canyon. Mixed desert shrub plants are found in the transition area between sagebrush shrublands and more steeply sloping areas that are barren. Vegetation in the NAPA is sparse and treeless above the rim of Kings Canyon (See Figure 8). Small pockets of pinyon-juniper trees may be present near the heads of tributaries to Kings Canyon. Small extents of grasslands may be present in the southern portion of the NAPA near existing well pads. Their combined presence constitutes less than four percent of the NAPA and is not discussed further because of their limited extent.

Table 3-6: Vegetation Communities

Vegetation Community	Presence (acres)	% of the Project Area
Sagebrush shrubland	1,431.3	61.8
Mixed desert shrub	662.2	28.5
Barren 135.5		5.8
Grassland 53.1		2.3
Pinyon-juniper woodland	37.9	1.6
Total 2,320.0		100.0

Sagebrush shrublands are typically populated with a cover of various sagebrush species mixed with semi-arid grasses; however, the rocky, shallow, and alkaline soils in the NAPA favor the growth of Wyoming big sagebrush (*Artemisia tridentata* ssp.wyomingensis) as the dominant species. Semi-arid grasses such as Indian ricegrass (*Achnatherum hymenoides*), purple three-awn (*Aristida purpurea)*, blue grama (*Bouteloua gracilis*), needle-and-thread (*Hesperostipa comata*), galleta (*Pleuraphis jamesii*), or muttongrass (*Poa fendleriana*) may be present as an understory (USU, 2011; BLM, 2008a). Sagebrush shrublands are typically found in broad basins, on plains, and on foothills at elevations below 5,900 feet.

The mixed desert shrub community consists of woody plants that tolerate low soil moisture and high soil salt concentrations. Trees are usually absent from this community, and vegetation is typically low-growth, though some taller vegetation may exist in sloping areas where salt is leached from the soils. The mixed desert shrub community is characterized by shadscale (*Atriplex confertifolia*), four-winged saltbush (*Atriplex canescens*), rabbitbrush (*Chrysothamnus spp.*), Mormon tea (*Ephedra* spp.), winterfat (*Krascheninnikovia lanata*), and littleleaf horsebrush (*Tetradymia glabrata*). The understory is generally sparse and may consist of warm season short and medium perennial grasses similar to those grasses found in sagebrush shrublands. Soils that support this community are usually saline, calcareous, alkaline, and medium to fine-textured. Mixed desert shrub communities usually occur in areas between 4,980 and 7,220 feet, including saline basins, alluvial slopes, and plains (CNHP, 2005; BLM, 2008a; USGS, 2009).

The vegetation community described as barren covers approximately six percent of the NAPA in its western portion along the slopes of Kings Canyon where bedrock dominates the surface. A barren community consists of cliff faces, canyons, and open tablelands that are actually very sparsely vegetated with scattered trees and short shrubs. Shrub and herbaceous species that utilize moisture from cracks and pockets where soil accumulates may occur as scattered individuals in barren communities (BLM, 2008a; USGS, 2009). Total vegetative cover is typically less than 10 percent within barren areas.

3.3.7 Livestock Grazing and Rangeland Health Standards

Livestock Grazing. The NAPA is located within the Wild Horse Bench Allotment, which consists of 43,562 acres, including 39,426 acres of federal lands managed by the BLM, 3,901 acres of State of Utah School and Institutional Trust Lands Administration lands, and 235 acres of Ute Tribal land. It is used for sheep grazing from November 15 through April 15. It is permitted for the use of 4,619 animal unit months (AUMs), corresponding to an allocation of approximately 9.4 acres per AUM. With an effective size of 2,320 acres, the NAPA is able to support 246.2 AUMs. The Wild Horse Bench Allotment

contains numerous range improvements, including stock ponds. Range improvements within the allotment not been inventoried

The allotment is also used by bison, wild horses and trespass cattle. Bison were re-introduced by the Ute Tribe two decades ago into the Hill Creek Extension of the Uintah and Ouray Indian Reservation, part of which is east of the NAPA. Although the project area is outside of the geographic range typically inhabited by bison (UDWR, 2011), they have recently begun to naturally extend across historic ranges and have been known to utilize the Wild Horse Bench Allotment from late fall to May.

Because of oil and gas encroachment within the allotment (surface pipelines, roads, well pads, and related infrastructure), lack of successful reclamation of disturbed areas to-date, and general range condition, the permittee has been able to use less than 1/3 of the available AUMs for this allotment, which contains an estimated 416 well pads and 146 miles of constructed roads. Within the NAPA, 36 well pads and 12.6 miles of access roads have been constructed, affecting an estimated 287 acres.

Rangeland Health Standards. In 1997, the Utah BLM developed *Standards for Rangeland Health and Guidelines for Grazing Management* that provided descriptions of the desired condition of the biological and physical components and characteristics of rangelands. "Standards" spell out conditions to be achieved on BLM Lands in Utah, and "guidelines" describe practices that will be applied to achieve the standards.

Rangeland Health Standards were assessed for the Wild Horse Bench Allotment in 2005. The current management category Of the Wild Horse Bench Allotment is "improve," which indicates that the lands have a need and a potential for improvement (BLM, 2008a). Since 2005, the development of oil and gas resources in the allotment has continued to remove vegetation for the long-term within the allotment.

3.3.8 Migratory Birds, including Raptors

Migratory birds are associated with vegetation communities. Migratory birds may nest on tree limbs, on the ground, or in rock outcrops. The nesting season for migratory birds is generally finished by July 31 annually. Nesting and fledgling seasons for raptors vary but may extend to August 31 annually. The NAPA also offers suitable wintering and migration habitats for several raptor species.

The Migratory Bird Treaty Act (MBTA) provides protection for migratory birds, including raptors. Some birds are also protected by the Endangered Species Act (ESA) and/or the Bald and Golden Eagle Protection Act. To further purposes of these protective acts, MOU WO-230-2010-04, "To Promote the Conservation of Migratory Birds," was issued in 2010 by the BLM and the USFWS, which directs the BLM to identify species listed in the USFWS Birds of Conservation Concern (BCC) that are likely to be present in the area of a proposed action and utilize best available population or habitat association data in the assessment of impacts to these species (USFWS, 2008). The goal of the BCC list is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. The Utah Partners in Flight (PIF) working group completed an avian conservation strategy identifying "priority species" for conservation within a state due to declining abundance or distribution, or vulnerability to various local and/or range-wide risk factors. The Utah PIF list is intended to be used as a tool for federal and state agencies to prioritize bird species that should be considered for

conservation action (Parrish and Norvell, 2002). One application of the strategy and priority list is to give these birds specific consideration when analyzing effects of proposed management actions and to implement recommended conservation measures where appropriate. The nesting season varies according to the type of bird but is generally finished by August 31 annually in the Uinta Basin.

Raptors are widely accepted indicator species of environmental quality due in part to their position at the top of some biological food chains. Raptor nest sites within the NAPA are typically located on promontory points such as cliff faces and rock outcrops in areas with slopes of 30 percent or greater. Some raptor species also may nest in pinyons, juniper, or deciduous trees, which may be found along ephemeral drainages. Typically raptors use the same nest site year after year. Raptor young tend to disperse to areas near the traditional nest sites. The BLM and USFWS have issued guidelines for the protection of raptors in the State of Utah that have been included in the Approved RMP (BLM, 2008; Romin and Muck, 2002). These guidelines include species-specific prescribed seasonal offsets to active nests (See Appendix C).

Migratory bird species associated with the sagebrush shrublands, desert shrub, pinyon-juniper, and grassland habitats that have a presence in Grand County are shown in Table 3-7. Raptor species included in the table are discussed below. A complete list of migratory bird species from the BCC list, PIF High Priority Species List, and Utah Wildlife Species of Concern (WSC) are identified with their habitat associations in Appendix C.

Table 3-7: USFWS Birds of Conservation Concern Region 16, PIF Priority, and BLM Sensitive Species That May Occur in Project Area

Species	BCC	BLM Sensitive	PIF
Black-throated grey warbler	-	-	X
Brewer's sparrow	X	-	X
Burrowing owl	X	X	-
Ferruginous hawk	X	X	X
Golden eagle	X	-	-
Gray vireo	X	-	X
Juniper titmouse	X		
Pinyon jay	X	-	-
Prairie falcon	X	-	-
Sage sparrow	-	-	X
Short-eared owl		X	
Virginia's warbler	-	-	X

Source: Parrish and Norvell, 2002; USFWS, 2008; UDWR, 2005.

The Bald and Golden Eagle Protection Act (Eagle Act), which initially protected only bald eagles, was amended in 1962 to include the golden eagle because of its dwindling populations and similar appearance to bald eagles when both eagles are young. The act prohibits any one from "taking" eagles, including their parts, nests, or eggs without a permit issued by the Secretary of the Interior. Taking also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or

bother an ea gle to a degree that interf eres with or interrupts nor mal breeding , feeding, or sheltering habits, and causes injury, death, or nest abandonment.

The burrowing owl is a Utah Species of Concern an d BLM sensitive species. Western burrowing owls are summer residents on the plains over much of Ut ah and usually arrive on breeding grounds from late March to m id-April. The specie s is associat ed w ith dry , open habitat that has short vegetation and typically exc avates its tunnels in prairie dog co lonies (Johnsg ard, 20 02). White-tailed prairie dog colonies are present within the project area, and two burrowing owl nests were identified in the NAPA in 2006 (Grasslands, 2006).

The ferruginous hawk is Utah Species of Concer n and BLM sensitive species. In Utah, ferruginous hawks nest on juni per, pinyon pine, and cottonwood trees; on the ground, low l edges, bluffs, and knolls ; and on m an-made structures (Behle, 1981). Poten tial nesting and foraging habitats for this species are present within the NAPA.

3.3.9 Paleontology

The fossil record for early Tertiary time in the Uinta Basin is entirely non-marine but is well-known for a large variety of p lant an d anim al specim ens fro m both lake a nd river en vironments (Stokes, 19 86). Exposures of the Uinta an d Green River Formations, both of whic h may contain fossils, are found in the NAPA. The Uinta Formation is considered the ty pe for the Uintan Land Mammal Age and is known for the presence of vertebrate fossils of the m iddle Eocene Age, including body fossils of turtles, crocodilians, fish, mammals, and their tracks (U of UT, 2004). This form ation is form ed fro m resistant interbedded, gradational and inte rlensed red sandstones, siltstones, and shales that were deposited as braided fluvi al sedim entary s ystems, thin-bedded floodplain d eposits, or l acustrine sed iments inter-fingering with over-bank deposits. Surface exposures in the NAPA consist entirely of the Wagonhound member, whi ch covers ap proximately 2,270 acres o f the NAPA. The Evacuat ion Creek member of the Green River Formation is a complex series of rock types that represent a variety of lacustrine depositional environments and marginal alluvial conditions. Outc rops cover approximately 130 acres, or five percent, of the NAPA in the lower reache s of Kings Cany on and its tributary cany ons (Stokes, 1986). Fossils in the Green River Formation have revealed climate and faunal change information. Vertebrate species that have been fo und i n this f ormation incl ude fish, rept iles, birds and m ammals. Invertebrate fossils are abundant, with remnants of snails and insects being common. Plant fossils, including many reeds, leaves, and wood specimens, are common.

In 20 07, the BLM released General Procedural Guidance for P aleontological Resource Managem ent, which includes a cl assification s ystem that provid es baseline guidance for predicting, a ssessing, and mitigating paleontological resources (BLM, 2007). The manual classifies resource areas by ranking them into one of five Potential Fossil Yield Classification (PFYC) classes according to their potential to contain vertebrate or noteworth y invertebrate or plant fossils . The formations that would be affected by the Proposed Action would be categorized as PFYC 3 or hig her, indicating a m oderate to high paleontological resource potential.

The Paleontological Resources Preservation Act of 2009 requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. It provides authority for the protection of paleontological resources, including criminal and civil penalties for fossil theft and vandalism. It also includes provisions allowing for casual or hobby collecting of common invertebrate and plant fossils without a permit on BLM-managed lands.

3.3.10 Threatened, Endangered or Candidate Animal Species

Although the NAPA itself does not constitute habitat for T&E or candidate animal species, the T&E animal species described in this section are those whose habitat may be affected by implementation of Alternative A. Candidate species are not present in the NAPA and do not have habitat that would be affected by Alternative A. A list of T&E and candidate animal species, their habitat, and potential for occurrence is contained in Appendix C.

The bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*) are listed as endangered by the ESA. These fish have experienced severe population declines due to flow alterations, habitat loss or alteration, and introduction of non-native fish species. Critical habitat for these fish has been designated for the endangered Colorado River fish within Uintah County in the Green River and its 100-year floodplain. The USFWS has developed conservation measures intended to minimize effects to these species. Their habitat would be affected by water depletions needed for drilling operations. The endangered fish are discussed as a group because their habitats and behavior are similar. They are found in a variety of habitat types, depending on life stage. The bonytail and Colorado pikeminnow prefer pools, eddies, and backwater habitats (USFWS 2002; USFWS 2002a). The humpback chub and razorback sucker prefer mid-channel runs and canyon areas with fast currents, deep pools, and boulder habitat (USFWS 2002b; USFWS 2002c).

3.3.11 Threatened, Endangered, Proposed, or Candidate Plant Species

T&E, proposed, or candidate plant species and species that may inhabit the NAPA include the threatened clay reed-mustard (*Schoenocrambe argillacea*), threatened Uinta Basin hookless cactus (*Sclerocactus wetlandicus*), and proposed threatened Graham's beardtongue (*Penstemon grahamii*). A list of T&E, Proposed, or Candidate plant species, their habitat, and potential for occurrence is contained in Appendix C. The USFWS has developed conservation measures intended to minimize effects to this species (See Appendix C).

The clay reed-mustard is endemic to the Book Cliffs in Uintah County, Utah. This species is known to occur in mixed desert shrub communities of shadscale, Indian ricegrass, and pygmy sagebrush along the contact zone of the Uinta and Green River Formations at elevations ranging from 4,800 to 5,650 feet (BLM, 2008a; UNPS, 2011). Individuals are known to occur in the western portion of Section 28, T10S-R19E. Suitable habitat may be present in the lower portions of Kings Canyon in shale bands at the interface of the Uinta and Green River Formations within the project area.

The Uinta Basin hookless cactus inhabits shadscale-desert shrub communities on gravelly hills and terraces of Quaternary and Tertiary alluvium soils. In Uintah County, the species occurs at elevations between 4,500 and 5,900 feet. The northwestern half of the project area is located within the USFWS

potential habitat polygon for *Sclerocactus wetlandicus*, which means that suitable habitat for the species may be present within the project area. The species is known to occur in this habitat type as scattered individuals on mesas and benches. The USFWS developed a revised recovery plan outline in 2010 (USFWS, 2010), which is intended as an overview of the known information for the Uinta Basin hookless cactus and a guide to recovery efforts, to be used to inform consultation and permitting activities until a comprehensive recovery plan for the species is approved.

The Graham's beardtongue inhabits shale ledges and slopes derived from the Parachute Creek members of the Green River Formation at elevations ranging from 4,600-6,700 feet within mixed desert shrub or pinyon-juniper communities (BLM, 2008a; UNPS, 2011). The species has been documented approximately three miles southwest of the southwestern corner of the NAPA. Suitable habitat for this species may be present within the NAPA.

3.3.12 Water Resources/Quality and Waters of the U.S.

Water Resources/Quality (Surface Water). The NAPA is located within the Kings Canyon-Green River watershed, a sub-watershed of the Lower Green River-Desolation Canyon watershed. The NAPA contains no perennial waters. The nearest perennially-flowing water bodies to the NAPA are the Green River, Hill Creek, and Willow Creek. Kings Canyon is a major ephemeral drainage within the NAPA that joins the Green River approximately 1.7 miles west of the project area. Drainages in the NAPA are generally oriented toward Kings Canyon, which trends northwesterly through the western portion of the NAPA. A map of the 100-year floodplain of the Green River indicates that flood waters are able to extend into the western half of Section 28, T10S-R19E, following the Kings Canyon drainage (Figure 7). Drainages in the NAPA are separated from the Hill Creek drainage, approximately 2.5 miles to the southeast, by Wild Horse Bench. Hill Creek flows into Willow Creek approximately 4.5 miles east of the NAPA.

Drainages in the NAPA carry water only in direct response to precipitation events, are characteristically dry, and do not support riparian vegetation. Spring runoff from snowmelt and brief intense thunderstorms that usually occur in the late summer dominate the hydrology of the Uinta Basin in general. Kings Canyon and its tributaries can be subject to flash floods during intense precipitation events.

Water quality in the Green River is described as generally good in that water in the river segment nearest the NAPA meets applicable state-designated standards for aquatic life support, warm water game fish protection and propagation, public water supply, and agricultural use. The most common indicators of impairment to waters in the Green River watershed are temperature, metals, and salinity, in that order (EPA, 2012a). Total dissolved solids (TDS) concentrations increase in surface waters as a result of saline sediment transport from runoff and flash floods. The nearest water body listed on Utah's 303(d) list of impaired waters is Willow Creek, which displays excessive levels of TDS and is impaired for agricultural beneficial use (UDEQ, 2010).

Poor road construction practices, irrigated agriculture, and surface disturbance/habitat modification resulting from well pad construction affect surface water quality in the Uinta Basin (BLM, 2008a). Irrigation sources and other non-point sources have been identified as a source of salt loading to the

waters of the Colorado River Basin from the Uinta Basin, which contributes 240,000 tons of salt annually, or 2.75 percent of the total. Recent salinity concentrations have trended upward where irrigated and dry croplands are found in waters tributary to the Green River, affecting water quality in the Uinta Basin (BOR, 2011). Natural sources of salinity, such as sodium carbonate minerals (salts) produced from a lacustrine depositional environment, also contribute to salt loading. In the central Uinta Basin, groundwater discharge areas along the Green River are present, resulting from regional upwelling of saline waters from depths ranging from 1.2 to 1.8 miles (Zhang et al., 2009).

Waters of the U.S. The Clean Water Act (CWA) defines a "water of the U.S." to include "intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand-flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce" and tributaries of these waters. In 2011, the EPA and the U.S. Army Corps of Engineers (COE) released guidance to clarify protection of waters of the U.S. Based on the agencies' interpretation of the CWA, tributaries to traditional navigable waters or interstate waters, may possibly be found in the NAPA and, if so, are protected by the CWA (Jencks, 2012). Conversely, erosional features, such as gullies and rills, swales, and ditches that are not tributaries or wetlands are generally not protected by the CWA (EPA, 2012). Section 404 of the CWA defines the landward limit of COE jurisdiction as the "ordinary high water mark" in non-tidal waters (COE, 2010). The ordinary high water mark is considered the line on the shore established by changing water levels and indicated by natural lines on a stream bank, shelving, changes in soil character, destruction of vegetation, and/or the presence of litter or vegetation debris.

The COE was contacted for clarification regarding its regulatory authority with respect to the Proposed Action. As a tributary to the perennial Green River, Kings Canyon can be considered by the COE to be a "water of the U.S." Typically, channel crossings would require a permit from the COE. Low water crossings affecting less than 0.1 acre with no impairment of flow may not trigger the need for a permit (Jencks, 2012).

3.3.13 Wild Horses

The NAPA is considered habitat for the wild horses that comprise the Hill Creek Herd. Approximately 245 horses were estimated to be present in the Hill Creek Herd Area in spring 2010. The horses are present in small bands of less than 10 horses. Occasionally larger bands of 10 or more may be observed during the winter months (BLM, 2012c). Within the herd area, the horses compete for forage with wintering bison as well as trespass livestock from nearby Tribal lands. Under the interim management guidance provided by the Approved RMP, any wild or feral horses present in the area would eventually be gathered and removed (BLM, 2008).

4.0 ENVIRONMENTAL IMPACTS

4.1 Introduction

Chapter 4 addresses direct, indirect, and cumulative impacts of Alternative A and No Action Alternative for each affected resource. For Alternative A, mitigation measures are described in Section 4.2.1.13. Residual impacts for Alternative A, which are impacts that remain after application of the proposed mitigation measures, are described in Section 4.2.1.14. Short-term impacts are those that would persist over a period of five years or less. Long-term impacts are those that would remain from five years until the end of well life, approximately 40 years plus an additional five years to reestablish vegetation.

4.2 Direct and Indirect Impacts

4.2.1 Alternative A – Proposed Action

4.2.1.1 Air Quality

Air quality impacts depend on the amount, duration, location, emission characteristics of emissions sources, and meteorological conditions (e.g., wind speed and direction, precipitation, etc.). Project-related emissions were estimated for criteria pollutants, HAPs, and GHGs. Emissions were estimated for each of three years of drilling and annually for production operations.

Well development produces construction, drilling, and completion emissions generated from earth-moving equipment, vehicle traffic on unpaved roads, vehicle exhaust, drill rig engine exhaust, and flaring during testing. Fugitive dust would result from vehicle traffic on unpaved roads and wind erosion where soils would be disturbed. Drill rig and hydraulic fracturing engine operations would produce exhaust emissions consisting mainly of NO_X and CO, with lesser amounts of SO_2. NO_X, SO_2, and CO would be emitted from vehicle tailpipes. Emissions from construction and drilling would be temporarily generated over a period of three years.

Emissions from well production operations would be long-term. Emissions from separators, condensate storage tanks, and daily tailpipe and fugitive dust emissions from operations traffic would be released to the atmosphere. NO_x, CO, and VOC emissions would result from the long-term operation of condensate storage tank vents, and well pad separators. HAPs emissions would originate primarily from storage tanks and dehydrators. Vehicle travel on unpaved roads would result in emissions of PM_{10} and $PM_{2.5}$. Fugitive emissions from wellheads, which are not regulated by the EPA and were not quantified, would consist primarily of negligible amounts of CH_4.

Emissions estimates were derived in consideration of emissions control technology as committed to by the Operator (See Section 2.2.6) and the chemical characteristics of produced natural gas from the project area wells. Table 4-1 summarizes annual emissions expected to take place over a four-year period. The number of wells that would be drilled in each of the first three years was an estimate provided by the Operator. All 124 wells would be in production in Year 4, which quantifies the estimated maximum annual emissions that would result well operations over their productive lives (approximately 40 years). Actual emissions shown for Year 4 would typically decrease as produced natural gas volumes decrease over the life of a well.

NO_x emissions would be greatest in Year 3 (407.30 tons), when the maximum number of wells would be drilled. NO_x emissions would decrease after all the wells are drilled in Year 4 (47.55 tons). VOC emissions increase according to the number of producing wells and would be highest in Year 4 (213.61 tons) when all the proposed wells would be on production. Emissions of NO_x and VOCs are ozone precursors and would likely contribute pollutants to low-level inversions characteristic of the Uinta Basin; however, project emissions of ozone precursors would be likely to be dispersed by moderate winds and/or diluted to the extent where any local ozone impacts from Alternative A would be indistinguishable from background conditions (See Section 3.3.1). PM emissions would vary according to the number of locations in construction in a year and would be much smaller during production operations, indicated by Year 4 and into the future. Small amounts of HAPs would be emitted by construction equipment, as can be seen in the Year 1 estimate of 0.038 tons. HAPs emissions would increase as wells are put in production and were estimated to be 34.54 TPY after all wells are drilled.

Table 4-1: Estimated Emissions from Alternative A

EMISSIONS	CRITERIA POLLUTANTS						TOTAL HAPS (tons)
	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	
Year 1: 36 wells drilled (tons)	289.85	159.07	20.58	0.38	640.09	73.96	0.302
Year 2: 42 wells drilled, 36 in production (tons)	365.96	195.41	88.18	1.67	750.55	86.91	10.25
Year 3: 46 wells drilled, 78 wells in production (tons)	407.30	220.38	162.88	1.71	822.31	95.79	21.80
Years 4 – lives of wells: 124 wells in production (TPY)	47.55	29.57	213.61	1.26	5.88	2.41	34.54

Source: CH2MHill, 2012

Application of emissions controls committed to by the Operator would reduce impacts to air quality from Alternative A. Assuming that all wells were to be put on production status, Table 4-2 displays the differences between uncontrolled emissions versus controlled emissions for 124 wells during the first three years of well development (construction and drilling/completion operations) and years when all wells would be producing (Year 4 through the end of productive well lives). Positive quantities represent emissions increases. Negative quantities represent decreases in amounts of emissions.

Table 4-2: Comparison of Uncontrolled to Controlled Production Emissions

Emission	Well Development Operations (tons)			Total Well Development (tons)	Production Operations (TPY)
	Year 1	Year 2	Year 3	Total Years 1-3	Years 4+ [1]
NOx	284.23	331.61	363.19	-979.03	0.00
CO	-4.91	-5.73	-6.28	16.92	0.00
VOC	0.00	535.32	1159.86	-1695.18	-2607.50
SO_2	0.00	0.00	0.00	0.00	0.00
PM_{10}	2.10	2.45	2.68	-7.23	0.00
$PM_{2.5}$	0.61	-0.14	-0.78	0.31	0.00
Total HAPs	0.18	0.00	0.00	-0.18	0.00

[1] Until the end of productive well life

NO_x emissions would be reduced during the three years of drilling operations by the use of Tier 2 drilling rigs. Total HAPs and VOCs would be reduced during development and production operations.

Installation of controls would reduce CH_4, an ozone precursor during development and production operations; however, CO_2 emissions would increase with the use of controls.

Because the scale of the proposed project is small in relation to other current and other proposed projects in the Uinta Basin, modeling was not performed to compare project-related emissions to the NAAQS; however, near-field models have been developed for much larger projects (See Section 4.3.4.1) in the Uinta Basin to determine impacts from emissions emanating from adjacent well pads during drilling/completion operations offset by varying distances. According to the model assumptions, a square mile was used to characterize the scenario sources arrangement, within which impacts were calculated. The model also assumed that up to four drill rigs would operate within a square mile, and each well pad would contain simultaneously operating drill and completion rigs. The model results indicated that the operation of a drill and completion rig on adjacent well pads could cause an exceedance of the NAAQS for 1-hour NO_2 (BLM, 2012) at distances ranging from 400 (corresponding to 40-acre surface density) to 800 meters. Compliance with the NAAQS was obtained for other scenarios modeled for the larger projects (BLM, 2012; BLM, 2012a).

Compliance with the 1-hour NO_2 criteria is based on the 98th percentile of the daily 1-hour maxima for each of three consecutive years. To evaluate impacts resulting from Alternative A related to possible the 1-hour NO_2 standard, the BLM considered the following operational factors: (1) the Operator would utilize drilling rig engines of Tier 2 quality or better to minimize NO_x emissions; (2) only two drill rigs would be in use at a particular time in the project area; (3) drilling and completion operations would be temporary (less than four years) within the project area; (4) drilling and completion operations would be unlikely to occur simultaneously all the time when a drilling and completion rig may be positioned on an "active" well pad; (5) drilling and completion operations would move throughout the project area over time such that distances between active pads would vary; (6) the small size of the project area (2,320 acres) would make it difficult to designate two active well pads that would always be separated by a sufficient distance to result in emissions that would always be lower than the modeled NO_2 value; and (7) the Operator has committed to taking measures through the placement of signs or fences along designated routes to limit public exposure to NO_2 emissions that would result from drilling and completing wells on pads in proximity to public roads. Therefore, it would be unlikely that a uniform level of drilling and completion operations would occur for three consecutive years at the same location. Although the model for the much larger project predicted that the 1-hour NO_2 standard may be exceeded during drilling operations, implementation of Alternative A would not be likely to result in a violation of the standard. Adverse effects to human health would be avoided by public notification and limiting public access.

Estimated emissions for the production phase of Alternative A (Year 4) were compared to the regional emission inventory compiled for the WRAP Phase III study for the Uinta Basin, 2006 baseline emissions (ENVIRON, 2009a), as displayed in Table 4-3. NO_x and VOCs emissions that would result from Alternative A are a small percentage of the WRAP baseline emissions. Based on the relatively small volume of emissions that would result from Alternative A, emissions are not likely to violate, or otherwise result in a violation of an air quality standard, and may contribute only a small amount to any projected future exceedance of an applicable air quality standard. Control technology is not required by the EPA at this time since the Uinta Basin is in attainment of the NAAQS.

Table 4-3: Comparison of Project Production Emissions to 2006 Uinta Basin Oil and Gas Emissions

Emission	Project Production Emissions (TPY)	WRAP Phase III 2006 Uinta Basin Baseline Emissions (TPY)	Comparison of Project Emissions to 2006 Baseline Emissions (%)
NO_x 47.55		13,093	0.36
VOC 213.61		71,546	0.30

Source: ENVIRON, 2009a

4.2.1.2 BLM Sensitive Plant Species

Impacts common to each BLM sensitive plant species could include destruction of individual plants and a reductions in the am ounts of available suitable habita t. An inventor y for t he presence of these species prior to construction operations would allow dete rmination of the presence of these species at the locations that would be di sturbed and provide i nformation to g uide the im plementation of protective measures (See Section 4.2.1.14).

Graham's catseye and Barneby' s catsey e are endemic to the oil-rich shale substrates of the Green Rive r shale, which covers approximately 130 acres in the NAPA. Since these substrates are found in and on the side slopes of the Kings Canyon system, construction operations from Alternative A would be more likely to indirectl y impact these plants as a result of sed imentation from disturbed ar eas above their preferred habitat rather than directly impact individual plants. Application of Gold Book BMPs during construction operations and im plementation of the Operator's SWPPP (Appendix E) woul d m inimize sedi mentation from disturbed areas. In addition, the Operator has committed to perform ing no new surface disturbance in Kings Can yon proper, includin g it s side slope s or active channel, which would m inimize habitat destruction from construction operations (See Section 2.2.6).

The Spanish bayonet may have suitable habitat on the sandy sub strates of the Uinta Form ation, which covers approximately 2,200 acres of the NAPA, prim arily on the upland above Kings Cany on where well pad and acc ess road construction w ould take place. Construction opera tions could affect up to 191.9 acres of suitable habitat for this species.

The *Strigose townsendia* is found in the salt desert shrub vegetation community, which is found primarily in transition areas between the low-sloping uplands and the Kings Canyon rim. Approximately 662 acres of suitable h abitat may b e found in t he NAPA. Potential im pacts to this species may occur where construction operations would be performed within this vegetation community.

The Operator would follow the guidelines of the Vernal FO Surface Disturbance Weed P olicy (Apri l 2010) and the BLM "Vegetation Treatments using Herbicides (September 2007) in addition to applying measures det ailed in the Operator' s Reclamation Plan (Appendix D) to reduce the likelihoo d of no xious weed invasion or spread that m ay com promise th e quality of the existing suitable habitat for these sensitive species. Im plementing the weed management plans would m inimize the effects to all BLM sensitive plant species.

Implementation of Alternative A **may affect individuals of each of the four BLM sensitive plant species, but is not likely to contribute to the need to become listed**. Sit e-specific surveys and a n avoidance buffer would be required if deemed necessary by the AO during project implementation.

4.2.1.3 Cultural Resources and Native American Religious Concerns

Cultural Resources. Alternative A would result in approximately 191.9 acres of surface disturbance that could potentially harm unidentified cultural resources. Cultural resources can be irreversibly damaged or destroyed by surface-disturbing activities. Many of the known prehistoric and historic archaeological sites in the Uinta Basin are shallow and vulnerable to the impacts of vegetation clearing, blading, and excavation. Prior to any construction-related surface disturbance, however, all well pad sites, access roads, and pipeline routes would be inventoried by a BLM-approved archaeologist to determine the presence of cultural resources. The inventory would identify cultural resources eligible for inclusion on the NRHP. Site avoidance of identified cultural resources would eliminate adverse effects to NRHP-eligible sites. The Operator committed to suspending construction operations that may affect previously unidentified cultural resources if such resources were to be found and contacting the AO for direction (See Section 2.2.6). Although impacts to cultural resources could include removal of surface artifacts due to illicit collection and inadvertent destruction, the NAPA is not easily accessible and does not attract recreational use (See Appendix A). Impacts to cultural resources would be unlikely to occur as a result of illicit collection by the public. Artifact removal by the public is not quantifiable.

Section 106 of the National Historic Preservation Act requires the BLM to account for the effects of its undertakings on historic properties. Consultations with the Utah SHPO will be conducted on a project specific basis. If Alternative A were to be approved, results of a field inventory conducted prior to surface disturbance would be submitted to the BLM, which would consult with the SHPO for concurrence of the BLM's determination of effects (See Section 5.1). If a site could not be avoided, coordination between the BLM and SHPO and Indian Tribes would determine additional mitigation, as needed, for any NRHP-eligible site that may be present in an area proposed for disturbance.

Native American Religious Concerns. Consultation with Indian Tribes has been performed because surface disturbance and/or surface use have the potential to impact historic archaeological sites and/or features of importance to modern Native American Tribes. The BLM sent letters to Tribes on July 11th, 2012, describing the Proposed Action. Tribal organizations responded to the request to consult. None of the responses yielded specific information concerning places of traditional or religious importance located on lands that would be affected by the Proposed Action (See Section 5.1). Therefore, the BLM determined that Alternative A would not result in impacts to Native American religious concerns.

4.2.1.4 Fish and Wildlife Excluding USFWS Designated Species

Alternative A would result in approximately 191.9 acres of surface disturbance that may overlap areas utilized by white-tailed prairie dogs; however, Alternative A consists of 19 distinct well pads, each of which would be constructed within a 5-acre area. If present, Alternative A may result in mortality of individuals, reductions in habitat, and destruction of portions of prairie dog towns. A colony may utilize hundreds of acres making a reduction of the species viability range-wide unlikely. Because the NAPA is 40 miles distant from the nearest re-introduction site for black-footed ferrets, impacts from Alternative A would be negligible to white-tailed prairie dogs and the species that use them as prey. Implementation of Alternative A may affect individual white-tailed prairie dogs, but is **not likely to contribute to the need for this species to become listed**.

Although pronghorn may be temporarily displaced from the vicinity of construction and drilling operations because of noise and vehicle use, they would likely return after production operations reestablished. Impacts to pronghorn would be short-term.

Impacts to Conservation Agreement fish are discussed in terms of all three fish, flannelmouth sucker, bluehead sucker, and roundtail chub, because the impacts would be qualitatively and quantitatively similar. Any depletion of waters of the Upper Colorado River Basin would result in adverse effects to Conservation Agreement fish. Fresh water use during the 3-year construction, drilling, and completion phase is estimated to be 320 acre-feet. Water depletion impacts would affect the flannelmouth sucker, bluehead sucker, and roundtail chub but would not be likely to result in a loss of viability of these species because of implementation of measures intended to protect endangered Colorado River fish that live in the same waters (See Section 4.2.1.10). Implementation of Alternative A may affect the habitat of the flannelmouth sucker, bluehead sucker, and roundtail chub but is **not likely to contribute to the need for these species to become listed**.

4.2.1.5 Greenhouse Gas Emissions

GHGs were quantified for Alternative A (Table 4-4); however, an assessment of the effects of GHG emissions is in its formative phase. Net impacts to change attributable to the proposed 124 wells cannot yet be evaluated because existing climate prediction models project global changes. Projected changed to climate from GHGs are likely to occur over several decades or longer. Although the estimates of GHG emissions in Table 4-1 are impossible to relate to regional or global climate, changes in world temperatures are believed to be caused by additional heat being trapped by GHGs in the atmosphere. Rising temperatures may produce changes in precipitation patterns, storm severity, and sea level from melting snow and ice. Increasing concentrations of GHGs are likely to accelerate the rate of climate change, and Alternative A would contribute to those increases. See the Proposed RMP and Final EIS for the Vernal FO (BLM, 2008a), the Greater Natural ButtesFinal EIS (BLM, 2012), and Gasco Uinta Basin Natutral Gas Development Project Final EIS (BLM, 2012a) for additional discussion of GHGs and climate change.

Table 4-4: Estimated GHGs from Alternative A

EMISSIONS	GHGs (TPY)			
	CO_2	CH_4	N_2O	CO_{2e}
Year 1: 36 wells drilled	28,300	16.89	3.51	29,743
Year 2: 42 wells drilled, 36 in production	45,721 45.72		4.30	48,012
Year 3: 46 wells drilled, 78 wells in production	61,140 75.04		4.89	64,232
Years 4 – lives of wells: 124 wells in production	38,655	83.34	0.63	40,601

Source: CH2MHill, 2012

4.2.1.6 Invasive Species/Noxious Weeds, Soils, and Vegetation

Invasive Species/Noxious Weeds. Project development would provide opportunities for invasion by non-native plants on disturbed areas. Weeds reduce the productivity and health of the native species, possibly resulting in their displacement. Weed invasion has the potential to reduce the amount of suitable habitat

for special status plant species, decrease the success of seedlings, and exacerbate competition for limited moisture. Revegetation is the best way to prevent infestation or spread of noxious and invasive weeds. Initial reclamation would reduce the 191.9 acres of initial disturbance 59 percent to 79.4 acres of bare ground. Initial reclamation would follow the procedures detailed in the Green River District Reclamation Plan and the Operator's Reclamation Plan (Appendix D) to maximize successful reestablishment of desired vegetation. The Operator has committed to monitoring its locations and roads for weeds and using herbicides as needed to prevent their establishment and spread (See Section 2.2.6). Halogeton, Russian thistle, and tumble mustard can be controlled effectively with herbicides, especially at the pre-flowering stage in the spring. Herbicide treatment for cheatgrass is also effective, but herbicide application is more effective in the fall if this species is present. The Operator would follow the guidelines of the Vernal FO Surface Disturbance Weed Policy (April 2010) and the BLM "Vegetation Treatments using Herbicides (BLM, 2007b)."

Soils. Construction of the well pads and access roads would result in immediate impacts to 191.9 acres of soils. Long-term disturbance to soils would result from 79.4 acres of bare ground needed to support production operations. Possible effects to disturbed soils may include compaction, accelerated erosion, loss of protective vegetation, and diminished productivity.

Although using heavy equipment during construction operations tend to compact soils, NAPA soils are resistant to compaction because of the presence of a large rock/ gravel component, which reduces the ability for soils to be compressed. The large percentage of rock fragments in NAPA soils allows them to moderately permeable (See Table 3- 5). Approximately 30 percent of the NAPA soils contain 15 to 20 percent bedrock exposures. Where exposed, bedrock precludes effects to soil permeability.

Naturally occurring soil loss can be accelerated from human activities that remove the ground cover and loosen the soil, exposing it to wind and water and accelerating the erosion process. Baseline soil loss in various areas in the Uinta Basin has been estimated to range from 0.2 ton per acre per year (BLM, 2005) to 1.45 tons per acre per year (BLM, 2007a), or a typical rate of approximately 1.0 ton per acre per year. A natural soil erosion of 1.0 ton of sediment per acre per year indicates that naturally occurring soil productivity is very low. Soil loss after surface disturbance has been estimated to be triple the baseline rate (BLM, 2007a). Using this metric, soil loss over the 191.9 areas of disturbance could approach 575.7 tons annually until initial reclamation reestablishes vegetation, reducing soil loss to 238.2 tons annually. The presence of bedrock and stones in NAPA soils further discourages soil transport from water or from wind erosion. Soil loss would likely be much less than 238.2 tons per year. Where bedrock is exposed, runoff may be high but soil particle transport by runoff is precluded. Slopes within the NAPA are greatest on the side slopes of Kings Canyon (See Section 3.2), which contains Walknolls-Rock Outcrop complex soils at its upper reaches and Cadrina Extremely Stony Loam -Rock Outcrop complex soils down-canyon. These soils contain from 15 to 90 percent stone fragments on surface in addition to 15 to 20 percent rock outcrops. The dominating presence of stones and rock outcrops, shallow soil depths, low-to-moderate permeabilities of these soils, and the Operator's commitment to avoiding construction in the mainstem of Kings Canyon would minimize soil loss and concomitant sediment delivery to the Green River.

The Approved RMP designates slopes greater than 40 percent as NSO areas unless it can be demonstrated that alternative disturbances would cause undue/unnecessary degradation. The 1.7-mile distance to the river, low amounts of seasonal precipitation, and high rate of evaporation would also help to minimize sedimentation (See Section 3.3.1).

Conforming to Gold Book standards (See Section 2.2.6) and following procedures in the Green River District Reclamation Plan, which would be supplemented by the Operator's Reclamation Plan (See Appendix D), would minimize impacts to soils by facilitating stability through the reestablishment of vegetation during initial reclamation. The monitoring that would be conducted by the Operator during the life of the project would ensure that access roads and well pads are stable. Incorporation of site-specific erosion and sediment control BMPs would further reduce soil loss.

Soil viability may be compromised by topsoil removal, impairing the soil's ability to cycle nutrients and disrupting biological processes; however, all NAPA soils are thin and lack sufficient depths to display substantial soil horizons. Because they also intrinsically lack organic material and contain a large rock component, mixing of soil horizons would, therefore, be minimal. Soil productivity would likely be decreased from existing conditions after surface disturbance, but the presence of near-surface bedrock under thin soils indicates that soil productivity is already very low. Soil viability would likely be maintained where initial reclamation operations take place.

Leaks or spills of fuels, condensate, and/or produced water could impair soil productivity where such releases occur. Impacts to soils from accidental releases would be minimized by following procedures specified in a SPCCP, as committed to by the Operator. Releases would be contained and reported to the BLM. Remedial actions would be taken at the direction of the AO, as needed.

Biological Soil Crusts. Where construction operations take place, the potential for erosion and soil loss would be exacerbated by the removal of the stabilizing influence provided by established soil crusts. Since biological soil crusts are not well developed in the NAPA because of the large amount of rock and gravel, implementation of the Proposed Action would contribute very small impacts to biological soil crusts in the CIAA.

Vegetation. Construction of well pads and roads would result in initial disturbance of approximately 191.9 acres of vegetation. After initial reclamation reestablishes vegetation, approximately 79.4 acres would remain bare of vegetation for the lives of the well pads.

The interactions among vegetation, disturbance, and climate complicate the probable success of vegetation restoration after reclamation. Vegetation treatments and reclamation are usually not very successful in the types of plant communities present within the NAPA due to shallow soils and low moisture availability. Shrub vegetation would suffer a disproportionately larger amount of disturbance than other vegetative communities within the NAPA because: (1) sagebrush shrublands dominate the NAPA (61.8%); (2) mixed desert shrubs comprise most of the remainder of the NAPA (28.5%); and (3) construction operations would be facilitated on the low slopes of the sagebrush shrub-dominated uplands. The timing of the surface disturbance with respect to events such as drought would play an important role in determining grass and shrub component recovery. Although approximately 112.5 acres would be

reclaimed by initial reclamation operations, poor soils and variable precipitation amounts would slow reestablishment of shrubs. Shrubs may require 20 years or more to become reestablished. The grass understory would likely to reestablish itself more quickly on the reclaimed acreage given sufficient precipitation and stable soil conditions. Current drought conditions, if maintained, may discourage the immediate regrowth of annual grasses (See Section 3.3.1).

The BLM emphasizes the use and perpetuation of native species; however, non-native species are sometimes used during reclamation in order to achieve ecological objectives for an area. Performing reclamation operations on the uplands above Kings Canyon with varieties of plants that are tolerant of the higher salt concentrations characteristic of the Motts-Casmos soils would facilitate vegetation regrowth. The types of seeds used for initial and final reclamation would be determined by the AO after evaluating opportunities for reestablishment of growth in the nutrient-poor soils of the NAPA and the presence of established species, including invasive non-native plants. Following the Green River District and the Operator's Reclamation Plans, which include monitoring, would return soils to a stable condition on initially reclaimed areas and promote the growth of grasses and desirable plants.

4.2.1.7 Livestock Grazing and Rangeland Health Standards

Livestock Grazing. The increase in the level of general human activity and use of mechanical equipment would result in short-term impacts to livestock that utilize the Wild Horse Bench Allotment. Construction and drilling activities would create noise and may generally displace livestock from the NAPA during the period of allotment use, November 15 through April 15. Range stock would be more likely to use adjacent portions of the allotment, possibly resulting in increased competition for available resources among the permitted livestock. The creation of roads and possible increase in vehicle traffic could heighten possibilities of vehicle-livestock collisions or facilitate the entry of trespass animals into the allotment. Approximately 6.7 miles of new access roads would be constructed in the NAPA.

Approximately 191.9 acres of forage would be temporarily removed from the Wild Horse Bench Allotment. Approximately 79.4 acres of forage, corresponding to 8.4 AUMs, would be unavailable to livestock for the lives of the wells. Successful initial reclamation would restore grasses to 112.5 acres within the allotment. The impacts to permitted AUMs corresponding to forage removed from the NAPA by Alternative A are summarized in Table 4-5. Since the effective use of the allotment is less than 1/3 of the permitted usage, approximately 2.8 AUMs would be unavailable as a result of long-term disturbance within the NAPA.

Table 4-5: Long-term Impacts to AUMs

No. of AUMs able to Utilize Forage in the NAPA	Long-term Disturbance (acres)	Acres per AUM	AUMs removed for the Lives of the Wells (long-term)
246.2 79.4		9.4	8.4

Impacts to grazing sheep from loss of forage correspond to the loss of shrubs, which comprise their primary diet during winter months. Stress from over-grazing the shrubs would be offset by the large size of the allotment and the regrowth of annual spring grasses, which sheep prefer as food, prior to the effective date of the season of use on April 15.

Effects to range improvements may result from construction or long-term production operations. Blading, grading, and/or blasting may alter topographic features, which may, in turn, alter the surface's natural drainage characteristics such that the water-retention capability of a stock pond may be altered. The Operator, however, has committed to avoid range improvements and perform necessary repairs if functionality of range improvements were to be altered as a result of project operations (See Section 2.2.6). Possible impacts would be identified at the onsite inspection prior to construction. Additional mitigation measures, if needed, would be identified and applied. Sedimentation into stock ponds would be controlled through the Operator's commitment to utilize Gold Book BMPs and implement a SWPPP (Appendix E).

Rangeland Health Standards. The current rangeland health determination of "improve" would not be likely change due to implementation of Alternative A. Surface disturbance may create opportunities for the remaining forage to be compromised by the introduction of invasive species. Implementation of a successful initial reclamation plan and an active weed management program, as committed to by the Operator, would prevent the establishment and spread of invasive plant species or noxious weeds (See Section 2.2.6; Appendix D).

4.2.1.8 Migratory Birds, including Raptors

Alternative A would result in an initial disturbance of 191.9 acres to nesting habitat for migratory birds, including 191.9 acres of foraging habitat for raptors. Ground-nesting species would be subject to a long-term loss of 79.4 acres.

Migratory birds in Utah are generally affected by activities that occur in the spring and summer months when they breed and nest. Sensitivity of adult and young birds to disturbance, such as construction and drilling activities, varies during the nesting cycle, with courtship, nest construction, incubation, and early brooding considered high risk periods, and according to proximity to a nest. During these periods, adult birds are more easily prone to temporarily desert or permanently abandon nests in response to disturbance, leaving the eggs and/or young susceptible to the effects of inclement weather, solar radiation, and predation. Temporary flushing from nests by adult birds due to noise can result in mortality of the young birds, which continue to be dependent on parental care (Romin and Muck, 2002). The severity of impacts to migratory birds that inhabit the NAPA, especially those identified as conservation priorities, may be greater than impacts to raptors because they typically exhibit smaller population sizes and more limited distributions. The effects to nesting migratory birds would be generally limited to those species that nest on the ground or on cliffs since the NAPA uplands lack trees (See Figure 8). Surface disturbing activities conducted during late fall and winter months would be likely to disturb fewer migratory birds than during other seasons. Most migratory birds species will have left the NAPA by the late fall for warmer wintering grounds to the south.

Many raptors display fidelity to nesting sites, and nearby vehicle traffic or human activity may cause nest failure or abandonment and/or displacement of individual birds. Nesting habitat for raptors that prefer cliff walls or high crags, such as golden eagles, would not be directly impacted where such nests are located on the side slopes of Kings Canyon proper (See Section 2.2.6). Potential nesting habitat for burrowing owls may be reduced if white-tailed prairie dog colonies were to be disturbed by construction operations. Individual burrowing owls have moderate to high site fidelity to general breeding areas,

prairie dog colonies, and even to particular nest burrows. Burrow and nest sites are reused at a higher rate if the bird has reproduced successfully during the previous year. Alternative A would not be likely to result in a reduction of burrowing owl viability range-wide because the amount of disturbance is small in comparison with available suitable habitat.

Elevated noise levels resulting from human presence and facility operation have been shown to be factors in raptor displacement (YFWMB, 2002). Responses of individual raptors, however, may vary from tolerance to avoidance of affected habitat. Effects may depend upon proximity to nest sites, patterns of noise occurrence, and noise intensity. Golden eagles generally show strong fidelity to the nesting area annually. Golden eagles are one of several cliff dwelling species sensitive to human disturbance, which can cause nesting failure, and permanent site abandonment, constituting take under the Eagle Act (Pagel et al., 2010). Displacement of raptors to nearby less-disturbed habitats may possibly result in increased competition between species and within individuals of a species for available resources.

To mitigate impacts to raptors, surveys would be conducted prior to construction or drilling, if such activities were to take place in the nesting season, to ensure the application of spatial buffers. Providing a buffer to active nests during nesting season would reduce the likelihood of nest abandonment or raptor displacement that may otherwise result from nearby human activity and noise during that sensitive time (See Appendix C).

4.2.1.9 Paleontology

Alternative A would result in approximately 191.9 acres of surface disturbance. Paleontological resources are non-renewable resources that can be irreversibly damaged or destroyed by surface-disturbing activities. Other impacts to paleontological resources could include removal of fossils due to illicit collection and inadvertent destruction. Since the NAPA is not easily accessible and does not attract recreational activity (See Appendix A), casual public access and illicit collection by the public would be unlikely. Fossil removal by the public is not quantifiable.

In sensitive fossil areas where bed rock is exposed at or near surface, the Operator has committed to employing a BLM-approved paleontologist to examine construction sites for paleontological resources prior to surface disturbing operations. The BLM-approved paleontologist would make recommendations as to fossil disposition if significant fossil were to be found. Where possible, avoidance measures would be taken. Monitoring would be conducted during construction operations if necessary. If any paleontological resources were to be found during construction operations, all operations that could further disturb such materials would be suspended, and the AO would be contacted for direction (See Section 2.2.6). Therefore, project activities would not be likely to affect paleontological resources.

4.2.1.10 Threatened, Endangered, or Candidate Animal Species

The Colorado River endangered fish species, including the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub, would be affected by activities that deplete or degrade the flow of downstream waters into the Upper Colorado River Basin (USFWS, 2011; USFWS, 2002; USFWS, 2002a; USFWS, 2002b; USFWS, 2002c; USFWS, 1994; USFWS, 1990). Impacts to these species are discussed in terms of all endangered fish because the impacts would be qualitatively and quantitatively similar. Candidate species would not be affected since they are not present in the NAPA and do not have

habitat that would be affected by Alternative A. Any depletion of waters of the Upper Colorado River Basin would result in adverse effects to T&E Colorado River fish. Fresh water use during the 3-year construction, drilling, and completion phase is estimated to be 320 acre-feet. The Operator would obtain water from permitted sources (See Table 2-2).

The Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin was established in January 1988 and extended to September 2012 to mitigate for water depletion impacts to federally endangered fish species. Under the RIP, water depletions from tributary waters within the Colorado River drainage would jeopardize the continued existence of these fish species. In October 1993, a Recovery Implementation Program Recovery Action Plan (RIPRAP) was developed to establish a framework for conducting Section 7 consultations. The RIPRAP has been reviewed and updated annually. Updates to the RIPRAP since 1997 determined that the Recovery Implementation Program has made sufficient progress to be the reasonable and prudent alternative to avoid the likelihood of jeopardy to the endangered fish and to avoid destruction or adverse modification of their critical habitat by small depletions. The provisions of the Recovery Implementation Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fish. Incremental withdrawals of more than 100 acre-feet (annual average) would require the water user to make a payment to the USFWS Upper Colorado River Endangered Fish Recovery Program. Depletions resulting from Alternative A would require payment to the Recovery Implementation Program. The Operator would make a one-time payment that would be calculated by multiplying the peak annual depletion by the depletion charge in effect at the time the payment is made. For Fiscal Year 2012, the depletion charge is $19.21 per acre-foot for the average annual depletion.

Other possible impacts to T&E Colorado River fish may include degradation of their habitat. While ephemeral drainages occur in and near the NAPA, none of these drainages contains perennial waters or provides habitat elements required by the T&E Colorado River fish. Although drainages within and near the NAPA have flashflood potential, it is unlikely that runoff originating from surface disturbance in the NAPA would reach the perennial water of the Green River because of the 1.7-mile distance to the river, low amounts of seasonal precipitation, and high rate of evaporation (See Section 3.3.1). Degradation of T&E Colorado River fish habitat as a result of erosion or sedimentation would generally be prevented by the implementation of erosion control techniques determined at the onsite inspection, Gold Book BMPs, and the Operator's SWPPP (See Appendix E).

Alternative A **may affect, likely to adversely affect** the endangered Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub. BLM conducted formal consultation with the USFWS with respect to Alternative A, which was concluded on September 28, 2012, with the receipt of correspondence from the USFWS (See Section 5.1).

4.2.1.11 Threatened, Endangered, Proposed or Candidate Plant Species

Impacts are predicted to be qualitatively similar for all T&E and proposed plant species and would result primarily from loss of habitat. Impacts to individual T&E and proposed plants would not occur because surveys would be performed prior to surface disturbance and 300-foot disturbance buffers were to be implemented from identified individuals (See Section 2.2.6). Adherence to the USFWS conservation

measures (Appendix C) would provide sufficient buffers to protect T&E plants and the plant proposed for listing.

Potential effects to these species may result from habitat fragmentation from construction operations, habitat invasion by noxious weeds and invasive species from surface disturbance, effects from the inappropriate use of herbicides, increased accessibility for plant collectors from the construction of roads, and reduced pollination and seed set caused by fugitive dust. Habitat fragmentation would result from the construction of approximately 6.7 miles of access roads, installation of 15 miles of pipelines, and 19 well pads, resulting in 191.9 acres of initial disturbance. Initial reclamation would reestablish viable conditions for plant growth such that long-term loss of habitat and fragmentation would result from 79.4 acres of bare ground, which would remain for the lives of the well pads. Habitat fragmentation may lead to reduced population sizes and densities, and excessive dust has the potential to inhibit pollination and reduce success of seed set. Possible habitat degradation due to the introduction or spread of invasive plants or noxious weeds would be minimized by implementation of the measures described in Section 4.2.1.6. The herbicides that would be used to control undesirable plant species would follow prescribed protocols and guidelines. Impacts from increased accessibility and illicit collection would be negligible because the NAPA is not a recreation destination (See Appendix A), and OHV use is limited to designated routes in the NAPA. Pre-construction surveys would provide protections sufficient to minimize impacts to these plants from fugitive dust.

Suitable habitat for clay reed-mustard occurs on the canyon slopes of Kings Canyon where the Green River Formation is exposed. Approximately 230 acres of the Green River Formation is exposed in the western portion of the NAPA in Kings Canyon. Individuals that have been identified in the western half of Section 28 would not be directly affected by construction operations because of the Operator's NSO commitment in that area. An inventory for this species would be conducted on a site-specific basis, as needed, prior to approval of an APD or other surface use proposal. The Operator has committed to avoid the side slopes and Kings Canyon proper (See Section 2.2.6), diminishing the likelihood that project activities would overlap suitable habitat and/or directly affect individuals of this species. Project construction operations that take place near the canyon rim may result in sedimentation downslope. BMPs would be identified by the AO when such disturbance would result. Therefore, Alternative A **may affect, but is not likely to adversely affect** the clay reed-mustard.

Suitable habitat for Uinta Basin hookless cactus is present within the NAPA. A field survey for this species would be conducted on a site-specific basis prior to approval of an APD or other surface disturbing activity. Based on field survey results, project activities would be designed to avoid all populations and individuals of this species by at least 300 feet. Potential impacts include the unavailability of 79.4 acres of habitat during the lives of the wells. Therefore, Alternative A **may affect, but is not likely to adversely affect** the Uinta Basin hookless cactus.

The NAPA may contain suitable habitat for the candidate species Graham's beardtongue. Suitable habitat in the NAPA consists of the Green River Formation, which covers approximately 130 acres in and on the side slopes of the Kings Canyon system. The Operator has committed to perform ing no new surface disturbance in Kings Canyon proper, including its side slopes or active channel (See Section 2.2.6).

Therefore, Alternative A is **not likely to jeopardize the continued existence of or adversely modify proposed critical habitat** of the Graham's beardtongue (See Section 5.1).

BLM conducted consultation with the USFWS with respect to Alternative A, which was concluded on September 28, 2012, with the receipt of correspondence from the USFWS (See Section 5.1).

4.2.1.12 Water Resources/Quality and Waters of the U.S. Water Resources/Quality (Surface Water)
Poorly constructed well locations, roads, and pipeline crossings can affect surface water quality by becoming sources of non-point pollution. Sediments transported by runoff may impair surface water quality by increasing concentrations of total dissolved solids, suspended solids, and/or salts associated with saline soils.

Proper land use is the BLM's preferred method of achieving salinity control, with the project planning process being the principal mechanism for implementation and conformance with the Colorado River Basin Salinity Control Act (BLM, 2008a). Gold Book BMPs include locating well pads set back from steep slopes, which would minimize the delivery of saline Motto-Casmos Complex sediments from the uplands to ephemeral drainages. The Operator's commitment to avoid construction in Kings Canyon proper, its side slopes, and active channel would prevent impacts from construction within the mainstem of the canyon. Construction in the smaller tributary drainages to Kings Canyon would be subject to RMP conditions that include criteria for construction on slopes of varying steepness. Other factors to consider include the NAPA soil characteristics, 1.7-mile distance to the Green River, low average seasonal precipitation, and high rate of evaporation, all of which influence the amount and frequency of sediment transport. The rate of soil loss corresponding to a bare surface of 79.4 acres of long-term disturbance would likely be much less the estimated 238.2 tons per year, which includes losses from wind as well as water transport (See Section 4.2.1.6). Because NAPA soils are characteristically channery and include bedrock exposures, they are not particularly susceptible to wind or water erosion except in areas where slopes exceed 10 percent, such as on the side slopes of Kings Canyon, which would be avoided (See Sections 3.3.5 and 2.2.6). Infiltration of surface water runoff into the subsoil may occur in the upper reaches of Kings Canyon where the moderately permeable Walknolls-Rock outcrop soils are present. Floodwaters originating from the Green River would not reach well locations because the 100-year floodplain stops within the western half of Section 28 and the Operator has committed to avoiding surface disturbance in the western half of Section 28 as well as in Kings Canyon proper (Figure 7). Successfully executed initial reclamation operations would further reduce the possibility of sediments reaching surface waters (See Section 4.2.1.6). Therefore, implementation of Alternative A would not be likely to contribute to existing salt concentrations in the Green River. Natural processes would likely continue to have the dominant impact on erosion and sedimentation.

Willow Creek is 4.5 miles distant from the NAPA and the topographically high Wild Horse Bench is between it and the NAPA. Drainages trend toward the northwest rather than to the east toward Willow Creek. Water quality in Willow Creek would not be degraded by sediments originating from the NAPA.

Implementation of the Proposed Action may result in possible effects to surface water resources as a result of accidental spills or releases of fuels, lubricants, chemicals, and petroleum products. The Operator would, however, develop, maintain, and implement the procedures contained in its SPCCPs to

contain accidental releases and minimize impacts to water resources. In addition, the Operator would construct berms or other containment devices to hold 110 percent of the volume of any one container or tank that would be installed on a location, in compliance with the Oil Pollution Act of 1990 (See Section 2.2.3). Other measures, such as use of a closed loop drilling system, would be required as determined at an onsite inspection (See Section 2.2.2.1). Runoff of extreme magnitudes can cause aboveground pipelines to break where they cross ephemeral drainages. Aboveground pipelines constructed along a road utilizing a dry channel crossing may be structurally insufficient to maintain integrity during flash floods. Application of the BLM's Hydraulic Considerations for Pipeline Crossings of Stream Channels, as determined at an onsite inspection, would ensure that the integrity of pipelines carrying liquid hydrocarbons would not be compromised and down-channel surface water quality would not be affected.

An estimated 320 acre-feet of fresh water would be taken from permitted sources for drilling and completion operations during the 3-year drilling period. One possible source may be the Green River (See Table 2-2). Consumptive water use reduces flows and may result in increased concentrations of pollutants. Flows vary annually, however, and are weather and snowpack dependent. Inflows into the Green River near the Flaming Gorge Reservoir, upstream from the Uinta Basin, were estimated to be 139 percent of average in 2011 (BOR, 2011a); however, 2012 has been dry to-date. Regardless of the weather, it is unlikely that the relatively small surface water withdrawal needed to support Alternative A would diminish flow volumes sufficiently to affect existing concentrations of pollutants in the surface water.

Waters of the U.S. Possible impacts to a water of the U.S. may result from Alternative A if a channel were to be crossed or flow within a channel were to be impaired as a result of construction operations. COE authority over aspects of the Proposed Action would be determined by the AO on a case-by-case basis after specific sites are located for well pads, access roads, and pipelines. Securing a Section 404 permit where necessary and abiding by permit conditions would minimize potential impacts to a water of the U.S. Implementation of Gold Book BMPs at channel crossings, as determined at the onsite inspection, would also minimize possible impacts to waters of the U.S.

4.2.1.13 Wild Horses

Until their removal is complete, approximately 191.9 acres of forage would be removed from the Hill Creek Herd Area in the NAPA for the short-term. Long-term removal of forage would result from 79.4 acres of bare ground. Construction and drilling activities would create noise and may temporarily displace wild horses from the NAPA. Competition between wild horses and grazing livestock for available resources in the NAPA may increase, especially over the 3-year length of drilling operations until 112.5 acres of forage is reestablished after initial reclamation. Wild horses would be more likely to use adjacent undisturbed locations within the Hill Creek Herd Area until production operations are established.

4.2.1.14 Mitigation Measures

Air Quality:

1. Consult with the AO prior to initiation of drilling operations to determine appropriate measures to take to limit public exposure to emissions that would result from drilling and completing wells on nearby pads. Such measures may include the installation of signs on designated routes and /or fencing, and/or other measures as deemed appropriate by the AO.

BLM Sensitive Plant Species:

2. If so directed by the AO, conduct surveys for the presence of BLM-sensitive plants prior to surface disturbing activities/construction.
3. At the discretion of the AO, implement measures to protect any individuals or habitat that may be found as a result of the surveys. Such measures may include a 150-foot buffer to identified individual plants.

Cultural Resources and Native American Religious Concerns:

4. A cultural resource inventory will be completed prior to construction or surface disturbing activities. A report detailing any findings and recommendations will be submitted to the BLM before such actions are initiated. Mitigation measures will be determined by the AO, as appropriate.

Invasive Plants/Noxious Weeds, Soils, and Vegetation:

5. Conduct annual monitoring of the progress of initial as well as final reclamation operations. If invasive species/noxious weeds are present, apply herbicides as appropriate to the type of species and the time most favorable for their effective use.
6. Utilize weed-free mulching or other means as necessary and determined appropriate by reclamation monitoring inspections to facilitate reclamation success.
7. If planning to construct on slopes of tributary canyons to Kings Canyon, consult with the AO regarding measures that must be taken on steep slopes. "Specific to oil and gas activities, steep hillsides shall be avoided in the construction of routes, pipelines, and flowlines. If surface-disturbing activities cannot be avoided on slopes 21-40%, an approved plan will be required prior to construction and maintenance that will include:
   • An erosion control strategy
   • GIS modeling
   • Proper survey and design by a certified engineer" (BLM, 2008).

Livestock Grazing and Rangeland Health Standards:

8. Use a reclamation seed mix that includes fourwing saltbush (*Atriplex canescens*), and winterfat (*Ceratoides lanata*) to aid reestablishment of forage preferable to sheep.
9. Submit a Pesticide Use Plan (PUP) to the BLM for approval. The PUP should be approved prior to the initiation of weed control operations.

Migratory Birds, including Raptors:

10. If project activities were to occur during raptor mating/nesting season, as specified in the Approved RMP, Appendix A, Attachment 2 (included in Appendix C of this EA), surveys will be conducted during nesting season by qualified biologists to locate nesting raptors prior to construction/surface disturbance or drilling/completion operations. The information will be provided to BLM AO for review to determine the appropriate avoidance or mitigation measures and spatial and temporal buffers.

Paleontology:

11. A paleontological inventory should be completed prior to construction or surface disturbance. A report detailing any findings and recommendations should be submitted to the BLM before such actions are initiated. If necessary, mitigation measures will be determined by the AO.

Threatened, Endangered, Proposed or Candidate Plant Species:

12. An inventory for the presence of T&E and Candidate plant species should be completed prior construction or surface disturbance. The conservation measures for the Threatened clay reed-mustard, Uinta Basin hookless cactus, and Candidate species Graham's beardtongue, included in this EA as Appendix C should be followed.

Water Resources/Quality (surface) and Waters of the U.S.:

13. Utilize procedures contained in the BLM's Hydraulic Considerations for Pipeline Crossings of Stream Channels as appropriate and as identified at the onsite inspections.

4.2.1.15 Residual Impacts

Residual impacts are those impacts that remain after the proposed mitigation measures have taken effect. Residual impacts represent the degree of environmental change. Residual impacts would correspond to all phases of well development and operation during approximately 40-year well life and the time required to reestablish vegetation, approximately five years. Approximately 79.4 acres would be devoid of vegetation and unavailable for land uses other than oil and gas production while the wells are producing. Small chemical and biological changes may occur to NAPA soils.

Forage would not be available for livestock, wild horses, or wildlife on bare ground for the long-term. Fragmentation of wildlife habitat would continue to increase in the NAPA as a result of road, pipeline, and well pad construction. Contiguous habitat areas would be reduced in size. Wildlife and livestock would likely be temporarily displaced during the construction of roads, wells, and pipelines, and during well drilling and completion activities.

Fugitive dust resulting from construction activities would be released during the three years of construction and drilling activity. Emissions of criteria pollutants and GHGs from gas production equipment would continue for the estimated 40-year lives of the wells. NO_x and VOC emissions would contribute to the formation of ozone and to the concentrations measured in the Uinta Basin.

Despite prior clearance surveys and compliance with Section 106, surface-disturbing activities have the potential to damage or destroy unknown and undetected cultural or paleontological resources. Adherence to relevant laws would provide opportunities for mitigation of the majority of these impacts.

Produced gas would be removed from the existing reserves and would be irretrievably lost to future use. Alternative uses for the land would be regained after the wells are plugged and abandoned and the land is fully reclaimed.

4.2.1.16 Monitoring and/or Compliance

Monitoring would take place periodically during the life of the project or as required by law. During construction of each well pad, the dirt contractor would be checked by the BLM to ensure that the disturbance conforms to what was approved in the APD. During the lifetime of a well, surface compliance inspections would be conducted by the BLM to ensure continued protection of the environment. After a well is plugged, the site would be inspected by the BLM to determine necessary reclamation measures, and it would be inspected in accordance with the Green River District Reclamation Guidelines thereafter until it is determined that reclamation is successful and a well and/or well pad could be accepted for final abandonment.

4.2.2 Alternative B – No Action

Under Alternative B, development of the proposed 124 natural gas wells and their associated facilities would be precluded. Selection of Alternative B would not affect the ongoing oil and gas operations currently permitted and operating in the NAPA. These activities include the operation of existing/previously authorized wells and reclamation operations, in accordance with their permit requirements. The impacts associated with current land uses and existing and approved oil and gas operations would continue under this alternative.

4.2.2.1 Air Quality

Emissions of 45.55 TPY NO_x, 29.57 TPY CO, 213.61 TPY VOCs, 1.26 TPY SO_2, 5.88 TPY PM_{10}, 2.41 TPY $PM_{2.5}$, and 34.54 TPY total HAPs from well production operations would not be released to the atmosphere.

4.2.2.2 BLM Sensitive Plant Species

Impacts to the Graham's catseye, Barneby's catseye, Spanish Bayonet, and Strigose townsendia or their habitat would not result from construction operations in the NAPA.

4.2.2.3 Cultural Resources and Native American Religious Concerns

Approximately 191.9 acres of surface disturbance that could result in inadvertent adverse effects to cultural resources would not occur. No actions would be undertaken that may result in impacts to Native American religious concerns.

4.2.2.4 Fish and Wildlife Excluding USFWS Designated Species

Possible loss of prairie dog individuals or part of a colony would not occur. Temporary displacement of pronghorn antelope would not occur. Impacts to the habitat of the bluehead sucker, flannelmouth sucker, and roundtail chub would not occur from implementation of Alternative B. Use of fresh water, estimated at 320 acre-feet, would not occur.

4.2.2.5 Greenhouse Gas Emissions

GHGs from 124 wells would not be released into the atmosphere. Approximately 38,655 TPY CO_2, 83.34 TPY CH_4, and 0.63 TPY N_2O (40,601 TPY CO_{2e}) would not be released into the atmosphere.

4.2.2.6 Invasive Plants/Noxious Weeds, Soils, and Vegetation

Invasive Species/Noxious Weeds. Possible introduction or spread of noxious weeds and/or invasive plant species would not occur as a result of implementation of Alternative A. Invasive plants could still be brought into the NAPA as seeds on vehicles that access the project area.

Soils. Approximately 191.9 acres of soils would not be disturbed for construction purposes. Approximately 79.4 acres of soils would not be used for production operations for the lives of the wells and would remain in their current condition. Approximately 238.2 tons of soil per year would not be lost as a result of surface disturbance.

Vegetation. Approximately 191.9 acres of plant habitat would not be disturbed for construction purposes. Approximately 79.4 acres of vegetation would not be used for production operations for the lives of the wells and would remain in their current condition.

4.2.2.7 Livestock Grazing and Rangeland Health Standards

Approximately 191.9 acres of grazing forage would not be disturbed for construction purposes. Approximately 8.4 AUMs would unavailable within the NAPA portion of the Wild Horse Bench Allotment for the 40+ years of well operation on 79.4 acres. The rangeland health assessment of the Wild Horse Bench Allotment would not be changed by the construction and operation of 124 wells. The current determination of "improve" would likely remain the same.

4.2.2.8 Migratory Birds, including Raptors

Approximately 191.9 acres of potential nesting and foraging habitat for migratory birds and raptors would not be disturbed for construction purposes. Approximately 79.4 acres of migratory bird and raptor habitat would not be used for production operations for the lives of the wells and would remain in their current condition.

4.2.2.9 Paleontological Resources

Approximately 191.9 acres of surface disturbance that could result in inadvertent adverse effects to paleontological resources would not occur.

4.2.2.10 Threatened, Endangered, or Candidate Animal Species

Impacts to the habitat of the endangered Colorado pikeminnow, razorback sucker, humpback chub, and bonytail chub would not occur. Water depletions, estimated at 320 acre-feet, would not occur. Water depletions of the Upper Colorado River Basin would continue to occur as a result of other actions.

4.2.2.11 Threatened, Endangered, Proposed, or Candidate Plant Species

Impacts to the clay reed-mustard, Uinta Basin hookless cactus, and Graham's beardtongue or their habitat would not occur from implementation of Alternative B.

4.2.2.12 Water Resources/Quality and Waters of the U.S.

Approximately 320 acre-feet would not be withdrawn from the Green River to be used for drilling operations. Channels that may be considered waters of the U.S. would not be affected by construction operations.

4.2.2.13 Wild Horses

Approximately 191.9 acres of grazing forage for wild horses would not be disturbed for construction purposes. Approximately 79.4 acres of grazing forage would not be used for long-term production operations.

4.2.2.14 Mitigation Measures

Mitigation measures are not needed for the implementation of the No Action Alternative.

4.2.2.15 Residual Impacts

Because residual impacts are those impacts that remain after the mitigation measures have taken effect, and because no mitigation measures would be applied to the No Action Alternative, residual impacts would not result from Alternative B.

4.2.2.16 Monitoring and/or Compliance

Monitoring of resource conditions would continue as they are currently being conducted. No additional monitoring would be needed under Alternative B.

4.3 Cumulative Impacts

Cumulative impacts are the incremental effects to specific resources that would occur from the alternatives in consideration of other reasonably foreseeable actions that may occur in the CIAA, which is defined for each resource. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The time frame for the cumulative impacts analysis is 45 years, corresponding to a typical well life of 40 years and approximate 5 years needed to reestablish vegetation and restore habitat and forage after successful final reclamation operations.

Quantification of cumulative impacts was developed in consideration of surface disturbance resulting from oil and gas operations only since these operations dominate past, current, and reasonably foreseeable actions in the CIAAs. Surface disturbance amounts were quantified in consistency with the assumptions presented in the Greater Uinta Basin Oil and Gas Cumulative Impacts Technical Support Document (BLM, 2012b). Although Gilsonite occurs within the NAPA, Gilsonite has not been developed in the NAPA, and such development is not reasonably foreseeable at this time.

4.3.1 Cumulative Impacts Areas

The CIAA for each resource and the rationale to support its choice is listed in Table 4-6.

Table 4-6: Cumulative Impacts Analysis Areas

Resource	CIAA	Rationale
Air Quality	Uinta Basin (11,500 square miles)	Oil and gas development is currently believed by the Vernal FO to be primarily responsible for past, current, and reasonably foreseeable impacts to air quality in the Uinta Basin. Impacts to air quality from the project would add to the concentration of pollutants in this airshed, which is topographically defined by the physiography of the Uinta Basin. The higher terrain on all sides of the basin results in similar climate and dispersion conditions for pollutants within it.
BLM Sensitive Plant Species	Kings Canyon-Green River watershed east of the Green River (24,800 acres acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to BLM sensitive plant species recognizes the interrelated needs of resources, such as soils, water, plants, and wildlife, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. Impacts to BLM sensitive plant species within the watershed would add to cumulative effects to the viability and presence of BLM sensitive plant species in a delineated habitat.
Cultural Resources and Native American Religious Concerns	Project area (2,320 acres).	Impacts would correspond to surface disturbance. Impacts to cultural resources and Native American religious concerns within the project area would not add to similar impacts outside of the project area.
Fish and Wildlife, excluding USFWS Designated Species	Kings Canyon-Green River watershed east of the Green River (24,800 acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to fish and wildlife recognizes the interrelated needs of resources, such as soils, water, plants, and wildlife, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. Impacts to fish and wildlife within the watershed would add to cumulative effects to the viability and presence of fish and wildlife in a delineated habitat.
Greenhouse Gas Emissions	Uinta Basin (11,500 square miles)	Past, current, and reasonably foreseeable oil and gas development is currently believed by the Vernal FO to be primarily responsible for the generation GHGs in the Uinta Basin. Impacts from GHGs resulting from the Proposed Action would add to the volume of GHG emissions in this airshed, which is topographically defined by the physiography of the Uinta Basin. The higher terrain on all sides of the basin results in similar climate and dispersion conditions for pollutants within it.

Resource	CIAA	Rationale
Invasive Plants/Noxious Weeds, Soils, and Vegetation	Kings Canyon-Green River watershed east of the Green River (24,800 acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to invasive plants/noxious weeds, soils, and vegetation recognizes the interrelated needs of these resources, in consideration of water and wildlife, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. Site-specific management of soils considers soil loss via erosion, sedimentation, and preservation of soil viability, which influence the sustainability of soils within a watershed. Site-specific management of invasive plants/noxious weeds and vegetation considers preserving/restoring habitat and reestablishing desired forage, which influence the sustainability of vegetation within a watershed. Impacts from the introduction or spread of invasive plants/noxious weeds would add to similar impacts throughout the watershed. Impacts to soils and vegetation within the project area would add to cumulative effects to the vegetation communities found within the watershed.
Livestock Grazing and Rangeland Health	Wild Horse Bench Allotment (43,526 acres)	Permits for grazing allotments define the type of livestock and level of use by a permitee. Impacts to livestock forage within the project area would add to similar impacts within the allotment, determining the amount of supportable AUMs and cumulative effects to rangeland health.
Migratory Birds, including Raptors	Kings Canyon-Green River watershed east of the Green River (24,800 acres acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to migratory birds and raptors recognizes the interrelated needs of resources, such as soils, water, plants, and migratory birds, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. Impacts to migratory birds within the watershed would add to cumulative effects to the viability and presence of migratory birds in a delineated habitat.
Paleontology	Project area (2,320 acres).	Impacts would correspond to surface disturbance. Impacts to paleontological resources within the project area would not add to similar impacts outside of the project area.
Threatened, Endangered, or Candidate Animal Species	Kings Canyon-Green River watershed east of the Green River (24,800 acres acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to T&E or candidate animal species recognizes the interrelated needs of resources, such as soils, water,

Resource	CIAA	Rationale
		plants, and T&E and candidate animal species, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. Portions of the Green River that occur within the CIAA may provide habitat elements needed to sustain the T&E Colorado River fish. Impacts to T&E or candidate animal species within the watershed would add to cumulative effects to the viability and presence of these species.
Threatened, Endangered, Proposed, or Candidate Plant Species	Kings Canyon-Green River watershed east of the Green River (24,800 acres acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to T&E, proposed, or candidate plant species recognizes the interrelated needs of resources, such as soils, water, T&E, proposed, or candidate plant species, and wildlife, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. Impacts to T&E, proposed, or candidate plant species within the watershed would add to cumulative effects to the viability and presence of these species in a delineated area.
Water Resources/Quality and Waters of the U.S.	Kings Canyon-Green River watershed east of the Green River (24,800 acres).	Impacts to surface water resources and waters of the U.S. from project implementation would add to effects to water resources/quality, including waters of the U.S., from oil and gas operations that utilize lands within the watershed. Because surface water impairment may result from sedimentation, the CIAA for water resources/quality, including waters of the U.S., corresponds to the CIAA for the analysis of soil resources.
Wild Horses	Kings Canyon-Green River watershed east of the Green River (24,800 acres).	A watershed is defined by topography and is a geographic area of land, water and biota within the confines of a drainage divide. Watershed analysis provides a framework for delineating the spatial distribution and linkages for physical processes and biological communities in a physical context. Using a watershed to analyze cumulative impacts to wild horses recognizes the interrelated needs of resources, such as soils, water, plants, and wild horses, as they respond to social and economic pressures. Information on ecological processes, history, condition, and response potential within the defined area of a watershed provides an opportunity for balancing environmental and economic objectives in consideration of land use and the intrinsic capability and capacity of the land. The presence and viability of wild horses are determined by presence of forage and water resources within a defined area. Impacts to wild horses in the project area would add to cumulative effects wild horses that utilize the resources within the watershed.

The CIAAs for BLM Sen sitive Plant Species; Invasive Plants/Noxious Weeds, Soils, and Vegetation; Migratory Birds; Threatened, Endangered, or Ca ndidate Animal Species; Threatened, Endangered,

Proposed, or Candidate Plant Species; Water Resources/Quality and Waters of the U.S.; and Wild Horses species corresponds to the approximate 24,800 acres that comprise the portion of the Kings Canyon-Green River watershed east of the Green River. It extends generally southward from the Green River to include both sides of Kings Canyon west of Wild Horse Bench, including approximately 39 sections in T9S-R19E, T10S-R19E, and T11S-R19E (See Figures 4 and 5).

4.3.2 Past and Present Actions

Past and present actions consist of oil and gas development. Past and present surface disturbance was estimated for each CIAA in Table 4-7. Impacts to cultural and paleontological resources correspond to short-term disturbance, prior to initial reclamation operations. Estimated disturbance for the grazing allotment and the watershed corresponds to long-term disturbance after successful initial reclamation.

Table 4-7: Estimated Surface Disturbance from Past and Present Oil and Gas Operations by CIAA

CIAA	Existing Active Well Pads	Length of Roads (miles)	Estimated Disturbance (acres)
NAPA – short-term disturbance for cultural and paleontological resources only	367.5		187.2
Wild Horse Bench Allotment	359	75.4	897.5
Kings Canyon-Green River watershed east of the Green River	189 39.7		472.5

[1] Source: UDOGM, 2012.

4.3.3 Reasonably Foreseeable Action Scenario

Reasonably foreseeable actions consist primarily of continued future oil and gas development. Reasonably foreseeable surface disturbance was estimated for each CIAA as in Table 4-8. Future development would likely follow the trend toward constructing well pads located on 40-acre surface density (See Figure 6). Impacts to cultural and paleontological resources correspond to short-term disturbance, prior to initial reclamation operations. Estimated disturbance for the grazing allotment and the watershed corresponds to long-term disturbance after successful initial reclamation.

Table 4-8: Estimated Surface Disturbance from Reasonably Foreseeable Oil and Gas Operations

CIAA	Number of Available 40-acre Locations	Length of Roads (miles)	Estimated Disturbance (acres)
NAPA – short-term disturbance for cultural and paleontological resources only	227.3	[1] 207.5	[1]
Wild Horse Bench Allotment	729	153.1	1,895.8
Kings Canyon-Green River watershed east of the Green River	431 90.5		1,120.6

[1] Includes initial disturbance that would result from Alternative A.

4.3.4 Cumulative Impact Analysis

The cumulative surface disturbance that has and may foreseeably result from oil and gas development operations in each CIAA is shown in Table 4-9.

Table 4-9: Estimated Surface Disturbance from Past, Present, and Reasonably Foreseeable Oil and Gas Operations

CIAA	Number of Well Pads	Length of Roads (miles)	Estimated Disturbance (acres)	% of CIAA
NAPA – short-term disturbance for cultural and paleontological resources only	58 14.8		394.7	NA [1]
Wild Horse Bench Allotment	1,088	228.5	2,793.3	6.4
Kings Canyon-Green River watershed east of the Green River	620 130.2		1,593.1	6.4

[1] Not applicable because portions areas disturbed from construction would be reclaimed by initial reclamation operations.

4.3.4.1 Air Quality

Alternative A. Cumulative impacts to air quality are quantified in terms of cumulative emissions, which correspond only partially to surface disturbance. As part of its RMP development, the Vernal FO estimated that approximately 6,530 new wells, 67 per cent of which would be gas wells, could be drilled and active in the Uinta Basin over a 15-year period after RMP approval in 2008. Future oil and gas development in the Uinta Basin would continue the exploration trend to new areas and deeper reservoirs utilizing advancing technologies and increased infill development as a balance is struck between diminished returns and tighter well spacing.

The analysis of cumulative impacts to air quality utilized available quantitative information from the following sources:

- Emissions estimates for the 124 proposed wells;
- Results of the Greater Natural Buttes (GNB) air quality study (BLM, 2012);
- Results of the Gasco air quality study (BLM, 2012a).

Estimated increases in emissions from production operations of 124 wells would incrementally add to changes in air quality in the Uinta Basin. Alternative A emissions from construction, drilling, and completion operations would be temporary over three years. Production emissions from Alternative A would contribute approximately 47.55 TPY NO_x, 29.57 TPY CO, 215.49 TPY VOC, 1.26 TPY SO_2, 5.88 TPY PM_{10}, and 0.09 TPY $PM_{2.5}$ to the atmosphere for the lives of the wells, approximately 40 years (See Table 4-1).

Although recent regional and large-scale air analyses (referenced above) indicate that cumulative well development and production activities in the Uinta Basin are not expected to affect attainment of the NAAQS or regional PSD increments, temporary NO_x emissions during drilling operations and long-term VOC emissions during production operations would contribute to the formation of ozone in an area where wintertime exceedances have been measured. Modeling conducted for 1,491 wells analyzed for the Gasco project determined that increases in pollutant concentrations in combination with other cumulative well operations were predicted to occur at levels below the NAAQS (BLM, 2012a). Similarly, modeling performed in support of the 2011 Air Quality Supplement to the GNB DEIS determined that, with the exception of the 1-hour standard for NO_2, the NAAQS would not be exceeded from the construction and operation of 3,675 wells and that the cumulative impacts of those wells to air quality would not exceed

the NAAQS (BLM, 2012).[1] The Proposed Action is contained within the modeled scope of projected development for all three studies.

For regional ozone issues, the emissions inventory for the production phase of Alternative A was compared to the projected regional emissions developed for the Greater Natural Buttes EIS (BLM 2012). Potential emissions from Alternative A would comprise less than one percent of the projected increase in NO_x and VOCs. Based on the magnitude of the projected increase in NO_x and VOC emissions for the Uinta Basin, and the small contribution of Alternative A an accurate analysis of incremental impacts to ozone concentrations from Alternative A is not feasible. Impacts to ozone levels from Alternative A would be indistinguishable from, and dwarfed by, the margin of uncertainty associated with the regional projected cumulative VOC and NO_x emission inventory. When compared to regional emissions inventories, the amounts of ozone precursors emitted from Alternative A are not expected to have a measurable contribution or effect on regional ozone formation. Thus, the effects of the release of ozone precursors from Alternative A to regional air quality cannot be modeled with any accuracy due to the relatively small amount of emissions from the Proposed Action, the size of the project, and the lack of model sensitivity.

Due to the high concentrations of ozone that have been detected at monitored stations located within the Uinta Basin, the BLM will establish an ozone action plan and conduct an updated ozone model effort as part of an adaptive management strategy/air resource management strategy. Based on the data review and criteria set forth in the ozone action plan, the BLM, in consultation with the appropriate federal, tribal and state stakeholder, will determine when to trigger implementation of the ozone action plan.

Alternative B. No direct or indirect impacts would occur under this alternative so an accumulation of impacts would not occur. Air quality in the Uinta Basin would remain under existing influences and other future proposals.

4.3.4.2 BLM Sensitive Plant Species

Alternative A. Approximately 1,593.1 acres, or 6.4 percent of the total 24,800 acres in the CIAA, would be disturbed in the CIAA by past, current, and future oil and gas exploration and development activities. Some portions of the CIAA are suitable habitat for Graham's catseye, Barneby's catseye, Spanish bayonet, and *Strigose townsendia*. Habitat for BLM sensitive plant species may be localized or specific to certain environments within the CIAA. Any long-term surface disturbance incrementally diminishes availability of the surface to BLM sensitive plants, reducing opportunities for growth.

Biological inventories may be required in potential or suitable habitats of BLM sensitive plant species prior to site-specific project implementation. These surveys would determine the presence of any individual plants and extent of their habitat. Impacts from past, current, and reasonably foreseeable actions would not result in a loss of species viability if avoidance measures are taken. If needed, implementation of surveys for BLM sensitive plants would facilitate avoidance of individuals.

[1] The interpretation of the modeled result for NO_2 was qualified in this document to explain the inherent limitations of the model and lack of incorporation of a drilling scenario that would likely approximate actual conditions. The exceedance for NO_2, therefore, was assessed as not likely to actually occur.

Alternative A, which would result in a long-term use of 79.4 acres, would not appreciably add to a loss of habitat viability.

Alternative B. No direct or indirect impacts to BLM sensitive plant species would occur under this alternative, so an accumulation of impacts would not occur.

4.3.4.3 Cultural Resources and Native American Religious Concerns

Alternative A. Cumulative impacts to cultural resources would result from 394.7 acres of disturbance in the NAPA, of which the Proposed Action would contribute 191.9 acres. Cumulative impacts to cultural resources would be qualitatively identical to those impacts described for the Proposed Action (See Section 4.2.1.3). Adverse effects to cultural resources would be minimized or avoided by pre-construction inventories. Identified cultural resource locations that are eligible for inclusion on the NRHP would generally be avoided. Mitigation measures would be developed by the BLM and the SHPO where necessary to minimize impacts to eligible cultural resources. The cultural resource knowledge base would be expanded as a result of the inventories.

The Proposed Action, in combination with other reasonably foreseeable activities projected for the CIAA, would contribute negligible impacts to Native American religious concerns. Objections to the use of the affected lands would have been identified during consultation with Tribes that may have interests in the CIAA.

Alternative B. Impacts to cultural resources and Native American religious concerns under Alternative B would be qualitatively and quantitatively identical to those described for Alternative A. An accumulation of impacts would not occur.

4.3.4.4 Fish and Wildlife Excluding USFWS Designated Species

Alternative A. The Proposed Action would contribute 79.4 acres to the 1,593.1 acres of surface disturbance that is estimated to comprise cumulative impacts to fish and wildlife, excluding USFWS designated species, in the 24,800-acre CIAA. Impacts to wildlife from increased human activities depend upon the sensitivity of resident and migratory species and populations to the type and timing of the activities, as well as the value of the habitat and adjacent habitats, condition of the populations or individuals being affected, and competition for resources. Physical parameters, such as topography, forage, and cover, may offset adverse impacts to some species. Because of these factors, cumulative impacts to wildlife cannot be quantified beyond the reduction of available habitat.

For both white-tailed prairie dogs and pronghorn antelope, cumulative impacts from oil and gas development would include displacement of individuals and possibility for collisions between wildlife and vehicles. Habitat fragmentation can be exacerbated by vehicle traffic, noise, weed invasion, and, human presence. Although habitat fragmentation is often used as part of a general description of landscape condition, habitat fragmentation corresponds to several factors, including: habitat for a particular species; the level of habitat description being considered (e.g., stands of vegetation versus structure of vegetation within stands), or suitable habitat; extent and pattern of the fragmentation; and how rapidly changes to habitat occur over time (Franklin et al, 2002). The responses mammals and birds species to habitat fragmentation are dependent on the proportion of suitable habitat within an area. If more than 30 percent of the available habitat is suitable for a species, habitat loss and reduced presence of

a species was the primary effect (Andren, 1994), which would be the anticipated effect to pronghorn antelope and white-tailed prairie dogs. Approximately 6.4 per cent of the CIAA is estimated to be disturbed as a result of past, current, and reasonably foreseeable oil and gas operations. Since the crucial year-long habitat for pronghorn comprises over 30 per cent in the CIAA, habitat loss would result in a reduction in the numbers of individuals able to utilize a particular habitat but would not result in a highly fragmented landscape where the losses would be accelerated. If neighboring habitat is available for use, habitat generalists, such as pronghorn and prairie dogs, may be able to survive in small patches because they can also utilize resources in the surroundings (Andren, 1994). In the CIAA, however, small isolated patches would not result from a disturbance level of 6.4 percent, and movement is not restricted.

Water depletion associated with Alternative A would incrementally affect the physical habitat of the Conservation Agreement fish during the three years of drilling by cumulative habitat reduction for the species. Implementation of Alternative A would contribute to a decrease in flow and/or withdrawal of 320 acre-feet of water over three years, which would be obtained from permitted sources. Measures that would be taken to conserve the endangered Colorado River fish would also provide habitat protection for the Conservation Agreement fish such that the need for listing because of cumulative depletions would be precluded. Alternative A is unlikely to contribute to sedimentation and degradation of habitat for the Conservation Agreement fish

Alternative B. An accumulation of impacts to fish and wildlife, excluding USFWS designated species, would not occur.

4.3.4.5 Greenhouse Gas Emissions

Alternative A. Production activities from the 124 wells comprising Alternative A would add GHGs into the local airshed: 38,519 TPY CO_2; 72.96 TPY CH_4; and 0.63 TPY N_2O. The balance between long-range transport and transformation of pollutants and their relationship to climate change is still under investigation. Procedures for projecting how a climate system would respond within a narrow range of input parameters confined to a specific regional locale, such as the Uinta Basin, are undetermined. While climate models are currently being assessed for fine resolution results in local, regional, and global applications, models and other tools for predicting climate change based on emissions of GHGs have not yet demonstrated accurate projections on those scales. Confidence in predictions and projections of climate change for different regions of the United States remains in evaluation (NOAA, 2011). Efforts are being made nationally and globally to make available improved scientific information to develop options for climate change mitigation and adaptation.

Alternative B. GHGs would not be emitted by the proposed 124 wells and would not add to existing GHG concentrations in the atmosphere.

4.3.4.6 Invasive Plants/Noxious Weeds, Soils, and Vegetation

Alternative A. The Proposed Action would contribute 794 acres to the 1,593.1 acres of surface disturbance that is estimated to comprise cumulative impacts to soils and vegetation in the CIAA. Approximately 6.4 percent of the soils and vegetation in the watershed would be affected by cumulative oil and gas development. Disturbance to soils and/or vegetation may result in the introduction or expanded presence of invasive plants and/or noxious weeds.

Disturbance of natural vegetation could facilitate invasion or spread of noxious or invasive weeds into the CIAA if measures are not taken for prevention. Most of the CIAA supports dry vegetation types and could be rapidly colonized with unwanted species without effective herbicide treatment. The requirement of oil and gas operators to follow the Vernal FO Surface Disturbance Weed Policy (April 2010) and the development of site-specific reclamation plans prior to surface disturbance would help to overcome the inherent limitations of the soils to support new vegetation. Oil and gas operators must submit pesticide use plans to the Vernal FO prior to treatment and are responsible for the control of weeds on their locations and access. Implementation of the Proposed Action would increase opportunities for introduction and/or spread of noxious or invasive plants; however, by following the procedures in the Green River District and the Operator's reclamation plans, the opportunities for their establishment in the project area and their spread beyond the NAPA would be small. Monitoring and treatment would render incremental adverse cumulative impacts from weed establishment small.

The dominant soils within the CIAA consist of the same soils that comprise the NAPA: the Motto-Casmos Complex, the Cadrina Extremely Stony Loam-Rock Outcrop Complex, and the Walknolls-Rock Outcrop Complex (NRCS, 2011). Their presence in the CIAA reflects the same relative abundance as in the NAPA. More productive loamy soils are present in the CIAA in a narrow border along the Green River. The productive soils are associated with riparian vegetation (See Figures 4 and 5). Cumulative effects to the more productive soils would be diminished by mandatory offsets of well development construction activities to riparian areas. Well development adjacent to the protected riparian areas has already occurred (See Figure 6). Past, current, and reasonably foreseeable actions in the CIAA would result in impacts similar to the impacts described in Section 4.3.1.5 soils, as they apply to these particular soil units. The presence of rocks and gravels in soils, as is common in upland soils in the CIAA, would diminish adverse effects to soil chemistry and texture in the CIAA. Alternative A would contribute 79.4 acres to the total estimated disturbance acreage. Alternative A would contribute 238.2 tons of soils to the estimated 4,779.3 tons of soil lost annually. Leaks or spills of fuels, condensate, and/or produced water could occur from equipment and machinery use, adversely affecting soil productivity where such releases occur. Impacts to soils from accidental releases would be minimized by following procedures specified in SPCCPs.

The dominant vegetation communities within the CIAA consist of the same vegetation communities that comprise the NAPA: sagebrush shrublands and mixed desert shrub communities. Together, these two communities represent over 80 percent of the vegetation in the CIAA. However, in contrast to the NAPA, mixed desert shrubs are more abundant in the CIAA than the sagebrush-dominated community. Past, current, and reasonably foreseeable actions in the CIAA would result in impacts similar to the impacts described in Section 4.3.1.6, as they apply to these particular vegetation communities. Disturbed areas originally populated by shrubs would likely be re-populated with grasses in the short-term after initial reclamation is performed. Recovery of the shrub component of the vegetation communities would occur more slowly than grasses.

Alternative B. The presence of noxious and invasive species present in the CIAA would remain under existing influences and other future proposals. No direct or indirect impacts to soils would occur under this alternative, so an accumulation of impacts to soils would not occur. No direct or indirect impacts to

vegetation would occur under this alternative, so an accumulation of impacts to vegetation would not occur.

4.3.4.7 Livestock Grazing and Rangeland Health Standards

Alternative A. An estimated 2,793.3 acres would be unavailable for forage as a result of cumulative disturbance within the Wild Horse Bench Allotment, affecting approximately 296 AUMs, or 6.4 percent of the permitted amount. The Proposed Action would prevent the use of 79.4 acres for the lives of the well pads and result in a lack for forage for 8.4 permitted AUMs. The effective use of the Wild Horse Bench Allotment has been much less because of poor range conditions. While successful future reclamation efforts would partially compensate for the removal of forage, the rangeland health condition of the Wild Horse Bench Allotment would likely remain "improve."

Alternative B. An accumulation of impacts to livestock grazing and rangeland health would not occur. Rangeland health in the Wild Horse Bench Allotment would remain under existing influences and other future proposals.

4.3.4.8 Migratory Birds, including Raptors

Alternative A. Approximately 1,593.1 acres of potential habitat for migratory birds, including raptors, or 6.4 percent of the total 24,800 acres in the CIAA, would be disturbed in the CIAA by past, current, and future oil and gas exploration and development activities. Alternative A would contribute up to 79.4 acres of disturbance to bird nesting and foraging habitat.

Migratory birds appear to have acreage thresholds for habitat necessary to support healthy populations. Below this species-specific threshold, a species may still occur, but not as a healthy population, or the species may disappear altogether although habitat requirements, other than size, are being met. Disturbance to 6.4 percent of the CIAA would be unlikely to reduce the remaining suitable habitat below critical thresholds for migratory birds since oil and gas development would likely be constructed on well pads with a surface density of 40 acres, and diverse suitable habitats would be affected as topography, soils, and vegetation varies across the CIAA. On federal lands, COAs would be applied to oil and gas development activities that would mandate surveys for raptors if those activities were planned to occur during raptor nesting season. Species-specific offsets and timing restrictions would be applied to minimize impacts to active raptor nests (See Appendix C).

Alternative B. No direct or indirect impacts to migratory birds or raptors would occur under this alternative, resulting in no accumulation of impacts.

4.3.4.9 Paleontology

Alternative A. Cumulative impacts to paleontological resources would result from 394.7 acres of disturbance in the NAPA, of which the Proposed Action would contribute 191.9 acres. Cumulative impacts to paleontological resources would be qualitatively identical to those impacts described for the Proposed Action (See Section 4.2.1.9). Adverse effects to fossils would be minimized or avoided by pre-construction inventories, which would be conducted where appropriate. Identified paleontological resource locations that are determined to be important would generally be avoided. Mitigation measures would be developed by the BLM where necessary. The existing knowledge base would be supplemented by information gained from the inventories.

Alternative B. Impacts to paleontological resources under Alternative B would be qualitatively and quantitatively identical to those described for Alternative A. An accumulation of impacts would not occur.

4.3.4.10 Threatened, Endangered, or Candidate Animal Species

Alternative A. Cumulative impacts to the endangered Colorado pikeminnow, razorback sucker, humpback chub, and bonytail include erosion and sedimentation associated with nearby surface disturbance, potential for spills or release of contaminants, entrainment in pumping devices, and consumptive water use.

Water depletion associated with Alternative A would incrementally reduce flow volumes of the Colorado River system, decreasing the physical habitat of the T&E Colorado River fish during the three years of drilling. Implementation of Alternative A would contribute to a decrease in flow and/or withdrawal of 320 acre-feet of water from permitted sources. Reduced flow from consumptive water use may result in decreased habitat availability for special status aquatic species. New depletions would be subject to the payments of the RIPRAP. This payment would mitigate the effects of water depletion impacts that result from Alternative A to federally endangered fish and would not further contribute to their endangerment.

Construction operations in proximity to the Green River within the CIAA require the use of BMPs to minimize sedimentation that would possibly degrade habitat and spill prevention measures to minimize opportunities for contamination. Following conservation measures for endangered Colorado River fish would mitigate impacts from the use of intake screens where withdrawing water from the Green River. Alternative A is unlikely to contribute to sedimentation and degradation of habitat for the T&E fish.

Alternative B. A decrease in flow and/or withdrawal of 320 acre-feet of water would not incrementally add to other depletions of the Colorado River system that may affect the habitat of the four endangered Colorado River fish.

4.3.4.11 Threatened, Endangered, Proposed, or Candidate Plant Species

Alternative A. Approximately 1,593.1 acres, or 6.4 percent of the total 24, 800 acres in the CIAA, would be disturbed in the CIAA by past, current, and future oil and gas exploration and development activities. Some portions of the CIAA are suitable habitat for threatened Uinta Basin hookless cactus, threatened clay red-mustard, and candidate species Graham's beardtongue. Alternative A would contribute up to 79.4 acres of disturbance to potential habitat. As with vegetation generally, any long-term surface disturbance incrementally diminishes availability of the surface to special status plants, reducing opportunities for growth.

Habitat for special status plant species may be localized or specific to certain environments within the CIAA. Areas in the CIA A near the Green River to the north of the NAPA have been mapped by the USFWS as core conservation areas for the Uinta Basin hookless cactus. Management guidelines have been developed to guide the extent of energy development in the core conservation areas. Monitoring provisions for the Uinta Basin hookless cactus included in the current USFWS guidelines (USFWS, 2010) would enable a continuing assessment of impacts. Biological inventories would be required in potential or known habitats of T&E or candidate plant species prior to site-specific project implementation. These surveys determine the presence of any individual plants and extent of their habitat. Avoidance of T&E or

candidate plant species and performance of surface disturbing operations in accordance with conservation measures co ntained in Appendix C would prom ote the vi ability of species individuals and the conservation of habitat. Im pacts from past, current, and reasonably foreseeable actions would not result in a loss of s pecies viabili ty, nor cause a trend towar ds federal listing in consid eration of monitoring the success of th e conservation measures. Implementation of Alternative A would not incre mentally change this assessment.

Alternative B. No direct or indirect i mpacts to vegetati on would occur under this alternative, so an accumulation of i mpacts would not occur. The presen ce of noxious and invasive species present in the CIAA would remain under existing influences and other future proposals.

4.3.4.12 Water Resources/Quality and Waters of the U.S.

Alternative A. Cumulative impacts to surface water quality would result, in part, from sedimentation via erosion, which is exacerbated b y construction activiti es. Approximately 1,593.1 acres of soils would be disturbed in the CIAA by past, current, and future oil and gas exploration and d evelopment activities and rendered bare for the lives of the wells. This am ount is estim ated to result i n 4,779.3 tons of soil lost annually, primarily from water transport. Some soils may be transported via erosion to the Green River, affecting surface wat er quality . The Proposed Action woul d contribute 79.4 acres of long-ter m bare ground to the total estimated long-term disturbance acreage, corresponding to an estimated 238.2 to ns of soils lost.

Sedimentation ty pically results fro m s oils lost near water ways. Becaus e the only perennial water way within the Ki ngs Cany on-Green River watershed is the Green River itself, construction o perations that would take place near est t he Green Ri ver would be more likely to contribute sedi ments t o the river, potentially com promising s urface water quality. Most well loc ations neare st to the Gre en Ri ver within the CIAA have been const ructed (See Figure 6), suggesting that impacts due to sedimentation from these locations may have already the greater effects on su rface water quality . Alternative A would contribute 238.2 tons of soils to the estimated 4,779.3 to ns of soil lost annually; however, surface disturbance in proximity to the river would be more likely to impair water quality via sedimentation. At a distance of at least 1.7 miles fro m the Green River at its neare st p oint and in c onsideration of the i mplementation of BMP and SWPPP i mplementation, sedimentation from well pads in the NAPA would be unlikel y t o impair surface water quality of the ri ver. Im plementing Gol d Book cons truction and maintenance procedures w ould m inimize i mpacts to surface waters as a result of the past, current, and reasonably foreseeable oil and gas actions. An evaluation of sediment runoff from gas well sites suggests determined that sedimentation is diminished by revegetation and the implementation of BMPs (Williams et al, 2007). Construction of all-weather roads, as is typical of well pad access roads in the U inta Basin, is a BMP that would reduce sedimentation from unpaved roads.

Implementation of the Proposed Acti on would increm entally add to the possibility that an accidental release may occur and resu lt in adverse im pacts to surface waters. By performing oil and gas production operations in co mpliance with provisio ns of the Oil Pollutio n Act of 1990, oil and gas op erators must develop detailed location-specific SPCC Ps to respon d in cases of spills or releases. I mpacts to surface water would be m inimized by adhering to the provisions of these plans. Additional im pacts to surface waters from the Proposed Action would be unlikely.

The need for a possible Section 404 permit from an oil and gas action would be determined by the BLM at the onsite inspection in coordination with the COE. If a permit were to be necessary for Alternative A, permit conditions would ensure that impacts would not accrue to the waters of the U.S.

Alternative B. No direct or indirect impacts to surface water or waters of the U.S. would occur under this alternative, so an accumulation of impacts would not occur.

4.3.4.13 Wild Horses

Alternative A: Approximately 1,593.1 acres of potential habitat for wild horses, or 6.4 percent of the total 24,800 acres in the CIAA, would be disturbed in the CIAA by past, current, and future oil and gas exploration and development activities. Alternative A would result in a long-term surface disturbance affecting 79.4 acres of forage in the NAPA portion of the Hill Creek Herd Area. Cumulative impacts to wild horses are not expected to jeopardize their viability since the BLM has planned for their removal from the Hill Creek Herd Area, and their extended range is not considered by the BLM to be crucial to their long-term survival.

Alternative B. No direct or indirect impacts to wild horses would occur under this alternative, so an accumulation of impacts would not occur.

5.0 CONSULTATION AND COORDINATION

5.1 Persons, Groups, and Agencies Consulted

Table 5-1: List of Persons, Agencies, and Organizations Consulted

Agency	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
United States Fish & Wildlife Service (USFWS)	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531).	Formal consultation was conducted with respect to T&E plant and wildlife species. Payments would be made to the Recovery Implementation Program (RIP) for Endangered Fish Species in the Upper Colorado River Basin, as applicable. The USFWS concurred with the BLM's effect determinations on October 2, 2012.
Utah State Historic Preservation Office (SHPO)	Consultation for undertakings, as required by the National Historic Preservation Act (16 USC 470).	Consultations with the Utah SHPO will be conducted on a project specific basis when exact locations are proposed.
Native American consultation	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 470).	A letter was sent to interested Tribes on July 11th, 2012. Responses were received from the Hopi Tribe, the Confederated Tribes of the Goshute Reservation, and the Pueblo of Laguna. The Hopi Tribe requested to review future cultural resource inventories associated with the proposed development. No other concerns were brought forth.

Agency	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Environmental Protection Agency	Clean Air Act Compliance	During the public comment period, EPA contacted the BLM with concerns regarding Air Quality. BLM worked collaboratively with EPA and the proponent to correct minor errors and bring the document into consistency with similar projects in the Vernal Field Office (e.g. Greater Natural Buttes EIS).

5.2 Summary of Public Participation

The public notification process was initiated by posting the proposed project on the Environmental Notification Bulletin Board on February 6, 2012. A 30-day public comment period from October 12, 2012 to November 12, 2012 was held. Public comments are addressed in Appendix G of the EA.

5.3 List of Preparers

Table 5-2: List of Preparers: BLM Preparers are listed in the Interdisciplinary Checklist in Appendix A.

3rd party consultants		
Bonnie Carson	Environmental Engineer; Smiling Lake Consulting	Air quality; cultural resources; livestock grazing; rangeland health; soils; vegetation; surface water; waters of the U.S.; wildlife
Scott Carson	Geologist, Environmental Compliance Specialist; Smiling Lake Consulting	Paleontological resources; QA/QC.
Chris Gayer	Biologist; Grasslands Consulting	Wildlife; vegetation.
Marc Sydnor	Hydrologist; Sydnor & Associates	Surface water; QA/QC.
Tim Horgan-Kobelski	Biologist, GIS Specialist; Grasslands Consulting	GIS; maps.
Nick Hall	Biologist, GIS Specialist; Grasslands Consulting	GIS; maps.

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6.2 Acronyms

µg/m^3	micrograms per cubic meter
µm	micron
AO	Author ized Officer
APD	Application for Permit to Drill
AQRV	Air Quality Related Values
BCC	USFWS Birds of Conservation Concern
BLM	Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act
CFR	Code of Federal Regulations
CH_4	methane
CIAA	cumulative impacts analysis area
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COA	condition(s) of approval
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act
DOT	Department of Transportation
DR	Decision Record
EA	environmental assessment
EIS	environmental impact statement
ENBB	Environmental Notification Bulletin Board
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
IDT	Interdisciplinary Team
IM	Instruction Memorandum
FLPMA	Federal Land Policy and Management Act of 1976
FO	Field Office
FOOGLRA	Federal Onshore Oil and Gas Leasing Reform Act of 1987
GHG	greenhouse gas
GNB	Greater Natural Buttes
HAP	hazardous air pollutant
HP	horsepower

MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act of 1920
MOU	Memorandum of Understanding
MRR	Rule for Mandatory Reporting of Greenhouse Gases
N_2O nitrous	oxide
NAAQS	National Ambient Air Quality Standards
NAPA	North Alger Project Area
NEPA	National Environmental Policy Act
NO_2 nitrogen	dioxide
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
NSO	no surface occupancy
O_3	ozone
PIF	Partners in Flight
PFYC	Potential Fossil Yield Classification
PM particulate	matter
$PM_{2.5}$	particulate matter, 2.5 microns in diameter, or less
PM_{10}	particulate matter, 10 microns in diameter, or less
ppb	parts per billion
PSD	Prevention of Significant Deterioration
PUP	Pesticide Use Proposal
RIP	Recovery Implementation Program
ROD	Record of Decision
ROW	right-of-way
SHPO	State Historic Preservation Office
SO_2 sulfur	dioxide
SPCCP Spill	Prevention Control and Countermeasure Plan
SWPPP	Stormwater Pollution Prevention Plan
T&E	threatened and endangered
TDS	total dissolved solids
TPY tons	per year
UAC	Utah Administrative Code
UDAQ	Utah Division of Air Quality
UDOGM	Utah Division of Oil, Gas, and Mining
UDWR	Utah Division of Wildlife Resources
US or U.S.	United States
USC	United States Code
USFWS	US Fish and Wildlife Service
VOC	volatile organic compound
WRAP	Western Regional Air Partnership

APPENDIX A

INTERDISCIPLINARY TEAM CHECKLIST

INTERDISCIPLINARY TEAM CHECKLIST

Project Title: Koch North Alger Project

NEPA Log Number: DOI-BLM-UT-G010-2012-0112

Project Leader: Mark Wimmer

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.

Determi-nation	Resource	Rationale for Determination*	Signature	Date
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)				
PI	Air Quality	Impacts to air quality would be expected from drilling activities, truck traffic, and from production.	Mark Wimmer	02/21/12
NP	Areas of Critical Environmental Concern	The project area does not lie in any designated Area of Critical Environmental Concern following GIS review.	Mark Wimmer	02/21/12
NP	BLM Natural Areas	The project area does not lie in any designated BLM Natural Area following GIS review.	Mark Wimmer	02/21/12
PI	BLM Sensitive Plant Species	The proposed project is located within potential habitat for UT BLM sensitive plant species.	Aaron Roe	6/28/2012
PI	Cultural Resources	Cultural resources are identified within the proposed project area. The entire project area has not been covered by cultural resource inventories. Class III cultural resource inventories as well as consultation and coordination with the Utah SHPO will be conducted prior to any surface disturbing activities.	Cameron Cox	8/17/2012
NI	Environmental Justice	The proposed alternatives would not likely create disproportionately high and adverse human health impacts or environmental effects on minority or low-income populations since there are none in the project area.	Mark Wimmer	02/21/12
NI	Farmlands (Prime or Unique)	All prime or unique farm lands in the Uintah Basin must be irrigated to be considered under this designation, among other factors. No irrigated lands are located in the proposed action area; therefore this resource will not be carried forward for analysis.	Mark Wimmer	02/21/12
PI	Fish and Wildlife Excluding USFWS Designated Species	Year-long crucial pronghorn habitat is designated by UDWR. The project area provides habitat for white-tailed prairie dogs. Conservation Agreement fish including bluehead sucker (*Catostomus discobolus)*, flannelmouth sucker (*Catostomus latipinnis)*, and roundtail chub (*Gila robusta*) will be affected by water depletions, Raptors are addressed under the Migratory Bird Section.	Suzanne Grayson	3/16/2012
NI	Floodplains	The only HUD inventoried flood plain is located within the west edge of Section 28 of the project area. However all ephemeral drainages have some degree of non-HUD inventoried flood plains. The proponent should identify	Stan Olmstead	2/22/12

Determi-nation	Resource	Rationale for Determination*	Signature	Date
		how well pads, roads and pipeline would impact flood plains and how the proposed project relates to Executive Order # 11988 for Floodplain Management. Simple analysis of the issue.		
NI	Fuels/Fire Management	There are no past or planned Fuels projects in the immediate area. The proposed reclamation activities should prevent additional hazardous fuels.	Blaine Tarbell	2/22/12
NI	Geology / Mineral Resources/Energy Production	Gilsonite veins are present in Sec 33 and 34. Encounters with gilsonite during any surface or drilling operation must be reported to the BLM Vernal Field Office. Please provide location and depth encountered. 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 with "Onshore Oil and Gas Order No. 2, Drilling Operations" will assure that the project will not adversely affect gilsonite, oil shale, or tar sand deposits. Due to the state-of-the-art drilling and well completion techniques, the possibility of adverse degradation of tar sand or oil shale deposits by the proposed action will be negligible. Well completion must be accomplished in compliance with "Onshore Oil and Gas Order No. 2, Drilling Operations". These guidelines specify the following: … *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.*[3]	Betty Gamber	2/6/12
PI	Greenhouse Gas Emissions	Should the project be approved as proposed, greenhouse gases would be emitted in the project area	Mark Wimmer	02/21/12
NI	Hydrologic Conditions (stormwater)	The proposed project will alter surface water flow patterns with the development of the infrastructure of the project. Potential stormwater may be an issue due to the development however the 2005 Energy Policy Act exempts energy development from Section 402 of the Clean Water Act. Analysis should be detailed enough to explain surface water flow changes and storm water requirements.	Stan Olmstead	2/22/12
PI	Invasive Plants/Noxious Weeds, Soils, and Vegetation	Disturbance to the soil and vegetation. Creation of suitable habitat for invasive plants	Steve Strong Aaron Roe	2/6/12 2/22/12
NI	Lands/Access	The proposed area is located within the Vernal Resource Management Plan (RMP). The RMP/ROD decision allows for processing applications, permits, operating plans, mineral exchanges, leases on public lands in accordance with policy and guidance and allows for management of public lands to support goals and	Cindy McKee	2-22-12

Determi-nation	Resource	Rationale for Determination*	Signature	Date
		objectives of other resources programs, respond to public requests for land use authorizations, and acquire administrative and public access where necessary (RMP/ROD p. 86). Rights-of-way would be required for power lines, pipelines and roads located off of the unit/lease in the project area. Rights-of-way would be required for power lines and pipelines that are operated by 3rd party holders in the project area. Main transportation pipelines would require a right-of-way over and within any unit/lease regardless of who owns/operates the unit/lease. Any commercial facilities located within the unit/lease would require a right-of-way within the project areas. Site-specific plans for road construction and upgrades would be included as part of individual APDs and/or ROW applications, including pipelines, and would be subject to approval from the appropriate SMA. Right-of-way holders are present in the project area per the VFO GIS database and Master Title Plats and shall be notified by BLM as site specific proposals are submitted. County claimed roads would need to be identified in the project area, any upgrades to these roads would require the county to obtain the row.		
NP	Lands with Wilderness Characteristics (LWC)	The project falls within previously inventoried units (Desolation Canyon and Wild Horse Bench) which were found to have no wilderness character during the ID Team Review process.	Jason R. West	2/29/2012
PI	Livestock Grazing	In Wildhorse Bench Allotment	Dusty Carpenter	2/6/12
PI Migrator	y Birds	Migratory bird foraging and nesting habitat would be degraded by the proposed action. If construction occurs during the spring and early summer months, nests/eggs and/or young could be destroyed.	Suzanne Grayson	3/16/2012
NP	Native American Religious Concerns	Consultations with Native American Tribes were initiated on July 11th, 2012. Responses were received from the Hopi Tribe, the Confederated Tribes of the Goshute Reservation, and the Pueblo of Laguna. The Hopi Tribe requested to review future cultural resource inventories associated with the proposed development. No other concerns were brought forth.	Cameron Cox	8/17/2012
PI Paleontolog	y	A paleo survey should be completed for any proposed new construction or surface disturbance (for the well pad, pipeline, or access road.) before any construction takes place.	Betty Gamber	2/6/12
PI	Rangeland Health Standards	Standards assessed in 2004-05. Rangeland Health Standards will be discussed in the EA under the Livestock Grazing Section.	Dusty Carpenter	2/6/12
NI Recre	ation	The proposed project falls within the Vernal Extensive Recreation Management Area (ERMA) Typically recreation may occur with little to no recreation infrastructure development. Though the VFO has Field Office wide Special Recreation Permits for Big Game	Jason West	2/29/2011

Determi-nation	Resource	Rationale for Determination*	Signature	Date
		Hunting, and Other types of Special Recreation Permits, it is not anticipated that the proposed project boundaries would conflict with anticipated permit and their associated uses.		
NI Socio-Economics		Effects on social and economic values would be minimal and would not require further analysis due to the small-scale nature of the action when compared to the larger economy in the area.	Mark Wimmer	02/21/12
PI	Threatened, Endangered or Candidate Animal Species	There are no known TEC species present. Water depletions would affect Endangered Colorado River Fish: G*ila elegans*, *Ptychocheilus lucius*, *Gila cypha*, and *Xyrauchen texanus*. .	Suzanne Grayson	3/16/2012
PI	Threatened, Endangered, Proposed, or Candidate Plant Species	The proposed project is located within potential habitat for *Sclerocactus wetlandicus* and within 300 feet of potential habitat for *Schoenocrambe argillacea*.	Aaron Roe	2/22/12
NI Visual	Resources	The proposed project area falls within VRM class IV. Class IV objectives state, "The objective of this class 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. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements." Class IV is the least restrictive VRM class and Allows for heavy development with dominant change in the landscape.	Jason R. West	2/29/2012
NI	Wastes (hazardous or solid)	Hazardous Waste: No chemicals subject to reporting under SARA Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the project. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, will be used, produced, stored, transported, or disposed of in association with the project. Solid Wastes: Trash would be confined in a covered container and hauled to an approved landfill. Burning of waste or oil would not be done. Human waste would be contained and be disposed of at an approved sewage treatment facility.	Mark Wimmer	02/21/12
PI	Waters of the U.S.	Although there are no perennial waters within the project area some steep drainages, most specifically Kings Canyon, can be considered by the U.S. Corp of Engineers as U.S. waters. These drainages should be quantified for potential impacts by the project. Direct disturbance acres and possible soil erosion that would enter the drainages. Waters of the U.S. are addressed with surface water quality.	Stan Olmstead	2/22/12
S:PI	Water Resources/Quality (surface/ground)	Surface: Analysis to quantify soil erosion and potential chemical spill issues due vehicle lubricants and fuels as well as industrial chemicals for the natural gas development should be described. Acreage of disturbance and analysis of erosion from pads, roads and pipeline	Stan Olmstead	S: 2/22/12

Determi-nation	Resource	Rationale for Determination*	Signature	Date
Gr: NI		development would be different. Groundwater: Compliance with "Onshore Oil and Gas Order No. 1, will assure that the project will not adversely affect groundwater quality. Due to the state-of-the-art drilling and wells completion techniques, the possibility of adverse degradation of groundwater quality or prospectively valuable mineral deposits by the proposed action will be negligible	Gr: Betty Gamber	Gr: 2/6/12
NP	Wetlands/Riparian Zones	Riparian habitat is not inventoried or known within the project area and the development would not be expected to negatively impact riparian of the Green River indirectly.	Stan Olmstead	2/22/12
NP	Wild and Scenic Rivers	None present as per Vernal RMP/ROD and GIS layer review	Jason West	2/29/2012
PI	Wild Horses	Within Hill Creek HA	Dusty Carpenter	2/6/12
NP	Wilderness/WSA	No wilderness areas have been designated by the U.S. Congress on BLM lands in the Vernal Field Office. The project area does not lie in a Wilderness Study Area as per GIS review.	Mark Wimmer	02/21/12
NP	Woodland / Forestry	Not present in project area as per GIS review	David Palmer	2/6/12

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator	Mark Wimmer	1/9/13	
Authorized Officer		1/7/2013	

APPENDIX B

FIGURES AND MAPS

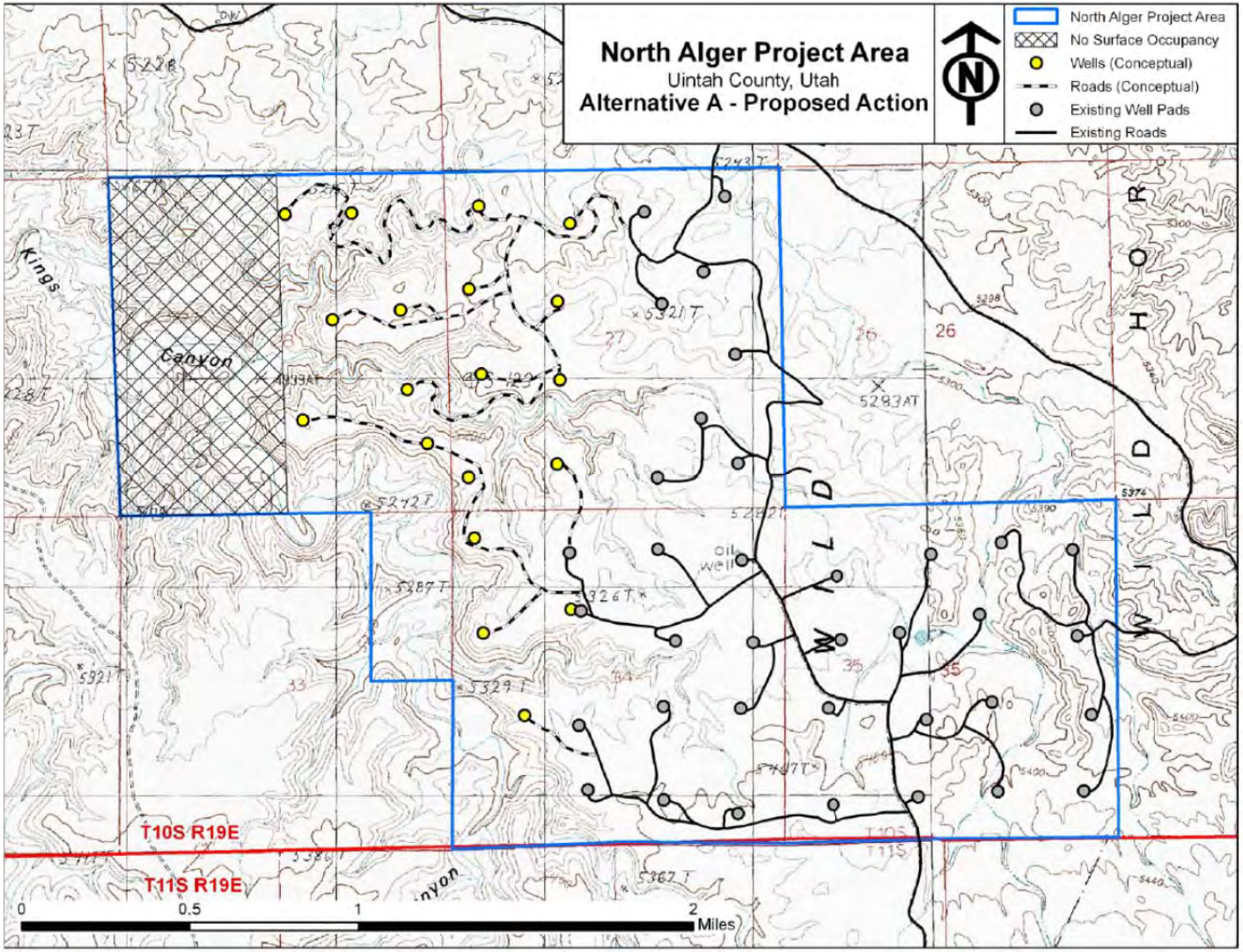

Figure 1: North Alger Project Area

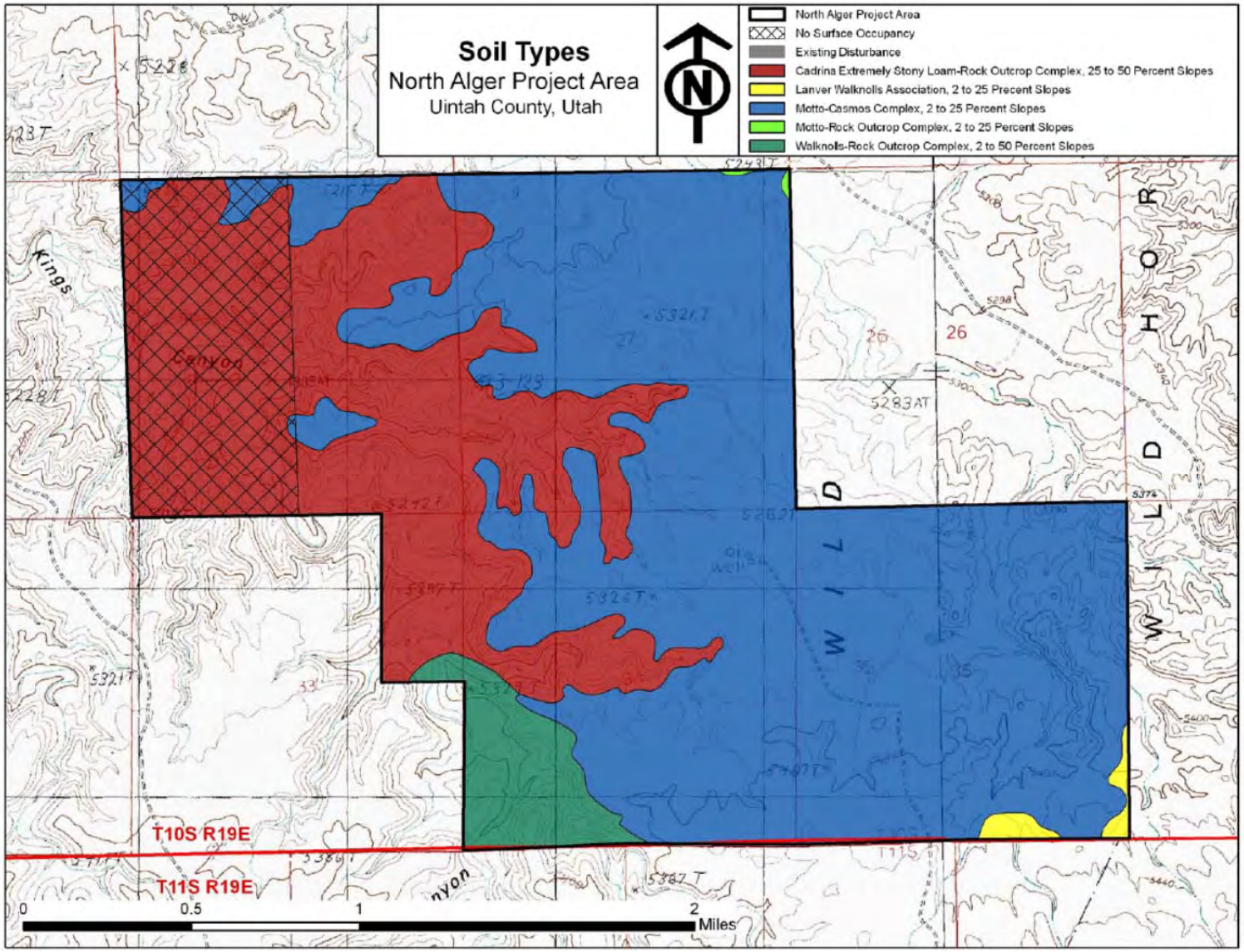

Figure 2: Project Area Soil Types

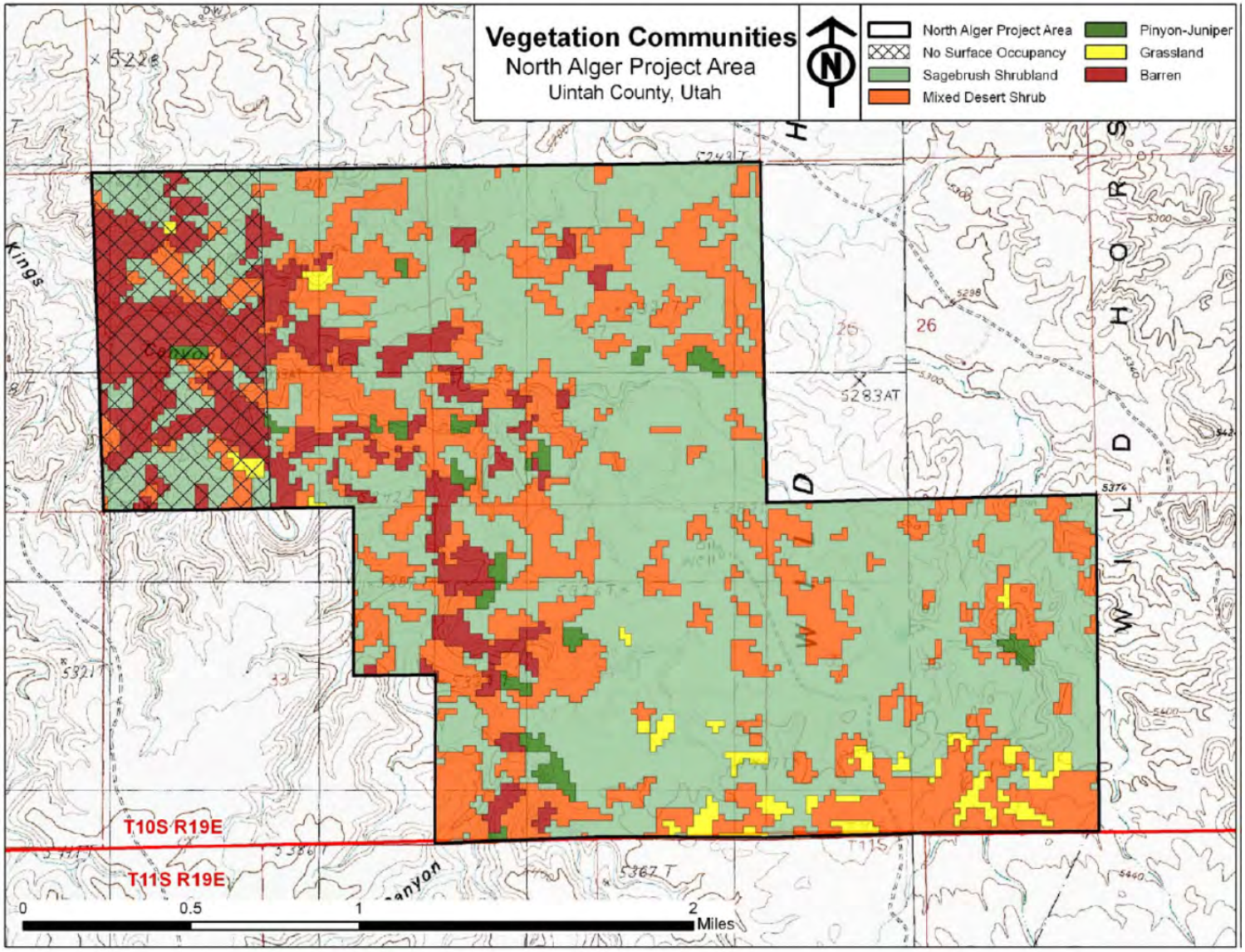

Figure 3: Project Area Vegetation Communities

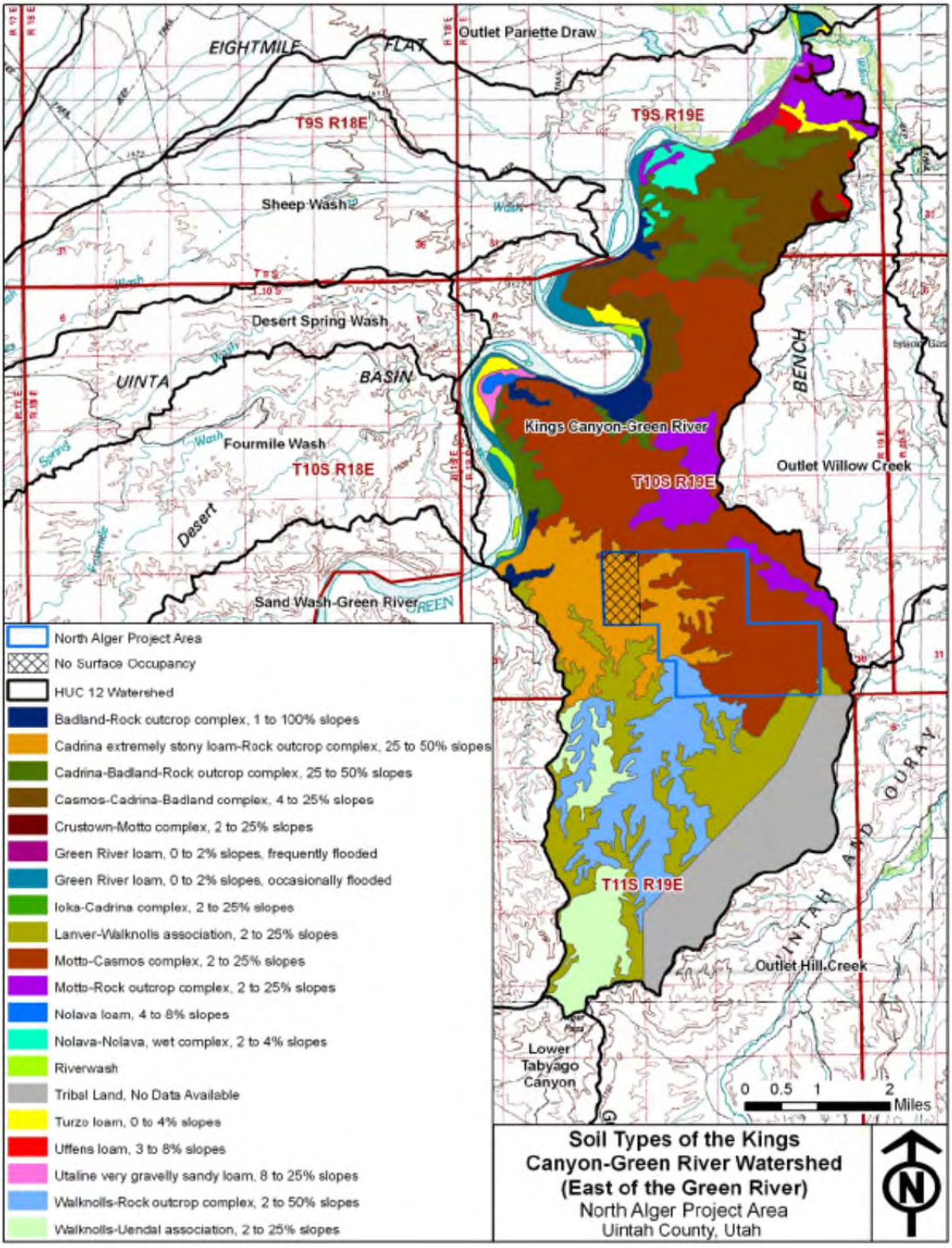

Figure 4: CIAA for Soil Types

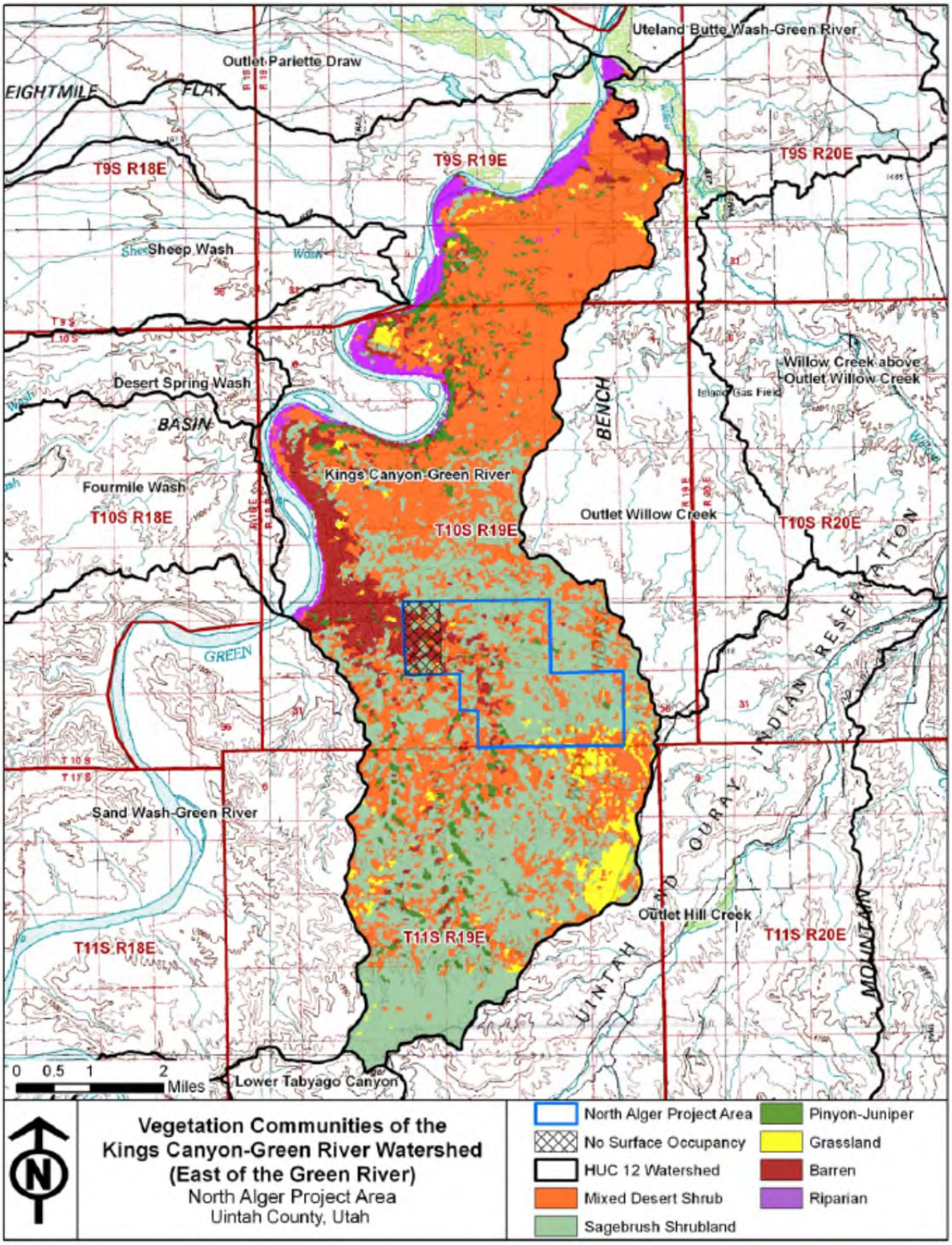

Figure 5: CIAA for Vegetation Communities

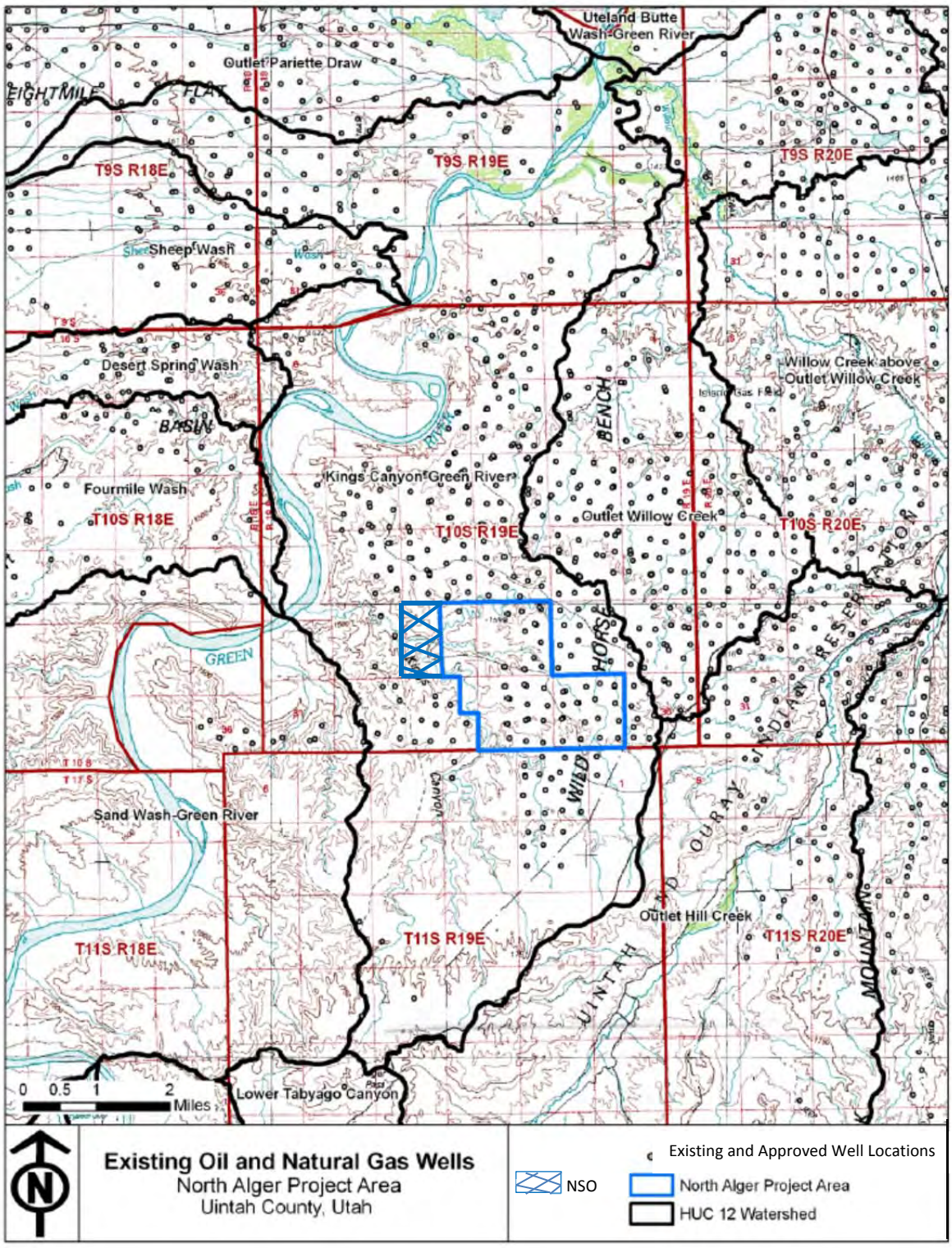

Figure 6: Well Locations in CIAA for Physical Resources

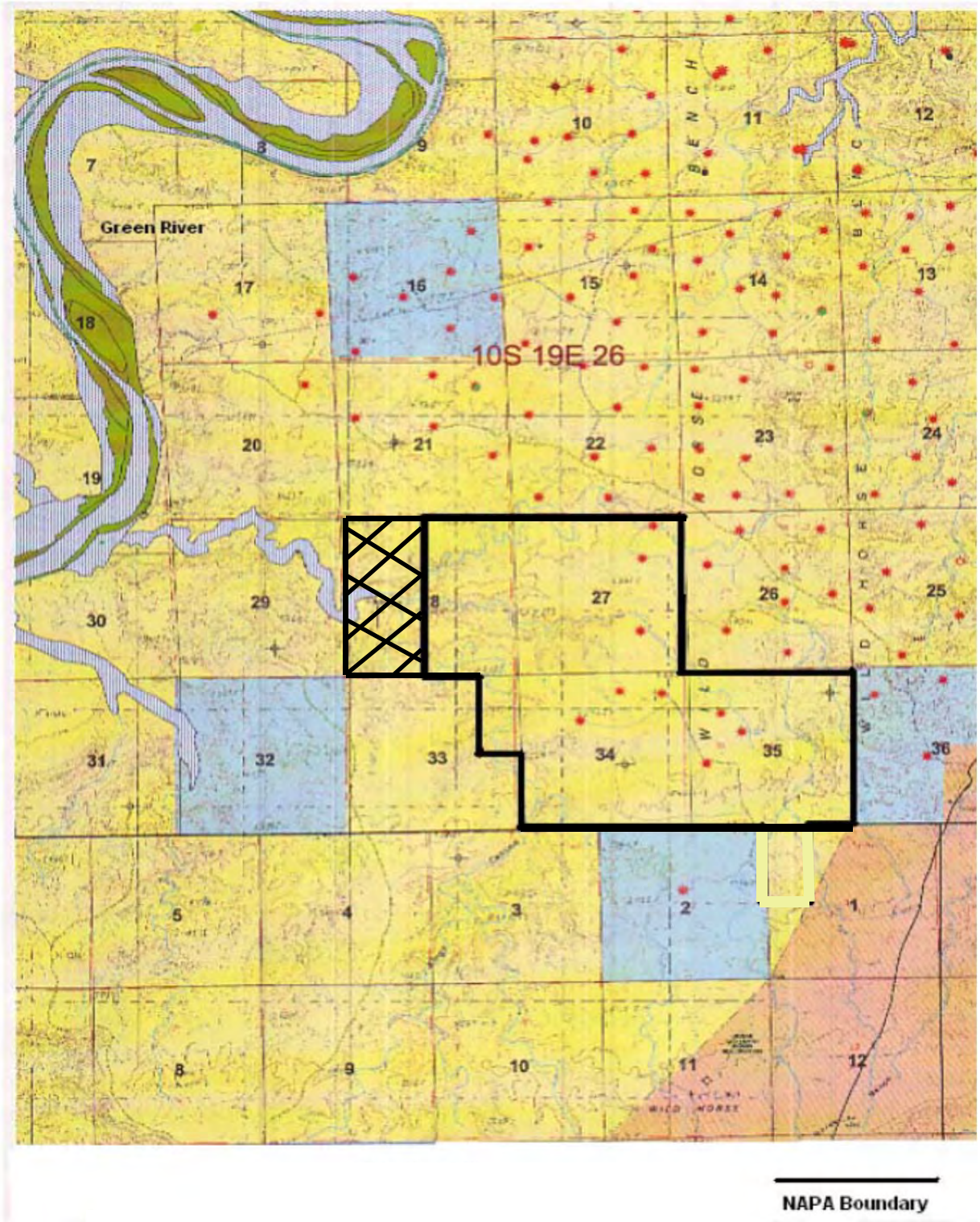

FIGURE 7: 100-Year Floodplain of the Green River

Figure 8: North Alger Vegetation at Rim of Kings Canyon

APPENDIX C

BIOLOGICAL DOCUMENTATION

TABLE C-1: THREATENED, ENDANGERED, PROPOSED, AND CANDIDATE SPECIES AND BLM UTAH SENSITIVE SPECIES THAT POTENTIALLY OCCUR IN UINTAH COUNTY

TABLE C-2: MIGRATORY BIRDS IDENTIFIED AS CONSERVATION PRIORITIES THAT MAY OCCUR IN THE PROJECT REGION

NESTING PERIODS AND RECOMMENDED BUFFERS FOR RAPTORS IN UTAH

CONSERVATION MEASURES FOR CLAY REED-MUSTARD (*SCHOENOCRAMBE ARGILLACEA*), GRAHAM'S BEARDTONGUE (*PENSTEMON GRAHAMII*), AND UINTA BASIN HOOKLESS CACTUS (*SCLEROCACTUS WETLANDICUS*)

TABLE C-1
THREATENED, ENDANGERED, PROPOSED, AND CANDIDATE SPECIES AND BLM UTAH SENSITIVE SPECIES THAT POTENTIALLY OCCUR IN UINTAH COUNTY

Status:

FE = Federally Listed as Endangered.
FT = Federally Listed as Threatened.
FC = Federal Candidate.
CS = Species receiving special management under a Conservation Agreement in order to preclude the need for a federal listing.
BLM = BLM Sensitive Species
SPC = Wildlife Species of Concern (Utah).

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
MAMMALS					
Big free-tailed bat *Nyctinomops macrotis*	SPC BLM	Rocky areas in rugged country. The species has been observed in lowlands of river floodplain-arroyo association; also in shrub desert and woodland habitats. Roosts in rock crevices (vertical or horizontal) in cliffs; also in buildings caves, and occasionally tree holes. Winter habits unknown.	The species has been documented in northeastern part of the state from Daggett County into Wyoming. Foraging habitat for this species may be present within the proposed project area.	yes	Fitzgerald et al. 1994; Oliver, 2000; UDWR, 2005.
Black-footed ferret *Mustela nigripes*	FE	Semi-arid grasslands and mountain basins. It is found primarily in association with active prairie dog colonies that contain suitable burrow densities and colonies that are of sufficient size.	The distribution of this species is limited to a nonessential experimental population reintroduced into Coyote Basin, Uintah County starting in 1999. Habitat is not present within the proposed project area.	yes	USFWS, 2010; UDWR, 2005.
Canada Lynx *Lynx canadensis*	FT	Primarily occurs in Douglas-fir, Spruce-fir, and subalpine forests at elevations above 7,800 feet amsl. The lynx uses large woody debris, such as downed logs and windfalls.	If extant in Utah, this species most likely occurs in montane forests in the Uinta Mountains. Habitat is not present within the proposed project area.	yes	Fitzgerald et al. 1994; Ruggiero et al., 1999; UDWR, 2005.
Fringed myotis *Myotis thysanodes*	SPC BLM	Occurs in a wide range of habitats from low desert scrub to fir pine associations. Oak and pinyon-juniper woodlands are the most used vegetative types. This species roosts in caves, mines, and buildings. Water courses and lowland riparian areas are very important. A few scattered observations of the species have been documented in Uintah County.	Potentially suitable habitats are limited, and species occurrence is likely scattered.	yes	Oliver, 2000; UDWR, 2005.
Spotted bat *Euderma maculatum*	SPC BLM	Inhabits desert shrub, sagebrush-rabbit brush, pinion-juniper woodland, and ponderosa pine and montane forest	The species potentially occurs throughout Utah; however, no occurrence records	yes	Oliver, 2000; UDWR, 2005.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
		habitats. The species also uses lowland riparian and montane grassland habitats. Suitable cliff habitat typically appears to be necessary for roosts/hibernacula. Spotted bats typically do not migrate and use hibernacula that maintain a constant temperature above freezing from September through May.	exist for the extreme northern or western parts of the state. Known occurrences have been reported in northeastern Uintah County. Habitat may be present within the proposed project area.		
Townsends big-eared bat *Corynorhinus townsendii*	SPC BLM	Inhabits a wide range of habitats from semidesert shrublands and pinion-juniper woodlands to open montane forests. Roosting occurs in mines and caves, in abandoned buildings, on rock cliffs, and occasionally in tree cavities. Foraging occurs well after dark over water, along margins of vegetation, and over sagebrush.	The species occurs throughout much of Utah including Duchesne and Uintah counties. One individual was collected at the Ouray National Wildlife Refuge in 1980. Roosting habitat for this species potentially could occur in areas where rock cliffs and caves are present. Habitat may be present within the proposed project area.	yes	Oliver, 2000; UDWR, 2005; BLM, 2008a.
White-tailed prairie dog *Cynomys leucurus*	SPC BLM	Inhabits grasslands, plateaus, plains and desert shrub habitats. White-tailed prairie dogs form colonies or "towns" and spend much of their time in underground burrows and hibernating during the winter months.	Prairie dogs are an obligate species to several other state-sensitive species, such as ferruginous hawk, mountain plover, and burrowing owl, in that these species depend on them for food, shelter, and nesting habitat or habitat manipulation. Habitat is present within the proposed project area.	no	Fitzgerald et al., 1994; UDWR, 2005.
BIRDS					
American white pelican *Pelecanus erythrorhynchos*	SPC BLM	Inhabits areas of open water including large rivers, lakes, ponds, and reservoirs with surrounding habitats ranging from barren to heavily vegetated sites. Typically nests on isolated islands in lakes or reservoirs.	Known to nest on islands associated with Great Salt and Utah Lakes. In northeastern Utah, the species occurs as a transient on larger water bodies. Habitat is not present within the proposed project area.	yes	UDWR, 2005; BLM, 2008a.
Bald eagle *Haliaeetus leucocephalus*	SPC BLM	Inhabits areas of open water including large rivers, lakes, ponds, and reservoirs with surrounding habitats ranging from barren to heavily vegetated sites. Typically nests on isolated islands in lakes or reservoirs. They are known to occur near the White and Green River corridor during the winter months.	This species is known to winter along the Green River, approximately 1.7 miles distant. They may utilize the project area for foraging.	yes	Johnsgard 1990; UDWR, 2005.
Bobolink *Dolichonyx oryzivorus*	SPC BLM	Inhabits mesic and irrigated meadows, riparian woodlands, and subalpine marshes at lower elevations (2,800 to 5,000 feet amsl). Suitable breeding habitat for this ground nester includes tall grass, flooded meadows,	The species breeds in isolated areas of Utah, primarily in the northern half of the state. Breeding and winter habitat have been documented throughout Uintah,	yes	Parrish and Norvell, 2002; UDWR, 2005; BLM, 2008a.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
		prairies, and agricultural fields; forbs and perch sites also are required.	Duchesne, and Daggett counties. Habitat is not present within the proposed project area.		
Burrowing owl *Athene cunicularia*	SPC BLM	Inhabits desert, semi-desert shrubland, grasslands, and agriculture areas. Nesting habitat primarily consists of flat, dry, and relatively open terrain; short vegetation; and abandoned mammal burrows (within northeastern Utah primarily in association with prairie dog complexes) for nesting and shelter.	Known to occur in Uintah and Duchesne counties. Nesting and foraging habitat is present within the proposed project area.	no	UDWR, 2005; BLM, 2008a.
Ferruginous hawk *Buteo regalis*	SPC BLM	Resides mainly in lowland open desert terrain characterized by barren cliffs and bluffs, pinion-juniper woodlands, sagebrush-rabbit brush, and cold desert shrub. Nesting habitat includes promontory points and rocky outcrops.	This species is known to occur in the West Desert and the Uintah Basin as a summer resident and a common migrant. Within the Uintah Basin, the species is more associated with prairie dog colonies as the main prey base. Foraging and nesting habitat is present.	no	Behle, 1981; Call, 1978; UDWR, 2005.
Greater sage-grouse *Centrocercus urophasianus*	FC SPC BLM	Inhabits upland sagebrush habitat in rolling hills and benches. Breeding occurs on open leks (or strutting grounds) and nesting and brooding occurs in upland areas and meadows in proximity to water and generally within a 2-mile radius of the lek. During winter, sagebrush habitats at submontane elevations commonly are used.	The species is widespread, but declining, with extant populations in Uintah and Duchesne counties. No leks are present.	yes	BLM, 2010; UDWR, 2005.
Lewis' woodpecker *Melanerpes lewis*	SPC BLM	Inhabits open habitats including pine forests, riparian areas, and pinion-juniper woodlands. Breeding habitat typically includes ponderosa pines and cottonwoods in stream bottoms and farm areas. The species inhabits agricultural lands and urban parks, montane and desert riparian woodlands, and submontane shrub habitats.	In Utah, the species is widespread, but is an uncommon nester along the Green River. Breeding by this species has been observed in Ouray and Uintah counties, and along Pariette Wash. Habitat is not present within the proposed project area.	yes	Parrish and Norvell, 2002; UDWR, 2005; BLM, 2008a.
Long-billed curlew *Numenius americanus*	SPC BLM	Inhabits shortgrass prairies, alpine meadows, riparian woodlands, and reservoir habitats. Breeding habitat includes upland areas of shortgrass prairie or grassy meadows with bare ground components, usually near water.	Widespread migrant in Utah. Breeding birds are fairly common but localized, primarily in central and northwestern Utah. Potential nesting has been reported in Uintah County, but has not been confirmed. Habitat is not present within the proposed project area.	yes	Parrish and Norvell, 2002; UDWR, 2005; BLM, 2008a.
Mexican spotted owl *Strix occidentalis lucida*	FT	In Utah, found primarily in rocky canyons. Nests in caves or crevices. Roosts on ledges or in trees in canyons. The species prefers mesic (moister/cooler) canyons with mixed conifer or riparian components. Breeding and nesting season: March through August.	Preferred habitat is not present.	yes	UDWR, 2005.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
Mountain plover *Charadrius montanus*	SPC BLM	In the Uintah Basin, small mountain plover populations breed in shrub-steppe habitat where vegetation is sparse and sagebrush communities are dominated by *Artemisia* spp. with components of black sage and grasses. Nest locations also vary with respect to topography (nests were located on flat, open ground; on the top or at the base of slopes; or very close to large rocky outcroppings).	The only known breeding population of mountain plover in Utah is located on Myton Bench.	yes	Parrish and Norvell, 2002; UDWR, 2005.
Northern goshawk *Accipiter gentilis*	CS	Generally found in a wide variety of forest types including deciduous, coniferous, and mixed forests. Typically mature and old growth forests and generally selects larger tracts of forest over smaller tracts. In the western U.S., characteristically nests in coniferous forests including those dominated by ponderosa pine, lodgepole, or in mixed forests dominated by various coniferous species including, Douglas-fir, cedar, hemlock, spruce, and larch. Western birds also nest in deciduous forests dominated by aspen, paper birch, or willow.	Prefers old-growth forests near or within large drainage systems. Habitat is not present within the proposed project area.	yes	Graham et al., 1999; BLM, 2008a.
Short-eared owl *Asio flammeus*	SPC BLM	Inhabits arid grasslands, agricultural areas, marshes, and occasionally open woodlands. In Utah, cold desert shrub and sagebrush-rabbit brush habitats also are utilized. Typically a ground nester.	Known to occur in Uintah County, with occurrence probable in Duchesne County. Preferred habitat is not present.	yes	Johnsgard, 2002; UDWR, 2005; BLM, 2008a.
Three-toed woodpecker *Picoides tridactylus*	SPC BLM	Prefers coniferous forest, primarily spruce and balsam fir. It inhabits areas where dead timber remains after fires or logging. It is found less frequently in mixed forest, and occasionally in Willow thickets along streams. Also found in high elevation aspen groves, bogs, and swamps.	Suitable habitat is not present within the proposed project area.	yes	Parrish and Norvell, 2002; BLM, 2008a; UDWR, 2011.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC	Riparian obligate and usually occurs in large tracts of cottonwood/willow habitats. However, this species also has been documented in lowland deciduous woodlands, alder thickets, deserted farmlands, and orchards. Breeding season: late June through July.	Species is known to occur along the Green River and the Ouray National Wildlife Refuge. Habitat is not present within the proposed project area.	yes	Parrish and Norvell, 2002; UDWR, 2005.
AMPHIBIANS AND REPTILES					
Corn snake *Elaphe guttata*	SPC BLM	Habitat includes pine woodlands, brushy fields, open hardwood forests, mangrove thickets, barnyards, and abandoned buildings, areas near springs, old trash dumps, and caves.	Occurs in Uintah County. The species have been identified at Ouray National Wildlife Refuge. Habitat is not present within the proposed project area.	yes UDWR,	2005.
Smooth greensnake *Opheodrys vernalis*	SPC BLM	Habitat includes meadows, grassy marshes, and moist grassy fields at forest edges, mountain shrublands, stream borders, bogs, open moist woodland, abandoned farmland, and vacant lots.	Although not commonly seen throughout Utah the species has been documented in the northern section of Uintah County in lower elevations. Habitat is not present	yes	BLM, 2008a; UDWR, 2005.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
			within the proposed project area.		
FISH					
Bluehead sucker *Catostomus discobolus*	CS	Occupies a wide range of aquatic habitats ranging from cold, clear mountain streams to warm, turbid rivers.	The bluehead sucker is native in parts of Utah. The species occurs in the upper Colorado River system. Habitat is not present within the project area but water depletion would occur.	no	BLM, 2008a; UDWR, 2005.
Bonytail *Gila elegans*	FE	Is endemic to the Colorado River system within main channels of large rivers, and favor swift currents.	This species occurs in the Green River. Habitat is not present within the project area; however, water depletion would occur.	no	UDWR, 2005; USFWS, 2002.
Colorado pikeminnow *Ptychocheilus lucius*	FE	This species is endemic to the Colorado River system. It is a long distance migratory fish that requires pools, deep runs, and eddy habitats maintained by high spring flows.	Suitable habitat does not exist within the project area; however, water depletion would occur with project implementation.	no	UDWR, 2005; USFWS, 2002a.
Colorado River cutthroat trout *Oncorhynchus clarkii pleuriticus*	CS	Requires cool, clear water and well-vegetated stream banks for cover and bank stability; in stream cover in the form of deep pools and boulders and logs also is important; adapted to relatively cold water, thrives at high elevations. Most remaining populations are fluvial or resident. Occurs also in lakes.	Habitat is not present within the proposed project area.	yes	UDWR, 2005; Lentsch et al., 2000.
Flannelmouth sucker *Catostomus latipinnis*	CS	Adults occur in riffles, runs, and pools in streams and large rivers, with the highest densities usually in pool habitat. Young live in slow to moderately swift waters near the shoreline areas.	The flannemouth sucker is native in Utah. The species occurs in the Colorado River system. Habitat is not present within the project area; but water depletion would occur.	no	BLM, 2008a; UDWR, 2005.
Humpback chub *Gila cypha*	FE	Endemic to the Colorado River System within deep, swift-running rivers, with canyon shaded environments.	This species occurs in the Green River. Habitat is not present within the project area but water depletion would occur.	no	USFWS, 2002b; UDWR, 2005.
Razorback sucker *Xyrauchen texanus*	FE	Endemic to large rivers of the Colorado River system.	This species occurs in the Green and White Rivers. Habitat is not present within the project area but water depletion would occur.	no	USFWS, 2002c; UDWR, 2005.
Roundtail chub *Gila robusta*	CS	Adults inhabit low to high flow areas in the Green River; young occur in shallow areas with minimal flow.	The roundtail chub is native in Utah. The species occurs in the Colorado River system. Habitat is not present within the project area but water depletion would occur.	no	BLM, 2008a; UDWR, 2005.
PLANTS					
Alcove bog orchid	BLM	This species occurs on moist stream banks, seeps, and	Suitable habitat for this species is not	yes	UNPS, 2011.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
Platanthera zothecina		hanging gardens of the Weber Sandstone Formation in mixed desert shrub, pinyon-juniper, and oakbrush communities from 4,000 to 8,690 feet.	present within the NAPA, as indicated by lack of associated geologic formations.		
Barneby's ridge cress *Lepidium barnebyanum*	FE	This species is known to occur only on tribal lands in Duchesne County on the West Tavaputs Plateau. Barneby's ridge cress occurs in the Indian Canyon Uinta Formation, on white shale outcrops, ridges, and barren inclusions in pinyon-juniper communities, at elevations between 6,200 and 6,500 feet.	The NAPA is outside the known elevation range of this species.	yes UNPS,	2011.
Clay reed-mustard (clay thelopody) *Schoenocrambe argillacea*	FT	This species is known to occur in Uintah County on canyon rims and steep slopes in the contact zone of the Uinta and Green River Formations in mixed desert shrub communities at elevations between 4,800 and 5,650 feet.	Potentially suitable habitats may be present near the NAPA. The nearest known population is located approximately 0.5 miles west of the NAPA.	no UNPS,	2011.
Gibben's beardtongue (Gibben's penstemon) *Penstemon gibbensii*	BLM	This species is known to occur in Daggett County on Browns Park and Green River Formations in sandy/shaly bluffs and slopes in juniper and mixed desert shrub communities at elevations between 5,500 and 7,700 feet.	Suitable habitat for this species is not present within the NAPA, which is slightly below the known elevation range.	yes	UNPS, 2011.
Goodrich's beardtongue (Goodrich's penstemon) *Penstemon goodrichii*	BLM	This species occurs on the Duchesne River on blue-gray to reddish bands of clay badlands at elevations of 5,590 to 6,215 feet.	The NAPA is outside the known elevation range of this species.	yes	BLM, 2008a; UDWR, 2005; UNPS, 2011.
Goodrich blazingstar *Mentzelia goodrichii*	BLM	This species is known to occur in Duchesne County in Willow and Argyle Canyons in the Green River Formation. The species occurs on steep escarpments and cliffs in white calcareous shale in montane brush communities at elevations between 8,100 and 8,800 feet.	The NAPA is outside the known elevation range of this species.	yes	UNPS, 2011.
Goodrich cleomella *Cleomella palmeriana* var. *goodrichii*	BLM	This species typically occurs in heavy clay soils on eroded clay and shale slopes of the Mancos, Tropic, and Morrison formations. It occurs in salt desert shrub communities from 4,000 to 6,000 feet in elevation.	This species occurs only in Rainbow Draw in Uintah County, which is outside the NAPA.	yes	BLM, 2008a.
Graham's beardtongue *Penstemon grahamii*	FP BLM	This species is known to occur in Uintah County on shale ledges and slopes derived from the Evacuation Creek and Parachute Creek members of the Green River formation. It grows in semi-barren mixed desert shrub or pinyon-juniper communities, at elevations between 4,600 to 6,700 feet.	Potentially suitable habitat for the species may be present within the NAPA.	no	BLM, 2008a; UNPS, 2011.
Hamilton milkvetch *Astragalus hamiltonii*	BLM	This species is known to occur in Uintah County at Asphalt Ridge on the Lapoint and Dry Gulch members of the Mowry Shale, and Dakota, Wasatch and Duchesne Formations. It occurs in mixed desert shrub or pinyon-	Suitable habitat for this species is not present within the NAPA, as indicated by lack of associated geologic formations.	yes	BLM, 2008a; UNPS, 2011.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
		juniper,at elevations between 5,240 to 5,800 feet.			
Huber pepperplant *Lepidium huberi*	BLM	This species is known to occur in Uintah County in foothills along Ashley Creek in Dry Fork along eroding cliffs, in alluvium, sandy or shaly bluffs derived from the Chinle, Park City, and Weber Formations. The species occurs in association with black sage or montane brush communities, at elevations between 5,000 to 9,700 feet.	Suitable habitat for this species is not present within the NAPA, as indicated by lack of associated geologic formations.	yes	BLM, 2008a; UNPS, 2011.
Owenby's thistle *Cirsium owenbyii*	BLM	This species inhabits the east flank of the Uinta mountains in sagebrush, juniper, and riparian communities at elevations ranging from 5,500 to 6,200 feet.	This species is currently known for a few sites in Brown's Park, Diamond Mountain, and Cliff Ridge.	yes	BLM, 2008a; UNPS, 2011.
Pariette cactus (Wagonhound cactus) *Sclerocactus brevispinus*	FT	This species is endemic to Duchesne and Uintah counties, occuring only in the Wagonhound member of the Uinta Formation on alkaline clay. It occurs in shadscale, mat-saltbush, and greasewood communities, at elevations between 4,700 and 5,400 feet.	This species has not been documented in the NAPA and is not known to occur east of the Green River.	yes	BLM, 2008a; UNPS, 2011.
Park rockcress *Arabis vivariensis*	BLM	This species is known to occur in Uintah County at Diamond Mountain, on the Diamond Gulch Weber Formation sandstone and limestone, in mixed desert shrub or pinyon-juniper communities, at elevations between 5,000 and 6,000 feet.	Suitable habitat for this species is not present within the NAPA, as indicated by the lack of the associated geologic formation.	yes	BLM 2008a; UNPS, 2011
Rock bitterweed *Hymenoxys lapidicola*	BLM	This species is endemic to Uintah County. The species occurs on rock crevices in the ponderosa pine-manzanita and pinyon-juniper communities between 6,000 and 8,100 feet.	Suitable habitat for this species is not present within the NAPA.	yes	BLM 2008a; UNPS, 2011
Shrubby reed-mustard *Schoenocrambe suffrutescens*	FE	This species is known to occur from Willow Creek to Sand Wash. The species occurs on calcareous shale outcrops of the Evacuation Creek member of the Green River Shale in mixed desert shrub, pinyon-juniper-sagebrush, or montane brush communities, at elevations between 5,100 and 6,600 feet.	Although suitable habitat may be present, the NAPA is outside the known occurrence of this species.	yes	BLM, 2008a; UNPS, 2011.
Spanish bayonet *Yucca sterilis*	BLM	This species is found in salt desert shrub communities on the Uinta Formation. The species occurs in grasslands, sagebrush shrublands, pinyon-juniper, and montainbrush areas, as well as on desert ridges and hills at elevations ranging from 4,790 to 5,800 feet.	Suitable habitat may be present where the Uinta Formation is exposed within the NAPA.	no UNPS,	2011.
Stemless beardtongue *Penstemon acaulis*	BLM	This species is known to occur in Daggett County on the Browns Park Formation in ashy, gravelly, or sandy ridges and knolls in sagebrush-desert, grass, or pinyon-juniper communities at elevations from 5,900 to 8,200 feet.	Suitable habitat for this species is not present within the NAPA, as indicated by lack of associated geologic formations.	yes UNPS,	2011.

Species Name	Status	Habitat Association	Potential for Occurrence within the Project Area and Cumulative Effects Area	Eliminated from Detailed Analysis (Yes/No)	References
Strigose Townsendia Hairy Townsend daisy) *Townsendia strigosa* var. *prolixa*	BLM	This species occurs in Daggett, Duchesne, and Uintah counties in salt desert shrub, mixed desert shrub, and pinyon-juniper communities at elevations ranging from 4,800 to 6,200 feet.	Suitable habitat for this species may be present within the NAPA.	no NRCS,	2012.
Uinta Basin hookless cactus *Sclerocactus wetlandicus*	FT	This species is known to occur in Duchesne and Uintah counties. It grows on gravelly hills and terraces in salt desert shrub and pinyon-juniper communities on river benches, valley slopes, and rolling hills of the Duchesne River, Green River, and Mancos Formations between 4,500 and 6,600 feet.	The NAPA is within the known range of the species and may have the potential to support individuals or small scattered populations.	no	BLM, 2008a; UDWR, 2005; UNPS, 2011.
Uinta greenthread *Thelesperma caespitosum*	BLM	The species occurs on white shale slopes, benches, and ridgecrests in pinyon-juniper, sagebrush, and montane brush communities, at elevations ranging from 5,000 to 9,000 feet.	This species is known to occur in Duchesne County at West Tavaputs Plateau on the north slope of the Uintas Bishop Formation. Suitable habitat for this species is not present within the NAPA.	yes UNPS,	2011.
Untermann fleabane *Erigeron untermannii*	BLM	This species is known to occur in Duchesne and Uintah Counties at the West Tavaputs Plateau on the Green River and Uinta Formation. The species occurs on ridges, in dry calcareous shales and sandstones in pinyon-juniper or montane brush communities, at elevations between 7,000 and 9,400 feet.	The NAPA is outside the known elevation range of this species.	yes	BLM, 2008a; UNPS, 2011.
Ute ladies'-tresses orchid *Spiranthes diluvialis*	FT	This species has been documented in Daggett, Duchesne, and Uintah Counties in unconsolidated alluvium in riparian corridors, wetlands, and wet meadows, at elevations between 4,500 and 6800 feet.	It occurs along the Green River in Brown's Park (Utah and Colorado), Dinosaur National Monument, and near the confluence with the Yampa River. The species also occurs on Ashley Creek, within Ashley Valley, along Big Bruch Creek, the upper Duchesne River, and tributaries to the Duchesne River. Suitable habitat for this species is not present within the NAPA.	yes	BLM, 2008a; UNPS, 2011.
White River beardtongue *Penstemon scariosus* var. *albifluvis*	FC	Known to occur in Uintah County at Evacuation Creek and on surficial outcrops of oil shale in southern Uintah County. It occurs on outcrops of oil shale, in semi-barren mixed desert shrub or pinyon-juniper communities at elevations between 5,000 to 6,880 feet.	Although suitable habitat may be present, the NAPA is outside the known occurrence of this species.	yes	BLM, 2008a; UDWR, 2005; UNPS, 2011.

Note: Status was derived using the USFWS List by County (UDWR, 2011a), the UDWR Utah Sensitive Species List (UDWR, 2011), the BLM sensitive plant list species list (BLM, 2008a); information received from BLM biologist (See Appendix A).

TABLE C-2
MIGRATORY BIRDS IDENTIFIED AS CONSERVATION PRIORITIES THAT MAY OCCUR IN THE PROJECT REGION

Species Name	USFWS Birds of Conservation Concern	State of Utah Wildlife Species of Concern	Partners in Flight Priority Bird Species	Primary Breeding Habitat	Secondary Breeding Habitat	Winter Habitat
American avocet *Recurvirostra americana*			X	Wetland	Playa	Migrant
American bittern *Botaurus lentiginosus*	X			Wetland	Wetland	Migrant
Bald eagle *Haliaeetus leucocephalus*	X X			Lowland Riparian	Agriculture	Lowland Riparian
Bendire's thrasher *Toxostoma bendirei*	X			Low Desert Scrub	Low Desert Scrub	Migrant
Black rosy-finch *Leucosticte atrata*	X			Alpine	Alpine	Grassland
Black-throated grey warbler *Dendroica nigrescens*			X	Pinyon-Juniper	Mountain Shrub	Migrant
Brewer's sparrow *Spizella breweri*	X		X	Shrubsteppe	High Desert Scrub	Migrant
Broad-tailed hummingbird *Selasphorus platycercus*			X	Lowland riparian	Mountain riparian	Migrant
Brown-capped rosy-finch *Leucosticte australis*	X			Above Timberline	Above Timberline	Migrant
Burrowing owl *Athene cunicularia*	X	X		High Desert Scrub Grassland		Migrant
Cassin's finch *Carpodacus cassinii*	X			Aspen	Sub-Alpine Conifer	Lowland Riparian
Chestnut-collared longspur *Calcarius ornatus*	X			Prairie	Grasslands Grasslands	
Ferruginous hawk *Buteo regalis*	X X		X	Pinyon-Juniper	Shrubsteppe Grassland	
Flammulated owl *Otus flammeolus*	X			Ponderosa Pine	Sub-Alpine Conifer	Migrant

Species Name	USFWS Birds of Conservation Concern	State of Utah Wildlife Species of Concern	Partners in Flight Priority Bird Species	Primary Breeding Habitat	Secondary Breeding Habitat	Winter Habitat
Gambel's quail *Callipepla gambelii*			X	Low Desert Scrub Lowland	Riparian	Low Desert Scrub
Golden eagle *Aquila chrysaetos*	X			Cliff	High Desert Scrub	High Desert Scrub
Grace's warbler *Dendroica graciae*	X			Ponderosa Pine	Mixed Conifer	Migrant
Grasshopper sparrow *Ammodramus savannarum*	X			Grasslands	Grasslands	Migrant
Gray vireo *Vireo vicinior*	X		X	Pinyon-Juniper	Northern Oak	Migrant
Greater sage-grouse *Centrocercus urophasianus*	X		X	Shrubsteppe	Shrubsteppe	Shrubsteppe
Gunnison sage-grouse *Centrocerus minimus*	X		X	Shrubsteppe	Shrubsteppe	Shrubsteppe
Juniper titmouse *Baeolophus ridgwayi*	X			Pinyon-Juniper	Pinyon-Juniper Pin	yon-Juniper
Lewis' woodpecker *Melanerpes lewis*	X X		X	Ponderosa Pine	Lowland Riparian	Northern Oak
Long-billed curlew *Numenius americanus*	X X		X	Grassland	Agriculture	Migrant
Lucy's warbler			X	Lowland Riparian	Low Desert Scrub	Migrant
Mountain plover *Charadrius montanus*	X	X	X	High Desert Scrub	High Desert Scrub	Migrant
Peregrine falcon *Falco peregrinus*	X			Cliff	Lowland Riparian	Wetland
Pinyon jay *Gymnorhinus cyanocephalus*	X			Pinyon-Juniper	Ponderosa Pine	Pinyon-Juniper
Prairie falcon *Falco mexicanus*	X			Cliff	High Desert Scrub	Agriculture

Species Name	USFWS Birds of Conservation Concern	State of Utah Wildlife Species of Concern	Partners in Flight Priority Bird Species	Primary Breeding Habitat	Secondary Breeding Habitat	Winter Habitat
Sage sparrow *Amphispiza belli*			X	Shrubsteppe	High Desert Scrub	Low Desert Scrub
Snowy plover *Charadrius alexandrius*	X			Playa	Playa	Migrant
Virginia's warbler *Vermivora virginiae*			X	Northern Oak	Pinyon-Juniper	Migrant
Veery *Catharus fuscescens*	X			Lowland Riparian	Lowland Riparian	Migrant
Willow flycatcher *Empidonax traillii*	X			Lowland Riparian	Mountain Riparian	Migrant
Yellow-billed cuckoo *Coccyzus americanus*	X		X	Lowland Riparian	Agricultur e	Migrant

Sources: UDWR, 2011; Parrish and Norvell, 2002 (Utah Priority Species, Colorado Plateau); USFWS, 2008 (Table 14 BCR 16)

ATTACHMENT 2

Nesting Periods and Recommended Buffers for Raptors in Utah

Species	Spatial Buffer (miles)	Seasonal Buffer	Incubation, # Days	Brooding # Days Post-Hatch	Fledging, # Days Post-Hatch	Post-fledge Dependency to Nest, # Days[1]
Bald eagle	1.0	1/1-8/31	34-36	21-28	70-80	14-20
Golden eagle	0.5	1/1-8/31	43-45	30-40	66-75	14-20
N. Goshawk	0.5	3/1-8/15	36-38	20-22	34-41	20-22
N. Harrier	0.5	4/1-8/15	32-38	21-28	42	7
Cooper's hawk	0.5	3/15-8/31	32-36	14	27-34	10
Ferruginous hawk	0.5	3/1-8/1	32-33	21	38-48	7-10
Red-tailed hawk	0.5	3/15-8/15	30-35	35	45-46	14-18
Sharp-shinned hawk	0.5	3/15-8/31	32-35	15	24-27	12-16
Swainson's hawk	0.5	3/1-8/31	33-36	20	36-40	14
Turkey vulture	0.5	5/1-8/15	38-41	14	63-88	10-12
California condor	1.0	NN yet	56-58	5-8 weeks	5-6 months	2 months
Peregrine falcon	1.0	2/1-8/31	33-35	14-21	35-49	21
Prairie falcon	0.25	4/1-8/31	29-33	28	35-42	7-14
Merlin	0.5	4/1-8/31	28-32	7	30-35	7-19
American kestrel	NN[2]	4/1-8/15	26-32	8-10	27-30	12
Osprey	0.5	4/1-8/31	37-38	30-35	48-59	45-50
Boreal owl	0.25	2/1-7/31	25-32	20-24	28-36	12-14
Burrowing owl	0.25	3/1-8/31	27-30	20-22	40-45	21-28
Flammulated owl	0.25	4/1-9/30	21-22	12	22-25	7-14
Great horned owl	0.25	2/1-9/31	30-35	21-28	40-50	7-14
Long-eared owl	0.25	2/1-8/15	26-28	20-26	30-40	7-14
N. saw-whet owl	0.25	3/1-8/31	26-28	20-22	27-34	7-14
Short-eared owl	0.25	3/1-8/1	24-29	12-18	24-27	7-14
Mex. Spotted owl	0.5	3/1-8/31	28-32	14-21	34-36	10-12
N. Pygmy owl	0.25	4/1-8/1	27-31	10-14	28-30	7-14
W. Screech owl	0.25	3/1-8/15	21-30	10-14	30-32	7-14
Common Barn-owl	NN[2]	2/1-9/15	30-34	20-22	56-62	7-14

[1] Length of post-fledge dependency period to parents is longer than reported in this table. Reported dependency periods reflect the amount of time the young are still dependent on the nest site; i.e. they return to the nest for feeding. [2] Due to apparent high population densities and ability to adapt to human activity, a spatial buffer is not currently considered necessary for maintenance of American kestrel or Common barn-owl populations. Actions resulting in direct mortality of individual bird or take of known nest sites is unlawful

C.1 CLAY REED-MUSTARD (*SCHOENOCRAMBE ARGILLACEA*)

In order to minimize effects to the federally threatened clay reed-mustard, the BLM in coordination with the U.S. Fish and Wildlife Service (USFWS) 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). The following avoidance and minimization measures should be included in the Plan of Development (POD):

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[1] prior to any ground disturbing activities to determine if suitable clay reed-mustard habitat is present.
2. Site inventories will be conducted within suitable habitat[2] to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat will be assessed and mapped for avoidance (hereafter, "avoidance areas"); in such cases, in general, 300-foot buffers will be maintained between surface disturbance and avoidance areas. However, site specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat. Where conditions allow, 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[3] 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 5th, in the Uinta Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or USFWS botanist or demonstrating that the nearest known population is in flower),
    c. Will occur within 300 feet from the centerline of the proposed right-of-way (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 May 1st the following year.

[1] *Potential habitat* comprises areas that satisfy the broad criteria of the species habitat description; usually determined by preliminary, in house assessment.
[2] *Suitable habitat* comprises areas that contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain clay reed mustard; habitat descriptions can be found in Federal Register Notice and species recovery plan links at <http://www.fws.gov/endangered/wildlife.html>.
[3] *Occupied habitat* is defined as any area within 300 feet of a listed plant individual.

3. Design project infrastructure to minimize impacts within suitable habitat[2]:
    a. Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (avoidance areas) and incorporate 300-foot buffers, in general; however, site specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat,
    b. Reduce well pad size to the minimum needed, without compromising safety,
    c. Limit new access routes created by the project,
    d. Roads and utilities should share common ROWs where possible,
    e. Reduce the 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,
    f. Place signing to limit off-road travel in sensitive areas, and
    g. Stay on designated routes and other cleared/approved areas.
4. Within occupied habitat[3], project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:
    a. Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (avoidance areas) and incorporate 300-foot buffers, in general; however, site specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat,
    b. Follow the above recommendations (#3) for project design within suitable habitats,
    c. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged,
    d. Construction of roads will occur such that the edge of the ROW is at least 300 feet from any plant and 300 feet from avoidance areas,
    e. Roads will be graveled within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from May 1st to June 5th (flowering period); dust abatement applications will be comprised of water only,
    f. The edge of the well pad should be located at least 300 feet away from plants and avoidance areas, in general; however, site specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat,
    g. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the ROW and plants and 300 feet between the edge of ROW and avoidance areas; use stabilizing and anchoring techniques when the pipeline crosses suitable habitat to ensure pipelines don't move towards the population; site specific distances will need to be approved by USFWS and BLM when disturbance will occur upslope of habitat,

h. Construction activities will not occur from May 1st through June 5th within occupied habitat,

i. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.,

j. Where technically and economically feasible, use directional drilling or multiple wells from the same pad,

k. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and

l. Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible.

5. Occupied clay reed-mustard 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 USFWS. 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 USFWS.
6. Reinitiation of section 7 consultation with the USFWS will be sought immediately if any loss of plants or occupied habitat for the shrubby reed-mustard 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 USFWS to ensure continued compliance with the ESA.

C.2 GRAHAM'S BEARDTONGUE (*PENSTEMON GRAHAMII*)

In order to minimize effects to Graham's beardtongue, which is proposed for federal listing as threatened, the BLM in coordination with the USFWS 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 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 POD:

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[4] prior to any ground disturbing activities to determine if suitable Graham's beardtongue habitat is present.

[4] *Potential habitat* comprises areas that satisfy the broad criteria of the species habitat description; usually determined by preliminary, in house assessment.

2. Within suitable habitat[5], 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[6] 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 USFWS botanist or demonstrating that the nearest known population is in flower),
    c. Will occur within 300 feet from the centerline 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 April 15th the following year.
3. Design project infrastructure to minimize impacts within suitable habitat[5]:
    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 the 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,
    e. Place signing to limit off-road travel in sensitive areas, and
    f. Stay on designated routes and other cleared/approved areas.
    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 habitat[6], 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 ROW is at least 300 feet 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 feet away from plants,

[5] *Suitable habitat* comprises areas that 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 71 (12): 3158 3196.
[6] *Occupied habitat* is defined as any area within 300 feet of a listed plant individual.

e. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the ROW 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. Reclaim well pads following drilling to the smallest area possible.

5. Occupied Graham's beardtongue 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 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 USFWS. 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 USFWS.

Additional site-specific measures may also be employed to avoid or minimize effects to the species.

C.3 SHRUBBY REED-MUSTARD (*SCHOENOCRAMBE* (=*GLAUCOCARPUM*) *SUFFRUTESCENS*)

In order to minimize effects to the federally endangered shrubby reed-mustard, the BLM in coordination with the USFWS 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 ESA. The following avoidance and minimization measures should be included in the POD:

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[7] prior to any ground disturbing activities to determine if suitable shrubby reed-mustard habitat is present.

[7] *Potential habitat* comprises areas that satisfy the broad criteria of the species habitat description; usually determined by preliminary, in house assessment.

C.4 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 USFWS, 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 ESA. The following avoidance and minimization measures would be included in the POD:

1. Pre-project habitat assessments will be completed across 100% of the project disturbance area within potential habitat[10] prior to any ground disturbing activities to determine if suitable Uinta Basin hookless cactus habitat is present.
2. Within suitable habitat[11], 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[12] 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[11]:
    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,
    e. Place signing to limit off-road travel in sensitive areas,

[10] *Potential habitat* comprises areas that satisfy the broad criteria of the species habitat description; usually determined by preliminary, in house assessment.

[11] *Suitable habitat* comprises areas that 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 USFWS's 2010 Recovery Outline and Federal Register Notices for the Uinta Basin hookless cactus (http://www.fws.gov/endangered/wildlife.html).

[12] *Occupied habitat* is defined as any area within 300 feet of a listed plant individual.

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 habitat[12], 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 ROW 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. 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 USFWS. 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 USFWS.

6. Reinitiation of section 7 consultation with the USFWS 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 USFWS to ensure continued compliance with the ESA.

APPENDIX D

RECLAMATION PLAN FOR UINTAH BASIN OPERATIONS

Koch Exploration Company, LLC
Reclamation Plan for Uintah Basin Operations

1. Introduction

1.1 For the purposes of this Program, reclamation is defined as the process of returning lands that have been disturbed to a condition that will meet specified regulatory requirements and other binding agreements. KEC's Reclamation Program establishes the expectations, conditions, guidelines and performance standards for reclamation following company activities.

1.2 KEC operates in multiple regulatory jurisdictions with various reclamation requirements. This document has been prepared to allow flexibility in order to comply with the various agency requirements.

1.3 This document does not modify government regulatory requirements, other internal reporting requirements outside of Environmental, Health and Safety (EHS) and Operations, or any specific binding agreement (e.g., lease obligations, surface use agreements).

2. Applicability

2.1 The Federal Land Policy Management Act of 1976 (FLPMA) mandates that the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values.

2.2 This Program applies to disturbed lands on federal-owned surfaces, state-owned surfaces and privately-owned surfaces. Reclamation should be conducted on disturbed surface that is not necessary for continued production and operation.

2.3 Typical areas requiring reclamation covered under this Program include:

- Well Locations
- Transportation Corridors (e.g., roads)
- Pipelines / Flowlines
- Right-of-Ways (ROWs)
- Pits/Reservoirs
- Utility Corridors (e.g., water, electricity, communication
- Facilities (e.g., compressor stations, tank batteries)

2.4 The Utah Pollution Discharge Elimination System (UPDES), as governed by the Utah Division of Water Quality, requires construction activities that disturb one or more acres of land be authorized under the UPDES General Permit for Construction Activities. KEC will abide by the General Permit and prepare a Stormwater Pollution Prevention Plan (SWPPP) as required by the General Permit.

3. Goals and Objectives

3.1 By implementing a Reclamation Program, it is KEC's goal to maintain stewardship to the environment, foster good-will with federal, state and local regulatory agencies, be a "good neighbor" with surface owners, and comply with all applicable regulations.

3.2 Stabilization (Short-Term) Reclamation – The objective of Short-Term Reclamation is to stabilize a disturbed area, protect adjacent areas from undue degradation during construction and development phases and reduce the cost and effort of Interim and Final Reclamation.

3.3 Interim (Long-Term) Reclamation – The objective of Interim Reclamation is to shape, stabilize, re-vegetate, or otherwise treat disturbed areas in order to provide a self-sustaining and productive use of the land during production operations.

3.4 Final Reclamation – After production and operations cease, the goal of final reclamation is to return the land to a condition that approximates that which existed prior to disturbance and maintain a stable and productive condition compatible with the land use.

4. Responsibilities

4.1 Production Superintendents – Production Superintendents are accountable for assuring compliance with this Program.

4.2 Operations Department – The Operations Department will be responsible for topsoil management, minimizing disturbance, and stabilization of disturbed soil throughout project and facility development and operation.

4.3 Regulatory Department – The Regulatory Department is responsible for training operations personnel, permitting, notice of intent, subsequent reports of activities, and final abandonment. And for designing, implementing, monitoring and tracking the progress of reclamation including erosion and weed control measures.

5. Pre-Construction and Pre-Disturbance Activities

5.1 Reclamation begins prior to surface disturbing activity commencement.

5.2 A Baseline Vegetation Survey may be conducted prior to soil disturbing activity. The inventory should include the species composition, cover and density. This inventory will aid in determining when final reclamation is complete.

5.3 Preliminary site information may be gathered prior to any soil disturbing activity. This information may include, but is not limited to, weeds and soil conditions, precipitation maps, soil survey maps, county maps, land use maps, topographic maps, survey plats of the proposed project, and an outline of impacts.

5.4 The Bureau of Land Management's (BLM's) placement Best Management Practices (BMPs) for Fluid Mineral Operations should be considered. Examples of placement BMPs include the following.

• Locations should be selected that will minimize disturbance. The disturbed area should be large enough to conduct safe drilling and production operations. Use existing roads whenever possible. Site access should be planned for the minimum width.
• Use corridors when possible, (one route for the power line, pipeline, and assess road).

• Consolidating and reducing facility size.

5.5 The selection of the best soil erosion and sediment controls for the specific site should be primarily based on the nature of the construction activity and the conditions that exist at the site. Minimum BMPs that should be utilized at each site include:

• Minimize the amount of soil disturbed and preserve existing vegetation,
• Prevent soil (or sediment) movement from leaving the original location within the construction site by the proper installation of erosion controls and sediment capture measures (such as silt fencing),
• Document inspections annually at a minimum,
• Maintain erosion and sediment control until vegetation has been re-established.

5.6 Prior to site disturbing activities Operations and Regulatory Departments should meet to discuss:

• An outline of expectations to operation personnel and contractors
• Safety issues
• Top soil management
• Review BMPs for erosion control, soil stabilization, and Short-Term Reclamation
• Review of any site specific Conditions of Approval

6. Short-Term Reclamation

6.1 Short-Term Reclamation commences as soon as soil disturbing activities begin up to completion of construction and drilling activity.

6.2 Soil erosion and sediment controls may be implemented to reduce the amount of soil that is carried off-site and to reduce the disturbance of the top soil.

6.3 Topsoil is an important component of the reclamation process. Topsoil is typically the most fertile portion of soil. Minimal topsoil disturbance will aid in the reclamation process. Whenever possible, the first 6 to 12 inches of top soil should be stockpiled for replacement at a later date. The salvaged topsoil should be applied as soon as possible to the area being reclaimed. A more detailed description of topsoil management can be found in the Handbook of Western Reclamation Techniques (see Section 15, References).

7. Long Term Reclamation

7.1 Long -Term Reclamation can occur during production operations. The long-term reclamation of an area helps stabilize and reduce final reclamation costs. Examples of long-term reclamation are listed below.

• Utility corridors should be backfilled and re-vegetated.

• The size of the well site should be reduced, if possible, to the area that is necessary for safe ongoing operations. Un-used areas at the well site should be re-vegetated as part of an interim reclamation program.
• Linear features alongside roads, such as borrow ditches and utility corridors should be re-vegetated. In some cases roads may be narrowed and the un-needed portions re-contoured and re-vegetated.
• Pits will be closed and backfilled as soon as practical. The surface area will be re-contoured and re-vegetated.

7.2 A complete description of long-term reclamation projects can be found in the Bureau of Land Management's Goldbook and the Handbook of Western Reclamation Techniques (see Section 15, References).

8. Final Reclamation

8.1 Final Reclamation can generally be judged complete when the landscape features meet the post-disturbance land use and vegetation shows signs of being self- sustaining, vigorous, diverse, and established with a density sufficient to retain fundamental resources.

8.2 All disturbed areas, including well pads, access roads, pipeline ROWs, will be reclaimed per BLM requirements.

8.3 Final reclamation may include re-contouring the area to its original contour, seeding, controlling noxious weeds, and other reclamation practices described in the Handbook of Western Reclamation Techniques (see Section 15, References).

8.4 Reclamation activities will be considered complete when applicable standards have been met, when vegetation has reached a minimum of 75 percent of background vegetation (undisturbed areas), or as approved by surface owner.

8.5 Once Final Reclamation has been achieved, the appropriate regulatory agencies should be notified. For example,

• BLM and/or Bureau of Reclamation – Sundry (Final Abandonment Notice)
• State Departments of Environmental Quality – Notice of Termination
• State Oil & Gas Conservation Commissions – Bond release
• Landowners – Cessation of surface use payments

9. Seeding and Re-vegetation

9.1 The goal of seeding is to re-vegetate and stabilize a disturbed site. The result of seeding should be a self-sustaining community of perennial vegetation.

9.2 Seeding and re-vegetation is a component of short-term, long-term, and final reclamation.

9.3 Seeding should occur as quickly as possible during the first appropriate seeding season.

9.4 The seed mix selected for re-vegetation should include a diverse mix of perennial species specified by the surface management agency or surface owner and are adapted to the region and consistent with

the current land use. The seed mix selection should be guided by experiences in similar location and observation of undisturbed vegetation in the area and at the discretion of the surface owner.

9.5 Certified weed free seed mix should be used. Seeding rates can be calculated using the Natural Resource Conservation Service's Technical Notes Reading Seed Packaging Labels and Calculating Seed Mixtures (see Section 15, References).

9.6 The methodology for seeding should generally be site specific. The methodologies for seeding techniques are described in the Handbook for Western Reclamation Techniques and Dryland Pastures in Montana and Wyoming (see Section 15, References).

9.7 Predatory grazing on areas being newly established should be avoided if possible.

10. Monitoring and Performance Assurance

10.1 Monitoring is the orderly and quantitative collection, analysis and interpretation of resource data to evaluate progress toward a goal.

10.2 The purpose of monitoring is to assess and assure performance and in progression toward final reclamation.

10.3 Monitoring methodologies and frequency generally should be scientific, according to surface use agreements, Bureau of Land Management (BLM) methodology, other regulatory requirements, or according to the project Conditions of Approval document.

10.4 Monitoring should continue until at least 70 percent or greater of vegetation, as compared to surrounding undisturbed areas, is established. If after two growing seasons, progression toward this standard has not been accomplished, further site evaluation may be necessary to determine if re-seeding or other actions are required to improve reclamation success.

10.5 Geospatial databases should be used to track the reclamation process. Data that should be tracked includes, but not limited to the following:

- Areas of disturbance
- Seeding data
- Vegetation progress
- Construction information
- Inspection information
- Well Data
- Weed Data

11. Training

11.1 Awareness training of this Program should be conducted by the Regulatory Department. Individuals with responsibilities involving construction and surface disturbing activities may receive additional training beyond awareness training.

11.2 Training of field level personnel will take place at the following frequency:

A. Initial Training will involve awareness of the Reclamation Program.
B. Refresher Training will be conducted on an annual basis.

11.3 Training topics can include, but are not limited to:

- Contents of Stormwater Pollution Prevention Plan
- Common stormwater pollutants and mitigation measures (BMPs)
- Phases of construction and reclamation
- Inspections

12. Relationship to Contractual Agreements

12.1 Nothing contained in this Program document shall be construed as altering in any way the rights, duties, and/or obligations contained in any applicable contract or master service agreement (Contract) between parties. Where a conflict arises between this Program document and the Contract, the language in the Contract will be controlling.

13. Relevant APC Programs

13.1 The following Programs are referenced within the KEC Reclamation Program:

A. Utah Pollution Discharge Elimination System.
B. The Reasonable and Prudent Practice (RAPPS) for Stabilization of Oil & Gas Construction Sites.

14. Document Management

14.1 Reclamation documentation forms, information, and data will be retained in KEC field and/or Denver office files in accordance with the KEC Records Retention Policy.

15. References

Utah Pollution Elimination System General Permit for Construction Activities, UTR300000.
U.S. Federal Regulations A. 43 CFR §3160, *Bureau of Land Management – Onshore Oil and Gas Operations.*
Oil and Gas – Surface Operating Standards for Oil and Gas Exploration and Development (Gold Book).
Handbook of Western Reclamation Techniques – Second Edition. 2006.
Draft - Solid Minerals Reclamation Handbook.
Natural Resource Conservation Service's Technical Notes – Wyoming. Reading Seed Packaging Labels and Calculating Seed Mixtures. June 2001.
Guidebook to the Seed of Native and Non-Native Grasses, Forbs and Shrubs of the Great Basin. U.S. Department of the interior, Bureau of Land Management. 2005.
Dryland Pastures of Montana and Wyoming; Montana State University Extension Service, 2003.

APPENDIX E

POST-CONSTRUCTION STORMWATER PLAN

KOCH EXPLORATION COMPANY, LLC

Post-construction Stormwater Plan

February 2012

Table of Contents

1.0 Introduction

The purpose of this plan is to outline best management practices (BMPs) to be used at facilities that have achieved final stabilization following construction activities.

2.0 Post-Construction Stormwater Program Contacts

Jordan Radin
Compliance Manager
(303) 325-2564 (office)
(720) 201-4941 (cell)

Don Johnson
Field Operations Manager
(505) 334-9111 (office)
(505) 320-0819 (cell)

3.0 Potential Pollution Sources and BMPs

Potential pollution sources and associated BMPs are addressed below.

3.1 Transport of Chemicals and Materials: Loading and Unloading Operations

Activities associated with this pollution source are potential spills during delivery and unloading of materials. BMPs selected to control this source are materials management practices and personnel training. Hazardous materials and petroleum products used in the post-construction phase of a pad include fuel and lubricants for equipment and vehicles, small quantities of paints and solvents, water or gel based frac fluids (surfactant, friction reducer, dilute hydrochloric acid, potassium chloride) used during well servicing; produced water; and condensate. Material Safety Data Sheets (MSDS) for materials to be used or that are produced, are maintained at KEC's Vernal field office. If a spill of pollutant(s) threatens stormwater or has the potential to discharge from the site, the procedures in the Emergency Response Plan (ERP) will be activated. A Spill Prevention, Control and Countermeasure (SPCC) Plan is in place for well sites that meet the minimum oil storage capacity thresholds (1,320 gallons aggregate oil storage). The ERP is stored in the Vernal Field Office and employee vehicles. The SPCC Plan is stored at the Vernal Field Office. Operators are trained in the safe handling of materials and spill discovery, response, and cleanup procedures as appropriate during annual SPCC and ERP training.

3.2 Vehicle/Equipment Fueling

Activities associated with this pollution source are fueling and equipment repair. Routine vehicle maintenance and fueling of vehicles generally will not occur on-site. However if refueling would occur or on-site maintenance is necessary, containment BMPs will be implemented as necessary.

3.3 Outdoor Storage Activities, Including those for Chemicals and Additives

KEC will adhere to the following good housekeeping practices regarding outdoor storage activities as applicable.

- Storage containers will be labeled as required by National Fire Prevention Assocation (NFPA) and Occupational Safety and Health Administration (OSHA) regulations;
- Containers are stored away from direct traffic to prevent accidents;
- Dumpsters and trash receptacles will be enclosed in order to prevent the spread of refuse;
- Storage areas will be kept free of trash;
- Chemical substances will have proper spill containment; and
- Chemical containers will be clearly and properly labeled, and an MSDS will be kept on file at the Vernal Field Office.

3.4 Outdoor Processing and Machinery

Production facility post-construction sites may include equipment such as separators, heaters, internal combustion engines, valves, meters, and flow lines. Equipment is maintained per the manufacturers instructions. Field personnel are trained to identify and immediately correct leaking machinery. Site inspections are conducted monthly and documented as required by the SPCC plan.

3.5 Erosion and Vehicle Tracking from Well Pads, Production Facilities, Tank Batteries, Road Surfaces, and Pipelines

Access road entrances from well pads, dirt road surfaces, and pipeline right of ways (ROWs) adjacent to paved roads may be graveled when practical (subject to landowner approval) to prevent or minimize any off-site soil tracking. In some instances, cattle guards are used to drop off caked mud before the vehicle exits the site areas.

3.6 Waste Disposal Practices

Trash, debris, scrap, or other discarded materials will be properly disposed. If impacted soils are excavated, additional BMPs may be employed to ensure containment of any stormwater runoff. In addition, stockpiles of impacted soil will be removed from the site and disposed or land-farmed as soon as possible.

3.7 Leaks and Spills

The KEC Uintah County SPCC Plan and ERP detail procedures used to prevent and remedy leaks and spills. Both plans are incorporated by reference.

3.8 Ground Disturbance Maintenance Activities

Structural and non-structural practices primarily include physical attributes of pad sites, production facilities, access roads, and pipeline ROWs and are designed to reduce erosion and sediment. Disturbed areas that aren't integral to production activities will be seeded and stabilized immediately.

Areas that become unstabilized over time (erosive conditions) may be seeded using seed mixes appropriate to the location and approved by the surface owner. Additional revegetation guidance will be obtained from soil conservation authorities related to the US Natural Resources Conservation Service, Local Conservation Districts, or reclamation contractors familiar with the area as needed.

Post-construction erosion control will be addressed as necessary by using all or combinations of various erosion control methods. These methods include, but are not limited to the following:

- Erosion Control Blanket (ECB) Hydraulic Mulching (HM)
- Land Grading (LG) – Roads
- Low Water Crossing (LWC)
- Mulching (M)
- Retaining Wall (RW)
- Revegetation (RV)
- Riprap (R)
- Soil Stabilizers (SS)
- Stockpiling (SP) – Topsoil and Subsoil
- Surface Roughening (SR)
- Terracing (T)
- Turf Reinforcement Mat (TRM)
- Vegetated Buffer (VB)
- Wattles (W)

Post-construction sediment controls that may be used to mitigate and control sediments generated from the erosive transport forces of stormwater may include the following:

- Check Dam (CD)
- Detention Pond (DP)
- Filter Berm (FB)
- Sediment Reservoir (SedR)
- Sediment Trap (ST)
- Silt Fence (SF)
- Slash (SL)
- Stabilized Construction Entrance (SCE)
- Straw Bale Barrier (SBB)
- Wattles (W)

4.0 Inspections

KEC will inspect all facilities as part of the annual detailed inspection program. Inspections will be documented and action items tracked to closure.

5.0 Employee Training

Field employees will receive stormwater training annually. Training records will be maintained in the KEC Aztec, NM or Denver, CO office.

APPENDIX F

USFWS BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
UTAH ECOLOGICAL SERVICES
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

September 28, 2012

In Reply Refer To:
FWS/R6
ES/UT
12-F-0247
6-UT-12-F-026

Memorandum

To: Michael Stiewig, Field Office Manager, Vernal Field Office, Bureau of Land Management

From: Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, West Valley City, Utah

Subject: Final Biological Opinion for Koch Exploration Company's North Alger Project

In accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.), and the Interagency Cooperation Regulations (50 CFR 402), this transmits the Fish and Wildlife Service's (Service's) final biological opinion for impacts to the endangered Colorado pikeminnow *(Ptychocheilus lucius)*, razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*); and designated critical habitat from Koch Exploration Company's North Alger Project Environmental Assessment and Biological Assessment (EA/BA). We received your letter requesting formal consultation on August 8, 2012. A complete administrative record of this consultation is on file at this office.

Impacts to clay reed-mustard (*Schoenocrambe argillacea*), Uinta Basin hookless cactus (*Sclerocactus wetlandicus*) and Graham's beardtongue (*Penstemon grahamii*) were also discussed in the environmental assessment and biological reports. We concur that this project may affect, but is not likely to adversely affect *Schoenocrambe argillacea* and *Sclerocactus wetlandicus* based in part on the following applicant-committed conservation measures (a complete list of applicant-committed conservation measures is included on pages 51-52 of the EA/BA and in Appendix C):

- avoidance of the side slopes and Kings Canyon proper (the western half of Section 28), which contains potential habitat for *Schoenocrambe argillacea;*
- implementation of BMPs to avoid downslope sedimentation that could potentially impact *Schoenocrambe argillacea;* and

- project activities will be designed to avoid all individuals of *Sclerocactus wetlandicus* by at least 300 feet.

We also concur that this action is not likely to jeopardize the continued existence of or adversely modify proposed critical habitat of *Penstemon grahamii*, based on the applicant's commitment of no new surface disturbance in Kings Canyon, including its side slopes or active channel, where potential habitat for *P. grahamii* exists.

We concur that the project may adversely affect the Colorado pikeminnow, humpback chub, bonytail, razorback sucker and their designated critical habitat on the Duchesne, Green and Colorado Rivers.

CONSULTATION HISTORY

This section summarizes significant steps in the consultation process:

- On August 21 through 23, we communicated with Bureau of Land Management (BLM) specialists to clarify questions over plant-specific mitigation measures and water depletions.
- On August 8, 2012, we received your request for formal consultation.

COLORADO RIVER FISH RECOVERY PROGRAM

On January 21-22, 1988, the Secretary of the Department of the Interior; the Governors of Wyoming, Colorado, and Utah; and the Administrator of the Western Area Power Administration signed a Cooperative Agreement to implement the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin"1 (Recovery Program). Since that time, the cooperators extended the Recovery Program with newly signed agreements twice: first in 2001, extending the Recovery Program until September 30, 2013[1]; and more recently in 2009, extending the Recovery Program to September 30, 2023[1]. The objective of the Recovery Program is to recover the listed species while water development continues in accordance with Federal and State laws and interstate compacts.

In order to further define and clarify processes outlined in sections 4.1.5, 4.1.6, and 5.3.4 of the Recovery Program, the cooperators developed a section 7 Agreement (Agreement) and a Recovery Implementation Program Recovery Action Plan (RIPRAP)[2]. The Agreement establishes a framework for conducting all future section 7 consultations on depletion impacts related to new projects and all impacts associated with historic projects in the Upper Basin. Procedures outlined in the Agreement are used to determine if sufficient progress is being accomplished in the recovery of the endangered fishes to enable the Recovery Program to serve

1 Original Document and extensions are available online at: http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/cooperative-agreement.html

2 Originals and annual reviews are available online at: http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-action-plan.html

as a reasonable and prudent alternative (RPA) to avoid jeopardy. The RIPRAP was finalized on October 15, 1993, and has been reviewed and updated annually[2].

In accordance with the 1993 Agreement, we annually assesses progress of the implementation of recovery actions to determine if progress toward recovery has been sufficient for the Recovery Program to serve as a RPA for projects that deplete water from the Colorado River. In the last review we determined that the Program has made sufficient progress to offset water depletions from individual projects up to 4,500 acre-feet/year[3]. Therefore, it is appropriate for the Recovery Program actions to serve as Conservation Measures in the project description for projects up to 4,500 acre-feet/year.

After many years of successful implementation of the Recovery Program and Agreement, federal action agencies have come to anticipate Recovery Program activities and a requirement of a financial contribution (for new depletions greater than 100 acre-feet) toward these activities serving as RPAs that must be included in their project planning to avoid jeopardy to listed species. Thus, the RPA has essentially become part of the proposed action. The Recovery Program activities will now serve as conservation measures within the proposed action and minimize adverse effects to listed species or critical habitat. The following excerpts summarize portions of the Recovery Program that address depletion impacts, section 7 consultation, and Project proponent responsibilities:

> "All future section 7 consultations completed after approval and implementation of this program (establishment of the Implementation Committee, provision of congressional funding, and initiation of the elements) will result in a one-time contribution to be paid to the Service by water project proponents in the amount of $10.00 per acre-foot based on the average annual depletion of the project . . . This figure will be adjusted annually for inflation [the current figure is $18.91 per acre-foot] . . . Concurrently with the completion of the Federal action which initiated the consultation, e.g., . . . issuance of a 404 permit, 10 percent of the total contribution will be provided. The balance . . . will be . . . due at the time the construction commences . . . ."

It is important to note that these provisions of the Recovery Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fishes. The Recovery Program further states:

> ". . . it is necessary to protect and manage sufficient habitat to support self-sustaining populations of these species. One way to accomplish this is to provide long term protection of the habitat by acquiring or appropriating water rights to ensure instream flows. Since this program sets in place a mechanism and a commitment to assure that the instream flows are protected under State law, the Service will consider these elements under section 7 consultation as offsetting project depletion impacts."

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3 Sufficient progress determinations, including the 2009 determination, are available at: http://coloradoriverrecovery.org/documents-publications/section-7-consultation/sufficient-progress-letters.html

Biological Opinion

DESCRIPTION OF PROPOSED ACTION

The BLM's preferred alternative (Alternative A) proposes that Koch Exploration Company will drill and complete 124 new wells from 19 well pads over the next three years. This development will also result in the construction of 6.7 miles of new access roads and up to 15 miles of pipelines. As indicated in the EA/BA, the purpose of the project is to explore for economically recoverable deposits of petroleum and/or natural gas and to produce those resources for delivery to market. The proposed project area is located in Sections 27, 28, 33, 34, and 35 of Township 10 South, Range 19 East. Total ground disturbance is anticipated to be approximately 191.9 acres of disturbance, 79.4 of which is considered long term disturbance.

Drilling and completion of the proposed wells will require approximately 320 acre-feet of water for the life of the project, or an average of 107 acre-feet per year. Water will be obtained from permitted water sources. Water withdrawals associated with this project are considered to be a new depletion to the Upper Colorado River Basin. We determined that the project proponents do not intend to withdraw water directly from the White and Green Rivers for use in well completion, but language in the draft EA for this project indicates that this is a possibility and will be considered in this biological opinion. In addition, water used to complete these wells is considered a new depletion and is subject to payment into the Colorado River fish recovery program.

ACTION AREA

Our regulations define the action area as all areas directly or indirectly affected by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). This project and its associated water depletions will result in a loss of water from the Green River Basin. Thus, those portions of waterways downstream of the project area, including the Green River within and outside of the project area, are included in the action area, along with the construction footprint.

APPLICANT COMMITTED CONSERVATION MEASURES

Conservation measures are actions that the action agency and applicant agree to implement to further the recovery of the species under review. The beneficial effects of conservation measures are taken into consideration for determining both jeopardy and incidental take analyses. The following sections list the applicable conservation measures for the federally listed fish and plant species.

CONSERVATION MEASURES ASSOCIATED WITH WATER DEPLETION IMPACTS

As explained in the Consultation History section, the Recovery Program is intended to implement actions that are needed to recover the endangered fishes and avoid jeopardy and adverse modification of critical habitat. Included in the Recovery Program is a

requirement for project proponents to make monetary contributions to the Recovery Program for projects that cause water depletions greater than 100 acre-feet/year (af/yr). The BLM agrees to incorporate requirement of this contribution as a condition of any issued permit or authorization.

Once the monetary contribution is made, the Recovery Program and its actions will serve as the conservation measures to minimize adverse effects to the endangered fishes and their critical habitat caused by the project's water depletions. Depletion impacts can be offset by accomplishment of activities necessary to recover the endangered fishes as specified under the RIPRAP and the water Project proponent's one-time contribution to the Recovery Program.

As the project's maximum annual new depletion of 107 acre-feet is below the current sufficient progress threshold of 4,500 acre-feet, Recovery Program actions will serve as conservation measures to minimize adverse effects to the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail and destruction or adverse modification of critical habitat caused by the project's new depletion.

With respect to the depletion contribution, the applicant will make a one-time payment which has been calculated by multiplying the project's depletion (107 af) by the depletion charge in effect at the time payment is made. For Fiscal Year 2012 (October 1, 2011, to September 30, 2012), the depletion charge is $19.21 per acre-foot[4] for the depletion, which equals a total payment of $2,055.47 for this project. Ten percent of the total payment ($206) will be provided to our designated agent, the National Fish and Wildlife Foundation (Foundation), at the time of issuance of the Federal approval from the BLM. The remaining balance will be due at the time construction commences. The payment will be included by the BLM as a permit stipulation. All payments should be made to the Foundation:

National Fish and Wildlife Foundation
Attn: Donna McNamara, Finance Department
1133 15th Street, NW
Suite 1100
Washington, DC 20005

The payment will be accompanied by a cover letter that identifies the project and biological opinion number '6-UT-12-F-026' requiring the payment, the amount of payment enclosed, check number, and the following notation on the check – "Upper Colorado Fish Recovery Program, NA.1104." The cover letter also will identify the name and address of the payor, the name and address of the Federal Agency responsible for authorizing the project, and the address of the Service office issuing the biological opinion. This information will be used by the Foundation to notify the BLM and the Service that payment has been received. The Foundation is to send notices of receipt to these entities within 5 working days of its receipt of payment.

4 The amount payable is adjusted annually for inflation based on the Composite Consumer Price Index.

CONSERVATION MEASURES ASSOCIATED WITH CONSTRUCTION, OPERATIONS, AND MAINTENANCE

Pertinent conservation measures associated with construction, operation, and maintenance of the project include erosion control techniques determined at onsite inspections, Gold Book BMPs, and the applicant's post-construction stormwater plan[5].

Whenever water is drawn directly from either the White or Green Rivers, the following conservation measures for endangered fish will be followed[6]:

a. The best method to avoid entrainment is to pump from an off-channel location – one that does not connect to the river during high spring flows. An infiltration gallery constructed in a Service-approved location is best.
b. If the pump head is located in the river channel the following stipulations apply:
    i. Do not situate the pump in a low-flow or no-flow area as these habitats tend to concentrate larval fishes.
    ii. Limit the amount of pumping, to the greatest extent possible during that period of the year when larval fish may be present (see above).
    iii. Limit the amount of pumping, to the greatest extent possible, during the midnight hours (10 pm to 2 am), as larval drift studies indicate that this is a period of greatest daily activity. Dusk is the preferred pumping time, as larval drift abundance is lowest during this time.
c. Screen all pump intakes with 3/32" mesh material.
d. Approach velocities for intake structures should follow the National Marine Fisheries Service's document "Fish Screening Criteria for *Anadromous Salmonids.*" For projects with an in-stream intake that operate in stream reaches where larval fish may be present, the approach velocity should not exceed 0.33 feet per second (ft/s).
e. Report any fish impinged on the intake screen or entrained into irrigation canals to the Service at (801) 975-3330 or the Utah Division of Wildlife Resources:

    Northeastern Region
    152 East 100 North
    Vernal, UT 84078
    Phone: (435) 781-9453

STATUS OF THE SPECIES / CRITICAL HABITAT

The purpose of this section is to summarize the best available information regarding the current range wide status of the listed fish species. Additional information regarding listed species may be obtained from the sources of information cited for these species.

UPPER COLORADO RIVER ENDANGERED FISH

5 Page 51 and Appendix E of the EA.
6 Page 19 in the EA

The Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*) are four fish species endemic to the Colorado River Basin. All are listed as endangered species. The Colorado pikeminnow and humpback chub were listed as endangered on March 11, 1967 (32 FR 4001). The bonytail was listed as endangered on April 23, 1980 (45 FR 27710) and the razorback sucker was listed as endangered on October 23, 1991 (56 FR 54957). Critical habitat was designated for all four fish species on March 21, 1994 (59 FR 13374). For information regarding these species or their critical habitat description, life history, population dynamics, and status and distribution, please see the species specific recovery plans and recovery goals[7]:

- Colorado pikeminnow
    - Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan (U.S. Fish and Wildlife Service 2002b)
- Razorback sucker:
    - Razorback Sucker (*Xyrauchen texanus*) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan (U.S. Fish and Wildlife Service 2002d)
- Humpback chub:
    - Humpback chub (*Gila cypha*) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan (U.S. Fish and Wildlife Service 2002c)
- Bonytail:
    - Bonytail (*Gila elegans*) Recovery Goals: amendment and supplement to the Bonytail Chub Recovery Plan (U.S. Fish and Wildlife Service 2002a)

Designated critical habitat for all four species in the State of Utah can be seen in Appendix A. For specific information regarding the river reaches and the primary constituent elements, please refer to 59 FR 13374.

Recovery units for each of the four species are delineated into the Upper and Lower Colorado River Basins (separated at Glen Canyon Dam, with the Upper including the San Juan and Green River sub-basins) (U.S. Fish and Wildlife Service 2002a, 2002b, 2002d, 2002c). This project affects only the Upper Basin Recovery Unit and as a result, this biological opinion will focus on the status of these species in that unit.

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed State or Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or

7 Available online at: http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-goals.html

private actions which are contemporaneous with the consultation process. The action area is defined at 50 CFR 402 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the purposes of this consultation, the action area has been defined to include the area of influence.

COLORADO PIKEMINNOW

Colorado pikeminnow occur in three populations: Green River Sub-basin; Upper Colorado River Sub-basin; and San Juan River Sub-basin (U.S. Fish and Wildlife Service 2002b). The Green River Sub-basin is the only population that is likely to be affected by the proposed action. Populations of this species, as well as known spawning locations, occur downstream of this project.

The Recovery Program conducts population monitoring on five river reaches in the Green River Basin: (1) the Yampa River; (2) the White River; (3) the middle Green River (16 km downstream of the Yampa confluence to upstream of the White River confluence); (4) the Desolation-Gray Canyon stretch of the Green River; and (5) the lower Green River (near the town of Green River downstream to the Colorado River confluence) (Bestgen et al. 2005). Table 1 summarizes these monitoring efforts.

Population estimates demonstrated an apparent decline in fish greater than 400 mm in all reaches from 2000 to 2003 (Bestgen et al. 2005). Declines were greatest in river reaches that supported the highest numbers of individuals (59% and 63% decline in the middle Green and White Rivers respectively), but declines were still evident in the other three reaches (29%, 11%, and 36% declines in the Yampa River, Desolation-Gray Canyon, and lower Green River respectively) (Bestgen et al. 2005). Basin-wide adult Colorado pikeminnow abundance estimates apparently declined from 4,084 in 2000 to 2,142 in 2003, an apparent reduction of 48% (Bestgen et al. 2005).

River Reach	Prior to 2000	2000	2001	2002	2003	2006	2007	2008
middle Green River		**1613** 1359-1948	**1184** 986-1441	**834** 593-1192	**663** 491-918	**674** 350-1422	**1026** 575-1901	**1109** 520-2444
Desolation-Gray Canyon			**699** 527-963	**757** 504-1166	**621** 423-942	**519** 350-813	**484** 307-793	**1296** 669-2580
lower Green River			**355** 270-496	**261** 184-388	**227** 154-352	**791** 617-1025	**604** 476-783	**467** 301-752
Yampa River		**317** 184-623	**320** 245-438	**277** 157-512	**224** 123-434	**149** 71-409	**153** 74-354	**140** 75-297
White River		**1100** 767-1653	**746** 586-973	**643** 491-864	**407** 300-573	**321** 207-548	**451** 309-691	**660** 355-1278
Entire Green River Basin	**6000 - 8000**	**3030** 2467-3592	**3303** 2900-3707	**2771** 2216-3325	**2142** 1686-2598	**2454** 1920-3185	**2718** 2055-3656	**3672** 2397-5715

TABLE 1. COLORADO PIKEMINNOW POPULATION ESTIMATES FOR THE GREEN RIVER SUB-BASIN OVER THE PAST DECADE (ESTIMATES SHOWN IN BOLD; CONFIDENCE INTERVALS SHOW BELOW).

Data suggests this apparent decline in abundance was caused, in part, by low recruitment rates which were not able to offset adult mortality (Bestgen et al. 2005). Low recruitment may be a product of weak year-classes of age-0 fish produced in nursery areas of the middle and lower Green River over previous years (Bestgen et al. 2005). However, survival rates for adult fish from 2000 to 2003 were only approximately 65%, which was lower than historic estimates (82%) or estimates from the upper Colorado River (~85%) (Bestgen et al. 2005). Therefore, apparent declines in populations were also tied to higher adult mortality. While mechanisms are unknown, it seems that low, drought-related base flows were related to apparent reductions in adult and recruit-sized fish, resulting in an overall decline in abundance (Bestgen et al. 2005). The Recovery Program continued population sampling efforts from 2006 to 2008. Analysis of this data suggests a 50% increase in abundance of adult Colorado pikeminnow throughout the Green River Basin over the study period, and about a 70% increase over 2003 estimates (Bestgen et al. 2010). Annual point estimates from 2006 to 2008 indicate highest apparent abundance increases in Desolation-Gray Canyon, the middle Green River, and the White River (Bestgen et al. 2010). Abundance of adult Colorado pikeminnow was stable and low in the Yampa River during the 2006 to 2008 period, but populations showed continued decline since 2003 (Bestgen et al. 2010). Abundance of adult Colorado pikeminnow in the lower Green River declined over the study period, but abundance levels were higher than in the 2000 to 2003 period (Bestgen et al. 2010). Basinwide, adult Colorado pikeminnow abundance increased each year of the study, from 2,454 fish in 2006, 2,718 in 2007, and 3,672 in 2008 (Bestgen et al. 2010).

Abundance estimates for recruit-sized fish during 2006 to 2008 were relatively high in the Green River Basin, and averaged 22% of estimated adult Colorado pikeminnow abundance (Bestgen et al. 2010). Recruitment rates were more than sufficient to offset mortality rates of adults, with most of the recruits apparently being produced in 2000 in the lower Green River when a large year-class of age-0 Colorado pikeminnow was produced by abundant adults (Bestgen et al. 2010). Survival rates from 2006 to 2008 averaged 80%, which are much greater than 2000 to

2003 (65%), and are in line with historic (82%) and upper Colorado River (~85%) estimates (Bestgen et al. 2010).

RAZORBACK SUCKER

In Utah, the razorback sucker occupies parts of the Green River Subbasin, the Upper Colorado River Subbasin, and the San Juan River Subbasin (U.S. Fish and Wildlife Service 2002d). The Green River Subbasin is the only population that is likely to be affected by the proposed action. Populations of this species, as well as known spawning locations, occur downstream of this Project.

Population estimates during the 1980 to 1992 period were on average between 300 and 600 wild fish (Modde et al. 1996). By the early 2000s, the wild population consisted of primarily aging adults, with steep decline in numbers caused by extremely low natural recruitment (U.S. Fish and Wildlife Service 2002d). Although reproduction was occurring, very few juveniles were found (U.S. Fish and Wildlife Service 2002d). Population estimates from sampling efforts in the Middle Green River had declined to approximately 100 by 2002, with researchers hypothesizing that wild fish in the Upper Colorado River Basin may have been extirpated because of lack of recruitment (Bestgen et al. 2002).

Because the population was so tenuous, the Recovery Program operates a stocking program for razorback sucker in the Upper Colorado River Basin. Almost 120,000 individual razorback suckers were stocked into the Colorado, Gunnison, and Green rivers from 1995 through 2005 (Zelasko et al. 2009). Stocking goals initiated in 2004 call for approximately 10,000 two year old fish (greater than 300 mm TL) to be stocked in each of the middle Green River and upper Colorado River sub-basins for each of six consecutive years (Zelasko et al. 2009). An assessment of the stocking efforts indicate that to improve success, future stocking should use larger individuals and stock outside of the summer season (Zelasko et al. 2009).

HUMPBACK CHUB

Six self-sustaining populations of humpback chub are known to exist, three of which are in Utah: Westwater Canyon, Colorado River; Desolation/Gray Canyons, Green River; and Cataract Canyon, Colorado River (U.S. Fish and Wildlife Service 2002c). Each population consists of a discrete group of fish, geographically separated from the other populations, but with some exchange of individuals. Humpback chub do not migrate to spawn, so populations are both resident and reproducing. Desolation/Gray and Cataract Canyons are found downstream of this project.

Population estimates for humpback chub tend to be variable, as their habitat is not easily accessible and conditions can greatly vary. Analysis of point estimates generated by capture-recapture data demonstrated that the adult humpback chub population in Desolation and Gray Canyons was composed of 1,254 individuals in 2001, 2,612 individuals in 2002, and 937 individuals in 2003 (Jackson and Hudson 2005). Similar analysis in Cataract Canyon indicated adult point estimates were 126 in 2003, 91 in 2004, and 70 in 2005.

BONYTAIL

Bonytail were once widespread in the large rivers of the Colorado River Basin (multiple references in U.S. Fish and Wildlife Service 2002a). The species experienced a dramatic, but poorly documented, decline starting in about 1950, following construction and operation of mainstem dams, introduction of nonnative fishes, poor land-use practices, and degraded water quality (U.S. Fish and Wildlife Service 2002a). A stocking program is being implemented to reestablish populations in the Upper Colorado River Basin. However, Bonytail remain so rare that it is currently not possible to conduct population estimates.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

COLORADO RIVER ENDANGERED FISHES

Water used for construction, completion, and dust control will be obtained from existing water rights, which affects downstream flows in the Green River Basin. The total annual water depletion for the proposed action is estimated to be 107 acre-feet.

EFFECTS TO ENDANGERED SPECIES

This project will adversely affect Colorado pikeminnow, razorback sucker, bonytail, and humpback chub by reducing the amount of water in the river system upon which they depend by up to 107 acre-feet/year for the life of the project. The effects to all four species primarily result from the effects of the action upon their habitats. In general, the proposed action will adversely affect the four listed fish by reducing the amount of water available to them, increasing the likelihood of water quality issues, increasing their vulnerability to predation, and reducing their breeding opportunities by shrinking the amount of breeding habitat within their range.

Cumulatively with other depletions, removing 107 acre-feet/year from the Green River Basin will change the natural hydrological regime that creates and maintains important fish habitats in the Duchesne, Green and Colorado Rivers, such as spawning habitats, and reduces the frequency and duration of availability of these habitats of the four endangered fish. The cumulative reduction of available habitats will directly affect individuals of all four species by decreasing reproductive potential and foraging and sheltering opportunities. Many of the habitats required for breeding become severely diminished when flows are reduced. As a result, individual fish within the action area may not be able to find a place to breed or will deposit eggs in less than optimal habitats more prone to failure or predation. In addition, reduction in flow rates lessens the ability of the Green River to inundate bottomland, a source of nutrient supply for fish

productivity. Water depletions also exacerbate competition and predation by nonnative fishes by altering flow and temperature regimes toward conditions that favor non-natives.

Cumulatively with other depletions, the proposed depletion affects the water quality in the action area by increasing concentrations of heavy metals, selenium, salts, pesticides, and other contaminants. Increases in water depletions will cause associated reductions in assimilative capacity and dilution potential for any contaminants that enter the river. The project depletions will cause a proportionate decrease in dilution, which in turn will cause a proportionate increase in heavy metal, selenium, salts, pesticides, and other contaminant concentrations in the Duchesne, Green, and Colorado Rivers to Lake Powell. An increase in contaminant concentrations in these rivers will likely result in an increase in the bioaccumulation of these contaminants in the food chain, which could adversely affect the endangered fishes, particularly the predatory Colorado pikeminnow. Selenium is of particular concern due to its effects on fish reproduction and its tendency to concentrate in low velocity areas that are important habitats for Colorado pikeminnow and razorback suckers.

The proposed project will affect the physical condition of habitat for the four listed fish by resulting in a reduction of water. This reduction will contribute to the cumulative reduction in high spring flows, which are essential for creating and maintaining complex channel geomorphology and suitable spawning substrates, creating and providing access to off-channel habitats, and possibly stimulating Colorado pikeminnow spawning migrations. Adequate summer and winter flows are important for providing a sufficient quantity of preferred habitats for a duration and at a frequency necessary to support all life stages of viable populations of all endangered fishes. To the extent that the proposed project will reduce flows, the ability of the river to provide these functions will be reduced. This reduction of water affects habitat availability and habitat quality.

The proposed project will contribute to an increase in nonnative fish populations. The modification of flow regimes, water temperatures, sediment levels, and other habitat conditions caused by water depletions has contributed to the establishment of nonnative fishes. Endangered fishes within the action area will experience increased competition and predation as a result.

EFFECTS TO CRITICAL HABITAT

All four of the listed Colorado River fish require the same Primary Constituent Elements (PCEs) essential for their survival. A PCE is a physical or biological feature essential to the conservation of a species for which its designated or proposed critical habitat is based on (such as food, water, air, light, minerals; cover and shelter; and sites for breeding)[8]. Therefore, we are combining our analysis of all four species into one section. Although the amount of designated critical habitat varies for each of the four species, the effects will be the same for all critical habitats within the action area.

Water, physical habitat, and the biological environment are the PCEs of critical habitat. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species.

8 For more information, see the Endangered Species Glossary at: http://www.fws.gov/nc-es/es/glossary.pdf

The physical habitat includes areas of the Duchesne, Green, and Colorado River systems that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment.

PRIMARY CONSTITUENT ELEMENT – WATER

This project will deplete up to 107 acre-feet/year from the Green River Basin. Removing water from the river system changes the natural hydrological regime that creates and maintains important fish habitats, such as spawning habitats, and reduces the frequency and duration of availability of these habitats of the four endangered fish. In addition, reduction in flow rates lessens the ability of the river to inundate bottomland, a source of nutrient supply for fish productivity and important nursery habitat for razorback sucker. Water depletions change flow and temperature regimes toward conditions that favor nonnative fish, thus adding to pressures of competition and predation by these nonnative fishes as discussed above.

Changes in water quantity will affect water quality, which is a PCE of critical habitat. Contaminants enter the Duchesne, Green, and Colorado Rivers from various point and non-point sources, resulting in increased concentrations of heavy metals, selenium, salts, pesticides, and other contaminants. Increases in water depletions will cause associated reductions in assimilative capacity and dilution potential for any contaminants that enter critical habitat in the Duchesne, Green, and Colorado Rivers.

Depletions from this project will cause a proportionate decrease in dilution, which in turn will cause a proportionate increase in heavy metal, selenium, salts, pesticides, and other contaminant concentrations in the Duchesne, Green, and Colorado Rivers to Lake Powell. An increase in contaminant concentrations in the river will likely result in an increase in the bioaccumulation of these contaminants in the food chain, which could adversely affect the endangered fishes, particularly the predatory Colorado pikeminnow. Selenium is of particular concern due to its effects on fish reproduction and its tendency to concentrate in low velocity areas that are important habitats for Colorado pikeminnow and razorback suckers.

PRIMARY CONSTITUENT ELEMENT - PHYSICAL HABITAT

This project will affect the physical condition of habitat for the four listed fish by resulting in a reduction of water. This reduction will contribute to the cumulative reduction in high spring flows, which are essential for creating and maintaining complex channel geomorphology and suitable spawning substrates, creating and providing access to off-channel habitats, and possibly stimulating Colorado pikeminnow spawning migrations. Adequate summer and winter flows are important for providing a sufficient quantity of preferred habitats for a duration and at a frequency necessary to support all life stages of viable populations of all endangered fishes. To the extent that this project will reduce flows, the ability of the river to provide these functions will be reduced. This reduction of water affects habitat availability and habitat quality.

PRIMARY CONSTITUENT ELEMENT - BIOLOGICAL ENVIRONMENT

To the extent that it will reduce flows and contribute to further habitat alteration, the project will contribute to an increase in nonnative fish populations. The modification of flow regimes, water temperatures, sediment levels, and other habitat conditions caused by water depletions has contributed to the establishment of nonnative fishes. Endangered fishes within the action area will experience increased competition and predation as a result.

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

Water depletions reduce the ability of the river to create and maintain the primary constituent elements that define critical habitats. Food supply, predation, and competition are 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.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. 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 many special status species 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 introductions of non-native plant, wildlife, or fish or other aquatic species, which can alter native habitats or out-compete or prey upon native species. Many of these activities are expected to continue on state and private lands within the range of the various federally protected wildlife, fish, and plant species, and could contribute to cumulative effects to the species within the action area. Species with small population sizes, endemic locations, or slow reproductive rates, will generally be more susceptible to cumulative effects.

UPPER COLORADO RIVER ENDANGERED FISH

Reasonably foreseeable future activities that may affect river-related resources in the area include oil and gas exploration and development, fire management, irrigation, recreational activities, and activities associated with the Upper Colorado River Endangered Fish Recovery

Program. Implementation of these projects affects the environment, including, but not limited to, water quality, water rights, socioeconomic, and wildlife resources.

Cumulative effects to this species will include the following types of impacts:

- changes in land use patterns that will further fragment, modify, or destroy potential spawning sites or designated critical habitat;
- shoreline recreational activities and encroachment of human development that will remove upland or riparian/wetland vegetation and potentially degrade water quality; and
- competition with, and predation by, exotic fish species introduced by anglers or other sources.

CONCLUSION

After reviewing the current status of the Colorado pikeminnow, humpback chub, bonytail, and razorback sucker, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that this project is not likely to jeopardize the continued existence of the endangered fish and is not likely to destroy or adversely modify designated critical habitat. We reach this conclusion because the Project will only enact downstream impacts on the four listed fish species and has followed all requirements under the Upper Colorado River Endangered Fish Recovery Program to apply conservation measures for these impacts.

We recognize that the amount and use of water depletions may vary from year to year. Consequently, water users assume the risk that the future development of senior water rights, including Tribal water rights, may result in shortages of water to junior users. Nothing in this biological opinion precludes any new depletion that results from the exercise of senior water rights within the action area.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. We further define harm is further to include significant habitat modification or degradation that results in death or injury of listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. We define harass as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7 (o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement. Two aspects of this

project may cause take of the listed fish species: 1) water depletions from the Green River Basin; and 2) water withdrawn directly from the White or Green Rivers.

WATER DEPLETIONS FROM THE GREEN RIVER BASIN

Colorado pikeminnow, humpback chub, bonytail, and razorback sucker are harmed from the reduction of water in their habitats resulting from this project in the following manner: 1) individuals using habitats diminished by the proposed water depletions could be more susceptible to predation and competition from non-native fish; 2) habitat conditions may be rendered unsuitable for breeding because reduced flows will impact habitat formulation and maintenance as described in the biological opinion.

Estimating the number of individuals of these species that will be taken as a result of water depletions is difficult to quantify for the following reasons: 1) determining whether an individual forwent breeding as a result of water depletions versus natural causes is extremely difficult to determine; 2) finding a dead or injured listed fish is difficult, due to the large size of the action area and because carcasses are subject to scavenging; 3) natural fluctuations in river flows and species abundance may mask depletion effects; and 4) effects that reduce fecundity are difficult to quantify. However, we believe the level of take of these species can be monitored by tracking the level of water reduction and adherence to the Recovery Program. Specifically, if the Recovery Program is not implemented, or if the current anticipated level of water depletion is exceeded, we fully expect the level of incidental take to increase as well. Therefore, we exempt all take in the form of harm from the depletion of 107 acre-feet of water per year and resulting impacts as described in the Effects section of this biological opinion. Water depletions above the amount addressed in this biological opinion will exceed the anticipated level of incidental take and are not exempt from the prohibitions of section 9 of the Act.

The implementation of the Recovery Program is intended to minimize impacts of water depletions, therefore, support of Recovery Program activities by the BLM as described in the proposed action exempts the BLM and project proponent from the prohibitions of section 9 of the Act. The BLM is responsible for reporting to us if the amount of average annual depletion is exceeded.

CONSTRUCTION, OPERATIONS, AND MAINTENANCE OF THE PROJECT

We do not anticipate any take to occur from construction, operations, or maintenance of the project beyond take associated with water depletions as described above. We expect no individuals of the four listed fish species to encounter the project features during operation and maintenance. We also expect that construction methods, as proposed, should not create any downstream impacts. Therefore, we do not authorize any incidental take of the four federally listed fish species beyond take that may occur due to the depletion of 107 acre-feet of water per year.

REASONABLE AND PRUDENT MEASURES

We believe that the BLM has proposed sufficient measures necessary to minimize impacts of incidental take as part of their proposed action by implementing the Recovery Program through

the project's depletion fee and implementing adequate construction, operation and maintenance BMPs. We are therefore not adding additional reasonable and prudent measures at this time.

REPORTING REQUIREMENTS

The incidental take statement provided in this biological opinion satisfies the requirements of the Endangered Species Act of 1973, as amended. This statement does not constitute an authorization for take of listed migratory birds under the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, or any other Federal statute.

Upon locating dead, injured, or sick listed species, immediate notification must be made to our Salt Lake City Field Office at (801) 975-3330 and the Service's Division of Law Enforcement, Ogden, Utah, at (801) 625-5570. Pertinent information including the date, time, location, and possible cause of injury or mortality of each species will be recorded and provided to our office. Instructions for proper care, handling, transport, and disposition of such specimens will be issued by our Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We recommend that the BLM continue to work toward threat abatement by continuing to implement best management practices for preventing impacts to the four Colorado River fishes' habitat, including (but not limited to):

- Employ closed-loop drilling methods for drilling and completion activities within all designated 100-year floodplains of streams and washes. This will apply to both new construction and expansion of existing facilities.
- Machinery should be fueled outside of all stream channels to prevent spillage into waterways.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in your request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the average annual water withdrawals exceed the estimated 107 acre-feet by more than 10%; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in

a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate the efforts the BLM has made to work with us to protect threatened and endangered species. If we can be of further assistance, or if you have any questions, please feel free to contact Jessi Brunson, botanist, at (435) 781-4448.

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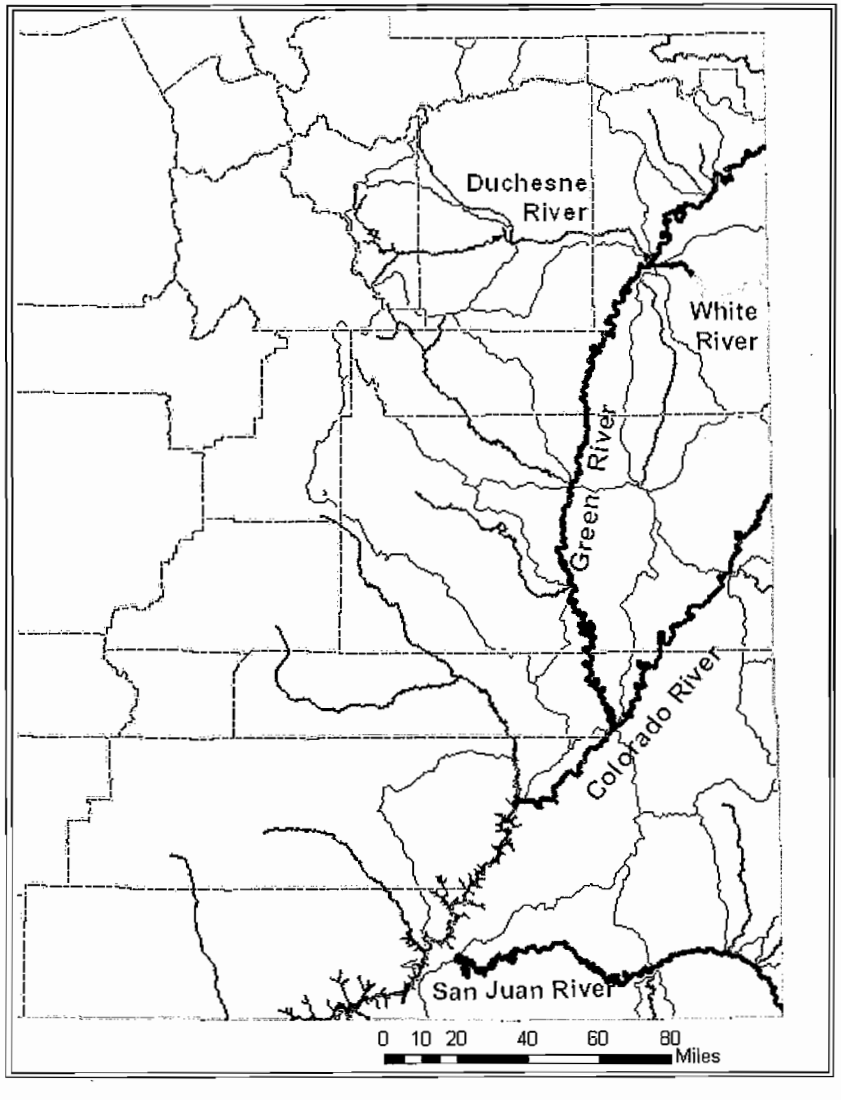
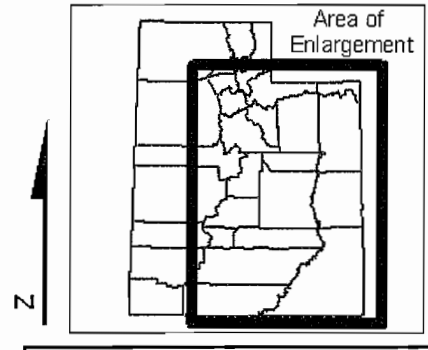
Designated Critical Habitat in Utah for Federally Listed Colorado River Fish





Legend

Critical Habitat

- Colorado Pikeminnow
- Razorback Sucker
- Razorback Sucker, Colorado Pikeminnow
- Razorback Sucker, Colorado Pikeminnow, Bonytail Chub, Humpback Chub
- Major Rivers (non-critical habitat)

Utah County Boundaries

Watersheds requiring consultation*

(Recovery Program, Mainstem River)

- San Juan River Basin Recovery Implementation Program, San Juan River
- Upper Colorado River Endangered Fish Recovery Program, Green River
- Upper Colorado River Endangered Fish Recovery Program, Upper Colorado River

Created by Kevin McAbee using FWS & USGS data. February 19, 2009.

*Water depletions from any portion of the occupied drainage are considered to adversely affect or adversely modify the critical habitat of the endangered fish species and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

APPENDIX A

APPENDIX G: RESPONSE TO COMMENTS ON THE ENVIRONMENTAL ASSESSMENT FOR THE NORTH ALGER PROJECT
Environmental Assessment, DOI-BLM-UTG010-2012-0112-EA

Two comments were received following the public comment period for the North Alger Project. Comments that were not considered substantive (e.g. opinions or preferences) did not receive a formal response, but were considered in the BLM decision-making process. Responses to substantive comments are identified in the table below.

No.	Commenter	Comment	BLM Response
1	Southern Utah Wilderness Alliance (SUWA)	"BLM has not fully or summarily analyzed any action alternatives to Koch Exploration Company LLC's proposed action. However, at least two alternatives exist which would allow Koch to fully develop the gas resource in the project area with a reduced surface impact."	BLM acknowledges that there are many potential alternatives to the proposed action. However, BLM has determined that the proposed action is in conformance with the current Resource Management Plan and leverages existing technology to allow for directional drilling from every proposed wellpad. BLM has found the proposed action to be a reasonable mode of developing the oil and gas resources on a lease where the reservoir is not definitively known to be productive. The proposed action allows for up to 16 wells to be drilled from one wellpad depending on production. This method allows flexibility in development and is considered progressive when compared to traditional wellpad density in the Uinta Basin.
2	SUWA	"This project will exceed limits on ozone; the BLM cannot approve projects that will lead to exceedances of federal air quality standards."	BLM has coordinated the final development of this EA with the EPA (see Section 5.1, Table 5-1.) and updated the EA to reflect EPA's concerns. EPA did not find it necessary to submit formal comments, but collaborated with BLM's Air Quality Specialist to clarify elements of the proposed action. These updates incorporate an adaptive management strategy that incorporates a regional ozone action plan that would ensure that BLM and the proponent would employ measures that are consistent with the Greater Natural Buttes EIS and other collaborative efforts in the Uinta Basin. The proponent of this project agreed with these updates and BLM has incorporated them into the proposed action under Section 2.2.6.
3	SUWA	"BLM should have discussed all predicted effects of climate change in its assessment of existing conditions and then provided actual analysis in its discussion of the impacts to global warming from the various alternatives of this project."	To attempt to quantify "all predicted effects of climate change" would yield an unwieldy analysis. BLM did present an estimate of principle greenhouse gas emissions in Table 4-4. BLM acknowledges that emissions from the North Alger Project, at present, cannot be adequately assessed in a meaningful way relative to global climate change based on a lack of proven or consistent modeling. Section 4.2.1.5 of the EA discusses greenhouse gas emissions for reference.

No.	Commenter	Comment	BLM Response
4	SUWA	"The North Alger EA fails to evaluate the potential contributions of the activities in the North Alger area on soil disturbance, which leads to early snowmelt in nearby mountains when transported in windstorms."	This comment leads the reader to believe that fugitive dust generated in the Uinta Basin would translate into early snowmelt in nearby mountains, given a set of conditions. BLM is not required to analyze speculative or unverified potential impacts in NEPA documents.
5	SUWA	"BLM should make proper estimations of the amount of land able to be reclaimed based on their own statements that reclamation of these soils is generally poor."	Historically, BLM has acknowledged that soils in the Uinta Basin are difficult to reclaim. Nevertheless, reclamation practices have improved over time. Further, BLM's commitment to ensuring reclamation takes place has increased through implementing reclamation planning into project designs and requiring public land users to comply with reclamation guidelines. A Reclamation plan, (Appendix D) has been determined to be in conformance with the BLM Green River District Reclamation Guidelines. These guidelines require oil and gas operators to meet reclamation standards. Should standards remain un-met for various reasons, BLM does not abandon reclamation efforts, but requires on-going efforts until reclamation standards are met. Section 2.2.4 describes the proponent's agreement with these standards and commitment to adhere to BLM's requirements.
6	SUWA	"BLM has failed to take a hard look at the effects of the proposed project on biological soils. BLM has not even acknowledged that biological soils exist within the North Alger area. BLM must prepare an inventory to assess the location or extent of these soils.	Section 4.2.1.6 of the EA discusses impacts to soils and biological crusts. In addition, the North Alger Project is programmatic in nature, meaning that the actual site-specific analysis of wellpad/roads/pipelines would be analyzed under an additional NEPA document. During on-site visits, and through the NEPA analysis, BLM will disclose any further impacts from development at that time. Depending on the well pad location, biological soils in the area may or may not be discussed.
7	SUWA	"BLM should more fully consider the impact of livestock in the area on those species, given that there will be the same amount of livestock in a smaller area, likely leading to increased interactions between livestock and special status species."	The EA adequately discloses and analyzes the number of AUMs that would be unavailable for the life of the project. The AUMs are determined on an allotment and project basis in the EA in Section 3.3.7. Less than 1% of the AUMs on the allotment would be unavailable for the life of the project and approximately 3% would be unavailable in the project area. Since cumulative impacts are assessed on an allotment basis, it has been determined that 8 AUMs would not make a substantial difference to available forage across the allotment.

United States Department of the Interior
Bureau of Land Management

Decision Record
for
Environmental Assessment
DOI BLM UT-G010-2012-0112

January 2013

North Alger Project

Location: Sections 27-28, 33-35 and 34
Township 10 South, Range 19 East

Salt Lake Base and Meridian
Uintah County, Utah

Applicant: Koch Exploration Company LLC

U.S. Department of the Interior
Bureau of Land Management
Vernal Field Office
170 South 500 East
Vernal, Utah 84078
Phone: (435) 781-4400
Fax: (435) 781-4410

DECISION RECORD
for
Environmental Assessment
DOI BLM UT-G010-2012-0112
North Alger Project

Decision:

It is my decision to authorize the development of the North Alger project area as described in the Proposed Action Alternative of Environmental Assessment (EA) DOI BLM UT-G010-2012-0112. Proposed drilling would include up to one hundred twenty four wells on up to 19 new well pads and associated facilities. A detailed description of the Proposed Action Alternative is included in Section 2.2 of the EA.

This decision is contingent on meeting all applicant committed environmental protection measures and mitigation described in the EA and applicable conditions of approval identified in attachment A of this decision record.

Authorities: The Project Area lands were leased for oil or gas development under authority of the Mineral Leasing Act. A lessee operator has the right to explore for oil and gas on its leases as specified in 43 CFR 3101.1-2, and if a discovery is made, to produce oil and/or natural gas for economic gain, so long as those operations are conducted in accordance with the lease terms and 43 CFR 3160. All right-of-way development would be conducted in compliance with 43 CFR 2800.

Decision Rationale:

The subject lands were leased for oil or gas development under the authority of the Mineral Leasing Act of 1920, as modified by the Federal Land Policy and Management Act of 1976, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. The lessee/operator has the right to explore for oil and gas on the lease as specified in 43 CFR 3102.1-2, and if a discovery is made, to produce oil and/or natural gas for economic gain.

The proposed project is consistent with the Uintah County General Plan, 2011-*as amended*. In general, the county 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.

There are no comprehensive State of Utah plans for the vicinity of the selected alternative. However, the State of Utah School and Institutional Trust Lands Administration (SITLA) have leased much of the nearby state land for oil and gas production. Consequently, it is assumed that the selected alternative would be consistent with SITLA and the objectives of the State of Utah.

The selected alternative meets the BLM's need to acknowledge and allow development of valid existing leases. The BLM objective to reduce impacts is met by the the imposing of mitigation measures to protect other resource values.

The North Alger EA analyzed the Proposed Action and No Action Alternatives. For a detailed description of the alternatives, refer to sections 2.2 and 2.3 of the EA, respectively. The selected alternative best addressed the BLM's purpose and need for the project while responding to the proponent's proposal for development of their leases while minimizing potential environmental impacts. The BLM has reached a Finding of No Significant Impact determination for the selected alternative.

The management of BLM public lands and resources in the North Alger project area is directed and guided by the Vernal Field Office Approved Resource Management Plan (RMP) and Record of Decision (ROD) (BLM 2008). The ROD and RMP allow for processing of Applications for Permit to Drill (APDs) and right-of-way (ROW) grant applications in support of oil and gas operations with the impacts of construction and operation activities (e.g., drilling of wells, operation of compressor stations, etc.) to be analyzed on a case-by-case basis. The management objective of the RMP for energy resources is to meet local and national non-renewable and renewable energy needs, while protecting other resource values.

Public involvement occurred as described in Chapter 5 of the EA. A 30-day public comment period was held for the EA from October 12, 2012 through November 12, 2012. Public comment letters have been reviewed, and substantive comments have been responded to in Appendix G of the EA. No substantial changes necessitating a further public review period were made as a result of the public comment period.

Protest/Appeal Language: This decision is effective upon the date it is signed by the Authorized Officer. The decision is subject to appeal. Under BLM regulation, this decision is subject to administrative review in accordance with 43 Code of Federal Regulations 3165. Any request for administrative review of this decision must include information required under 43 Code of Federal Regulations 3165.3(b) *State Director Review*, including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, Utah State Office, P.O. Box 45155, Salt Lake City, Utah 84145-0155, within 20 business days of the date this decision is received or considered to have been received.
If you wish to file a petition for stay, the petition for stay should accompany your notice of appeal and shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied;
(2) The likelihood of the appellant's success on the merits;
(3) The likelihood of irreparable harm to the appellant or resources if the stay is not granted; and
(4) Whether the public interest favors granting the stay

Authorized Officer

JAN 17 2013
Date

Attachment 1: Conditions of Approval

Air Quality:

- The Operator will utilize drilling rig engines of Tier 2 quality or better.
- The Operator will install dehydrator volatile organic compound (VOC) emission controls to attain + 90 percent efficiency.
- If needed, the Operator will install stationary internal combustion engines that meet an emissions standard of 2 grams/BHP-hour for engines less than 300 horsepower (HP) and 1 gram/BHP-hour (base horsepower-hour) for engines greater than or equal to 300 HP. *Note: No stationary internal combustion engines are proposed for this project*.
- The Operator will install 95 percent efficient VOC emission controls on production tanks with the potential to emit more than 6 tons per year (TPY) VOCs, as required by NSPS Subpart OOOO (EPA, 2011f-as cited in the EA).
- The Operator will utilize low-bleed (or equivalent device that does not exceed the EPA low-bleed emissions thresholds of 6 scfh) pneumatic devices at all new and existing production facilities (EPA, 2011f-as cited in the EA).
- The Operator will establish a thief hatch/Enardo inspection and replacement program to minimize tank losses.
- The Operator will utilize telemetry to minimize well visits.
- The Operator will install solar-powered chemical pumps on production facilities.

The Operator will employ measures to mitigate any potential exceedance of the 1-hour NO2 standard during drilling operations by employing effective public health buffer zones out to 200 meters (m) from the nearest emission source. Examples of an effective public health protection buffer zone include the demarcation of a public access exclusion zone by signage at intervals of every 250 feet that is visible from a distance of 125 feet during daylight hours, and a physical buffer such as active surveillance to ensure the property is not accessible by the public during drilling operations. Additionally, the applicant commits to developing a project-specific adaptive management strategy, to be informed by periodic emission inventory updates. Implementation of this strategy and associated application of "enhanced" ozone mitigation measures would be required once the proposed project is initiated if:

1) USEPA designates the area "nonattainment" for ozone;
2) There is a monitored ozone standard exceedance;
3) The ARMS modeling shows that additional mitigation is needed to prevent future ozone exceedances; or
4) The ARMS group establishes industry-wide mitigation requirements through ongoing modeling.

If implementation of this adaptive management strategy is triggered, the applicant commits to working with the BLM to analyze project-specific "enhanced" mitigation measures and employ them within 1 year. The measures to be considered could include, but would not be limited to, the following:

- Reducing the total number of drill rigs.
- Installing Tier 4 or better drill rig engines.
- Seasonally reducing or ceasing drilling during specified periods.
- Using only lower-emitting drill and completion rig engines during specified time periods.

- Using natural gas-fired drill and completion rig engines.
- Replacing internal combustion engines with gas turbines for natural gas compression.
- Using electric drill rig or compression engines.
- Centralizing gathering facilities.
- Limiting blow-downs or restricting them during specified periods.
- Installing plunger lift systems with smart automation.
- Employing a monthly Forward Looking Infrared, or FLIR, monitoring program to reduce VOCs.
- Enhancing a direct inspection and maintenance program.
- Employing tank load out vapor recovery.
- Employing enhanced VOC emission controls with 95 percent control efficiency on additional production equipment having a potential to emit of greater than 5 tons per year.

In addition to the commitments discussed above, the applicant commits to complying with applicable air pollution control rules and regulations.

Air quality issues are being addressed on a Utah-wide basis through the Utah Air Resource Technical Advisory Group (UTAG) and the BLM's ARMS. The actions outlined below have been designed to address ozone levels possibly associated with oil and gas operations in the Uinta Basin. The actions consist of the following elements:

- Refine air quality modeling predictions;
- Develop a Uinta Basin ozone action plan; and
- Implement a regional ozone action plan.

The first two elements of this strategy are being implemented by the BLM and other agency stakeholders, independent of the decision to be made regarding further development in the Uinta Basin. Regional operators may participate in these initial planning steps, thereby having the opportunity to contribute to the outcome of the process. The third element would require specific action by the applicant and other oil and gas operators in the Uinta Basin following the approval of the Decision Record. All three elements are described in more detail in the following paragraphs.

Cultural Resources:

- Prior to any construction-related surface disturbance, all well pad sites and access roads will be examined by an archaeologist approved by the BLM to determine the presence of cultural resources. If any are found, recommendations will be made to avoid or recover such resources. The possible need for on-site monitoring will be addressed at the onsite inspection.
- If any historic or archaeological resources are found during operations, all operations that could further disturb such materials will be suspended, and the AO will be contacted for direction.

Livestock Grazing:

- If existing range improvements were to be damaged by project operations, the Operator will contact the AO immediately for direction.
- Stock ponds in the NAPA would be avoided such that they would not be damaged by project operations. If existing stock ponds were to be functionally impaired by sedimentation resulting from project operations, the Operator will contact the AO immediately for direction and will take measures to restore the functionality of affected range improvements.

Paleontological Resources:

- In sensitive fossil areas where bedrock is exposed at or near surface (generally less than 3 feet below the soil surface), a BLM-approved paleontologist will examine well pad sites, access roads, and pipelines for paleontological resources and make recommendations regarding the disposition of such resources. The possible need for monitoring will be addressed at the onsite inspection.
- If any paleontological resources are found during operations, all operations that could further disturb such materials will be suspended, and the AO will be contacted for direction.

Raptors and Other Migratory Birds:

- Surveys for raptors and other migratory birds will be conducted as directed by the AO.
- Construction, drilling, and completion operations will be conducted in compliance with spatial offsets and timing limitations specified in Appendix A, Attachment 2, of the Approved RMP (BLM, 2008) unless waived by the AO.

Soils and Water:

- No new surface disturbance will occur in Kings Canyon proper, including side slopes, or in the active channel.
- Slopes greater than 40 percent are designated as NSO by the Approved RMP, Appendix K (BLM, 2008). These slopes may only be constructed on if it can be demonstrated that alternative disturbances would cause undue/unnecessary degradation.
- Diversion dikes or terraces, straw bales, silt fences, weed-free mulch, soil stabilizers, or sediment basins would be utilized as determined appropriate during the onsite.
- Stormwater flow and sedimentation will be controlled with the implementation of Gold Book BMPs and the Operator's Post-construction Stormwater plan (SWPPP) (See Appendix E of the EA).

Threatened, Endangered, and Candidate Species:

- The U.S. Fish and Wildlife Service (USFWS) conservation measures for the clay reed-mustard, Uinta Basin hookless cactus, and Graham's beardtongue will be followed. Site-specific inventories will be performed by a BLM-approved biologist under the direction of the AO prior to an onsite inspection.
- If an individual of a threatened, endangered, or candidate wildlife or plant species or its habitat is known to exist in the project area, or would be affected by proposed operations, the Operator will consult with the AO prior to initiating surface disturbance activities to determine appropriate procedures.
- If necessary, avoidance and/or mitigation measures will be implemented, as appropriate. As determined by the AO at the onsite inspection, site-specific mitigation measures intended to protect the clay-reed mustard, Uinta Basin hookless cactus, or Graham's beardtongue may

include strategic placement of roads and facilities and/or installation of silt fencing, straw bales, and straw batting to protect individuals or habitat.

- *Although not currently planned,* if water were to be drawn from the White or Green Rivers, the conservation measures for endangered fish will be followed:
    a. The best method to avoid entrainment is to pump from an off-channel location – one that does not connect to the river during high spring flows. An infiltration gallery constructed in a USFWS-approved location is best.
    b. If the pump head is located in the river channel the following stipulations apply:
        i. Do not situate the pump in a low-flow or no-flow area as these habitats tend to concentrate larval fishes.
        ii. Limit the amount of pumping, to the greatest extent possible during that period of the year when larval fish may be present (see above).
        iii. Limit the amount of pumping, to the greatest extent possible, during the midnight hours (10pm to 2 am), as larval drift studies indicate that this is a period of greatest daily activity. Dusk is the preferred pumping time, as larval drift abundance is lowest during this time.
    c. Screen all pump intakes with 3/32" mesh material.
    d. Approach velocities for intake structures should follow the National Marine Fisheries Service's document "Fish Screening Criteria for *Anadromous Salmonids*". For projects with an in-stream intake that operate in stream reaches where larval fish may be present, the approach velocity should not exceed 0.33 feet per second (ft/s).
    e. Report any fish impinged on the intake screen or entrained into irrigation canals to the Service (801.975.3330) or the Utah Division of Wildlife Resources:
    Northeastern Region
    152 East 100 North
    Vernal, UT 84078
    Phone: (435) 781-9453

Vegetation:

- The Operator would implement site-specific reclamation activities based on a Reclamation Plan (Appendix D) and the Green River District Reclamation Guidelines
- The Operator would initiate an active weed management program in its NAPA leases in the spring of 2012. The Operator would use herbicides to control infestations of weeds, using procedures described in a weed control plan.
- All herbicide treatments will follow the guidance of the Record of Decision for the BLM Vegetation Treatments Using Herbicides (BLM, 2007b) and any future local Weed Management direction received from the FO to ensure the use of safeguards with respect to approved chemicals, application rates, and BMPs.
- Weed-free mulching or other means, as determined appropriate during the onsite or reclamation inspections, will be used.

United States Department of the Interior
Bureau of Land Management

Finding of No Significant Impact
for
Environmental Assessment
DOI BLM UT-G010-2012-0112

January 2013

North Alger Project

Location: Sections 27-28, 33-35 and 34
Township 10 South, Range 19 East

Salt Lake Base and Meridian
Uintah County, Utah

Applicant: Koch Exploration Company LLC

U.S. Department of the Interior
Bureau of Land Management
Vernal Field Office
170 South 500 East
Vernal, Utah 84078
Phone: (435) 781-4400
Fax: (435) 781-4410

FINDING OF NO SIGNIFICANT IMPACT
for
Environmental Assessment
DOI BLM UT-G010-2012-0112
North Alger Project

INTRODUCTION:
The Bureau of Land Management (BLM) has prepared Environmental Assessment UT-G010-201200112 for the North Alger Project proposed by Koch Exploration Company LLC. The proposed action alternative programmatically analyzes the drilling of and production from of up to 124 wells, including up to 19 new well pads, and the construction of associated facilities.

FINDING OF NO SIGNIFICANT IMPACT:
Based upon a review of the EA and the supporting documents, I have determined that the agency preferred alternative is not a major federal action and will not significantly affect the quality of the human environment, individually or cumulatively with other actions in the general area. No environmental effects meet the definition of significance in context or intensity as defined in 40 CFR 1508.27 and do not exceed those effects described in the Vernal RMP/FEIS. Therefore, an environmental impact statement is not needed.
This finding is based on the context and intensity of the project as described:
Context: The project is a step-out development plan within the North Alger Unit of the BLM Vernal Field Office directly involving approximately 192 acres of BLM administered land that.
Intensity: The following discussion is organized around the Ten Significance Criteria described in 40 CFR 1508.27 and incorporated into resources and issues considered (includes supplemental authorities Appendix 1 H-1790-1) and supplemental Instruction Memorandum, Acts, regulations and Executive Orders. The following have been considered in evaluating intensity for this proposal:

1. **Impacts may be both beneficial and adverse**. The proposed action would impact resources as described in the EA. Measures to reduce impacts were incorporated in the design of the proposed action. None of the environmental effects discussed in detail in the EA and associated appendices are considered significant.

2. **The degree to which the selected alternative will affect public health or safety**. The proposed action is designed to minimize impacts to health thru the application of measures to reduce the emissions through an adaptive management strategy similar to the Greater Natural Buttes EIS in an effort to manage emissions associated with the project.

3. **Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wilderness, wild and scenic rivers, or ecologically critical areas**. All characteristics of the geographic area have been considered during preparation of the EA as documented in Appendix A of the EA. Those resources determined to be potentially impacted were described and analyzed in detail in Chapters 3 and 4 of the EA. No significant impacts were identified.

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial**. There is no scientific controversy over the nature of the impacts.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks**. The environmental effects to the human environment are fully analyzed in the EA. There are no predicted effects on the human environment that are considered to be highly uncertain or involve unique or unknown risks. The BLM has experience implementing similar actions in this and other adjacent areas.

6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** The actions considered in the selected alternative were considered by the interdisciplinary team within the context of past, present, and reasonably foreseeable future actions. The proposed action alternative is a step-out project in a largely undeveloped oil and gas field that would not establish a precedent or represent a decision in principle about future considerations for oil and gas development in the area.

7. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts – which include connected actions regardless of land ownership.** The interdisciplinary team evaluated the proposal and the no action alternative in context of past, present and reasonably foreseeable actions. All related and connected actions were analyzed in the proposal and no action alternative. No cumulatively significant impacts were identified.

8. **The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.** The proposed action is programmatic in nature and includes measures that would avoid or mitigate adverse effects on historic properties for the project area. In addition, Section 4.2.1.3 of the EA describes the process by which cultural resources and Native American Religious concerns would be addressed. Consultation with the State Historic Preservation Office (SHPO) will take place in accordance with Section 106 of the National Historic Preservation Act when specific well proposals are received. Any surface-disturbing activity will not take place until SHPO concurrence has been received based on BLM's determinations of eligibility and No Adverse Effect for the undertaking.

9. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973, or the degree to which the action may adversely affect: 1) a proposed to be listed endangered or threatened species or its habitat, or 2) a species on BLM's sensitive species list.** The proposed action has been designed to minimize adverse effects to listed plants and animals. Section 7 ESA Consultation was initiated on August 8, 2012, and the USF&WS concurred with BLM's determinations on September

28, 2012 as described in EA and Appendix F of the EA. Conservation measures include protections for clay reed mustard, Graham's penstemon, Uinta Basin hookless cactus, and endangered fish species in the Upper Colorado River Basin.

10. **Whether the action threatens a violation of a federal, state, local, or tribal law, regulation or policy imposed for the protection of the environment, where non-federal requirements are consistent with federal requirements.** The project does not violate any known federal, state, local or tribal law or requirement imposed for the protection of the environment. Federal, state, local, and tribal interests were given the opportunity to participate in the environmental analysis process including the public comment period as documented in Chapter 5 of the EA. No concerns regarding law, regulation or policy consistency were raised.

Authorized Officer

JAN 17 2013
Date