

**United States Department of the Interior  
Bureau of Land Management**

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**Environmental Assessment  
for the Oak Mesa Coal Exploration License**

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Uncompahgre Field Office  
2465 South Townsend Avenue  
Montrose, CO 81401

DOI-BLM-CO-S050-2011-0036-EA  
COC74911

April 2012

Preliminary EA



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2465 South Townsend Avenue  
Montrose, CO 81401**

**ENVIRONMENTAL ASSESSMENT**

NUMBER: DOI-BLM-CO-S050-2011-0036

CASEFILE/PROJECT NUMBER: COC74911

PROJECT NAME: Oak Mesa Coal Exploration License

PLANNING UNIT: Planning Unit 1

LEGAL DESCRIPTION:

Township 13 South, Range 92 West, 6 <sup>th</sup> P.M. Sec 7, Lots 13-20 Sec 8, S/2 Sec 9, S/2 Sec 15, Lots 13, 18, 19, and 22 Sec 16, All Sec 17, All Sec 18, All Sec 19, All Sec 20, All Sec 21, All Sec 22, Lots 4, 5, 12, and 13 Sec 28, Lots 2-7 Sec 29, All Sec 30, Lots 5-18	Township 13 South, Range 93 West, 6 <sup>th</sup> P.M. Sec 9, Lots 9-16 Sec 10, Lots 9-16 Sec 11, Lots 9-16 Sec 12, Lots 9-16 Sec 13, All Sec 14, All Sec 15, Lots 1-10, 14-15 Sec 16, Lots 1-4 Sec 23, Lots 1-15 Sec 24, All Sec 25, All Sec 26, Lots 1-15 Sec 35, All Sec 36, Lots 1-8, 11-14
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APPLICANT:  
Oxbow Mining, LLC  
P.O. Box 535  
3737 Highway 133  
Somerset, CO 81434

## BACKGROUND/INTRODUCTION

The Bureau of Land Management (BLM) Uncompahgre Field Office (UFO) currently manages several active federal coal leases related to three coal mines located in the valley of the North Fork of the Gunnison River near Paonia, Colorado. Bowie No. 2, West Elk, and Elk Creek are actively producing longwall coal mines, with a total annual output of nearly 15 million tons. While each mining operation controls coal reserves with a mix of federal and fee and/or state coal, about 90% of local production is federal (BLM 2011a). The UFO manages active federal coal leases for the three mines in the North Fork Valley. Table 1 below shows mining companies, mines, and typical yearly coal production for each mine.

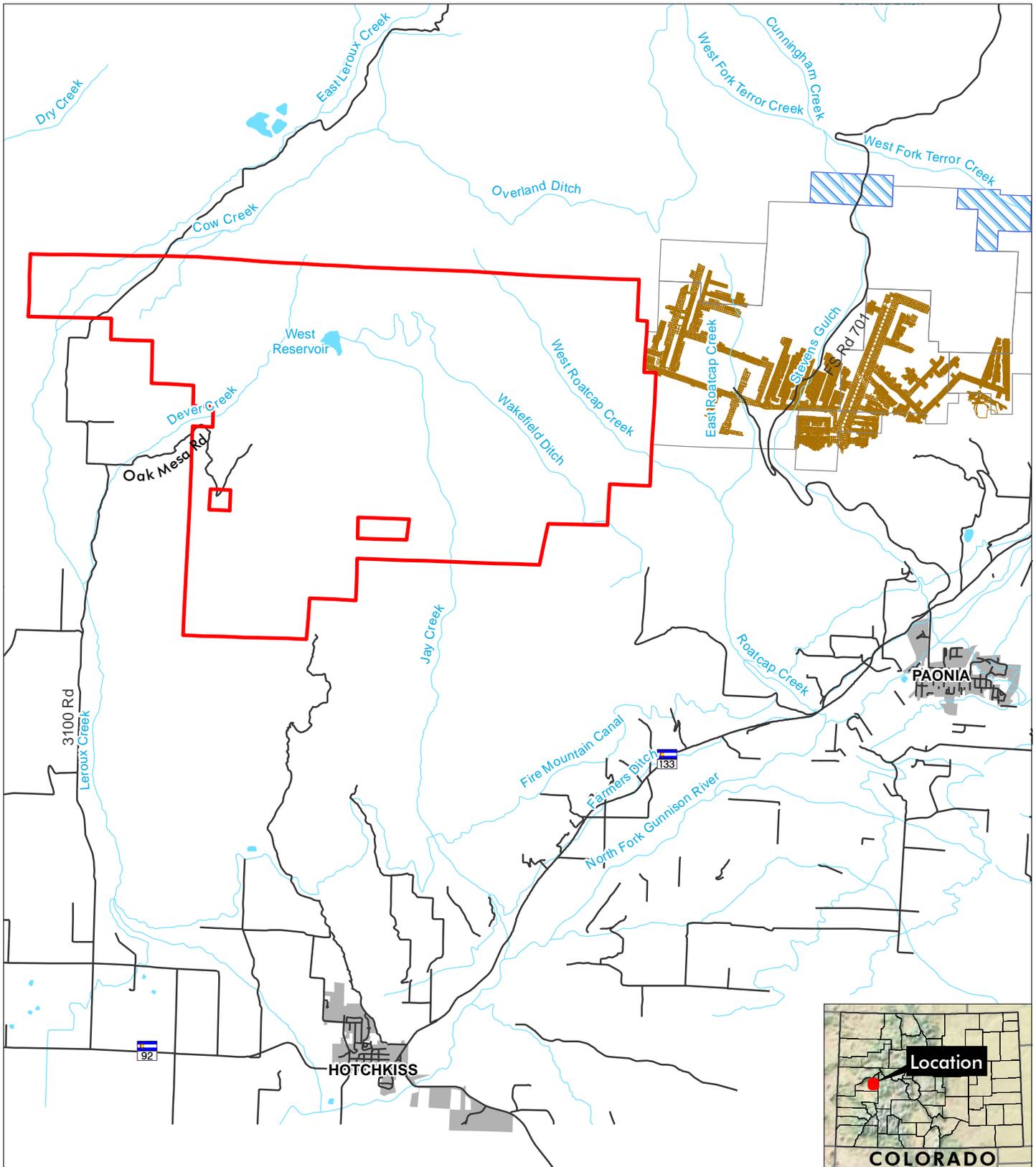
**Table 1. BLM UFO Coal Resources**

Company Name	Mine Name	5 year Average Coal Production (tons) (2006 – 2011)*
Bowie Resources, LLC	Bowie No. 2	2,808,556
Mountain Coal Company	West Elk	5,721,944
Oxbow Mining, LLC	Elk Creek	4,378,814
	<b>Total</b>	<b>12,909,314</b>

\*Periods end September 30, 2011 (BLM 2011b)

Coal exploration drilling is needed to determine seam reserve availability for possible development of a new underground coal mine in Delta County. The proposed Oak Mesa exploration area is located in Delta County to the west of the Orchard Valley Mine, a.k.a. the Bowie No. 1 Mine (see Figure 1). The exploration drilling is proposed to confirm the quality, quantity, and extent of the coal within this area. The proposed Oak Mesa project extends from the western edge of the Bowie Mine holdings westward across the mesa to the Leroux Creek area, encompassing about 13,873 acres, north of Hotchkiss. The area does not reach into the Grand Mesa National Forest. The Oak Mesa Project is adjacent to existing coal leases in an area of known coal reserves (see Figure 1).

The North Fork Valley is a historical coal mining area. More than 744 million recoverable tons of coal is present in the North Fork Valley according to a 2000 USGS report (USGS 2000). The project area has mixed public and private surface and mineral ownership, a situation called “split estate”. Most of the project area is in private surface ownership, with BLM-held mineral (subsurface) ownership. In split estate situations, the surface and subsurface rights (such as the right to develop minerals) for a piece of land are owned by different parties. Separation of mineral and surface ownership rights is a result of some of the early homesteading laws including the Stock Raising Homestead Act (Act of December 29, 1916 (39 Stat. 862)), in which homesteaders were granted the surface rights and the federal government retained the mineral rights. Mineral rights are considered dominant, meaning that they take precedence over other property rights, including those associated with surface ownership. However, the mineral owner must show due regard for the interests of the surface estate owner, and occupy only those portions of the surface that are reasonably necessary to develop the mineral estate (BLM 2011a).



### Oak Mesa Exploration Project

- Exploration Boundary    — Stream/Lake    — Highway/Road
  - Active Coal Lease
  - Pending Coal Lease
  - Bowi #1 Mine
- Data Source: CDOT



**Figure 1**  
**Project Location**

Prepared for: Oxbow Mining, LLC.  
File: 5057 - Figure 1 EA.mxd (WH)  
April 2012



## **PURPOSE AND NEED FOR THE ACTION**

On May 6, 2011, pursuant to regulations in 43 CFR 3410.2-1, Oxbow Mining, LLC (Oxbow) submitted a Federal Coal Exploration License application to the Colorado State Director of the BLM. The BLM is charged with administration of the mineral estate on these Federal lands, and is required, by law, to consider leasing Federally-owned minerals for economic recovery.

The BLM's purpose for the action is to decide whether, and under which provisions, to approve the application for exploration drilling of about 13,873 acres of federal coal that underlies BLM and private surface lands, or to reject the proposal. The objective of exploring coal deposits is to obtain geological, environmental, and other pertinent data concerning coal deposits (43 CFR 3410.0-2). The need for the action is to respond to an application to explore the coal deposits in accordance with 43 CFR Part 3400.

## **ISSUES AND CONCERNS:**

1. Surface Water Quality and Quantity
2. Ground Water Quality and Quantity
3. Water Supply/Water Rights
4. Traffic
5. Air Quality
6. Wildlife Impacts
7. Socio-economic Effects (beneficial and detrimental)

## **DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES**

### ***Proposed Action***

Oxbow proposes to drill 43 exploration drill holes (see Figure 2) on private and federal lands into federal subsurface holdings. The drill holes would be completed from small (1/2 acre) drill pads, and would be drilled to a depth of 220 to 2,249 feet, depending on the location of each drill hole (see Table 3). The entire exploration area covers about 13,873 acres, and mostly temporary surface disturbances from road and pad construction would occur on about 32.9 acres. Most drilling locations would not require grading/leveling a pad site; however, occupancy disturbance is anticipated for all pads. Therefore, disturbance from pad creation and occupation is expected to be about 21.5 acres. Of the 43 proposed drill holes, 10 would require construction of a pad to create level ground for drilling (about 5.0 acres). Occupation (no grading) would occur on all the remaining drill pads (about 16.5 acres) (see Table 3). Activities needed to complete the exploration project include access roads, staging and storage areas, limited clearing and leveling of areas for drilling equipment (for only 10 of the drill holes), completing exploratory drill holes, site maintenance, and reclamation activities. Existing access roads would be used wherever possible. New disturbance from temporary road construction is anticipated to be 2.5 acres on BLM and 8.8 acres on private surface for a total of 11.3 acres (see Table 2). Wherever possible, existing ground surface would be used for drilling sites, and construction activities would be limited to clearing and removal of large boulders. Prior to construction, the limits of construction disturbance areas along the access road routes and pad locations would be clearly defined. These limits would be staked and flagged. All construction activities would be

confined to these areas. Stakes and flagging would be removed when construction and restoration are completed.

See Appendix B and C for further mitigation related to the proposed action.

### ***Schedule and Timing***

Exploration activities could expect to begin with issuance of the license and would be completed within two years after authorization. Road construction and any pad leveling required would occur in advance of drilling activities. Roads would be constructed about 1 to 2 days prior to drilling at each site.

Drilling work in the exploration area would be completed with one or two drill rigs (typically two). Each rig would have two crews working 24 hours per day, on 10 or 12-hour shifts. Drilling would take approximately two to three days per pad. The sections that follow provide more details about each part of the exploration project (also see Figure 2).

### ***Access***

There are many existing ranch access roads throughout the project area. Some roads may require maintenance such as grading, drainage ditch repair, and graveling. Where there are no existing roads and slopes and natural obstacles do not allow cross-country driving/travel, new temporary roads would be constructed. New roads would have a driving surface about 12 feet wide, and a total disturbance width of about 14 feet. Specifically, the following design features would apply to new access roads:

- Existing access roads would be used wherever possible to reach the drilling locations.
- New roads and other linear facilities would be located and constructed to follow the contour of the landform or to mimic lines in the vegetation (avoiding straight roads and steep slopes).
- Road beds would be a maximum of 14 feet wide.
- Cutting and filling, and crowning and ditching, of temporary roads would be kept to the minimum necessary.

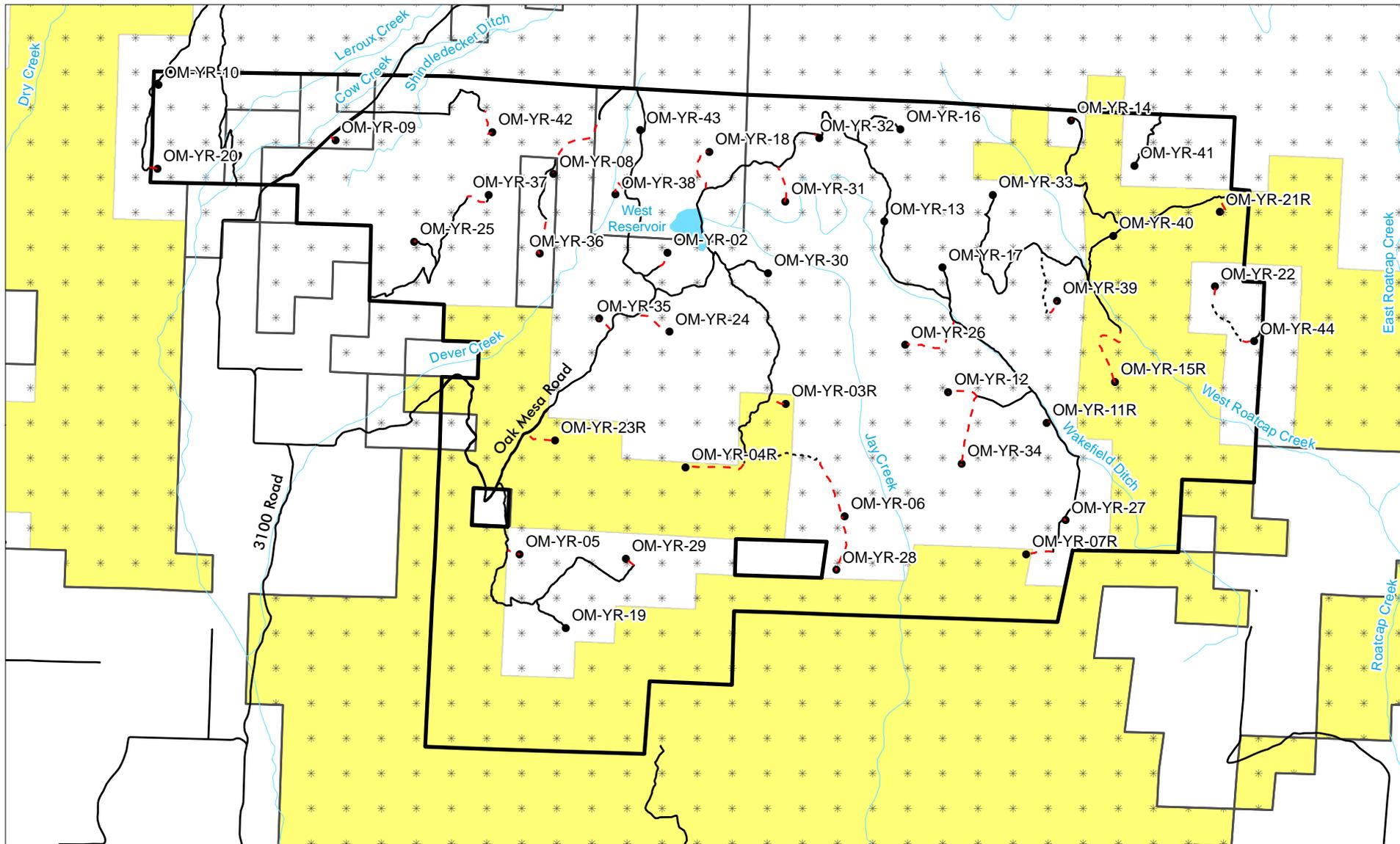
**Table 2. Access Roads Length and Temporary surface disturbance and occupation.**

Type of access	BLM surface (length in miles)	BLM surface (acres)	Private surface (length in miles)	Private surface (acres)
<b>Surface occupation</b>				
Drive-in access on existing roads (as-is)	5.5		24.7	
Drive-in access on existing roads/2-tracks to be improved	0.4	0.7*	1	1.7*
<b>Subtotal</b>	5.9	0.7*	25.7	1.7*
<b>Surface disturbance</b>				
New temporary access roads	1.5	2.5	5.2	8.8
<b>Subtotal</b>	1.5	2.5	5.2	8.8
<b>Total</b>	7.4	3.2*	30.9	10.5*

*Columns may not sum correctly due to minor rounding errors.*

*\*Surface occupation calculations are based on a maximum width of 14 feet. There would be minimal new disturbance on existing roads to be used or improved for project purposes.*

*Existing roads have varying widths of existing disturbance. Acres shown for existing roads in Table 2 represent occupied area.*



### Oak Mesa Exploration Project

- Drill Hole Location
- Bureau of Land Management
- Stream/Lake
- Subsurface Mineral Right
- Private
- Federal Minerals Including Coal
- Highway/Road
- Private Minerals
- 2-Track Road
- Exploration Boundary
- New Road

**Figure 2**  
**Proposed Action**

Prepared for: Oxbow Mining, LLC.  
File: 5057 - Figure 2 EA.mxd (WH)  
March 2012



### ***Staging and Storage***

The 7X/Bear Ranch LEX property would serve as a casting and laydown area. Other storage, including equipment and supply storage, would occur along new temporary access roads or at drill locations within the designated areas. All storage would occur away from public access areas.

### ***Site Clearing***

Clearing and grading would be needed for new access roads and nine of the pad locations. Where possible, areas of existing disturbance would be used. All of the pad sites would require clearing of brush and removal of boulders and large rocks. Of the 43 drilling locations, ten are anticipated to require grading to establish a level pad site (drill holes 14, 21, 22, 25, 33, 36, 37, 39, 41, and 44). Clearing and grading would be accomplished using bulldozers, road graders or other standard earth-moving equipment. The topsoil component (up to 12 inches, where present) would be salvaged for use in reclamation activities. In many areas, surface rock is present and topsoil salvage would be limited. Drill pads that require grading would have a surface area of about 0.50 acres (about 180 feet by 120 feet). Drill pads not requiring grading would have a surface occupation and clearing area of no greater than 0.50 acre.

### ***Drilling Activities***

Exploratory drilling would use a truck-based, self-leveling rotary drill rig with about a 53 foot mast (fully extended) and with a base dimension of about 10 by 10 feet (see Photo 1). The drill rig is equivalent in size and capability to those used to drill deep water wells. Bore holes would be drilled using 8 ¾ inch rotary bit to a depth of up to 200 feet, depending upon ground conditions and the ultimate depth of the hole at each location. A steel surface casing would be installed and cemented in place. A 6 ¼ inch rotary bit would be used to drill the borehole to a preselected depth above the target coal seam (see Table 3); depth ranges from 220 to 2,249 feet (see Table 3). A 3-inch core barrel and bit would be used to recover a core from the coal seam and portions of the rock material above and below the coal seam. The cores would provide information about the depth, quality, and extent of the coal within the project area.



**Photo 1. Photo of representative drilling operations on natural surface.**

In order to obtain discrete representative samples, bore holes would be drilled to the extent possible with air, air-water, air-foam, or water as the circulation medium. In some cases it may be difficult to keep boreholes open, and maintain sample integrity. In those situations, a lubricating bentonite-based mud would be used. The muds used in these instances would not contain metallic compounds. It is estimated that approximately 10 percent of the boreholes may require the use of a mud circulation medium during a portion of the drilling (see attached Appendix A for Material Safety Data Sheets (MSDS) for drilling supplements).

It is estimated that approximately 3,000 to 4,000 gallons of water would be used for each borehole under normal drilling conditions (0.528 acre foot of water total for all 43 boreholes). Water would be delivered to each borehole site by a tanker truck designed to haul water. A cuttings pit to hold soil and rock material removed from the borehole would be excavated with a backhoe within the pad area. The pit would be approximately 20 feet in length, 8 feet in width, and 8 feet deep (47 cubic yards each). All drilling locations would require construction of a pit for cuttings and containment of produced water (both water injected during air drilling and any water produced from the formation). If drilling mud is required to maintain hole stability and/or circulation, a portable mixing tank would be used to mix and contain the drilling mud. It is anticipated that ten percent of the excavation holes may require drilling mud. Handling of the drill cuttings would include retaining the cuttings near the drill hole, so that they can either be put back into the drill hole after drilling is complete, or pushed into the cuttings pit. Reclamation of the cuttings pits is described in the *Reclamation* section below.

**Table 3. Drill Pad disturbance area.**

Drill hole ID	Depth of drill hole	Total temporary impacts (acres)	BLM temporary surface disturbance (acres)*		Private temporary surface disturbance (acres)*	
			Road	Pad	Road	Pad
OM-YR-02	1856	0.70			0.20	0.50 (O)
OM-YR-03R	1193	0.70	0.20	0.50 (O)		
OM-YR-04R	829	1.22	0.72	0.50 (O)		
OM-YR-05	429	0.65			0.15	0.50 (O)
OM-YR-06	654	1.24			0.74	0.50 (O)
OM-YR-07R	635	0.82	0.32	0.50 (O)		
OM-YR-08	1887	1.33			0.83	0.50 (O)
OM-YR-09	725	0.57			0.07	0.50 (O)
OM-YR-10	1245	0.55			0.05	0.50 (O)
OM-YR-11R	1108	0.55			0.05	0.50 (O)
OM-YR-12	1261	0.21			0.86	0.50 (O)
OM-YR-13	1832	0.50			0.00	0.50 (O)
OM-YR-14	1510	0.54			0.04	0.50 (G)
OM-YR-15R	597	1.45	0.95	0.50 (O)		
OM-YR-16	2203	0.50			0.00	0.50 (O)
OM-YR-17	1645	0.50			0.00	0.50 (O)
OM-YR-18	2234	1.05			0.55	0.50 (O)
OM-YR-19	212	0.50			0.00	0.50 (O)
OM-YR-20	932	0.60			0.10	0.50 (O)

Drill hole ID	Depth of drill hole	Total temporary impacts (acres)	BLM temporary surface disturbance (acres)*		Private temporary surface disturbance (acres)*	
			Road	Pad	Road	Pad
OM-YR-21R	1298	0.73	0.23	0.50 (G)		
OM-YR-22	1098	0.81			0.31	0.50 (G)
OM-YR-23R	814	0.85	0.35	0.50 (O)		
OM-YR-24	1451	0.89			0.39	0.50 (O)
OM-YR-25	773	0.56			0.06	0.50 (G)
OM-YR-26	1400	1.28			0.78	0.50 (O)
OM-YR-27	831	0.53			0.03	0.50 (O)
OM-YR-28	474	1.15			0.65	0.50 (O)
OM-YR-29	427	0.62			0.12	0.50 (O)
OM-YR-30	1719	0.50			0.00	0.50 (O)
OM-YR-31	1967	0.92			0.42	0.50 (O)
OM-YR-32	2117	0.58			0.08	0.50 (O)
OM-YR-33	1634	0.50			0.00	0.50 (G)
OM-YR-34	970	1.32			0.82	0.50 (O)
OM-YR-35	1379	0.68			0.18	0.50 (O)
OM-YR-36	1524	0.94			0.44	0.50 (G)
OM-YR-37	1240	0.78			0.28	0.50 (G)
OM-YR-38	1867	0.80			0.30	0.50 (O)
OM-YR-39	904	0.66			0.16	0.50 (G)
OM-YR-40	862	0.50	0.00	0.50 (O)		
OM-YR-41	1677	0.50			0.00	0.50 (G)

Drill hole ID	Depth of drill hole	Total temporary impacts (acres)	BLM temporary surface disturbance (acres)*		Private temporary surface disturbance (acres)*	
			Road	Pad	Road	Pad
OM-YR-42	1271	0.84			0.34	0.50 (O)
OM-YR-43	2249	0.55			0.05	0.50 (O)
OM-YR-44	1137	0.50			0.00	0.50 (G)
<b>Total</b>		32.86 ac	2.77 ac	3.50 ac	8.59 ac	18.00 ac

\*(O) = Surface occupation and clearing only; (G/Shaded) = Graded disturbance

Preliminary

Oxbow may complete several of these exploration holes as ground water monitoring wells, in preparation for base line monitoring. Identification of specific boreholes to be completed as ground water monitoring wells has not been finished. Any boreholes selected to be completed as monitoring wells would be completed in accordance with the guidelines agreed to by the BLM for monitoring wells and meet monitoring well completion rules of the Colorado Division of Water Resources.

Because nighttime drilling activities would be conducted, lighting would be required. Lighting would consist of one or two “tower” lights near the top of the drill rig at a height of about 50 feet, and portable lighting units on the ground to allow drillers to monitor drill cuttings and review the drill cores. Ground lighting units would be aimed at work areas. For safety reasons, lighting cannot be artificially shielded, but natural topographic and vegetative shielding would be considered in light placement.

Noise levels from drilling operations would be about 85 decibels (dB), which does not require hearing protection for workers. The small rig used for exploratory drilling would produce less noise than the large rigs used for drilling oil and gas wells. For comparison, the following are noise limits established by the schedule to Division 7 of the Motor Vehicle Act Regulations:

- Light Duty 83 dB
- Heavy Duty Gasoline 88 dB
- Motorcycles 91 dB
- Heavy Duty Diesel 93 dB

### ***Equipment and Personnel***

The following personnel and equipment would be required to complete exploration activities:

- Bulldozer (1) and Excavator (1) for clearing, excavating, moving, and grading; personnel about 2 people;
- Grader (1) for clearing, moving small amounts of soil and finish grading; personnel 1;
- Drilling rig (1 or 2); personnel about 5 to 7 people;
- Carpool pickup (1 for each rig crew) to transport drilling staff;
- E-log truck (1) and equipment for digital logging of bore holes; personnel 1 to 2 people;
- Delivery trucks and semi trucks for delivery of water tanks, and other bulk construction items; about 1-2 personnel per delivery; about 2 trips per day;
- Water Truck for dust suppression (1); personnel 1; and
- Pick-up trucks and SUVs with flatbed trailers (1) for small equipment transport; personnel 1.

### ***Storm Water Control***

For locations that require construction of a drill pad, the pad would be graded so that any water runs toward the cuttings pit. Either silt fencing or straw wattles would be placed to contain storm water runoff within the pad area. For locations that do not require construction/leveling of a pad, silt fencing or straw wattles would be used as needed to prevent storm water runoff from leaving the drilling operations area.

## ***Site Maintenance***

During drilling, Oxbow would control dust from drilling and related activities, divert and control both natural runoff from disturbed areas and fluid loss from drilling, and would clean up any trash or debris. A water truck would be used to apply water to access roads, as needed, to control dust. A maximum of about 0.4 acre-foot of water is anticipated to be required for fugitive dust suppression, depending on seasonal climate conditions. Waste construction materials and rubbish from all construction areas would be collected, hauled away, and disposed of in an approved manner. Food-related trash would be stored inside contractor vehicles and removed daily. If necessary, bear-proof trash containers would be provided. Where fences must be cut for gate installation or other construction activities, prior to gate cutting, the brace posts would be installed and wires attached in order to maintain adjacent wire tension. Any fence damaged during construction would be repaired immediately. Gates, where required, would be installed in accordance with landowner and BLM agreements, and would be maintained in good working order. All new or existing gates would remain closed and locked at all times except when attended or unless otherwise directed by the landowner.

All drilling equipment would be provided with fire extinguishers and shovels for fighting small fires, if necessary. Drilling crews would be equipped and trained to fight small fires. Spark arresters would be required for equipment generating sparks, including ATVs and chainsaws. Smoking would be allowed during construction activities only in designated safe-smoking areas. Common sense practices regarding heat/spark sources, particularly in dry conditions, would be followed. Parking hot vehicles on dry shrubs would not be allowed, and other logical avoidance practices would be followed.

## ***Reclamation***

Upon completion of drilling and related activities, all drill holes would be backfilled, sealed and abandoned. During drilling, fluid return would be monitored to identify the depth and extent of any water producing zones. Upon abandonment, in accordance with Drill Hole Plugging Procedures agreed to by BLM and the Colorado Division of Reclamation, Mining, and Safety (CDRMS), bentonite chips or bentonite plug gel or similar seal would be established in the bottom of the hole, extending to within ten feet of the surface. A cement plug would be set in the hole ten (10) feet below the ground to within three (3) feet of the surface. Accumulations of drill cuttings would be buried in the excavated pit (see Photo 2). If drilling mud (bentonite) is required for the drilling of a borehole, the mud will be mixed and contained in a portable steel container. After drilling, any remaining drilling mud will be used along with newly mixed drilling mud, if additional volume is required, in the well abandonment process. The Colorado Department of Natural Resources requires all boreholes be abandoned according to State regulations. Part of the abandonment process includes the use of bentonite mud to seal the borehole. At no time during the drilling and well abandonment process will any bentonite mud be placed in the cuttings pit.



**Photo 2. Example of a Drill Site 1 year after Reclamation.**

As mentioned previously, Oxbow may complete several of the exploration holes as ground water monitoring wells, in preparation for base line monitoring required for permit submission. Identification of specific drill holes to be completed as ground water monitoring wells would occur once initial meetings with the CDRMS have occurred. Drill holes selected to be completed as monitoring wells would be completed in accordance with the guidelines agreed to by the BLM and CDRMS for monitoring wells. Once monitoring is no longer required, these wells would be abandoned as described above.

The following design features would apply to road reclamation:

- Interim reclamation would include partially revegetating roads in order to reduce the amount of bare ground created during construction and drilling activities.
- The new road segments would be reclaimed to their original contour and rough texture in order to match the “texture” of the surrounding landscape, and revegetated in accordance with BLM direction, and using a BLM-approved seed mix.

All trash and debris would be removed from drill sites for disposal. Excavations, including pits, would be backfilled. Any drilling mud left in the portable mixing tank after the borehole is completed would be used along with additional bentonite in the hole abandonment process. The pits may be temporarily fenced and allowed to dry before backfilling with previously excavated material. The excavated material would be returned to the pits in such a manner as to approximate the original soil profile, particularly as related to the near-surface soils or top soil. During backfilling, the material would be mixed and compacted as it is replaced, by running the equipment over the backfilled area during placement of successive lifts. Following backfilling, disturbance areas would be graded to their approximate original contour or to a natural looking configuration that blends with the surrounding topography and the original surface drainage reestablished. Any salvaged topsoil materials would be re-spread onto the regraded surface and

reseeding of the areas (pads and roads – unless the landowner requests the roads remain) would take place using the following seed mixture. A metal post with tag would be placed in the vicinity of the hole as a permanent marker.

**Table 4. Seed Mix for Project Area**

<b>Seed Mix for Oakbrush Zone</b>			
(source: BLM - UFO )			
<b>SPECIES</b>	<b>% of Mix</b>	<b>PLS</b>	<b>#/Acre</b>
Western Wheatgrass var Arriba	12	8.0	0.96
Slender Wheatgrass var San Luis	12	5.5	0.66
Mountain Brome var Bromar	12	12.5	1.5
Big Bluegrass var Sherman	12	1.5	0.18
Bottlebrush Squirreltail	12	8.0	0.96
Canada Wild rye	12	7.0	0.94
American Vetch	6	10.0	0.6
Rocky Mountain Penstemon	6	1.5	0.09
<u>Western Yarrow</u>	6	1.0	<u>0.06</u>
Total application rate for incorporated seed			5.95 #/acre
Seed application rates will be doubled if aerial broadcast methods are used.			

Seeding would take place in the fall or early spring. Monitoring of re-seeding efforts would occur for two or three field seasons to determine stand success, re-seeding requirements and control of any noxious weeds. On previous projects, Oxbow has found this period of time is adequate for reclamation; however, Oxbow is committed to monitoring until success criteria have been met (see bullet list below). A temporary perimeter fence would be placed around reclaimed areas to prevent disturbance by cattle and elk.

Reclamation Success criteria:

- Vegetation cover in disturbed areas would be at least 70 percent of the vegetation cover in adjoining undisturbed areas. For example, if nearby undisturbed areas have approximately 75 percent vegetation cover, the reclamation success criteria would be 52.5 percent total vegetation cover.
- Vegetation cover would be comprised of species included in the seed mix (see Table 4) and other desirable species found in the surrounding area.
- Vegetation patchiness is acceptable, as long as there are no contiguous bare areas greater than about 3 feet by 3 feet (about 9 square feet).

### ***Noxious Weed Management***

Oxbow has developed a Noxious Weed Management Plan for the control of weeds in new disturbance areas (see Appendix B). The following Best Management Practices (BMPs) that prevent the spread of noxious weeds would be followed (Partners Against Weeds Action Plan for BLM).

- Clean equipment to remove weed seeds prior to use onsite;
- Monitor and spray/perform weed control as necessary.
- The operator and the operator’s contractors will disinfect heavy equipment, hand tools, boots and any other equipment used previously in a river, lake, pond, or wetland, by

routinely cleaning equipment using 140° water and high-pressure sprayers to remove dirt, mud and foreign debris before equipment is brought on-site.

- The operator and the operator's contractors will clean trucks and equipment at wash-stations in nearby towns or at the contractor's yard (off-site) to ensure that all equipment and vehicles shall be clean of all dirt and debris that can harbor weed seed.
- Monitoring and control of noxious or invasive weeds attempting to establish within the project boundaries throughout the construction and production phases should be performed in coordination with routine maintenance activities and in accordance with state law.
- The Operator will monitor for and control noxious or invasive weeds throughout the construction and production phases. Mandatory noxious weed control is required on the pads, drill holes, and access roads used by the lessee/operator for the life of the project.
- Application of pesticides and herbicides on public lands will conform to BLM regulations and state laws.
- To prevent the entry of hazardous substances into surface waters:
  - Chemical treatments within the riparian areas shall be applied by hand and shall be applied only to specific targets.
  - Leave a 25-foot buffer along surface waters when chemicals are being applied through ground application with power equipment.
  - Always refer to chemical label instructions for additional guidance on use near water and required buffer zones.
  - To enhance effectiveness and prevent transport into streams, apply chemicals during appropriate weather conditions (generally calm and dry) and during the optimum time for control of the target pest or weed.

### ***Coordination***

Oxbow is committed to coordinating with landowners and interested parties throughout the process, including meeting with domestic and irrigation water providers to address concerns about water supply facilities.

### ***Design Features***

In addition to measures described in the previous sections, the following design features have been incorporated into the proposed action to minimize resource impacts:

- Clearances/survey, including cultural resource surveys and biological resource surveys, would be completed for drill hole and access road locations that were not reviewed in Fall 2011 because of lack of right-of-access prior to any ground disturbing activities.
- Refueling of equipment would not occur within 100 feet of live water.
- Any lubricant, oil or grease, or fuel spills shall be reported immediately to the BLM hazardous material coordinator. Any spills would be removed from the spill area as quickly as possible and disposed of appropriately off-site. Any spills will be cleaned to the authorized officer's satisfaction using standard hazmat procedures.
- The point of access (where applicable) would be blocked as directed to prevent motorized use of a reclaimed road. To discourage access and use of reclaimed areas, natural barriers and signs would be placed near the point of entry where project roads have been reclaimed. The BLM would approve barrier locations and techniques.

- A red-tailed hawk nest located just south of West Reservoir and within ¼ mile of the OM-02 site, would be monitored for nesting activity during construction. If the nest is active, construction and drilling operations could be put off until the young have fledged. This would eliminate the chances of the nest being impacted.
- If project timing would include construction during the migratory bird nesting time frame for the project area (generally through July 15), potential impacts and modifications to project schedule needed to comply with the Migratory Bird Treaty Act would be discussed with BLM prior to exploration activities. Monitoring for migratory birds would occur if Oxbow wishes to proceed during the nesting season. If monitoring results in positive active nest data, appropriate avoidance buffers would be developed in coordination with BLM based on species and site-specific conditions.
- For drilling sites where development of a pad is necessary, the topsoil would be stockpiled, and either silt fencing or straw wattles would be placed around the stockpile.
- Straw wattles would be used to minimize erosion until the pad is revegetated.
- During and after drilling, the drill site would be fenced to keep animals out of the site to prevent damage to stormwater BMPs and newly revegetated areas. Oxbow is negotiating with individual landowners regarding the type of fence installed for reclamation purposes; electric fencing with solar panels to provide power have been used in the past and are proposed. Oxbow would be responsible for fence installation, monitoring and removal.
- Where bentonite is used, portable mixing tanks would contain all bentonite. It would not be placed in the cuttings pit.

### ***No Action Alternative***

The No Action Alternative means that the proposed action would not take place. In the case of an exploration license request, this would mean that a request for license to explore would be denied or rejected. Under the No Action Alternative, the BLM would not grant an exploration license for the exploratory drilling.

### ***Alternatives Considered But Eliminated From Detailed Analysis***

No other alternatives have been proposed to respond to unresolved conflicts concerning alternative uses of available resources.

## **SCOPING AND ISSUES**

Public comments were solicited via a letter dated September 19, 2011, that was mailed to the appropriate agencies, specific interested parties, and to the general public. The letter was also posted on the BLM UFO website. Information regarding the exploration proposal was made available for public review after September 19, 2011, through legal notices published in the Delta County Independent. In addition there were announcements of the public scoping period in The Daily Sentinel in Grand Junction. Public comments were received through October 24, 2011. All comment letters were reviewed and considered in the development of the EA.

A total of 394 comment letters were received during the public comment period. The comments generally fall into five categories, with specific comments listed in the table below. Comments received were categorized and coded (see Table 5). Comments were coded once for each letter (i.e., if a comment was made several times in one letter, it was counted once for purposes of the summary). In general, comments focused on traffic, water, natural resources, real estate/quality of life, and socioeconomic issues. Subcategories for each comment type also were developed (see Table 5).

Issues identified in comment letters were separated into two relevance categories; key and non-key issues. Key issues are those that could be directly or indirectly caused by implementing the proposed action, coal exploration activities on Oak Mesa. Non-key issues fall into three types; those that are 1) not relevant to the proposed action, 2) outside of the scope of the proposed action (i.e., related to future coal mining or other activities), or that are 3) already determined by existing laws or regulations. Table 5 shows the page and section where key issues are addressed in the EA.

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**Table 5. Scoping Comment Summary.**

<b>Comment #</b>	<b>Comment</b>	<b>Number of specific comment</b>	<b>EA Page/ Section where issue is addressed</b>	<b>Key/non-key issue; notes</b>
<b>1</b>	<b>Traffic</b>			
1a	Wear and tear on public roads	10	Page 79; Access/ Transportation	Key issue
1b	Public safety concerns (speed and volume of traffic)	8	Page 79; Access/ Transportation	Key issue
1c	Dust and noise	3	Page 28, Page 84; Air Quality, Noise	Key issue
1d	Hazardous spills	1	Page 77; Wastes, Solid or Hazardous	Key issue
1e	General increase in traffic/heavy equipment	5	Page 79; Access/ Transportation	Key issue
<b>2</b>	<b>Water</b>			
2a	Degradation in water quality (including erosion/sedimentation) and reduction in quantity (domestic, municipal and agricultural)	12	Page 68, 83; Water quality, surface; Water quantity, surface; Water Supply/ Water Rights	Key issue
2b	Damage to water supply facilities	1	Page 83; Water Supply/ Water Rights	Key issue
2c	Stream crossing impacts	2	Page 68; Water quality, surface	Key issue
2d	Toxicity impacts of fracking fluids	1		Non-key, not relevant; drilling activities would not include fracking. Fracking is associated specifically with oil and gas operations.
<b>3</b>	<b>Landscape/Natural Resources</b>			
3a	Visual impact	4	Page 86; Visual Resources	Key issue
3b	Deforestation	3	Page 36;	Key issue

<b>Comment #</b>	<b>Comment</b>	<b>Number of specific comment</b>	<b>EA Page/ Section where issue is addressed</b>	<b>Key/non-key issue; notes</b>
			Vegetation	
3c	Vegetation impacts and reclamation	7	Page 36; Vegetation	Key issue
3d	Hazardous waste, trash, and debris	6	Page 77; Wastes, Solid or Hazardous	Key issue
3e	Increased fire danger	3	Page 82; Fire	Key issue
3f	Air pollution/quality and soil pollution.	8	Page 28; Air Quality	Key issue
3g	Potential increase in Noxious/Exotic Weeds	2	Page 28; Invasive, Non-native Species	Key issue
3h	Impacts to wildlife and sensitive natural habitats (including habitat fragmentation)	11	Page 48, 56, 61, 64; Threatened and Endangered Species; Migratory Birds; Wildlife, Terrestrial and Wildlife, Aquatic	Key issue
<b>4</b>	<b>Real Estate and Quality of life</b>			
4a	Devaluation of property	3		Non-key; exploration activities and associated impacts would be short-term and temporary.
4b	Damage to private land	2		Non-key; Oxbow must enter into landowner agreements for use of land surface for operations related to exploration. Conditions of access, including reclamation would be negotiated with private landowners, a process outside of the scope of this EA.

<b>Comment #</b>	<b>Comment</b>	<b>Number of specific comment</b>	<b>EA Page/ Section where issue is addressed</b>	<b>Key/non-key issue; notes</b>
4c	Conservation easements	8		Non-key; Oxbow must enter into landowner agreements for use of land surface including those with existing conservation easements, a process outside of the scope of this EA.
4d	Noise and light pollution	8	Page 84, 86, Noise; Visual Resources	Key issue
4e	Degradation of agricultural land	4	Page 31; Farmlands, Prime/Unique	Key issue
<b>5</b>	<b>Socioeconomics</b>			
5a	More jobs/Long term work	233		Non-key; this EA evaluates exploration activities only. Exploration activities would determine quality and quantity of coal reserves, and the economic viability of coal resource extraction.
5b	Tax revenue and support for schools, roads, other social infrastructure, and non-profit organizations	152		Non-key; this EA evaluates exploration activities only. Exploration activities would determine quality and quantity of coal reserves, and the economic viability of coal resource extraction.
5c	Revenue for local economy	205		Non-key; this EA evaluates exploration activities only. Exploration activities would determine quality and quantity of coal reserves, and the economic viability of coal resource extraction.
5e	Oxbow's high wages	2		Non-key; this EA

<b>Comment #</b>	<b>Comment</b>	<b>Number of specific comment</b>	<b>EA Page/ Section where issue is addressed</b>	<b>Key/non-key issue; notes</b>
				evaluates exploration activities only. Exploration activities would determine quality and quantity of coal reserves, and the economic viability of coal resource extraction.
<b>6</b>	<b>Coal</b>			
6a	Quality of coal	254		Non-key; this EA evaluates exploration activities only. Exploration activities would determine quality and quantity of coal reserves.
6b	Energy independence	93		Non-key; this EA evaluates exploration activities only
6c	Affordable energy	8		Non-key; this EA evaluates exploration activities only
6d	Demand for coal energy	39		Non-key; this EA evaluates exploration activities only
<b>7</b>	<b>General</b>			
7a	Concerns about adequacy of NEPA analysis	1		Non-key; the NEPA process is being completed in compliance with state and federal laws and regulations.
7b	Timing and intensive nature of NEPA process	11		Non-key; the NEPA process is being completed in compliance with state and federal laws and regulations.
7c	Modern coal mining technology makes mining safer and more efficient.	2		Non-key; this EA evaluates exploration activities only
7d	BLM must analyze the cumulative effects of the August 2011 North Fork	1		Non-key; the NEPA process is being completed in compliance

Comment #	Comment	Number of specific comment	EA Page/ Section where issue is addressed	Key/non-key issue; notes
	Valley Oil and Gas Lease Sale Nomination			with state and federal laws and regulations.

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PLAN CONFORMANCE REVIEW: The Proposed Action is subject to and has been reviewed for conformance with the following plan (43 CFR 1610.5-3, BLM 1617.3):

Name of Plan: Uncompahgre Basin RMP

Date Approved: July 26, 1989, as amended

Decision Number/Page: Mineral Resources Decision, Coal Management, page 31, Record of Decision (ROD)

Decision Language: Management Units 1, 3, 4, 7, 8, and 16 are acceptable for further leasing consideration with no special restrictions.

The Proposed Action Alternative is consistent with current land management planning for the proposed lease.

### ***Other Related NEPA Documents***

North Fork Coal EIS (BLM 2000)

Other relevant laws, regulations, policies, program guidance, and permitting requirements include:

#### **Mining and Minerals Policy Act of 1970 and Mineral Leasing Act of 1920, as amended**

The BLM manages its minerals program under guidance given in the Mining and Minerals Policy Act of 1970, which states (in part) that it “is the continuing policy of the federal government in the national interest to foster and encourage private enterprise in...(the) development of economically sound and stable domestic mining minerals and mineral reclamation industries...(and) the orderly and economic development of domestic mineral resources...” Further, federal mineral leasing follows the Mineral Leasing Act of 1920 as amended by the Federal Coal Leasing Amendments Act of 1976 (MLA) and specific procedures set forth in 43 CFR 3432. Exploration licenses specifically are regulated under 43 CFR 3410.

#### **Federal Land Policy and Management Act of 1976, as amended**

The Federal Land Policy and Management Act (FLPMA) was enacted in 1976. FLPMA laid out specific land management guidance for BLM-managed lands, and repealed the Homestead Act (meaning public lands remaining were to be retained in public control). FLPMA formalized the concepts of managing public lands for multiple use and sustained yield, authorized management of special resource areas (Areas of Critical Environmental Concern, or ACEC’s), provided guidance for rangeland and grazing management, and provided support for minerals leasing and development.

#### **Surface Mining Control and Reclamation Act of 1977**

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) created the Office of Surface Mining Reclamation and Enforcement (OSM) in the United States Department of the Interior. The CDRMS developed Colorado’s permanent regulatory program, which is approved by OSM and authorizes CDRMS to regulate surface coal mining operations and the surface effects of underground coal mining on private and state lands within the State of Colorado.

## Standards for Public Land Health

In January 1997, Colorado Bureau of Land Management (BLM) approved the Standards for Public Land Health. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. A finding for each standard will be made in the environmental analysis section of this EA.

**Table 6. Standards for Public Land Health**

Standard	Definition/Statement
#1 Upland Soils	Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes. Adequate soil infiltration and permeability allows for the accumulation of soil moisture necessary for optimal plant growth and vigor, and minimizes surface runoff.
#2 Riparian Systems	Riparian systems associated with both running and standing water, function properly and have the ability to recover from major surface disturbances such as fire, severe grazing, or 100-year floods. Riparian vegetation captures sediment, and provides forage, habitat and bio-diversity. Water quality is improved or maintained. Stable soils store and release water slowly.
#3 Plant and Animal Communities	Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential. Plants and animals at both the community and population level are productive, resilient, diverse, vigorous, and able to reproduce and sustain natural fluctuations, and ecological processes.
#4 Threatened and Endangered Species	Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.
#5 Water Quality	The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands would achieve or exceed the Water Quality Standards established by the State of Colorado. Water Quality Standards for surface and ground waters include the designated beneficial uses, numeric criteria, narrative criteria, and anti-degradation requirements set forth under State law as found in (5 CCR 1002-8), as required by Section 303(c) of the Clean Water Act.

## AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES and MITIGATION MEASURES

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and presents comparative analyses of the direct, indirect and cumulative effects on the environment.

Cumulative impacts of the proposed action are shown in the analysis of each element. A description of the past, present, and reasonably foreseeable actions is at the end of this section.

Elements specified by statute, regulation, executive order, or the Standards for Public Land Health are described and analyzed in this section, as well other elements. Those that could be impacted are brought forward for analysis. Any element not affected by the proposed action or no action alternatives is not analyzed in this document; the reason for no impact is stated.

**Table 7. Specified Elements**

<b>Element</b>	<b>Not Applicable or Not Present</b>	<b>Present, But No Impact</b>	<b>Applicable &amp; Present; Brought Forward for Analysis</b>
Air Quality			X
Areas of Critical Environmental Concern	X		
Wilderness and Lands with Wilderness Characteristics	X		
Wild and Scenic Rivers	X		
Cultural			X
Native American Religious Concerns	X		
Farmlands, Prime/Unique			X
Soils			X
Vegetation			X
Invasive, Non-native Species			X
Threatened and Endangered Species			X
Migratory Birds			X
Wildlife, Terrestrial			X
Wildlife, Aquatic			X
Wetlands & Riparian Zones			X
Floodplains			X
Water Quality, Surface and Ground			X
Wastes, Hazardous or Solid			X
Environmental Justice			X
Access			X
Transportation			X
Cadastral Survey	X		
Realty Authorizations		X	
Rangeland Management			X
Forest Management	X		
Fire			X
Hydrology/Water Rights			X
Noise			X
Recreation			X
Visual Resources			X
Geology and Minerals			X
Paleontology	X		
Law Enforcement	X		
Socio-Economics			X

## **AIR QUALITY**

### **Affected Environment**

Based on a review of the U.S. Environmental Protection Agency (EPA) reported non-attainment areas (EPA 2011), the project area is in an attainment area for all reported state and federal air quality standards. There are no non-attainment areas in Delta County or any of its adjoining counties. The Proposed Action is outside a 10-mile radius of any special designation airsheds or non-attainment areas. Non-attainment areas have air pollution levels that persistently exceed the national ambient air quality (NAAQ) standards and are tracked and documented by the EPA. Projects that could impact special designation areas and non-attainment areas may require special consideration from the air quality regulatory agencies of Colorado Department of Public Health and Environment (CDPHE) and the EPA. Special designation airsheds include wilderness areas and national parks. The closest Class I airsheds to the project area include the West Elks Wilderness (located about 25 miles southeast of the project area), and the Black Canyon of the Gunnison National Park (located about 25 miles southwest of the project area).

### **Environmental Consequences/Mitigation:**

#### **Proposed Action**

Construction of drill pads and access roads would result in minor short-term impacts to air quality. Increases to both criteria and non-criteria pollutants could occur due to use of equipment with combustion engines and soil disturbing activities. Criteria pollutants are those for which NAAQ standards have been set; non-criteria pollutants do not have set NAAQ standards. Criteria pollutants are from combustion engines, and include carbon monoxide, ozone, nitrogen dioxide, and sulfur dioxide. Non-criteria pollutants include nitric oxide, air toxics such as benzene, and suspended particulates. Exceedence of NAAQ pollutant standards occurs in urban areas, with high vehicle concentrations, and where climate conditions induce trapped air and reduced air flow, such as temperature inversions. Only about 8 project-specific vehicles would be on-site (within the 13,873 acre project area) at any one time (see Equipment and Personnel section, page 13). The vehicles would not be concentrated, but instead would be completing different operations at different locations. Vehicles include both heavy- and light-duty trucks and engines with no other existing emission sources. For these reasons, increases in criteria and non-criteria pollutants would be unlikely to result in an exceedence of any hourly, 8-hour average, or daily NAAQ standards or Colorado ambient air quality (CAAQ) standards.

Fugitive dust from soil disturbing activities such as road and drill pad construction could result in an increase in suspended particulates; however, use of a water truck to control dust would mitigate this impact. Drill pads and roads would be reclaimed after exploration drilling operations are completed to minimize impacts from fugitive dust. All impacts to air quality would be minor, short-term and temporary.

#### **Cumulative Impacts**

For Air Quality, the cumulative impacts analysis area is defined as the North Fork Valley within Delta County, including the eastern portion of the county. The Proposed Action would result in minor, short-term air quality impacts. Oil and gas exploration, operation and development could result in similar air quality impacts to the project area. Cumulatively, air quality impacts are expected to be minor. All anticipated air quality impacts would be short-term

and minimal.

## **No Action Alternative**

Under the No Action alternative, there would be no project-related air quality impacts.

## ***AREAS OF CRITICAL ENVIRONMENTAL CONCERN***

Areas of Critical Environmental Concern (ACEC) are identified by the BLM through its resource management planning process to protect or manage sensitive resource values. ACECs may be designated to protect historic, cultural, visual, natural, and/or biological resources, systems, or processes. There are no ACECs near the project area. The nearest existing ACEC is Needle Rock, located about 17 miles southeast of the project area. The Adobe Badlands ACEC is located about 20 miles west of the project area. Because no ACECs are in or near the project area, there would be no impacts to this resource and it is not evaluated or discussed further.

## ***WILDERNESS and LANDS WITH WILDERNESS CHARACTERISTICS***

There are not any designated Wilderness Areas or Wilderness Study Areas within or adjacent to the project area.

Through FLPMA (Sec. 201 and 202) of 1976, Congress directed the BLM to maintain an inventory of the lands under its jurisdiction that possess “wilderness characteristics.” Each BLM office maintains an inventory of lands with wilderness characteristics, updating it as necessary. The characteristics are:

- A. Size – generally 5,000 acres or greater that do not have mechanically constructed and maintained roads. Smaller areas that share a boundary with existing wilderness or wilderness study areas of 5,000 acres or greater may also be considered to have adequate size.
- B. Naturalness – lands must appear to have been affected primarily by the forces of nature, and people’s work must be substantially unnoticeable.
- C. Outstanding opportunities for solitude, or primitive and unconfined type of recreation:
  - a. Solitude – visitors can feel alone, secluded and isolated from the sights and sounds of other people.
  - b. Primitive and unconfined recreation – the use of the area is primarily through non-motorized or non-mechanical means with no or minimal recreation facilities.
- D. Supplemental values – the area contains ecological, geological, or other features of scientific, educational, scenic, or historical value.

For an area to possess wilderness characteristics it must meet A, B and C. D is optional.

BLM surface ownership lands within the Uncompahgre Field Office were inventoried for wilderness characteristics in 2010 through 2011. No lands possessing wilderness characteristics were found on BLM-managed lands within, or adjacent to the area of this proposed project. Because no lands with wilderness characteristics are in or near the project area, there would be no impacts to this resource and it is not evaluated or discussed further.

## ***WILD AND SCENIC RIVERS***

Congress authorized the National Wild and Scenic Rivers (WSR) Act in 1968 to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The purpose of the Act was to allow for special management or protection of those free-flowing rivers with “outstandingly remarkable value”, including scenic, recreational, geologic, fish, wildlife, cultural, historic, vegetation, or other similar value (such as paleontological). A value must also be unique, rare, or exemplary, as well as significant within a defined region of comparison.

Only Congress or (under certain circumstances) the Secretary of the Interior may designate a river for inclusion in the WSR system. The UFO completed an inventory and analysis of waters within the Uncompahgre Planning Area for WSR values and characteristics in 2010 (BLM 2010b) as part of its resource management planning process. There are not any eligible waters within the Project area. Because there are not any eligible wild and scenic rivers in or near the project area, there would be no impacts to this resource and it is not evaluated or discussed further.

## ***CULTURAL RESOURCES***

### **Affected Environment**

. Eleven cultural resources have been previously documented within the study area. These include six historic sites, four prehistoric isolates, and one prehistoric site. Only one of these previously recorded resources intersects areas of proposed drill hole locations or access roads (Overland Ditch – 5DT.650). Six of these sites represent historic activity on Oak Mesa and consist of ditch, mining, and homestead/ranching activities. The remaining five resources are prehistoric and consist of a single open lithic scatter and four isolates.

In addition, a Class III field survey was conducted for the 43 proposed drill hole locations and approximately 9 miles of new or improved access roads to identify unknown cultural resources within the area of potential effect (about 7 miles could not be surveyed due to lack of right-of-entry from the landowner; these roads would be surveyed prior to surface disturbance). Each drill hole location was surveyed with a 1-acre buffer and a 100-foot corridor was surveyed for each access road. The survey resulted in the documentation of four segments of irrigation systems, including a lateral of the Overland Ditch (5DT.650.1) and three localized, unnamed ditches (Robbins et al. 2011). The Overland Ditch has been preliminarily determined not eligible for listing on the National Register of Historic Places (NRHP) and the three newly documented ditches are recommended not eligible for listing on the NRHP. Concurrence on these recommendations is required from the BLM and the State Historic Preservation Officer (SHPO).

### **Environmental Consequences/Mitigation:**

#### **Proposed Action**

Because the four newly documented ditch segments and previously recorded ditches are active or may become active in the future, avoidance is necessary to maintain current or future operation, regardless of NRHP significance. Since all four cultural resources have been determined or are recommended not eligible for listing on the NRHP, no further work or mitigation is necessary pending concurrence by BLM and the SHPO on the determination.

## Cumulative Impacts

The Proposed Action would not result in impacts to eligible cultural resources. Therefore, no cumulative impacts would occur.

## No Action Alternative

Without the project, no new exploration drilling would take place to affect potential historic properties.

## ***NATIVE AMERICAN RELIGIOUS CONCERNS***

There are no known Native American religious concerns in the project area.

## ***FARMLANDS, PRIME AND UNIQUE***

Prime and other important farmlands are categorized, designated, and regulated by the U.S. Department of Agriculture (USDA) and the Natural Resource Conservation Service (NRCS) under the Farmland Protection Policy Act. Farmlands can fall into one of four categories: Prime farmland (which may be qualified by a number of sub-classifications), Farmland of statewide importance, Farmland of local importance, or Farmland of unique importance. Farmland of unique importance is identified based on its use for the production of specific high value food and fiber crops. Characteristics of these soils include the adequacy of its moisture supply to sustain those crops, and other favorable factors including: soil quality, growing season, temperature, humidity, air drainage, elevation, aspect, or other conditions, and such as nearness to market. Farmlands of statewide importance are those that “economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. In some states, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law.” The NRCS is tasked to coordinate on any federal actions that could affect the production of crops on designated farmlands.

## Affected Environment

Two soil types categorized as Farmland of Statewide Importance are within the project boundaries—Cerro loam (soil map unit #21) and Delson loam (soil map unit # 32). These soils have very limited distribution within the project area, and most are not currently cultivated. Some areas have been subdivided and are not currently used for agricultural purposes.

**Table 8. Soils Classified as Farmland of Statewide Importance**

<b>Soil Type, map unit, and description</b>	<b>Acres within proposed exploration boundary</b>	<b>Percentage of Project area</b>	<b>Erosion and Rutting Hazard</b>
Cerro loam (#21), 6 to 12 percent slopes	246.7	1.8	Slight (wind) to moderate to high (water)
Delson loam (#32), 3 to 12 percent slopes	316.8	2.3	Slight (wind) to moderate (water)

Source: USDA 2008

## Environmental Consequences/Mitigation

### Proposed Action

OM-YR-21, OM-YR-40, OM-YR-09 and portions of their access roads appear to intersect the two soils classified as farmland of statewide importance. Impacts from exploration activities would be minor and temporary; in addition, the lands under this classification do not appear to meet the required characteristics for farmland of statewide importance. These units currently are uncultivated meadows, uncultivated open space, or hayfields.

### Cumulative Impacts

The Proposed Action would result in minor, short-term impacts to soils classified as farmland of statewide importance. Existing and future oil and gas exploration, operation and development on existing and proposed lease areas could result in similar impacts in the project vicinity. Cumulatively, farmland impacts are expected to be minor. All anticipated cumulative impacts would be short-term and minimal. If oil and gas wells are economically feasible for operation and production, surface impacts would remain during the productive life of the well, normally about 30 years.

### No Action Alternative

Under the No Action alternative, there would be no project-related impacts to soils classified as farmland of statewide importance.

### ***SOILS (includes a finding on Standard 1)***

#### Affected Environment

According to the North Fork Landscape Health Assessment (LHA), all soils around the project area meet the Standard 1 Rating for soils (table 6) and do not exhibit soil loss problems. In addition, there are no sites near the project area with runoff drainage problems (BLM 2007). The most abundant soils in the project area (accounting for about 72% of the surface area) are Delson stony loam and Delson very stony loam. These soils have slight (wind) to moderate (water) erosion and rutting hazard. Soil types (USDA 1981) present in the project area include:

**Delson loam, 3 to 12 percent slopes (#32)** – Delson loam is deep and well drained. It is on fans and mesas and is formed in stony alluvium. The hazard of water erosion is high and is slight from wind. Most of these soils are used for irrigated crops, mainly pasture, small grains, and alfalfa.

**Cerro loam, 6 to 12 percent slopes (#21)** – Cerro loam is well drained and deep. It is formed on glacial outwash and old landslides and is found on mountain sides, terraces, and alluvial fans. The hazard of erosion is slight from wind and moderate to high from water. It is used for livestock and wildlife grazing and if irrigated, it can be used for crops.

**Cerro stony loam, 10 to 35 percent slopes (#22)** – This soil is deep and well drained. It is formed in old landslide deposits and glacial outwash and is on terraces, alluvial fans, and mountain side slopes. The hazard from wind erosion is slight, but is high from water erosion. Cerro stony loam is primarily used for recreational purposes and livestock and wildlife grazing.

**Ascalon sandy loam, 3 to 10 percent slopes (#8)** – Ascalon sandy loam is a formed in colluviums and alluvium derived from sandstone and is on fans and uplands. It is well drained

and deep. The hazard from wind erosion is slight to moderate and erosion from water is moderate to high. Ascalon can be used for irrigated crops, grazing of wildlife and livestock, and recreational purposes.

**Delson very stony loam, 20 to 60 percent slopes (#34)** – Delson very stony loam is deep and well drained soil. It is found on mountain side slopes and is derived from stony alluvium and colluviums. The erosion hazard from wind is slight and moderated from water. This soil is primarily used for recreational purposes and limited wildlife and livestock grazing.

**Torriorthents-Rock outcrop, sandstone, complex (#75)** – This soil consists of Rock outcrop and moderately steep to very steep soils on the side slopes of mesas, uplands, and pediments. For Torriorthents, the hazard of erosion is lessened by the stony surface. Torriorthents-Rock is typically used for wildlife cover/habitat and recreational purposes.

**Delson stony loam, 3 to 20 percent slopes (#33)** – This soil is well drained and deep. It is found on fans and mesas and is formed in stony alluvium. The hazard of erosion from water is moderate and from wind is slight. Delson stony loam is used for limited wildlife and livestock grazing and recreational purposes.

**Cochetopa stony loam, 10 to 40 percent slopes (#25)** – Cochetopa stony loam is deep and well drained. It is derived from landslide deposits and alluvium and is found on the side slopes of mountains and valleys. The hazard of wind erosion is slight and is moderate to high from water erosion. This soil is typically used for recreational purposes and limited livestock and wildlife grazing.

**Beenom-Absarokee association, 20 to 60 percent slopes (#13)** – These soils are hilly to very steep. Beenom is shallow well drained soils Absarokee is also well drained and overlies bedrock. The hazard of erosion from wind for both of these soils is slight, and moderate to high for water. Beenom soil is often used for winter range or mule deer and at high elevations, elk. Absarokee soil is used for wildlife and livestock grazing and for recreational purposes.

**Saraton-Agua Fria complex, 20 to 50 percent slopes (#70)** – These soils are moderately steep to very steep and are found on side slopes of benches, terraces, and mesas. The hazard of erosion from water is moderate to high and slight from wind. Saraton and Agua Fria are both deep and well drained, derived from basalt, and formed in cobbly, stony outwash alluvium. These soils are used for recreational purposes and limited livestock and wildlife grazing.

**Work loam, 6 to 12 percent slopes (#82)** – Work loam is deep and well drained soil found on uplands, in depressions, and on alluvial fans. It is formed in “reworked material that was weathered from sandstone.” The hazard of erosion from water is high and slight from wind. This soil is mainly used for livestock and wildlife grazing and recreational purposes; however, it can be irrigated and used for crops, primarily hay, small grains, and pasture.

**Absarokee-Work loams, 6 to 25 percent slopes (#2)** – Absarokee-Work loams are on valley sides and uplands and are moderately sloping to moderately steep. Both soils are deep and well drained and formed from weather sandstone. The hazard of erosion for Absarokee is moderate for water and slight for wind. Work is also slight for wind, but high for water. This complex is primarily used for wildlife and livestock grazing and recreation.

**Midway-Gaynor silty clay loams, 10 to 40 percent slopes (56)** – These soils are hilly, steep, and strongly sloping. Midway soil is shallow and well drained and is formed in weathered silty calcareous shale. Gaynor soil is moderately deep and well drained and is also formed in silty calcareous shale. The hazard of erosion for both soils is slight for wind and high for water. Midway-Gaynor soils are used for livestock and wildlife grazing and recreational purposes.

**Table 9. Soil Resources in the Proposed Exploration Area**

<b>Soil Type, map unit, and description</b>	<b>Acres within proposed exploration boundary</b>	<b>Percentage of Project area</b>	<b>Erosion and Rutting Hazard</b>
Beenom-Absarokee association (#13), 20 to 60 percent slopes	266.6	1.9%	Slight (wind) to moderate to high (water)
Cerro stony loam (#22), 10 to 35 percent slopes	1240.0	8.9%	Slight (wind) to high (water)
Delson loam (#32), 3 to 12 percent slopes	316.8	2.3%	Slight (wind) to high (water)
Cerro loam (#21), 6 to 12 percent slopes	246.7	1.8%	Slight (wind) to moderate to high (water)
Ascalon sandy loam (#8), 3 to 10 percent slopes	0.4	0.0%	Slight to moderate (wind) to moderate to high (water)
Delson very stony loam (#34), 20 to 60 percent slopes	5008.1	36.2%	Slight (wind) to moderate (water)
Torriorthents-Rock outcrop, sandstone, complex (#75)	513.8	3.7%	Moderate (water)
Delson stony loam (#33), 3 to 20 percent slopes	4978.3	35.9%	Slight (wind) to moderate (water)
Cochetopa stony loam(#25), 10 to 40 percent slopes	681.6	4.9%	Slight (wind) to moderate to high (water)
Saraton-Agua Fria complex (#70), 20 to 50 percent slopes	549.1	4.0%	Slight (wind) to moderate to high (water)
Work loam (#82), 6 to 12 percent slopes	33.1	0.2%	Slight (wind) to high (water)
Absarokee-Work loams (#2), 6 to 25 percent slopes	20.2	0.2%	Slight to moderate (wind) to moderate to high (water)
Midway-Gaynor, silty clay loams (56), 10 to 40 percent slopes	18.4	0.1%	Slight (wind) to high (water)

Source: USDA 2008

Note: Cerro loam (#21) and Delson loam (#32) are described in Table 8.

## **Environmental Consequences/Mitigation:**

### **Proposed Action**

The proposed action would include surface-disturbing activities such as access road construction and drill pad construction. About 32.9 acres of total temporary disturbance is anticipated from the proposed action, including about 21.5 acres for graded/occupied drill pad locations and 11.4 acres for construction of new access roads. Drill site occupation and construction of cuttings pits at each drilling location would also have direct soil disturbance. Drilling and transport activities would occur primarily in the Delson Stony Loam and Delson Very Stony Loam soil types. These soil types have slight to moderate erosion hazard. Soil compaction due to drilling activities would reduce aeration, permeability, and water-holding capacities of soils on the access roads and the drilling sites. Erosion control measures, including silt logs and berms, would be used to minimize soil erosion. These measures would limit stormwater flows off disturbed areas. Reclamation activities, as described in the proposed action, would take place as soon as possible after drilling is completed. Each drilling location, including cuttings pits and access roads, would be restored to near-original topographic position and re-seeded. The combination of temporary erosion control measures and rapid reclamation implementation would minimize soil impacts. Sites would be monitored to ensure adequate revegetation occurs to avoid or limit soil loss.

Due to the healthy vegetation and soils with low erosion risk, along with erosion control measures incorporated in the Proposed Action, soil erosion and impacts to soil productivity following reclamation would be minimal.

### **Cumulative Impacts**

The Leroux Creek basin (including Dever Creek and Cow Creek), Jay Creek basin, and West Roatcap Creek basin were considered the cumulative effects analysis area. The Proposed Action would result in minor, temporary impacts to soils. Oil and gas exploration, operation and development on existing and future leases could result in similar impacts to soils in the project vicinity, from drillpad and access road disturbance. If oil and gas wells are economically feasible for operation and production, surface impacts to project area soils would remain during the productive life of the well, normally about 30 years. Cumulatively, impacts to soils are expected to be minor. With mitigation, including erosion control measures and revegetation/reclamation activities, all anticipated soil impacts would be minimal, and temporary.

### **No Action Alternative**

Without the project, there would be no project-related effects to soils.

### **Finding on the Public Land Health Standard for upland soils**

According to the North Fork LHA, all soils around the project area meet the Standard 1 Rating for soils and do not exhibit soil loss problems. In addition, there are no sites near the project area with runoff drainage problems. There are some sites that are lacking soil protection due to lack of vegetation and bare soil exposure along the western edge of the project area (BLM

2007). With mitigation, including revegetation of drill pads and access roads, this action is unlikely to reduce the productivity of soils impacted by surface disturbing activities.

### ***VEGETATION (includes a finding on Standard 3)***

Upland vegetation communities are discussed in the section below. Open water, wetlands, and riparian areas are discussed in the Wetland and Riparian Zones section on page 65.

#### **Affected Environment**

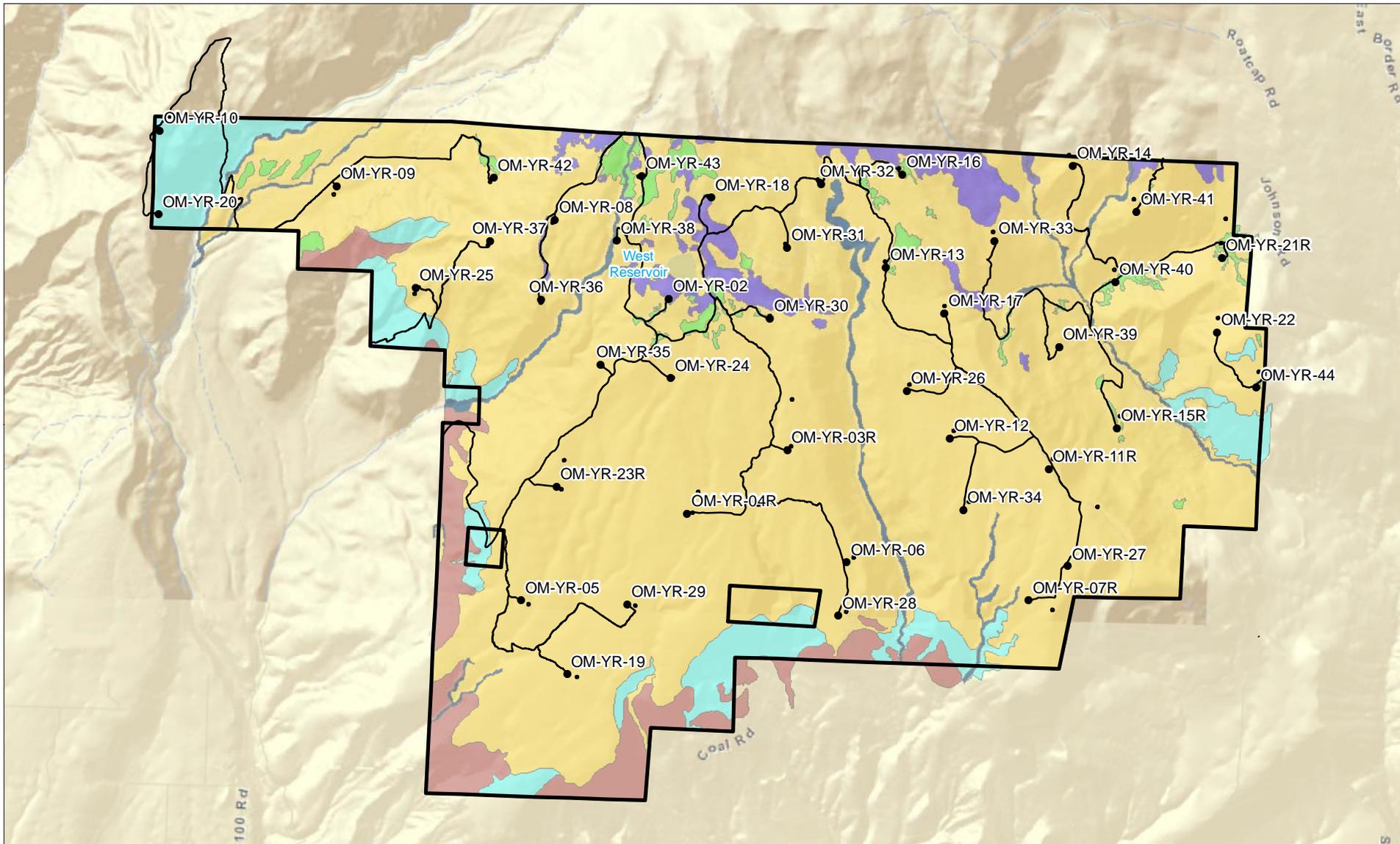
Within the project area there are large expanses of mature and over-mature (also called decadent, or old) Gambel oak/mountain shrub habitat. This habitat type makes up about 80 percent of habitat within the project area, with Pinyon-Juniper Oak the second most common habitat type (about 7 percent) with large stands at lower elevations along the southern border of the project area. Small open meadows are scattered throughout the project area. There are aspen stands along the northern border of the exploration area that extend to the north. There are also a few small aspen pockets found at higher elevations. Riparian habitat is found in perennial drainages in the project area (see Figure 3 for vegetation map).

Preliminary

**Table 10. Vegetation in Project Area**

<b>Vegetation Description</b>	<b>Area (Acres)</b>	<b>Area (Percent)</b>
Gambel Oak - Mountain Shrub	11,290.1	81.4%
Pinyon - Juniper - Gambel Oak	970.6	7.0%
Pinyon – Juniper	658.7	4.7%
Meadow	277.8	2.0%
Cottonwood/Riparian	136.9	1.0%
Riparian	38.5	0.3%
Aspen	468.5	3.4%
West Reservoir	32.0	0.2%
<b>Total</b>	<b>13,873.0</b>	<b>100.00</b>

Preliminary EEA



### Oak Mesa Exploration Project

- |   |   |  |
|---|---|--|
|  Aspen                     |  Pinyon Juniper            |  Drill Hole Location  |
|  Gambel Oak Mountain Shrub |  Pinyon Juniper Gambel Oak |  Road                 |
|  Meadow                    |  Riparian                  |  Exploration Boundary |

0 2,500 5,000 feet



**Figure 3**  
**Vegetation Communities**

Prepared for: Oxbow Mining, LLC.  
File: 5057 - Figure 3 EA.mxd (WH)  
February 2012



### **Gambel oak – Mountain shrub vegetation type**

The Gambel oak-mountain shrub vegetation community is dominant across the project area and occurs on ridge slopes, along drainages, and over level to moderately rolling terrain. This type accounts for approximately 81 percent of the vegetation in the area. In some areas, near-pure stands of Gambel oak dominate slopes, drainages, and some areas on top of Oak Mesa. Where the community occurs in larger meadows and along drainages, there is a variety of other shrub species that are co- or sub-dominant depending upon growing conditions. Other shrubs that occur in slightly more moist areas include snowberry (*Symphoricarpos oreophilus* or *S. rotundifolius*) and serviceberry (*Amelanchier alnifolia*). The dominant shrub species is Gambel oak. Toward the south end of Oak Mesa on the benches below approximately 7,800 feet, stands of Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) with isolated occurrences of Basin big sagebrush (*Artemisia tridentata tridentata*) are found interspersed in the Gambel Oak vegetation type. These areas of sagebrush are typically no more than a few acres in size. In more moist areas, chokecherry (*Prunus virginiana*) is also found. Small, sub-dominant aspen (*Populus tremuloides*) are found in wetter areas where the chokecherry community borders the aspen community.



**Photo 3. Typical Gambel oak-mountain shrub community on Oak Mesa.**

### **Pinyon-Juniper (PJ) vegetation type**

Two PJ vegetation types are found in the project area. The PJ woodland is dominated by Utah juniper (*Juniperus osteosperma*), with Colorado pinyon (*Pinus edulis*) in some areas along the south edge of Oak Mesa. In this area, a few Rocky Mountain juniper (*Juniperus scopulorum*) are also present. There is typically a sparse and variable understory that may contain remnant shrubs such as Wyoming big sagebrush, birchleaf mountain mahogany (*Cercocarpus montanus*), bitterbrush (*Purshia stansburiana*), siltbush (*Zuckia brandegeei*), snakeweed, potato cactus (*Opuntia fragilis*), muttongrass (*Poa fendleriana*), and bottlebrush squirreltail (*Elymus elymoides*).



**Photo 4. Pinyon-Juniper vegetation type on south face of Oak Mesa.**

With increasing elevation, Utah juniper and Colorado pinyon drop out of the community and Gambel oak and mountain shrubs dominate the vegetation. In both these communities where there are openings between the typically dense shrub canopies, or in areas where the canopy is well above the ground surface, a productive understory of forbs and grasses exists. Commonly found species are elk sedge (*Carex geyeri*), Letterman's needlegrass (*Acnatherum lettermanii*), Kentucky bluegrass (*Poa pratensis*), muttongrass, Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail, western wheatgrass (*Pascopyrum smithii*), and nodding brome (*Bromus anomalus*). Forbs are numerous with many species. The most widespread and dominant include western yarrow (*Achillea millefolium*), lupine (*Lupinus* spp.), western sweetcily (*Osmorhiza occidentalis*), southern ligusticum (*Ligusticum porteri*), biscuitroot (*Lomatium dissectum*), and aspen peavine (*Lathyrus lanzwertii*).



**Photo 5. Transition from Pinyon-Juniper to Gambel oak-mountain shrub on south end of Oak Mesa.**



**Photo 6. Gambel oak-mountain shrub with pockets of sagebrush and scattered pinyon-juniper; view to west near south end of Oak Mesa.**

### **Aspen vegetation type**

Aspen stands occur at elevations greater than 8,800 feet near the northern edge of the project area and beyond, especially at the heads of drainages. This vegetation type inhabits more moist areas on all slopes in these northern, higher elevation areas. It mixes with most of the other vegetation types on site and has a more open, highly productive understory. The dominant tree species is aspen. Common understory species include Woods rose (*Rosa woodsii*), snowberry,

chokecherry, mountain brome (*Bromus marginatus*), elk sedge, white- flowered peavine, Fendler meadow-rue (*Thalictrum fendleri*), and American vetch (*Vicia americana*).

At somewhat lower elevations in small mesic drainages associated with the larger drainages, there are small pockets of aspen vegetation. In most cases, there are only a few aspen and many of these are dying out. The aspen understory typically contains snowberry and sometimes black chokecherry or willows with a very productive understory of the grasses and forbs.



**Photo 7. Stands of mature aspen; view up West Roatcap Creek near the north border of the project area.**



**Photo 8. View of aspen stand that has been logged and is regenerating.**

### **Riparian vegetative community**

Within the broad category of riparian vegetation are several distinct plant communities. The most common riparian community is dominated by narrowleaf cottonwood (*Populus angustifolia*) and distinguished by various associated shrubs, forbs and grasses. The cottonwood vegetation community is generally limited to the lower reaches of the Jay, West Roatcap, and Leroux Creek drainages at elevations below approximately 8,800 feet. As shown on Figure 3, the cottonwood community ends at higher elevations in Jay and West Roatcap drainages.

Riparian zones occur along project area drainages and are characterized by comparatively narrow vegetation communities requiring wetter growing conditions than the surrounding uplands. Riparian zones occur in a very narrow band along the drainages and, in most cases, are no more than one or two trees wide (50 to 200 feet). There is a limited amount of understory associated with the cottonwoods. There are some pockets of willows scattered along the bottoms.



**Photo 9. View of cottonwoods along West Roatcap Creek and representative of cottonwoods along Jay Creek. Hillsides are dominated by Gambel oak-mountain shrub.**



**Photo 10. Riparian zone along Dever Creek.**

In other drainages, such as Dever Creek, there are some small pockets of aspen and willows. These pockets are usually very small, not over 50 to 100 feet wide and 200 to 300 feet long, and found only in the bottom of the drainages.

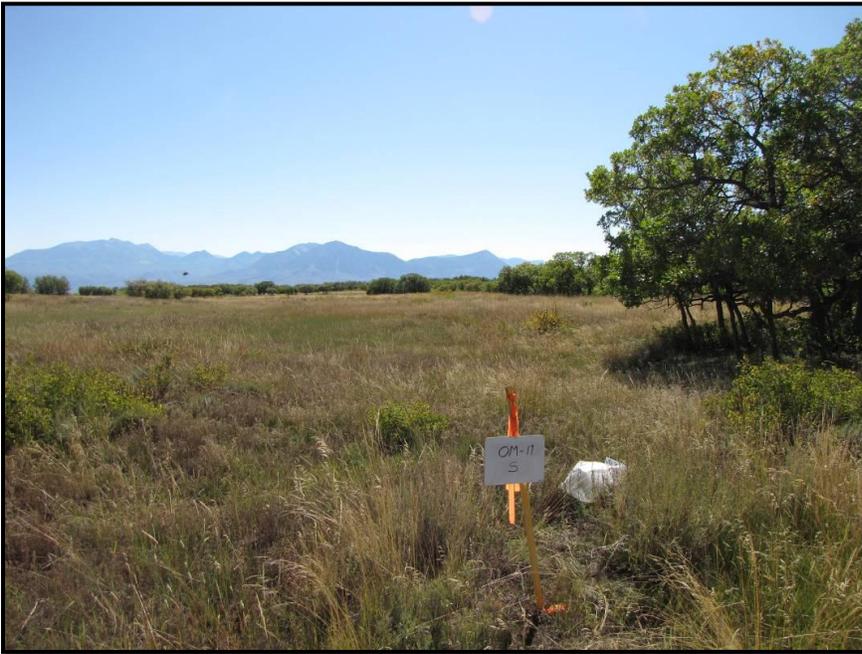
The boundaries of riparian zones are limited in width by the steep topography associated with drainage systems. These zones may or may not include a recognized wetland component. A variety of tree species are usually associated with the riparian zones of the project area and, where occurring, the shrub component is denser than in the surrounding uplands due to soil moisture conditions.

### **Meadow vegetative community**

Scattered across the project area, the meadow vegetation community is associated primarily with nearly level to moderately sloping sites on a variety of aspects and elevations. This community occurs as small natural clearings within other vegetation types, revegetated development disturbances, and heavily grazed meadows often associated with developed stockponds. Dominant vegetation includes a variety of native and introduced herbaceous species. Native species present include wheatgrasses (*Agropyron* sp.), bluegrasses (*Poa* sp.), needlegrasses (*Stipa* sp.), and a variety of penstemons (*Penstemon* sp.), as well as rushes (*Juncus* sp.) and spikerushes (*Eleocharis* sp.) bordering stock pond margins. Introduced species present include smooth brome (*Bromus inermis*), orchard grass (*Dactylis glomerata*), and mountain timothy (*Phleum alpinum*).

On the western portion of the project area there are some irrigated and seeded meadow areas that receive a limited amount of irrigation. Species include orchard grass, brome, and mountain timothy. At the north edge of the project area, overflow from the Overland Ditch occurs during the spring of some years which benefits the grasses in this area. Lower on the property, a limited amount of water is diverted from the Wakefield Ditch to supplement naturally occurring moisture in the spring and early summer. However, most of the water taken from the ditch is

used to insure that stock ponds are filled to provide water for cattle during the summer and early fall.



**Photo 11. Meadow on west end of project area.**

## **Environmental Consequences/Mitigation**

### **Proposed Action**

Under the proposed action, there would be impacts to vegetation communities from new road and drill pad construction. In addition to direct impacts to vegetation communities from clearing and grading, there would be indirect impacts from deposition of fugitive dust, increased risk of exotic species/noxious weed introduction, introduction of new genetic strains from re-seeding efforts, and change in age class and successional pattern in revegetation areas.

Design features have been incorporated into the proposed action to avoid and minimize impacts to the extent possible. The proposed roads and drill pads have been oriented to minimize clearing and disturbance, and take advantage of topography and vegetation gaps. Only 10 of the proposed drilling locations would require construction of a graded pad; the other locations would require only minor clearing and removal of large rocks. This use of surface occupation only rather than grading would ensure rapid revegetation due to limited soil disturbance. Dust suppression using application of water to roads, pad locations, and soil stockpile locations would minimize fugitive dust. Implementation of a weed management plan to minimize risk of introduction, monitor disturbed and occupied areas (including existing roads used as access), and control existing and new noxious weed populations would limit impacts from weed spread. Proposed reclamation measures would ensure that all impacts would be temporary, unless the landowner requests that new roads remain. Revegetation is not always successful; therefore the sites would be monitored until revegetation success criteria have been met. All new roads and all drill pads would be revegetated as described in the *Proposed Action* section. Table 11 quantifies impacts to the vegetation communities, from both drill pad and road

construction. In summary, the overall impacts from the proposed project on vegetation communities are minor and represent about 0.3% of the project area.

**Table 11. Vegetation Community Clearing Impacts from the Proposed Action.**

<b>Vegetation Community</b>	<b>Temporary Impacts, BLM surface (acres)</b>	<b>Temporary Impacts, Private surface (acres)</b>
Gambel Oak-Mountain Shrub	3.9	22.2
Pinyon-Juniper-Gambel Oak	0.5	1.1
Pinyon-Juniper	0.0	0.0
Meadow	1.6	2.4
Cottonwood-Riparian	0.0	0.0
Riparian	0.0	0.1
Aspen	0.0	1.0
<b>Total</b>	<b>6.0</b>	<b>26.9</b>

Note: acres may not sum due to minor rounding errors.

### **Cumulative Impacts**

The Leroux Creek basin (including Dever Creek and Cow Creek), Jay Creek basin, and West Roatcap Creek basin were considered the cumulative effects analysis area for vegetation. The Proposed Action would result in minor, temporary impacts to vegetation communities. Some impacts on successional stage of vegetation may be long-term (20 to 30 years); this would occur primarily in shrub/tree areas. Oil and gas exploration, operation and development and coal lease modifications in the cumulative effects analysis area could result in similar impacts in the project vicinity. Cumulatively, impacts to vegetation communities are expected to be minor. With mitigation, including dust suppression, erosion control measures, implementation of a weed management plan and revegetation/reclamation activities, all anticipated impacts would be, minimal, and temporary. If oil and gas wells are economically feasible for operation and production, surface impacts would remain during the productive life of the well, normally about 30 years.

### **No Action Alternative**

Without the project, there would be no project-related effects to vegetation communities on Oak Mesa.

### **Finding on the Public Land Health Standard for plant and animal communities**

(partial, see also Wildlife, Aquatic; Wildlife, Terrestrial; and Invasive, Non-native Species)

According to the North Fork LHA, the southern portion of the project area is classified as “meeting with problems” the Standard 3 Rating for Healthy Biotic Communities. All other areas are either uplands or are meeting the Standard. There are no sites around the project area that have plant diversity problems, however, there are several sites, primarily on the east and west

boundaries of the project area that have cool season perennial grass problems and low perennial forb cover. Just one site on the south-western edge of the project area has both warm season perennial grass problems and PJ invasion and pinyon decline problems (BLM 2007).

There are several sites on the south west edge of the project area where the shrubs are moderately to seriously hedged and there are sites on all but the north edge of the project area that exhibit plants in low vigor (BLM 2007).

The Proposed Action would not change to the Standard 3 Rating for the project area. Some areas could see an improvement in the vegetative communities with reclamation following the exploration, and shrub clearing could have a beneficial effect on herbaceous vegetation.

### ***INVASIVE, NON-NATIVE SPECIES (includes a finding on Standard 3)***

#### **Affected Environment**

One State of Colorado listed noxious weed species (Colorado Department of Agriculture 2010), Canada thistle (*Breca arvensis*), was observed in the project area during the September 2011 vegetation surveys. Other observed species in or near the project area include hoary cress (*Cardaria draba*) and Russian knapweed (*Centaurea repens*). During surveys for other projects in the North Fork Valley in similar habitat types and elevations other listed species have been observed. Those that could occur in the project area include Perennial pepperweed (*Lepidium latifolium*), musk thistle (*Carduus nutans*), bull thistle (*Cirsium vulgare*), cheatgrass (*Anisantha techtorum*) and hounds tongue (*Cynoglossum officinale*). Yellow starthistle (*Centaurea solstitialis*) is known to occur near the east edge of the project area, and could spread to the project area. Non-county listed weeds present in the project that are invasive include horehound (*Marrubium vulgare*), and cocklebur (*Xanthium strumarium*). The existing weeds in the project area could be a result of landowner activities, grazing, transport of cattle and other equipment access, and previous oil and gas exploration and drilling activities.

#### **Environmental Consequences/Mitigation**

##### **Proposed Action**

The proposed project would result in ground-disturbing activities or occupation on 32.9 acres during construction of new access roads and drill pads. During construction and reclamation, the disturbed areas would be open for noxious weed establishment and potential spread onto adjacent lands. Additional existing road areas would be occupied by vehicles, though the ground would not be disturbed by grading. Equipment used for construction and drilling can introduce and spread new weed species that currently are not established. The species mentioned above are typically aggressive and highly competitive with more desirable species. New roads and pad disturbance were minimized during project design by using existing roads, and using flat topographic areas as much as possible for drilling. Using this approach, only 10 pads would require grading. Other design features including prompt reclamation of disturbed areas, monitoring and weed control following the project, washing equipment prior to use in the project area, and following the Weed Management Plan would help avoid the introduction and spread of weeds.

## **Cumulative Impacts**

The Leroux Creek basin (including Dever Creek and Cow Creek), Jay Creek basin, and West Roatcap Creek basin were considered the cumulative effects analysis area for noxious weeds. The Proposed Action would result in increased risk for spread of noxious weeds. Oil and gas exploration, operation and development, and coal lease modifications on adjacent lands could also result in the spread of noxious weeds. However, with mitigation for the proposed action and similar requirements for oil and gas operations, the increased risk is anticipated to be minimal.

## **No Action Alternative**

Without the project, there would be no project-related effects to invasive, non-native species on Oak Mesa. Existing weed infestations likely would continue to spread.

## **Finding on the Public Land Health Standard for plant and animal communities**

(partial, see also Wildlife, Aquatic; Wildlife, Terrestrial; and Vegetation)

There are only two sites in the exploration area that present potential “exotic” plant problems in undisturbed areas. One is on the eastern edge and the other is on the southern edge of the project area. There is one site on the southwest edge of the exploration area that, according to the North Fork LHA has significant cheatgrass cover. There are minor patches of noxious weeds scattered around the boundary of the project area with one significant infestation located along the northeastern edge of the project area (BLM 2007). Although the species is not identified in the North Fork LHA, most common weeds in the project vicinity are identified as Russian knapweed, hoary cress, tamarisk, and Canada thistle (BLM 2007).

The Proposed Action would not change the Standard 3 Rating for the project area. Weed management and reclamation could have a beneficial effect.

## ***THREATENED, ENDANGERED, AND SENSITIVE SPECIES (includes a finding on Standard 4)***

### **Affected Environment:**

#### **Federal and State**

No terrestrial threatened and endangered (T & E) wildlife or plant species listed by the U.S. Fish & Wildlife Service (FWS) or Colorado Parks and Wildlife (CPW) were observed during habitat and wildlife surveys (Table 12). Occupied and suitable habitat in the exploration area is lacking for all of the T&E listed species, including plants. The only listed fish species are found downstream in the Gunnison and Colorado Rivers. The yellow-billed cuckoo and Gunnison sage grouse are listed as federal candidate species. There is no suitable habitat for these two species in the proposed exploration area (See further explanation below). The paragraphs that follow provide a description of the species in Table 12.

**Table 12. Federal and State Threatened, Endangered, and Candidate Species**

Species	Status	Habitat Present	Species Present
Canada lynx	FT,SE	No	No
Black-footed ferret	FE,SE	No	No
North American Wolverine	FE,SE	No	No
Greenback cutthroat	FT	No	No
Colorado pikeminnow	FE, ST	No	No
Humpback chub	FE, ST	No	No
Razorback sucker	FE, SE	No	No
Bonytail chub	FE, SE	No	No
Yellow-billed cuckoo	FC, SC	No	No
Gunnison sage grouse	FC, SC	No	No

FE - Federal Endangered

FT - Federal Threatened

FC - Federal Candidate Species

Source: FWS 2011

SE - State Endangered

ST - State Threatened

SC - State Species of Concern

### **Canada lynx**

The project area is not located within or near any mapped lynx habitat (USFS 2011b). The CPW lynx data base does not show that any lynx have been observed within miles of the area since lynx were first reintroduced into the state. Under the Southern Rockies Lynx Amendment guidelines aspen is classified as secondary habitat. However, aspen stands that would fit this classification are found at the northern edge of the exploration area. Some of these stands have been logged and in others there are existing roads. In five years of winter habitat and track surveys conducted by Monarch on Grand Mesa and near the West Elk Wilderness in similar aspen habitat, it was found that suitable prey base for lynx is lacking. The only predator tracks found in these areas were those of coyotes and these were few in number. The only prey tracks were a very limited number of rodents (Monarch 2011).

### **Black-footed ferret**

There is no black-footed ferret habitat in the project area. Their primary prey, white-tailed prairie dogs are known to occur in Delta County, but none are in or near the Oak Mesa area (Monarch 2011). Black-footed ferret are also assumed to be extirpated from the Uncompahgre Field Office (UFO) management area.

### **North American wolverine**

There is no wolverine habitat in the project area. The nearest areas where there could potentially be wolverine habitat are in the West Elk Wilderness Area which is miles from the project area (Monarch 2011).

### **Greenback cutthroat trout**

Greenback cutthroats are known to occur in Leroux Creek. However, surveys conducted by the CPW and USFS show that these fish are all found upstream from the project area on the Grand Mesa National Forest (Dare 2011).

### **Endangered Fish**

Four federally listed endangered species (Colorado pikeminnow, humpback chub, bonytail chub, and razorback sucker) occur in offsite areas including the Gunnison and Colorado Rivers. These four species of fish occur in warm water habitats downstream of the project area in the Gunnison and Colorado Rivers. None of these species of fish are known or expected to occur in the project area. However, water depletions associated with this type of project are known to affect these species.

In May 2008, BLM prepared a Programmatic Biological Assessment (PBA) that addresses water depletion activities associated with BLM's fluid minerals program in the Colorado River Basin in Colorado. In response to BLM's PBA, the FWS issued a Programmatic Biological Opinion (PBO)(ES/GJ-6-CO-08-F-0006) on December 19, 2008, which determined that BLM water depletions from the Colorado River Basin are not likely to jeopardize the continued existence of the Colorado pikeminnow, humpback chub, bonytail, or razorback sucker, and that BLM water depletions are not likely to destroy or adversely modify designated critical habitat. The PBO addresses water depletions associated with fluid minerals development on BLM lands, including water used for well drilling, hydrostatic testing of pipelines and dust abatement on roads. The PBO includes reasonable and prudent alternatives developed by the FWS which allow BLM to authorize oil and gas wells that result in water depletion while avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification of their critical habitat. As a reasonable and prudent alternative in the PBO, FWS authorized BLM to solicit a one-time contribution to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) in the amount equal to the average annual acre-feet (ac-ft) depleted by fluid minerals activities on BLM lands (Monarch 2011).

This project would result in a one-time depletion of approximately one acre-foot to the Gunnison and Colorado river systems from water used for drilling and dust control. The FWS has determined any amount of water depletion in the Upper Colorado River will jeopardize the continued existence of the four listed Colorado River fishes. Therefore, the depletion of one acre-foot of water would result in a may affect, likely to adversely affect to the four listed Colorado River fishes. However, as discussed above, the BLM has completed a programmatic consultation covering small water depletions associated with well drilling activities (Biological Opinion Ref # (PBO) (ES/GJ-6-CO-08-F-0006). The scope of this PBO encompasses the proposed action.

### **Yellow-billed Cuckoo**

Although there are cottonwoods along Jay, West Roatcap, and Leroux creeks, these are narrow stringers and do not provide suitable nesting habitat for the yellow-billed cuckoo. Overall, nesting habitat for these birds is lacking in the project area. They have been found in large cottonwood gallery forests along the North Fork of the Gunnison River, about 4 miles south of the project area (BLM 2007). There is a slight chance that a yellow-billed cuckoo might be found in the stringers in lower portions of the drainages (Monarch 2011).

### **Gunnison sage grouse**

There are no records of Gunnison sage grouse having been observed in the Oak Mesa area. There are small areas of sagebrush on the large benches near the south end of the mesa. These

birds require large areas of continuous sage brush. The small pockets of sagebrush found in the project area are not of sufficient size to support these birds. In addition, these pockets are found where there are larger shrubs and in some cases PJ that could be used as hunting perches by raptors. This further reduces that chances that any of these birds might occur in the area. The nearest known populations of these birds are in the Crawford area several miles south of the project area. CPW mapped historic range for Gunnison sage grouse reaches as far north at Wakefield Mesa, greater than 2 miles southeast of the project area. Based upon what is known about habitat requirements for these birds suitable habitat is lacking for these birds in the project area (Monarch 2011). The nearest known Gunnison sage grouse habitat is greater than 8 miles south of the project area (BLM 2007).

### **BLM Sensitive Species of the UFO**

The BLM lists a total of 43 terrestrial vertebrates, fish, invertebrates and plant species, which occur, potentially occur, or habitat for which occurs in the UFO area. A review of information on these species shows that only six terrestrial vertebrates, one amphibian, and one fish are known to occur or have suitable habitat in the project area (see Table 13). There is no suitable habitat for any sensitive plant species in the project area (Monarch 2011; BLM 2007).

**Table 13. BLM Sensitive Species of the UFO Potentially Occurring in the Project Area**

<b>Species</b>	<b>Habitat Present</b>	<b>Species Present</b>
<b>Terrestrial vertebrates</b>		
Spotted bat	Yes	Unknown
Fringed myotis bat	Yes	Unknown
Townsend’s big-eared bat	Yes	Unknown
Bald eagle	Forging habitat only	Unknown
American peregrine falcon	No nesting habitat	Yes
Brewer’s sparrow	Yes	Unknown
<b>Amphibians</b>		
Northern leopard frog	Yes	Yes
<b>Fish</b>		
Bluehead sucker	Yes	Yes

Source: Monarch 2011; BLM 2007

### **Spotted bat**

The spotted bat can be found in many western states and provinces, but its distribution is quite patchy, likely due to its dependence on large, isolated cliffs for roosting. In localities where such habitat is abundant (e.g., the Grand Canyon), spotted bats are believed to be moderately common. However, given the scarcity of suitable habitat, range- wide abundance is still thought to be fairly low. This, combined with unknown population trends, a suite of potential threats, and lack of basic life history data contribute to a broad level of conservation concern (Luce and Keinath 2007).

The main threats to the persistence of spotted bat populations are loss or reduction in value of wet meadows and other foraging areas, at least at a local scale. Such impacts could result from

over-grazing by livestock, water diversion, or changes in land use such as conversion of native habitats to tilled cropland.

No spotted bat occurrence has been formally documented within the proposed project area. No cliffs or rock walls, which this species requires for roosting, occur in the project area, which further reduces chances that any spotted bats occur in the project area (Garrison 2011).

### **Townsend's big-eared bat**

Because of its narrow roosting preferences, local distribution of Townsend's big-eared bat tends to be restricted by the presence of suitable roosting habitat (i.e., primarily caves and mines, abandoned buildings, and large tree hollows) (Gruver and Keinath 2006).

Suitable roosting habitat is lacking within the proposed project area. Suitable foraging habitat is limited within the proposed project area. There are records of Townsend's big-eared bats for Delta County, but none have been formally documented in the project area (Garrison 2011).

### **Fringed myotis**

Suitable roosting sites are a critical habitat component, the availability of which can determine population sizes and distributions (Humphrey 1975, Kunz 1982, Adams 2003, Fitzgerald, 1994). Maternity roosts, diurnal roosts, nocturnal roosts, and winter hibernacula must all be considered. Throughout their range, fringed myotis use caves, mines, and buildings as maternity colonies, solitary day and night roosts, and hibernacula. (Keinath, D.A. 2004).

Fringed myotis are gleaners foraging close to the plant canopy. They commonly forage around the edges to forests and within shrub communities such as Gambel oak. Suitable roosting habitat is present in Gambel oak in the project area (Adams 2003). Fringed myotis bats have not been formally documented in the project area (Garrison 2011).

### **Bald eagle**

No occurrence of the bald eagle has been formally documented within the proposed project area. The nearest known bald eagle activity is along the North Fork of the Gunnison River. Suitable nesting and reproductive habitat for the bald eagle is found along the river, but is not present in the proposed project area. Bald eagles do winter along the North Fork of the Gunnison River and in the winter possibly make foraging flights through the area searching for carrion. Winter range is documented south of the project area. Winter roost habitat for the bald eagle is not present within the project area (Monarch 2011; BLM 2007).

### **Peregrine falcon**

One peregrine falcon was observed foraging in the area during spring surveys in 2011. This is the only occasion that a peregrine has been observed in the area. However, there have been numerous sightings of peregrines in the North Fork Valley and there is a known nest site several miles to the east in Dove Gulch. Suitable cliff nesting habitat for this species is lacking in the project area. Known peregrine falcon areas occur on the Grand Mesa National Forest greater than 10 miles north of the project area (Monarch 2011; BLM 2007).

### **Brewer's Sparrow**

This species prefers rabbitbrush and sagebrush habitat (Kingery 1998). There are a few small stands of sagebrush that could provide suitable habitat for this species along the southern portion of the project area (Monarch 2011).

### **Northern leopard frog**

The northern leopard frog prefers the banks and shallow portions of marshes, wet meadows, ponds, lakes, and streams particularly where rooted aquatic vegetation is present (Hammerson

1999). They prefer permanent bodies of water and are a wide-ranging species known to elevations of 3,355 meters (11,000 feet). Northern leopard frogs can range up to 5 kilometers (3 miles) and feed on insects, spiders, and worms. Northern leopard frog tadpoles are herbivorous scavengers (USFS 1997). There is suitable northern leopard frog habitat along drainages and in stock ponds in the project area (Monarch 2011).

#### **Colorado River cutthroat trout**

Suitable habitat for the Colorado River cutthroat trout does not occur within the project area. This fish may occur in Leroux Creek north of the exploration boundary in the Grand Mesa National Forest, greater than 3 miles north of the project area (Monarch 2011).

#### **Bluehead sucker**

This species is known to occur in streams in the North Fork Valley (Speas 2011). However, during stream sampling conducted by the BLM in 2007 below the confluence of Leroux and Dever creeks no bluehead suckers were found (Fresques 2011).

### **Environmental Consequences/Mitigation**

#### **Proposed Action**

##### **Federally Threatened and Endangered Species**

##### **Canada lynx**

There would be no additional disturbance of the older aspen stands in this area during road building associated with the exploration program. It would be necessary to build one short section of road to the OM-18 drill site through an aspen stand that has been logged and is regenerating. This stand would not be considered lynx habitat. The OM-18 drill site would be constructed in Gambel oak-mountain shrub habitat. Based on the above information, it has been determined that the project would have no effect on Canada lynx.

##### **Black-footed ferret**

There is no habitat for the black-footed ferret in the project area, and the project would have no effect on this species.

##### **North American wolverine**

There is no habitat for the wolverine in the project area, and the project would have no effect on this species.

##### **Greenback cutthroat trout**

There is no habitat for the greenback cutthroat trout in the project area, and habitat for the species in Leroux Creek is greater than 3 miles upstream of the project area on the Grand Mesa National Forest. The project would have no effect on this species.

##### **Endangered Fish**

This project would result in a one-time depletion of approximately one acre-foot to the Gunnison and Colorado River systems. The FWS has determined any amount of water depletion in the Upper Colorado River will jeopardize the continued existence of the four listed Colorado River fishes. Therefore, the depletion of one acre-foot of water would result in a may affect, likely to adversely affect to the four listed Colorado River fishes. However, as discussed previously, the BLM has completed a programmatic consultation covering small water depletions associated with well drilling activities (Biological Opinion Ref # (PBO) (ES/GJ-6-CO-08-F-0006) such as the proposed action.

### **Yellow-billed Cuckoo**

There is no habitat for the yellow-billed cuckoo in the project area, and habitat for the species along the North fork of the Gunnison River is greater than 3 miles south of the project area. The project would have no effect on this species.

### **Gunnison sage grouse**

There is no habitat for the Gunnison sage grouse in the project area, and habitat for the species is greater than 8 miles south of the project area. The project would have no effect on this species.

### **BLM Sensitive Species**

The purpose of this section is to analyze the effects of the proposed project, to determine if the proposed activities are likely to cause a loss of viability or a trend toward Federal listing under the Endangered Species Act for any of these species.

### **Spotted bat**

No spotted bat occurrence has been formally documented within the proposed project area. No cliffs or rock walls occur in the project area, which further reduces changes that any spotted bats could be affected. Activities from the project would have no impact to the spotted bat.

### **Townsend's big-eared bat**

Suitable roosting habitat for the Townsend's big-eared bat is lacking near the proposed activities, and suitable foraging habitat is limited or lacking. No Townsend's big-eared bat occurrence has been formally documented within the proposed project area. Activities from the project would have no impact to the Townsend's big-eared bat.

### **Fringed myotis**

The fringed myotis has not been formally documented in the project area. Suitable foraging and roosting habitat occurs, but given the large expanses of foraging habitat and small amount of disturbance it is doubtful there would be any impact to these bats as a result of the exploration drilling activities. Activities from the project would have no impact to the fringed myotis.

### **Bald eagle**

The bald eagle has not been formally documented in the project area. No suitable nesting or winter roost site habitat for the bald eagle is present in the project area. The bald eagle may forage in the project area for carrion during the winter months, but no activities are proposed during this time frame. Activities from the project would have no impact to the bald eagle.

### **Peregrine falcon**

Peregrine may occasionally forage in the project area. There is no suitable cliff nesting habitat, and the nearest known nest site is several miles east of the proposed project activities. Activities from the project would have no impact to the peregrine falcon.

### **Brewer's sparrow**

Disturbance to the limited sagebrush habitat present in the project area would only occur at two sites and the disturbance would be minor. There could be minor impacts to the Brewer's sparrow if construction activities occur between June 1 and July 15 and no impact if work is conducted outside of this time frame. Preconstruction surveys would be conducted if disturbance to sagebrush habitat is expected between June 1 and July 15. Exploration activities would have minimal impact on Brewer's sparrow if construction occurs outside of the nesting period or if the site is Brewer's sparrow is determined not to be present. Activities may adversely affect individuals, but are not likely to result in a loss of viability in the project area, nor cause a trend towards federal listing or a loss of species viability.

### **Northern leopard frog**

Direct impacts on northern leopard frogs could possibly occur if sediment enters water bodies where they are present. However, leopard frogs are found in ponds used by livestock where turbidity is often high. With proposed erosion control mitigation measures potential indirect effects on this species would be minimized. Activities may adversely affect individuals, but not likely to result in a loss of viability in the project area, nor cause a trend towards federal listing or a loss of species viability.

### **Bluehead sucker**

This species is known to occur in Leroux Creek. All drilling activity associated with exploration operations would occur greater than ½ mile from Leroux Creek. Leroux Creek Road and other existing ranch roads would be used and no new crossings of Leroux Creek would be required. Sediment control measures, in addition to distance from the stream, would prevent impacts to stream water quality. The small areas of disturbance, location of construction activity and implementation of sediment control measures minimize the chances that silt would reach the stream.

The small areas of disturbance and location of construction activity and proposed sediment control measures minimizes the chances that these fish would be impacted. Exploration activities may adversely affect individuals, but are not likely to result in a loss of viability on the Planning area, nor cause a trend towards federal listing or a loss of species viability.

### **Cumulative Impacts**

The Leroux Creek basin (including Dever Creek and Cow Creek), Jay Creek basin, and West Roatcap Creek basin were considered the cumulative effects analysis area for listed and sensitive species. The Proposed Action would not result in impacts to any federally listed species (ESA). There would be no cumulative effects to ESA-listed species. For three BLM species of concern (Brewer's sparrow, northern leopard frog, and bluehead sucker), a determination of "may adversely affect individuals" has been made, due to surface disturbance and increased risk of sedimentation.

Cumulative impacts from other activities that are reasonably foreseeable would be similar in nature to those associated with the proposed action. Oil and gas exploration, drilling, and operation would result in access roads and small (5 to 7 acre) pad sites that would increase vegetation disturbance. Ongoing grazing impacts likely would continue. While existing and proposed leases occur in the project vicinity, few wells have been drilled and even fewer have been completed. Production is very limited in the identified cumulative impacts analysis area. Without substantial changes to the oil and gas economy or extraction technology, the low existing level of exploration and drilling is likely to continue. Within the past 10 years, only 14 oil and gas wells have been drilled within 10 miles of the 13,873-acre project area. Given the small project impacts and low level of anticipated impacts from reasonably foreseeable actions, impacts to populations are unlikely. With the design features incorporated into the proposed action and similar measures required of oil and gas development, habitat impacts would not threaten any populations of Brewer's sparrow, northern leopard frog, and bluehead sucker that inhabit the cumulative effects analysis area.

## No Action Alternative

Without the project, there would be no project-related effects to any federally listed species, or BLM species of concern.

## Finding on the Public Land Health Standard for Threatened & Endangered species:

Based on the North Fork Land Health Assessment NFLHA, there is no habitat for threatened and endangered species in the project area. The southern edge of the project area is adjacent to the northern edge of potential Bald Eagle Winter Range (BLM 2007). All areas surrounding the project area are meeting Standard 4 Special Status Species (BLM 2007). The proposed project would not change the ability of the project area to meet Standard 4.

## *BIRDS (Birds of Conservation Concern of the UFO, Migratory, and Raptors)*

### Affected Environment

#### Birds of conservation concern of the UFO

The USFWS (2008) lists 26 bird species as occurring in the UFO district. Of these, habitat is lacking in the project area for all but 8 species (Table 14; Monarch 2011).

Table 14. Birds of Conservation Concern of the UFO

Species	Habitat Present	Species Present
Golden eagle	Foraging only	Yes
Peregrine falcon	Foraging only	Yes
Prairie falcon	Foraging only	Yes
Lewis's woodpecker	Yes	Yes
Gray vireo	Yes	Yes
Pinyon jay	Yes	Yes
Juniper titmouse	Yes	Yes
Brewer's sparrow	Yes	Unknown

Source: FWS 2008.

The golden eagle, peregrine falcon and prairie falcon are known to forage in the area. There are some cottonwood trees along Leroux Creek within the project area that could be utilized by golden eagles for nesting. However, there are no records of golden eagles nesting in that area or in any other cottonwood stands in or near the project area. Golden Eagle nest sites occur both east and west of the project area, in cliff habitat (BLM 2007). There is no suitable nesting habitat for peregrine or prairie falcons in the project area (Monarch 2011).

There are other Species of Conservation Concern (SCC) that utilize other habitat types in the project area. These include the Lewis's woodpecker, Gray vireo, Pinyon Jay, and Juniper titmouse. The Lewis's woodpecker is known to nest in riparian habitat and sometimes in PJ. The Gray vireo, Pinyon Jay and Juniper titmouse are known to nest in PJ. These birds may also forage in the Gambel oak-mountain shrub habitat (Monarch 2011).

The Brewer's sparrow is known to nest in sagebrush stands in the North Fork Valley. There are small pockets of sagebrush in the Gambel oak-mountain shrub habitat in the project area

these birds could utilize. However, the pockets are few in number and small in size which limits the number of these birds that might use the sagebrush stands for nesting (Monarch 2011).

### **Raptors**

During surveys conducted in September 2011 all suitable nesting habitat, which included aspen, cottonwood and PJ was checked. Areas surveyed included the delineated exploration area and in some cases, areas outside the delineated area when suitable raptor nesting habitat was within ¼ mile of a proposed drill site or access road. Also taken into consideration were vegetation and topographic conditions that would preclude a nest site from being observed from a drill site. There are also a few aspen stands in the area that are dying out and do not provide suitable nesting conditions for raptors. Declining aspen stands and the lack of use by nesting raptors in these stands has been commonly observed over the last few years during surveys in the North Fork Valley (Monarch 2011).

Only one active nest, that of a red-tailed hawk known to be active in 2010 and 2011 was located. This nest is located just south of West Reservoir. The remnants of two nests of unknown species were located in small aspen stand stringers at the north end of the West Roatcap Creek drainage. None were found in larger mature aspen stands (Monarch 2011).

Aspen logging has occurred in the area in the past and there are some regenerating stands that are very dense and do not provide suitable conditions for raptor nesting. It will be a number of years before aspen in these stands grow to sufficient size to be used by raptors (Monarch 2011).

No surveys were conducted for raptor nests in Gambel oak-mountain shrub habitat, as this vegetation community does not provide suitable nest habitat (Monarch 2011).

Raptors observed during the September 2011 surveys included golden eagle, sharp-shinned hawk, Cooper's hawk, red-tailed hawk, American kestrel, and American peregrine falcon. During prior wildlife surveys in the area in the spring of 2010 and 2011 prairie falcons and northern harriers were observed flying over the area (Monarch 2011).

Golden eagles were observed flying over the area at a level and pattern that indicated they were foraging. These birds were observed in both 2010 and 2011 (Monarch 2011).

Prairie falcons were observed on two occasions in 2010 and 2011 flying over the area. These appeared to be migrants moving through the area. There are no suitable nest sites for these birds in the project area (Monarch 2011).

### **Migratory birds**

Plant communities within the analysis area provide habitats for a variety of migratory bird species. The U.S. Fish and Wildlife Service list of Birds of Conservation Concern was used as to complete this analysis (USFWS 2008, Table 14, p.32, BCR 16 [Southern Rockies/Colorado Plateau]). A variety of migratory bird species use habitat in the project area for nesting, particularly the gambel oak-mountain shrub community. Those birds that have been observed in this habitat type in the North Fork Valley are shown on Table 15. This species list is based upon observations within this habitat type at other projects in the North Fork Valley over the past ten years (Monarch 2011). Only those species which are known to, or may nest in this habitat type within the project area are shown on the list.

**Table 15.** Observed Bird Species (in Prior Studies of the North Fork Valley) that are Known to Nest in Gambel Oak-Mountain Shrub Habitat

Mourning dove	Orange-crowned warbler
Great horned owl	Virginia's warbler
Broad-tail hummingbird	Yellow warbler
Black-chinned hummingbird	MacGillivary's warbler
Olive-sided flycatcher	Western tanager
Dusky flycatcher	Black-headed grosbeak
Loggerhead shrike	Lazuli bunting
Plumbeous vireo	Green-tailed towhee
Warbling vireo	Spotted towhee
Western scrub-jay	Chipping sparrow
Black-billed magpie	Brewer's sparrow
Black-capped chickadee	Vesper sparrow
White-breasted nuthatch	Lark sparrow
House wren	Gray-headed junco
Blue-gray gnatcatcher	Brewer's blackbird
Hermit thrush	Brown-headed cowbird
American robin	Pine siskin

In addition to the species listed on Table 15 there are numerous other migratory species that would be expected to be found in those habitat types in the project area. Those species known to occur, or could occur in the habitat types found in the project area are shown on Table 16. This species list has also been compiled from surveys conducted for other projects in the North Fork Valley over the last 10 years. Some of these birds were observed during the September 2011 surveys in the project area.

**Table 16. Bird Species Observed in Habitat other than Gambel Oak-Mountain Shrub in the Project Area\***

Western grebe	Flycatcher spp.	Mountain bluebird
Great blue heron	Olive-sided flycatcher	Townsend's solitary
Mallard	Western wood peewee	Ruby-crowned kinglet
Blue winged teal	Dusky flycatcher	Lewis's woodpecker
Cinnamon teal	Loggerhead shrike	Swainson's thrush
Green winged teal	Plumbeous vireo	Hermit thrush
Ring-necked duck	Warbling vireo	American robin
Turkey vulture	Gray vireo	Gray catbird
Golden eagle	Gray jay	Orange-crowned warbler
Bald eagle	Stellar's jay	Virginia's warbler
Northern harrier	Western scrub-jay	Yellow warbler
Sharp-shinned hawk	Stellar's jay	Yellow-rumped warbler
Cooper's hawk	Black-billed magpie	MacGillivray's warbler
Red-tailed hawk	American crow	Common wellowthroat
Swainson's hawk	Common raven	Wilson's warbler
American kestrel	Tree swallow	Western tanager
Peregrine falcon	Violet-green swallow	Black-headed grosbeak
Prairie falcon	Purple martin	Lazuli bunting
Willet	Black-capped chickadee	Green-tailed towhee
Spotted sandpiper	Mountain chickadee	Cedar waxwing
Dusky grouse	Plain titmouse	Spotted towhee
Merriam's turkey	Bushtit	Chipping sparrow
Mourning dove	Red-breasted nuthatch	Brewer's sparrow
Great Horned owl	White-breasted nuthatch	Gray-headed junco
Northern pygmy owl	House wren	Brewer's blackbird
Long eared owl	Blue-gray gnatcatcher	Brown-headed cowbird
Common nighthawk	Hairy woodpecker	Cassin's finch
Broad-tail hummingbird	Northern flicker	Pine siskin
Black-chinned hummingbird	Red-naped sapsucker	Downy woodpecker

\*Bird species that have been observed during surveys at this and other project sites with similar habitat types over the last ten years in the North Fork Valley

## **Environmental Consequences/Mitigation**

### **Proposed Action**

#### **Birds of Conservation Concern**

No PJ habitat that could be used by these birds would be lost as a result of road or drill pad construction. These birds may also forage in the Gambel oak-mountain shrub habitat. When considering the large expanses of Gambel oak-mountain shrub habitat in the project area (13,873 acres), the temporary loss of about 32.9 acres for road and pad construction would not be expected to have an effect on activities by these birds in the area. The temporary habitat loss represents about 0.3 percent of total habitat in the project area.

#### **Raptors**

For all but four drill sites and access roads (OM-02, OM-14, OM-16 and OM-18 ) suitable raptor nesting habitat is either more than ¼ mile from the site or in those cases where it is closer than ¼ mile, the habitat is shielded from the site by either topographic or vegetative relief. Only one active raptor nest, that of a red-tailed hawk known to be active in 2010 and 2011 was located. This nest is located just south of West Reservoir and within ¼ mile of the OM-02 site. However, this nest site is over a ridge and in a large aspen stand that precludes the nest from being observed from the drill site. Red-tailed hawks nesting within 100 yards of active mining operations has been observed at numerous mines over the years (Monarch 2011), so it is unlikely the construction and drilling operations would disturb nesting activities at this nest if it is active. If the nest were active, construction and drilling operations could be put off until the young have fledged. This would eliminate the chances of the nest being impacted.

There is no suitable golden eagle nesting sites within ½ mile of any proposed drill sites or access roads. The nearest known active golden eagle nest sites are several miles from the exploration area.

#### **Migratory birds**

The BLM has determined that if construction and drilling activities for projects occur between May 1 and July 15 migratory bird nesting would be affected. During an average spring, conditions are too wet to allow for construction activities to occur before June 15. This means that if work commences between June 15 and July 15, nesting migratory birds would be affected. In this situation the BLM requires that acreages that would be disturbed, potential impacts and species that might be impacted be determined and discussed prior to exploration activities. Of the 11,290 acres of mapped Gambel oak-mountain shrub habitat, it is expected that less than 28 acres would be affected during the mid-June to July 15 period. Further, many of the road corridors circumvent shrub stands and many of the drill sites are also found in open areas that would not require any shrub removal.

Because wet conditions commonly persist in aspen stands until sometime in July, no road and pad construction in the aspen community is expected until after the middle of July. Except for the possibility of one or more raptors nesting in the aspen stands, there would be no impacts to migratory birds. In addition, current plans call for reconditioning existing roads in the aspen stands that would not result in the removal of any aspen trees. This further reduces the chances of migratory birds being directly affected.

If work commences after the middle of July, migratory birds would have finished nesting and the young will have fledged. BLM has determined that disturbing nesting habitat after that time would not result in more than minimal impacts to nesting migratory birds. Location of roads and

pads to minimize loss of nesting habitat would reduce chances of the loss of nests or young. Activities may adversely affect individuals, but are not likely to result in a loss of viability on the Planning area, nor cause a trend towards federal listing or a loss of species viability.

## **Cumulative Impacts**

The Leroux Creek basin (including Dever Creek and Cow Creek), Jay Creek basin, and West Roatcap Creek basin were considered the cumulative effects analysis area for the various categories of bird species. The Proposed Action would result in temporary increased risk for disturbance to birds of conservation concern, raptors, and migratory birds.

Cumulative impacts from other activities that are reasonably foreseeable would be similar in nature to those associated with the proposed action. As noted previously in the EA section covering Threatened, Endangered, and sensitive species, oil and gas exploration, drilling, and operation would result in access roads and small (5 to 7 acre) pad sites that would increase vegetation disturbance. Ongoing grazing impacts likely would continue. While existing and proposed leases occur in the project vicinity, few wells have been drilled and even fewer have been completed. Production is very limited in the identified cumulative impacts analysis area. Without substantial changes to the oil and gas economy or extraction technology, the low existing level of exploration and drilling is likely to continue. Within the past 10 years, only 14 oil and gas wells have been drilled within 10 miles of the 13,873-acre project area. Given the small project impacts and low level of anticipated impacts from reasonably foreseeable actions, impacts to migratory bird populations and reproductive success are unlikely. With the design features incorporated into the proposed action and similar mitigation measures required of oil and gas development, habitat impacts would not threaten bird populations that inhabit the cumulative effects analysis area.

Oil and gas exploration, operation and development on adjacent lands could also result in disturbance to these species. However, with mitigation for the proposed action and similar requirements for oil and gas operations, the increased risk is anticipated to be minimal.

## **No Action Alternative**

Without the project, there would be no project-related effects to birds of conservation concern, raptors, or migratory birds.

## ***WILDLIFE, TERRESTRIAL (includes a finding on Standard 3)***

### **Affected Environment**

#### **Big Game**

Elk, mule deer, and black bear are commonly observed in the study area. There are also suitable conditions in the area for mountain lions.

A review of CPW mapping shows the area as elk winter and summer range and mule deer summer range. Lower elevations in the project area are identified as mule deer winter range. Elk populations within the project area move seasonally to and from higher to lower elevation habitat. Shifts in distribution and habitat use patterns occur as a result of migration in response to snow cover. In deep snow winters the elk move off Oak Mesa into the valley, and habitat along the North Fork Gunnison River and adjoining agricultural lands. During milder winters when there is less snow, some animals do winter on the mesa (Madariaga 2011; Morris 2011).

During a winter 2011 survey (January 18), limited elk tracks were encountered. All tracks were encountered at lower elevations on the southern end of Oak Mesa in Gambel oak-mountain shrub habitat.

No elk production areas have been identified in the project area by the CPW. Good elk calving habitat is found at higher elevations on the foot of Grand Mesa. There are some aspen stands (both mature and regenerating after logging) at the northern boundary of the exploration area that might be used by elk for calving.

During the September 2011 surveys, a few elk were observed in mountain shrub and aspen habitat in the study area. Other evidence of recent elk activity in the area was minimal indicating that use during that period of the year is low (Monarch 2011).

Observations made during the spring of 2010 and 2011 and well as September 2011 indicate that mule deer numbers and habitat use are similar to what has been observed in similar habitat at mining operations in the valley over the years. Wintering deer tend to move off the top of Oak Mesa to lower elevations in the valley to winter and return in the spring after snowmelt. This is the pattern for deer seasonal habitat use throughout the North Fork Valley (Monarch 2011). Although production areas are not mapped by CPW in the project area, fawning likely occurs in the gambel oak habitat.

Bears are common in the area. Habitat and forage are not limiting to these animals here or elsewhere in the North Fork Valley (Monarch 2011).

There is suitable mountain lion habitat in the area and these animals are known to occur on and around the exploration area. These animals are very secretive, and the chance of an encounter with one of them is very remote. One or more lions may be in the area at any time during the year (Monarch 2011).

## **Environmental Consequences/Mitigation**

### **Proposed Action**

#### **Big Game**

When evaluating potential effects on big game habitat use from proposed development activities two things must be considered; (1) numbers of animals that might use the area for winter or transition range and (2) total amount of habitat available. Deer and elk numbers are low from spring through fall in the project area. In the winter, most deer and elk are found lower in elevation in the North Fork Valley.

Because activities associated with the exploration operations would occur during the summer and early fall they would not affect winter habitat use by elk. With several thousand acres of suitable habitat and only approximately 31 acres to be disturbed there is little chance that elk wintering activity or foraging habitat would be affected. The small disturbance footprint also means that chances of elk that move through or remain in the area from late spring through fall being disturbed are minimal. In addition, elk in the area have habituated to human activity over time which further minimizes the chances of these animals being affected. This habituation to human activity has been observed while conducting wildlife surveys at the three mines in the North Fork Valley. At all these operations, elk are commonly observed throughout the areas where exploration and methane drainage well operations are ongoing. Well monitoring operations throughout the year at these mines have not affected elk habitat use.

Only one drill site (OM-18) in a potentially suitable elk production/calving area might affect habitat. No drilling is planned in the project area before the middle of June, which is after the elk calving season. Drilling would even come later in those areas such as the aspen stands where conditions would be too wet for road and pad construction until late June or early July.

Of the total estimated acres of disturbance that would occur during construction, more than 80% would occur in Gambel oak-mountain shrub habitat. When considering total amount of year around habitat in the area available to elk, loss of a very small amount of habitat is unlikely to adversely affect elk. No mature aspen habitat that is utilized by elk would be lost during road and drill site construction.

Given the large expanses of potential fawning habitat in the region, the small area of disturbance associated with the exploration operations, and timing of those activities, the potential for adverse effect to individual deer or the deer population is minimal.

The presence of human activity associated with the exploration operations is not anticipated to affect bear activities in the area. It would be important that food waste is rigidly controlled around the drilling operations to prevent the bears from becoming habituated to human food. All waste and food-related trash would be stored in a vehicle during the day and disposed of off-site prior to the vehicle returning to the project area. No on-site food or trash storage would occur.

There is suitable mountain lion habitat in the area and these animals are known to occur on and around the exploration area. These animals are very secretive, and the chance of an encounter with one of these animals is very remote. One or more lions may be in the area at any time during the year, but there is little chance exploration operations will affect their activities.

## **Cumulative Impacts**

The entire North Fork Valley was considered the cumulative effects analysis area for the big game. These are wide-ranging species that use multiple watersheds and migrate widely throughout the valley. The Proposed Action would result in temporary increased risk for disturbance to big game activities.

Cumulative impacts from other activities that are reasonably foreseeable would be similar in nature to those associated with the proposed action. As noted previously in the EA section covering Threatened, Endangered, and sensitive species, oil and gas exploration, drilling, and operation would result in access roads and small (5 to 7 acre) pad sites that would increase vegetation disturbance. Ongoing grazing impacts likely would continue. While existing and proposed leases occur in the project vicinity, few wells have been drilled and even fewer have been completed. Production is very limited in the identified cumulative impacts analysis area. Without substantial changes to the oil and gas economy or extraction technology, the low existing level of exploration and drilling is likely to continue. Within the past 10 years, only 14 oil and gas wells have been drilled within 10 miles of the 13,873-acre project area. With overall limited temporary habitat disturbance from proposed action and low level of anticipated impacts from reasonably foreseeable actions, cumulative impacts to big game would be minimal. With the design features incorporated into the proposed action and similar mitigation measures required of oil and gas development, habitat impacts would not threaten big game populations that inhabit the cumulative effects analysis area.

## **No Action Alternative**

Without the project, there would be no project-related effects to terrestrial wildlife.

## **Finding on the Public Land Health Standard for plant and animal communities (partial, see also Vegetation; Invasive, Non-native Species; and Wildlife, Aquatic)**

According to the North Fork LHA, the project area does not provide suitable habitat for mule deer or elk severe winter or winter concentration (BLM 2007). Some evidence of overall big game range is present. In addition, there are no biodiversity focal areas in the project area (BLM 2007). All areas surrounding the project area are meeting Standard 3, plant and animal communities (BLM 2007). Under the proposed action, with reclamation activities as proposed, the project area would continue to meet Standard 3.

## ***WILDLIFE, AQUATIC (includes a finding on Standard 3)***

### **Affected Environment**

#### **Amphibians and reptiles**

There are bodies of water including West Reservoir, some spring fed ponds, and streams and ditches that are capable of supporting northern leopard frogs and chorus frogs. Northern leopard frogs have commonly been observed at perennial ponds and other water bodies at similar elevations throughout the North Fork Valley (Monarch 2011).

#### **Fisheries**

The only stream that supports viable fisheries in the project area is Leroux Creek, the only perennial water within the exploration boundary. The other drainages in the project area dry up during normal conditions during some portion of the year (Monarch 2011).

### **Environmental Consequences/Mitigation**

#### **Proposed Action**

There would be no disturbance to Leroux Creek, West Reservoir, or natural/constructed ponds during construction or drilling operations. Drilling locations have been located outside of aquatic habitat. Existing access roads that cross aquatic resources would not require improvement to allow drilling access; however, maintenance of existing features including culverts and low water crossings would be completed as needed. No culverts have been specifically identified for replacement. There would be no new disturbance to aquatic resources from the Proposed Action. Stormwater management mitigation measures outlined in the *Surface Water Quantity* section on page 61 of the EA would be protective of aquatic resources, including fisheries.

#### **Cumulative Impacts**

The Proposed Action would not result in impacts to aquatic habitat; therefore there would be no cumulative impacts to this resource. There are no anticipated effects to aquatic resources.

#### **No Action Alternative**

Without the project, there would be no project-related effects to aquatic wildlife.

## **Finding on the Public Land Health Standard for plant and animal communities (partial, see also Vegetation; Wildlife, Terrestrial; and Invasive, Non-native Species)**

The southern portion of the project area is classified as “meeting with problems” the Standard 3 Rating for Healthy Biotic Communities. Low perennial forb problems were identified at several locations in the southern edge of the proposed exploration area (BLM 2007). There would be no project-related impacts to aquatic resources, and therefore no change to the public land health standard.

## ***WETLANDS & RIPARIAN ZONES (includes a finding on Standard 2)***

### **Affected Environment**

Wetlands and riparian areas are limited within the project area. Riparian areas, including cottonwood riparian zones, were identified as part of the vegetation community mapping effort. Riparian areas are concentrated along perennial and intermittent drainages in the project area, as well as the borders of ditches, reservoirs and stock ponds. Along these water features, wetland/upland transition zones are typically narrow to abrupt as a function of channel topography found in this area. Wetlands exist outside of these drainages along stock ponds, reservoirs, and seeps/springs in the project area. Existing impacts to wetlands and riparian areas include existing ranch access roads with culverts or low-water crossings, agricultural activities such as stock ponds that dam drainages, and cattle/sheep grazing (Monarch 2011).

### **Seeps, Springs, and Stockponds**

Seeps and springs are naturally occurring and are primarily associated with sandstone outcrops at lower elevations along slopes in the larger drainages. Recharge comes from direct precipitation or snowmelt infiltration. Seeps and springs on steeper slopes support small pockets of aspen along with a variety of grasses and forbs. Aspen typically provide a tree component where one exists, though this species is not a consistent indicator of wetland seep or spring conditions.



**Photo 12. Spring fed stock pond on west side of Oak Mesa.**

Stock ponds are man-made features which are filled either by flow from springs, overland runoff, or water taken from the Wakefield or Overland ditches. On the top of Oak Mesa, stock ponds dry out in the summer and dryland grasses and forbs found throughout the area grow immediately adjacent to the high water line. A few ponds found off the top of Oak Mesa have a narrow bank fringe around the stock pond depressions. The fringe is dominated primarily by spikerush and rush species. Other species such as small-winged sedge (*Carex microptera*), clustered field sedge (*Carex praeegracilis*), northwest cinquefoil (*Potentilla* sp.), and a variety of buttercups (*Ranunculus* sp.) may also be present. A wetland shrub or tree stratum is rare, presumably as a direct result of animal use and/or soil compaction from earthwork by dozers or other equipment.

### **Wetlands**

Wetlands occur along constructed stock ponds and the Wakefield Ditch. Most drainages in the project area are intermittent and only have water in them during spring runoff or during heavy rain events that may occur in the summer. Other drainages in the project area are ephemeral and only carry water during precipitation events. None of these drainages support wetland conditions. Additional information regarding wetlands and riparian areas is on page 65.

### **Environmental Consequences/Mitigation:**

#### **Proposed Action**

Under the proposed action, no impacts to wetlands or riparian areas would occur. Surface disturbing activities have been located in a manner that would avoid impacts. No new roads or road improvements crossing wetlands or riparian areas are proposed. No drilling locations would be within wetlands or riparian areas. Although not anticipated, depending on conditions during drilling it may be necessary to improve culverts or low water crossings on existing routes to avoid downstream impacts. Where culverts or low water crossings are poorly constructed, undersized, or in need of maintenance (i.e., are inducing erosion or have been trampled by

livestock), those features would be maintained within the footprint of the existing disturbance. Mitigation/design features to help eliminate impacts to wetlands/riparian zones include:

- New ground disturbing activities would avoid water features such as drainages and reservoirs;
- Sediment control, as identified in the stormwater management plan, would be used as necessary in areas with soil disturbing activities such as grading.
- No new access roads would cross wetlands or riparian areas.

### **Cumulative Impacts**

Because there would be no impacts to wetlands or riparian resources under the proposed action, there would be no cumulative impacts.

### **No Action Alternative**

Under the no action alternative, there would be no project-related effects to wetlands or riparian areas.

### **Finding on the Public Land Health Standard for riparian systems**

According to the North Fork LHA, the project area meets the Standard 2 Rating for riparian areas. Inadequate vegetation and species without strong rooting capabilities were noted in the NFLHA as problems along lower Jay Creek, outside of the exploration area (BLM 2007). The Proposed Action would not change the ability of the project area to meet the Standard 2 Rating for riparian areas.

## ***FLOODPLAINS***

### **Affected Environment**

The Federal Emergency Management Agency (FEMA) is responsible for mapping floodplains and floodways. Floodplains along the Project Area's watercourses are managed in accordance with Executive Order 11988 – Floodplain Management. Floodplains along lower order streams have no delineated floodplains, but are commonly considered to include the extent of the riparian zone bordering the channel, in reaches that are not incised. Floodplains are narrow in the project area due to steep terrain. Riparian areas were mapped in the Project Area along Leroux Creek, Cow Creek, Dever Creek, Jay Creek, and West Roatcap Creek, and are shown on the vegetation map (see Figure 3); these can be considered an estimate of the floodplain. The primary benefit of floodplains is to dissipate floodwater energy and attenuate the magnitude of high flows. Other benefits include sustaining healthy riparian plant communities, and recharging alluvial ground water systems.

### **Environmental Consequences/Mitigation:**

#### **Proposed Action**

No drilling activities would occur within the floodplains. Under the proposed action existing ranch access roads would be used during exploration activities and would cross some riparian/floodplain areas; however, no new access roads would be constructed in riparian areas or floodplains, and no new impacts would occur to riparian/floodplain areas.

## **Cumulative Impacts**

There would be no impacts to floodplains from the proposed action; therefore there would be no cumulative effects.

## **No Action Alternative**

Under the no action alternative, there would be no project-related effects to floodplains.

## ***SURFACE WATER QUANTITY***

### **Affected Environment**

Streams located within the project area include Leroux Creek, Dever Creek, Jay Creek, West Roatcap Creek, Short Draw, Love Gulch, and Cow Creek. Leroux Creek is a perennial stream whose flows were measured just west of Hotchkiss by the USGS from 1976 to 1996 (EarthInfo 2010). The highest average monthly flow of 112 cfs occurred in May, with the second highest flows occurring in April and June. A maximum creek flow of 256 cfs occurred in June 1995. High flows occur during the period of snowmelt runoff from the Grand Mesa. The lowest average monthly flows of about 10 cfs occurred during December through March, and the lowest measured flow was less than 1 cfs. The USGS description of the flow measurement site is that the natural flow is affected by upstream diversions and irrigation return flows, and that most of the flow after June is irrigation return flows. Other streams in the project area are known to flow only intermittently due to snowmelt or storm runoff and as a result of irrigation return flows.

The project area is a ground water discharge area, expressed as springs that discharge either perennially or intermittently, typically at the contact between bedrock and alluvial or colluvial deposits and/or within incised drainages. There are numerous springs in and near the project area. Springs discharging from the Mancos shale or fractured bedrock generally produce between 1 and 30 gpm (Cordilleran 2002). Two springs located in Long Draw, a tributary to West Roatcap Creek, have been monitored for many years; these springs have flows that have ranged from being dry to about 35 gpm (Bowie 2011). There is one reservoir, West Reservoir, located near the north end of the project area, which is supplied entirely or nearly entirely by surface runoff, much of which is collected via feeder ditches (Hughes 2011). There are numerous ponds, some natural and some manmade, located within the project area and some outside the project area near the north boundary of the inclusion area. Some of the ponds are spring-fed and may also collect runoff, and some are supplied just by surface runoff.

### **Environmental Consequences/Mitigation**

#### **Proposed Action**

The water used for drilling would be bought or leased from West Reservoir and/or another nearby agricultural water right owner. The drill holes would be located at least 200 feet from any active stream channel, flowing spring, or surface water body. During drilling, storm water would be routed around the disturbed area, so the natural flow of runoff to a stream may be slightly altered. Because the well would be sealed within the unconsolidated sediments (typically to a depth of 200 feet), if the drill hole produces water, it would be bedrock ground water, not shallow ground water that discharges as springs. No water used in drilling would be allowed to flow towards any natural drainage, but would be stored in the drill hole mud pit or

other drill hole pits. Water stored in the pits would either evaporate or seep into ground water, which, if the pit were located near a steep slope, may express itself temporarily as a seep down gradient from the pit until the pit became as dry as the surrounding soils. It is not expected that the drilling exploration program would measurably change surface water availability or affect streamflows, spring flows, or the amount of water stored in nearby reservoirs or ponds.

There is no proposed mitigation for surface water quantity/flow effects for the exploratory drilling program because no adverse effects are expected.

### **Cumulative Impacts**

There would be no impacts to water quantity from the proposed action; therefore there would be no cumulative effects.

### **No Action Alternative**

Under the no action alternative, there would be no project-related effects to availability of water for streams, springs, and stored water bodies on and downstream of Oak Mesa.

## ***SURFACE WATER QUALITY (includes a finding on Standard 5)***

### **Affected Environment**

The Colorado Water Quality Control Commission (WQCC) has adopted water use classifications for streams, lakes and reservoirs that identify the uses to be protected on a stream segment or in a lake or reservoir, and adopted numerical standards for specific water quality parameters to protect these uses (CDPHE 2012). With a few exceptions, all of the streams in and near the project area are listed in Segment 4 or 5 of the North Fork of the Gunnison River basin and are classified for the following uses:

- Aquatic Life Cold 1 (waters that currently are capable of sustaining a wide variety of cold water biota, including sensitive species, or could sustain such biota but for correctable water quality conditions; waters are considered capable of sustaining such biota where physical habitat, water flows or levels, and water quality conditions result in no substantial impairment of the abundance and diversity of species)
- Recreation P (waters have the potential to be used for primary contact recreation)
- Water Supply (waters are suitable or intended to become suitable for potable water supplies; after receiving standard treatment (defined as coagulation, flocculation, sedimentation, filtration, and disinfection with chlorine or its equivalent) these waters will meet Colorado drinking water regulations)
- Agriculture (waters are suitable or intended to become suitable for irrigation of crops usually grown in Colorado and are not hazardous as drinking water for livestock).

All of the streams in Segments 4 and 5 must be maintained and protected at their existing water quality unless it is determined by the state that allowing lower water quality is necessary to accommodate important economic or social development in the area. No degradation is allowed unless deemed appropriate following an antidegradation review by the Colorado Department of Public Health and Environment (CDPHE 2011). All of the lakes and reservoirs in and near the project area not located on national forest lands, as well as Love Gulch, Cow Creek, and Dever Creek, are listed in Segment 6b of the North Fork of the Gunnison River basin, and are designated Use Protected. These are poorer quality waters that the state has determined do not

warrant the special protection provided by the antidegradation review process. These streams, lakes and reservoirs are classified for the following uses:

- Aquatic Life Warm 2 (waters not capable of sustaining a wide variety of warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species)
- Recreation P
- Water Supply
- Agriculture.

The non-attainment of water quality standards is reported every two years in Colorado's 303(d) list (CDPHE 2010). Stream segments, lakes, or reservoirs on the 303(d) list are considered impaired for one or more water quality parameters and a Total Maximum Daily Load (TMDL) effort will need to occur to resolve the impairment. The EPA defines TMDL as a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. The mainstems of Leroux Creek, Jay Creek and Short Draw, and the mainstem and tributaries of Roatcap Creek are on Colorado's 2010 303(d) list for selenium. A TMDL for the Gunnison Basin, including the North Fork Gunnison River basin, was completed in November 2010 (CDPHE 2010). The TMDL assessment stated that point sources such as wastewater treatment plants and gravel operations are a source of selenium to streams, and that an important pathway by which selenium is introduced into surface water within the Gunnison Basin is associated with irrigation within the basin. Seepage from irrigation canals, particularly when unlined, and deep percolation of irrigation waters dissolve selenium from Mancos shale derived soils as well as from the underlying parent material. Other pathways include surface runoff of irrigation water, whether associated with agriculture or urban land uses. Annual loads from the North Fork Gunnison River total 3,124 pounds annually. The TMDL assessment has calculated a total selenium load reduction for Jay Creek of 75 percent, a 78 percent reduction in Short Draw, and monthly load reductions of 39 to 72 percent in Leroux Creek to meet the selenium standard in each creek (CDPHE 2010).

Water quality samples have been collected by the Colorado Water Quality Control Division (WQCD), U.S. Geological Survey (USGS), Bowie Resources and its predecessors, and Gunnison Energy during the past 20 years from Leroux Creek, Dever Creek, Jay Creek, Roatcap Creek, and Short Draw (WQCD 2011, EarthInfo 2008, Bowie Resources 2011, Oxbow 2011). In general, the water quality of the creeks is good near the north end of the project area at higher elevations, and is of poorer quality south of the project area near Hotchkiss. There are likely two sources of poorer water quality in the lower reaches of the creeks: irrigation return flows and the Mancos shale, which crops out on the southern slopes of Oak Mesa and is the source of the selenium in surface waters. Stream water quality can generally be characterized as calcium/magnesium-bicarbonate water. At all locations, the water is alkaline, with a pH of 8 to 8.6. An example of the change in water quality from higher to lower elevations is specific conductivity, a measure of dissolved solids content, in Leroux Creek. At a location slightly north of the project area, the specific conductivity in Leroux Creek was measured at less than 100  $\mu\text{S}/\text{cm}$ , at a point below the confluence with Dever Creek it was measured at about 300  $\mu\text{S}/\text{cm}$ , and just west of Hotchkiss it was measured at greater than 1,000  $\mu\text{S}/\text{cm}$ . In general, metal concentrations are low in project area creeks except for selenium. In upper Leroux Creek, the dissolved selenium concentration was measured at less than 1  $\mu\text{g}/\text{L}$ , but near Hotchkiss, selenium

concentrations in the creek averaged about 6 µg/L. In Dever Creek, the total iron concentration was elevated, the dissolved selenium concentration was slightly elevated, and specific conductivity was about 1,000 µS/cm. Nitrogen concentrations were low in Leroux and Dever Creeks. The average sulfate concentration in Leroux Creek at Hotchkiss was 280 mg/L, and the water was extremely hard (average of 475 mg/L). Water quality data for Jay and Roatcap Creeks are available only at Highway 133, not at higher elevations in the project area. Both creeks have similar water quality to Leroux Creek at Hotchkiss: very hard, high specific conductivity, low nitrogen concentrations, low metal concentrations except for dissolved selenium, and elevated total iron concentrations in Roatcap Creek. Short Draw in Hotchkiss also has high specific conductivity and dissolved selenium concentrations.

Springs and ponds in and near the area of proposed coal exploration were also sampled by Gunnison Energy for water quality between 2002 and 2010 (Oxbow 2011). Two springs in Long Draw, a tributary of West Roatcap Creek within the project area, were sampled for many years by Bowie Resources, LLC and its predecessors (Bowie 2011). West Reservoir was sampled, as were ponds north of West Reservoir within or just north of the project area. The water quality of the reservoir and ponds was good. The water was slightly alkaline, with generally low metal, nitrogen, and sulfate concentrations, and specific conductivities averaging 110 µS/cm. Spring-fed ponds had an average specific conductivity of about 245 µS/cm. There were elevated total iron concentrations in West Reservoir and in one spring-fed pond. Spring water quality was quite variable, probably due to varying contributions from shallow and deeper ground water and variability in the unconsolidated sediments from which the springs flow (alluvium and colluvium). In addition, water quality varies depending on the flow of the spring at different times of the year. Specific conductivities ranged from less than 100 to more than 7,000 µS/cm, and sulfate concentrations ranged from 2 to more than 4,000 mg/L. The spring water was neutral to slightly alkaline (pH of 7 to 7.8), some nitrate concentrations were elevated, and some total aluminum, total iron, and total selenium concentrations were high in different springs. One of the springs in Long Draw have water that is somewhat alkaline, and sometimes has elevated calcium, bicarbonate, sodium and sulfate concentrations. Specific conductivity averages about 700 µS/cm in both springs.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

Prior to constructing new roads, drill pads, or beginning drilling, Oxbow would need to obtain a construction stormwater permit from the Colorado WQCD. As part of the permit, Oxbow would need to prepare a stormwater management plan (SWMP) for the project, which would include:

- A designated SWMP Administrator who would be on-site during construction activities
- Descriptions of structural and non-structural Best Management Practices (BMPs) for erosion and sediment control within disturbed areas, and prevention of pollutant laden water from flowing off of disturbed areas
- A list of all possible pollutant sources
- A description of good housekeeping practices to be used to keep construction areas as neat and clean as possible
- Preventive maintenance and spill response procedures
- A description of materials handling and storage procedures

- A schedule and description of inspections and maintenance of BMPs
- Methods for record keeping and documentation of BMP inspections and repairs
- A description of final stabilization after completion of drilling at each drill hole locations and for roads that would no longer be used.

The SMWP would need to be kept on-site, be available for any site inspectors, and all on-site Oxbow employees would need to be familiar with and follow the requirements of the SWMP.

The drill holes would be drilled approximately 200 feet from the ground surface through unconsolidated sediments into underlying bedrock and would be secured with steel casing cemented into place. This would prevent the leakage of any water from the drill hole to nearby shallow water resources, such as springs, creek channels or stored water bodies. Up to 4,000 gallons of water, delivered by water truck to each drill hole, would be used during drilling. All wet cuttings, drilling mud, or water produced from the drill hole would be stored in a shallow pit near the drill hole. No water from the drill hole would be allowed to drain away from the drill hole, the pit, or any of the area disturbed by the drilling activities. All natural runoff from snowmelt or storm events would be routed around the disturbed areas at each drill site with the use of berms. The berms would also serve to keep all runoff within the disturbed area from flowing out of the disturbance area. Rerouted stormwater would be prevented from creating erosion with the use of stormwater BMPs such as temporary diversion dikes, swales, or sediment entrapment facilities such as straw wattles or silt fences). It is not expected that much water would be produced from the exploratory boreholes, but if more water were produced than could be used or stored at the site pit, the water would be pumped out of the hole into a water truck, then used elsewhere for drilling other boreholes, or stored in other borehole pits. For drilling sites where development of a pad is necessary, the topsoil would be stockpiled, and either silt fencing or straw wattles would be placed around the stockpile. Straw wattles would be used to minimize erosion until the pad is revegetated. During and after drilling, the drill site would be fenced to keep animals out of the site to prevent damage to stormwater BMPs and newly revegetated areas.

The drill holes may need drilling supplements to improve circulation to bring the cuttings to the surface. The foamer and defoamer compounds would be the only chemicals used during drilling, with the exception of fuel, oil and grease used in the trucks and drilling equipment. Any spills of fuel, oil or grease would be removed from the spill area as quickly as possible and disposed of appropriately off-site. The MSDS provided for the foaming agent "F-485" states that the product contains one hazardous ingredient, isopropanol, which is approximately 10 percent of the foaming agent by weight. The MSDS for the defoamer "DF-104" states that there is one hazardous ingredient in the product, which is methanol, of which the percent weight in the defoamer is confidential. Both MSDSs state "prevent flow/discharge into lakes, ponds, streams, waterways or public water supplies." The foaming agent would be used down hole, and would be sent via pipeline along with drilling cuttings and any drilling mud to the pit. The defoamer would be used in the pit, if needed, to prevent any foaming over the top of the pit. Oxbow estimates that between 1.5 and 6 gallons of the foamer may be used in each drill hole. Assuming a use of 6 gallons of foamer, mixed with 4,000 gallons of water, the percent of isopropanol in the water mixture pumped from the drill hole to the pit would be 0.015 percent. Oxbow estimates that between 0.3 and 1.2 gallons of the defoamer may be used in each pit. Assuming a use of 1.2 gallons of defoamer, mixed with 4,000 gallons of water, the percent of methanol in water in the pit (assuming a worst case of 85 percent methanol by weight) would be 0.025 percent. The concentrations of isopropanol and methanol in the drill hole and in the pit would be very dilute,

so it is expected that any seepage of water from the pit would not cause adverse environmental effects. The site Health and Safety Manager would ensure that the drilling crew handling the foaming agent and defoamer would be familiar with the MSDSs, would follow the transport and storage recommendations, would use the recommended personal protection equipment to prevent any adverse health effects, would make all efforts to prevent spills, would follow the spill control and disposal procedures described in the MSDSs if a spill occurred, and would prevent any of the foaming agent or defoamer from entering nearby surface water or public water supplies.

With no movement of surface water from the disturbed area at each borehole, no leakage of water from the borehole, immediate cleanup of any spills, and minimal and very careful use of the foamer and defoamer products, it is not expected that the water quality of streams, springs, stored water, and water supply ditches or pipelines would be affected by drilling. Water would be used for dust suppression, but would not be applied at rates causing runoff from disturbed areas or roads. Additional erosion from roads due to increased use during drilling activities might occur; the project manager and/or SWMP Administrator would inspect the roads at least every two weeks. If additional erosion along roadways were observed by Oxbow, property owners, or the BLM during use of the roads during exploration, Oxbow would repair the road and use BMPs, if needed, to prevent runoff of sediment-laden water from the road to nearby stream channels or surface water bodies.

There is no proposed mitigation for water quality effects, other than implementation of best management practices per the stormwater management plan, because no adverse effects from the exploratory drilling program are expected. Regular inspections of the active drill sites and roads in use during the drilling program should prevent any drilling activity from causing more than a very temporary, quickly repairable water quality problem that would not reach and measurably affect the quality of streams, springs, ditches, pipelines, or stored water bodies in and near the project area.

### **Cumulative Impacts**

There would be no impacts to water quality from the proposed action; therefore there would be no cumulative effects.

### **No Action Alternative**

Under the no action alternative, there would be no project-related effects to water quality.

### **Finding on the Public Land Health Standard for Water Quality**

Stream segments 5 and 6b of the North Fork of the Gunnison River basin currently do not meet state standards for selenium impairment. The source of contamination is the Mancos shale and irrigation of private lands over the Mancos shale, which increases the rate of selenium loading to surface water bodies. This problem is outside the control of BLM management. As such, implementation of the proposed action or no action alternative would not alter the current finding.

## ***GROUND WATER QUANTITY***

### **Geologic Framework**

The proposed exploration area is located in the southern edge of the Piceance Basin of Western Colorado (Hettinger et al., 2004). The area is underlain by coal-bearing strata in several of the Cretaceous formations, the most significant of which economically is coal in the Upper Cretaceous Mesaverde Formation. Of particular interest in the proposed exploration area are coal beds stratigraphically above the Rollins Sandstone Member of the Mesaverde Formation.

The bedrock formations exposed at the surface in the proposed exploration area are the Upper Cretaceous Mancos Shale and Mesaverde Formation. The marine Mancos Shale is a dark brown to gray nonresistant clay shale with minor thin interbedded resistant sandstone, calcareous shale and sandstone, and locally thin limestones. The Mancos Shale has a maximum thickness in this region of 4,000 to 5,000 feet thick (Hail 1972a and b). The Mancos Shale is exposed at the surface between the valley of the North Fork of the Gunnison River and elevations of about 7,000 to 7,400 feet.

The Mesaverde Formation, and specifically the Rollins Sandstone Member, conformably overlies the Mancos Shale. The Rollins Sandstone is composed of light gray to white cliff forming sandstone, interbedded with carbonaceous shale and coal with a maximum thickness in the area of about 160 feet. Overlying the Rollins Sandstone are medium-grained sandstones and gray shales and commercially important coal beds near its base (Hail 1972a and b).

Unconsolidated or surficial geologic deposits that overlie the Cretaceous bedrock formations include Holocene Alluvium, Holocene Alluvial terrace gravels, Holocene Landslide and mudflow deposits, and Upper Pleistocene High Level alluvial gravels. The Holocene or Recent alluvium is limited to the lowest reaches of Leroux Creek up to an elevation of about 6,000 feet. Refer to Hail (1972a and b) for the location and distribution of these unconsolidated deposits. The High-level alluvial gravels generally consist of basalt boulders derived from volcanic flows capping Grand Mesa and are probably mostly a result of glacial outwash (Hail 1972a and b).

### **Affected Environment**

There is limited information regarding the occurrence of ground water within the proposed exploration area. The lack of data is most likely the result of limited ground water development in the area due to the overall poor ground water resources and the regional dependency on surface water sources.

In general, the low permeability marine Mancos Shale does not produce ground water at economic rates, and what is available is typically of poor quality. The thin sandstone interbeds within the Mancos Shale have been reported to yield ground water at usable rates and quality, but their extent is limited (Galloway 1980). The sandstone layers within the Mesaverde Formation, including the Rollins Sandstone Member can produce ground water, but production rates are generally low due to the well cemented, and therefore, low permeability sands. Fractures within the sandstone units may account for some of the available ground water. Because of limited ground water development in the Mesaverde in this area, there is little information concerning the occurrence of ground water.

The surficial materials (High-level gravels and colluvium) that occur in the proposed exploration area probably contain and transmit most of the ground water in the proposed exploration area. Because of their generally higher permeability, compared to the bedrock

formations, these unconsolidated materials receive some amount of recharge from precipitation and transmit ground water down gradient (downhill). Springs may occur at the downhill end or toe of any particular deposit. An inventory of wells in the vicinity of the proposed exploration area indicate there are several wells located along Leroux Creek near the north boundary of the proposed exploration area (Oxbow 2011a). It is presumed that these wells are screened in one of the High-level gravel units mapped along the creek. However, it is possible that one or more of these wells is also screened in a sandstone of the Mesaverde Formation below the gravels.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

It is highly unlikely that the proposed action would affect ground water resources in the proposed exploration area. The exploration wells may produce limited quantities of ground water during drilling, but after the well is completed, the borehole would either be plugged and abandoned or would be completed as a monitoring well. In either case, Oxbow would be required to use procedures required by the Colorado Division of Water Resources. Depending on the depth to the coal at each location, the upper portion of the borehole (up to 200 feet in some cases) would be cased and cemented to provide both borehole stability and isolation of shallow water-bearing zones (if any) from the rest of the borehole.

There would be no permanent use of ground water during the exploration program. Other than temporary production of ground water during drilling, if encountered, all other water use would be from other sources, and delivered by truck.

### **Cumulative Impacts**

There would be no impacts to ground water quantity from the proposed action; therefore there would be no cumulative effects.

### **No Action Alternative**

There would be virtually no difference between the no action alternative and the proposed action with respect to ground water quantity.

## ***GROUND WATER QUALITY (includes a finding on Standard 5)***

### **Affected Environment**

Water quality data from the various geologic units in the vicinity of the proposed exploration area are limited due to minor ground water development and use in the area. However, some data exist from wells and springs that are mostly located outside of the proposed exploration area (Oxbow 2011). Where ground water quality data are available from the Mancos Shale, the quality is typically poor with total dissolved solids (TDS) concentrations greater than 1,000 mg/L, most of which is due to high calcium, sodium, and sulfate (Galloway 1980). Mancos Shale ground water also typically contains high concentrations of iron and manganese. Although a geologic or drill log is not available, one well located southwest of the proposed exploration area may be screened in the Mancos Shale and produces sodium sulfate water with a TDS concentration of about 1,000 mg/L. Because this well is located along Dever Creek, it may represent a mixture of water sources.

Other wells in the vicinity of the proposed exploration area appear to be screened in either High-level gravels or a combination of the gravels and underlying sandstone beds within the Mesaverde Formation. As described in the previous section, this group of wells is located along Leroux Creek at the north boundary of the proposed exploration area or outside of the area to the north. Water quality data from these wells indicate that ground water in this area is generally of good quality, with TDS values of less than 500 mg/L. The ground water in these wells is either sodium or calcium bicarbonate water.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

The proposed action is not expected to affect ground water quality within and adjacent to the proposed exploration area. The proposed action does not include the use of any chemicals or compounds that could adversely affect ground water. Drilling fluids would be limited to air, air-water, air-foam, and limited use of standard drilling muds (composed primarily of clay). The characteristics of the foamer and defoamer are discussed in more detail in the Surface Water Quality Section. The exploration drilling does not include the use of any procedures where chemicals would be injected into the borehole under sufficient pressure to force these fluids into any water bearing zone for any reason. The drilling fluids would be used for circulation purposes only to remove drill cuttings from the hole and lubricate the drill bit and core barrel.

As described in the previous sections, upon completion of each borehole, the borehole would be either plugged and abandoned or completed as a monitoring well using procedures required by the Colorado Division of Water Resources.

If ground water is produced during the drilling of a borehole, the water would accumulate in shallow pits and would be allowed to evaporate and/or seep into the surface materials. Given the likely quality of this water (as described previously) and the limited volume of the produced water, it is unlikely that this water would negatively affect ground water resources of the area. No drill holes are proposed near known springs.

Other than drilling fluids, chemicals or materials used during the exploration program would include typical petroleum based materials, such as lubricating oils and fuels. The volume of fuels and lubricating oils at the site at any one time would be limited to vehicle fuel tanks and crankcases and would not include large volume storage. If a fuel spill were to occur, Oxbow would be required to immediately clean up the material, including affected soils, and remove from the site. With the limited volume of onsite fuels and immediate removal, the impact to ground water quality would be limited to the immediate area around the spill.

### **Cumulative Impacts**

There would be no impacts to ground water quality from the proposed action; therefore, there would be no cumulative effects.

### **No Action Alternative**

Under the no action alternative, there would be no project-related effects to ground water quality.

## **Finding on the Public Land Health Standard for water quality**

BLM's Land Health Assessment did not identify any specific ground water issues in this area. The assessment acknowledged that ground water resources are limited to unconsolidated deposits, such as alluvium and colluvium and the ground water in the Mesa Verde Formation flows down dip to the north out of the North Fork Valley. Springs which discharge within the Land Health Assessment area generally have good water quality. The proposed exploration action will not likely affect the existing sources of ground water.

## ***WASTES, HAZARDOUS OR SOLID***

### **Affected Environment**

There are no known hazardous or other solid waste in the vicinity of the proposed project activities. No hazardous materials are known to have been used, stored, or disposed of at sites in the project area. The project area has been used historically for grazing and ranching, and no industrial activity other than small-scale coal mining has occurred.

### **Environmental Consequences/Mitigation**

#### **Proposed Action**

The Proposed Action would use regulated materials, and generate solid waste. Equipment and materials used onsite during drilling include combustion engines that require fuel, oils, antifreeze, and other fluids to operate; and there is some risk of these fluids. Accidents and mechanical breakdowns are a possibility. The drill rig(s) may require drilling fluids to complete exploration holes. The WATER QUALITY, SURFACE section above describes the foamer/defoamer agents that are anticipated to be used on-site. The MSDS for these agents is included in Appendix A.

As described in the WATER QUALITY, SURFACE section, a SWMP would be prepared to maintain a safe workplace and prevent and minimize releases of hazardous materials. Additional measures for management and containment of hazardous materials is described in the WATER QUALITY, SURFACE section, including cuttings, drilling mud, produced water, and handling of the foaming agent and defoamer. The proposed measures would minimize the risk associated with hazardous or other solid waste, and no adverse impacts are anticipated.

#### **Cumulative Impacts**

The Proposed Action is not expected to increase risk from hazardous or other solid waste. Oil and gas exploration, operation and development could result in use of similar materials (foamer/defoamer agents) in the project area; however, those operations would use similar avoidance and minimization measure to reduce the risk from hazardous or other solid waste. Cumulatively, impacts are expected to be minimal. Use of drilling fluids and combustion engines associated with the exploration activities would be short-term and temporary.

#### **No Action Alternative**

Under the No Action alternative, there would be no project-related hazardous materials impacts.

## ***ENVIRONMENTAL JUSTICE***

### **Affected Environment**

Executive Order 12898, signed on February 11, 1994, directs federal agencies to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high adverse human health or environmental effects of its activities on minority and low-income populations. Environmental Justice involves fair treatment, which means that no group of people, including a racial, ethnic, or socio-economic group, should bear a disproportionate share of negative environmental consequences resulting from a federal action.

US Census Bureau summary data for Delta County (Census 2011) does not indicate that there are ethnic groups or communities or low income populations in the upper drainage of the North Fork of the Gunnison River or in adjacent portions of Delta County that may be affected by the proposed action. The Hispanic community has the largest minority population in Delta County, at 14.0 percent. African Americans, American Indians and Pacific Islanders account for approximately two percent of the Delta County population (Census 2011). 13.9 percent of the population in Delta County is below the poverty level compared with 12.9 percent in Colorado as a whole (Census 2011).

### **Environmental Consequences/Mitigation**

#### **Proposed Action**

The proposed action to conduct exploratory drilling on the proposed exploration area is not expected to negatively or disproportionately impact minority or low income populations.

#### **Cumulative Impacts**

There would be no environmental justice impacts from the proposed action; therefore there would be no cumulative effects.

#### **No Action Alternative**

Under the No Action alternative, there would be no project-related disproportionate negative effects to minority and low-income populations.

## ***ACCESS AND TRANSPORTATION***

### **Affected Environment**

General access to the proposed exploration area is from two directions—from the west off of 3100 Road (Leroux Creek Road) and Oak Mesa Road, and from the east off of Steven’s Gulch Road (FS Rd 701; see Figure 1). Primary access to the project area is on private lands and private ranch roads. There is no existing public access to the exploration area, other than Oak Mesa Rd. There is an extensive network of private roads within the exploration area that is used for ranching and other private access. The Oak Mesa Road is the only public access to the project area.

Within the project area, 3100 Road and Oak Mesa Road (up to the gate onto private property) are County Roads, maintained by Delta County. The Steven’s Gulch Road on the east side of the project area is maintained by Delta County via “Schedule A” arrangements with the USFS.

Traffic data for Leroux Creek Road and Steven’s Gulch Road was obtained from the Delta County Engineering Department (Kalenak pers. Comm. 2011). According to Mr. Kalenak, use of these roads is highly seasonal, with peak use occurring during hunting season in the Fall. Dates for traffic count collection were not available, but likely were completed during the summer months. Counts near the highway on Leroux Creek Rd are significantly higher than those further north. There are many homes, residences, and orchard operations on Rogers Mesa that are destinations for vehicle traffic. North of Redlands Mesa Road there are fewer residences. Traffic in this vicinity is attributable to residences and access to recreational opportunities in the Forest north of the project area. Firewood cutting in the Forest is an additional use that contributes to traffic north of Redlands Mesa Road.

Posted speed limits on Leroux Creek Road are 45 mph between Highway 92 and the end of pavement, and 30 mph in unpaved sections of road (north of the Redlands Mesa Road).

Use of Oak Mesa Road east of Leroux Creek Road is limited. Occasional mountain biking or hiking use may occur on this road. However, because there are no recreation facilities or destinations on Oak Mesa, use is likely limited to area residents.

**Table 17. Traffic Counts on Leroux Creek and Steven’s Gulch roads.**

<b>Road</b>	<b>Location</b>	<b>Year</b>	<b>Vehicle Count (trips per day)</b>
Leroux Creek Rd (3100 Rd)	Immediately north of Highway	2002	1187
Leroux Creek Rd (3100 Rd)	Immediately north of Highway	2005	1843
Leroux Creek Rd (3100 Rd)	½ mile north of Highway	2007	1102
Leroux Creek Rd (3100 Rd)	North of Redlands Mesa Rd (North Rd)	2002	53
Leroux Creek Rd (3100 Rd)	North of Redlands Mesa Rd (North Rd)	2007	59
Steven’s Gulch Rd (FS 701)	Immediately north of Highway	2002	120

Road	Location	Year	Vehicle Count (trips per day)
Steven's Gulch Rd (FS 701)	Immediately north of Highway	2005	176
Steven's Gulch Rd (FS 701)	South of Johnson Rd	2002	65

Source: Kalenak 2011.

## Environmental Consequences/Mitigation

### Proposed Action

Personnel and equipment would use both Leroux Creek Rd and Steven's Gulch Rd to access the proposed exploration area. Most equipment would be transported to the project area and would remain on-site until the drilling activities are completed. Transport for a bulldozer, excavator, grader and one or two drilling rigs would be required, and would be a one-time transport. An e-log truck and delivery trucks would access the project area intermittently, and are anticipated to account for about 2 vehicle trips per day during the project duration. All loading/unloading activities would take place either at the staging area on the 7X Ranch, or on drill pads/access roads. Additional vehicles, including pick-up trucks (some with flatbed trailers) and SUVs would be needed for personnel and small equipment transport, and are anticipated to account for 3 to 5 vehicle trips per day. A total of about 5 to 8 vehicle trips per day, mostly for crew transport, are anticipated during exploration activities. A carpool plan is in place to transport drilling crews and minimize vehicle traffic on area roads.

The proposed project would result in a minor, temporary increase in traffic on Leroux Creek Rd and Steven's Gulch Rd. The magnitude of increase would vary by location along the roads, and would vary by season. Based on available data, traffic on Leroux Creek Rd south of Redlands Mesa Rd would increase by about 1%, and north of Redlands Mesa Road would increase by about 15% during the exploration activities. North of Redlands Mesa Rd, traffic counts drop from about 1,100 vehicle trips per day to only 59, which results in a higher percentage of increased traffic. Traffic on Steven's Gulch Rd would increase by about 5 to 12%, depending on location along the road. The increase would be temporary, would occur during spring through fall, and for a maximum of 2 years.

All traffic related to exploration activities would be required to comply with posted speed limits.

Occasional recreational and landowner use of Oak Mesa Rd could be affected by increased traffic. Actual use of the road is unknown, but the Oak Mesa area does not offer any formal recreation opportunities on BLM lands and use is likely very low. Traffic resulting from the proposed project could temporarily impact recreation and landowner use on Oak Mesa Rd.

No new BLM access routes for public use would be created as a result of the proposed project. All new access roads constructed on BLM and private land would be reclaimed and revegetated, unless private landowners request that improved or constructed roads remain.

### Cumulative Impacts

Oil and gas activities on active leases in the project vicinity could also result in increased traffic on Leroux Creek Rd and Steven's Gulch Rd. Specific proposed drilling operations have not been identified. Increased traffic from oil and gas operations would be temporary.

## **No Action Alternative**

Under the No Action alternative, there would be no project-related effects to access or transportation.

## ***REALTY AUTHORIZATIONS***

### **Affected Environment**

Various right-of-way authorizations are present within the project area. Typical rights-of-way authorizations within this area could include powerlines, telephone lines, access roads to private land, pipelines, ditches and irrigation facilities.

### **Environmental Consequences/Mitigation**

#### **Proposed Action**

Existing rights-of-way will be avoided to the extent possible. If they cannot be avoided, caution will be taken to ensure no damage to the facility or disruption of use occurs. As necessary, right-of-way holder(s) will be contacted to coordinate activities that may influence their facilities. Oxbow will obtain permits from the county for use of or work inside county road rights-of-way. Coal companies are not required to obtain a right-of-way from BLM for activities on Federal surface within their exploration area.

#### **Cumulative Impacts**

There should be no cumulative impacts to existing rights-of-way and no new rights-of-way are required for this project.

## **No Action Alternative**

Under the No Action alternative, there would be no effects to existing rights-of-way.

## ***RANGELAND MANAGEMENT***

### **Affected Environment**

Several grazing allotments are managed on BLM and private lands within the project vicinity. A total of 14,157 acres (12,765 BLM-owned and 987 private-owned) are managed for cattle grazing (some grazing allotments overlap the exploration boundary; therefore the total acreage is greater than the exploration extent). An Animal Unit Month (AUM) is defined as the amount of forage needed to sustain one cow, five sheep, or five goats for a month. Allotments are summarized in Table 18 below. All allotments in the project area are authorized for cattle. The West Roadcap allotment is authorized for summer use (mid-June through mid-October); the other allotments are authorized for spring and/or fall use.

**Table 18. Grazing Allotments in the Project Area.**

<b>Allotment number and name</b>	<b>Total Acres (public/private)</b>	<b>Actual Active AUMs</b>	<b>Status</b>
Oak Mesa #14506	1,375 (735/640)	51	Active
Overland #14511	507 (160/347)	30	Active
Roatcap-Jay Creek #14507	9,955 (9,955/0)	955	Active
Leroux #14550	2,000 (2,000/0)	32	Active
West Roatcap #14510	320 (320/0)	88	Active
<b>Total</b>	14,157 (12,765/987)	<b>1,156</b>	

## **Environmental Consequences/Mitigation**

### **Proposed Action**

Effects to rangeland resources and management would be minor and temporary. Traffic from exploration activities would be minimal and are not likely to affect grazing cattle or range movement. Temporary impacts from construction of new roads and pads would be minimal. Reclaimed areas would be temporarily fenced to exclude grazing until vegetation has reestablished. Oxbow is negotiating with individual landowners regarding the type of fence installed for reclamation purposes; electric fencing with solar panels to provide power have been used in the past and are proposed. Oxbow would be responsible for fence installation, monitoring and removal.

### **Cumulative Impacts**

The cumulative impact analysis area for grazing was defined as the 14,157 acres of grazing allotments that overlap with the proposed exploration boundaries. About 0.2 percent of the cumulative impact analysis area would be temporarily affected by the proposed action. Any future oil and gas development would have similar effects to grazing in the vicinity of the project; however those effects would be long-term due to the long lifespan of oil and gas wells. Existing mine leases (Bowie No. 1 Mine, a.k.a. Orchard Valley Mine) to the east of the proposed exploration area could be developed further, but surface impacts would be limited. Cumulative effects to rangeland would be minimal.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related effects to rangeland resources or management.

## ***FIRE***

### **Affected Environment**

Hot, dry conditions are normal during the summer months within the project area, contributing to a moderate fire risk. Portions of the project area have heavy oak-mountain shrub cover, which contributes to fire risk. There are no known recent fires in the project area, but one major fire has occurred in pinyon-juniper dominated areas to the southeast (Wake Fire in 1994).

## **Environmental Consequences/Mitigation**

### **Proposed Action**

The Proposed Action is not expected to increase the risk of fire, or to affect the rate, duration, frequency of future fires. All drilling equipment would be provided with fire extinguishers and shovels for fighting small fires, if necessary. Drilling crews would be equipped and trained to fight small fires. Spark arresters would be required for equipment generating sparks, including ATVs and chainsaws. Smoking would be allowed during construction activities only in designated safe-smoking areas. Common sense practices regarding heat/spark sources, particularly in dry conditions, would be followed. Avoiding parking hot vehicles on dry shrubs and other logical avoidance practices would be followed. Drilling crews would have access to telephones to contact the necessary fire officials if a fire occurred, or if one were observed in the project vicinity. Minor brush clearing for road and pad construction could provide a minor, immeasurable benefit by removing excess fuel.

### **Cumulative Impacts**

The Proposed Action is not expected to increase fire risk; therefore there would be no cumulative impacts.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related effects to fire hazards or management.

## ***WATER SUPPLY/WATER RIGHTS***

### **Affected Environment**

There are numerous surface water direct diversion and storage rights listed by the Colorado Division of Water Resources whose sources are within or near the project area, and no wells near the project area (CDSS 2011). According to landowner Nick Hughes, water supply on Oak Mesa is reliable, although during the 2002 to 2003 drought, water was in short supply (Hughes 2011). Surface rights include diversions from Leroux Creek, Jay Creek, and Roatcap Creek, storage within the watersheds of these three creeks, and diversions and storage from numerous springs. The majority of the rights are for irrigation or stock water. The largest storage right is 454.5 acre-feet per year in West Reservoir, which was constructed in 1905 (CDSS 2011). Hunt Reservoir, with a storage right for 124 acre-feet per year, is also within the project area. Many of the stock ponds are very old, small, not decreed, and were constructed to capture runoff. The largest spring, based on decreed diversion rate, is the Hanson Spring, located in alluvium near Dever Creek near the project area. The decree for Hanson Spring is for 135 gpm, and the decree states that the spring cannot physically provide the original request for a right for 225 gpm. Various ditches are used to collect water for storage and/or to route water for irrigation purposes. One of these is the Roberts Stucker Ditch, first constructed in 1896, that diverts water in the Roatcap Creek drainage (CDSS 2011). The Wakefield Ditch is not a decreed ditch, but is a delivery ditch for water from West Reservoir to several farms (Schmucker 2011).

Stucker Mesa Water Company has the right to divert water for domestic purposes from two springs in the West Roatcap Creek watershed within the project area. The company has a

pipeline to deliver water to its 21 taps. Other water providers in the area, including Sunshine Mesa Domestic Water Company, Domestic Pipeline, and Pitkin Mesa Domestic Water, divert water either north and above the project area, or east or west of the project area from drainages that are entirely outside of the project area. The Town of Hotchkiss and Rogers Mesa Domestic get their water directly from Leroux Creek at the Highline Ditch headgate. Hanson Mesa gets its water from the Town of Hotchkiss after filtration.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

Before beginning any exploratory drilling or building of new roads, Oxbow would coordinate with any water providers concerned about possible effects to their water supply. If needed, drill sites, disturbance areas, and roads would be moved to prevent any effects to the water supply sources and/or infrastructure of any water supply providers. All actions necessary to prevent harm or injury to any existing water rights, and/or water supply diversion and storage structures would be taken. Water used for drilling would be obtained by purchase or lease of a nearby water supply that is available for use. Although these measures should prevent any damage to existing water rights and water users, if a water supply is temporarily disrupted, such as due to accidental rupture of a water pipeline or ditch, Oxbow would provide a temporary clean alternate water source to that user.

### **Cumulative Impacts**

Oil and gas operations in the project vicinity may require water for drilling; water would likely be leased or purchased from local water rights holders. Temporary water use is a cumulative effect of both the proposed action and other reasonably foreseeable activities in the project area. Neither oil and gas operations, nor the Proposed Action, would negatively impact existing water rights in the project area.

### **No Action Alternative**

Without the project, there would be no effects to water rights and water supply on and downstream of Oak Mesa other than those currently occurring due to existing land and water uses.

### ***NOISE***

#### **Affected Environment**

The project area setting is rural, with limited background noise. Engine noise is limited to access by landowners via truck and ATV. Some existing oil and gas exploration activities have caused occasional short-term, temporary increases in noise in the vicinity of the project. There are several residences along the west side of the proposed exploration area.

Colorado Noise Statutes (25-12-103) provide the following maximum noise limits that apply to a distance of 25 feet from a property line:

**Table 19. Maximum Noise Limits**

Zone	7:00 am to next 7:00 pm	7:00 pm to next 7:00 am
Residential	55 db (A)	50 db (A)
Commercial	60 db (A)	55 db (A)
Light Industrial	70 db (A)	65 db (A)
Industrial	80 db (A)	75 db (A)

Construction projects are subject to the maximum permissible noise levels specified for industrial zones.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

Noise from the proposed action would be short-term and temporary, and isolated to the proposed pad and road construction and drilling activities. Noise levels from drilling operations are anticipated to be about 85 dba at the drill pad, a noise level that does not require hearing protection for workers. Noise levels will be in compliance with state and federal standards. Noise levels for compliance with state limits are measured at 25 feet from the property line. Noise sources would be attenuated by dense vegetation cover and topography at most locations, and are greater than about 1,000 feet from any permanent residence. Sound impacts from drilling and construction would be minimal and temporary. Impacts would not exceed state statutes.

### **Cumulative Impacts**

The Proposed Action would result in minor, short-term noise impacts that are not anticipated to exceed state statutes. Oil and gas exploration, operation and development could result in noise impacts to the project area, and are subject to noise regulations promulgated by the Colorado Oil and Gas Conservation Commission (Act §34-60-103, Section 802). Cumulatively, noise impacts are expected to be minor due to the topography and dense vegetation in the project area. All anticipated noise impacts would be short-term, minimal, and temporary.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related noise impacts.

## ***RECREATION***

### **Affected Environment**

There are no public recreation facilities within the project area. Intermittent use of Oak Mesa Road for hiking and mountain biking may occur. Limited recreation destinations occur north of the project area in the National Forest, and include unimproved campgrounds, fishing areas along Leroux Creek, and informal hiking trails, and access to several small reservoirs (Bailey Reservoir, Goodenough Reservoir, and other small reservoirs). No motorized boating is permitted. Big game and small game hunting are common on private land in the project area.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

No impacts to recreation use of the project area or the Grand Mesa National Forest are anticipated from exploration activities. A minor, temporary increase in traffic on 3100 Rd, Steven's Gulch Rd and Oak Mesa Rd would not disrupt existing recreation uses. No new recreation uses are proposed as part of the Proposed Action. Exploration activities could affect the hunting season for up to two years. Oxbow has developed agreements with individual landowners, some of which include timing restrictions to avoid hunting impacts.

### **Cumulative Impacts**

The Proposed Action is not expected to impact recreation; therefore there would be no cumulative impacts.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related recreation impacts.

## ***VISUAL RESOURCES***

### **Affected Environment**

BLM completed a Scenic Quality Field Inventory for the project area in June 2009 (BLM 2009). The proposed affected area falls within Class III in the inventory. Class III objective is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The proposed exploration project is in the Stevens Gulch Scenic Quality rating unit, which was evaluated for landscape character and scored on a scale of A (highest scenic quality) to C (lowest scenic quality). The Stevens Gulch unit was scored as B, or medium rated. Variability in landform (hills, ridges and outcrops), vegetation (patchiness and variable vegetation types and shapes), and structural interest were noted. The primary sensitive viewing area would be from 3100 Rd/Leroux Creek Rd. The visual character of the project area is defined as "Foothills...covered in dense vegetation with meadow breaks. The landform is rolling and varied with a few rock formations poking out, and drainages leading through and down to the valley below. Vegetation is dense with meadow openings: aspens, pinyon/juniper, conifers, and sage." (BLM 2009).

Existing nighttime lighting is limited to scattered residences and outbuildings in the project area.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

Most of the proposed activities would not be visible from Leroux Creek Rd or Steven's Gulch Rd, the primary public access roads near the project area, due to topographic barriers and dense vegetation. Use of existing roads and limited creation of drill pads would minimize visual impacts. New roads and pads have been positioned to minimize vegetation clearing, and all disturbance would be temporary. In addition, most drill sites would not require grading a formal

pad area, and disturbance would be limited to brush clearing and rock removal. Disturbed areas would be returned to their previous topographic position (including replacing rocks that were moved during clearing operations) and reseeded as soon as possible (within 1 to 6 months) following drilling. The proposed action would not result in permanent facilities that would be visible from public access routes. There may be minor, short-term impacts to the visual character of the landscape that would result from access road and drill pad construction. Visual modifications would be consistent with existing land uses in the project area, including ranching and grazing. The Class III objective of partial retention would be maintained within the project area. There would be no permanent facilities visible within the project area.

Nighttime drilling activities would be conducted, and lighting would be required for safe nighttime operations. Lighting would consist of one or two “tower” lights near the top of the drill rig at a height of about 50 feet, and portable lighting units on the ground would allow drillers to monitor drill cuttings and review drill cores. Depending on the number of drill rigs used (one or two), nighttime drilling would add one or two light sources during drilling operations. Light sources would be attenuated by dense vegetation cover and topography at most locations. Impacts from lighting would be minimal and temporary.

### **Cumulative Impacts**

The Proposed Action would result in minor, short-term visual impacts. Oil and gas exploration, operation and development could result in impacts to the visual character of the landscape in and surrounding the project area. Dispersed residential development also could change the visual character of the landscape, and is unregulated. Cumulatively, visual impacts are expected to be minor due to the topography and dense vegetation in the project area, and the limited amount of use on area roads with views toward the project area.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related visual resource impacts.

## ***GEOLOGY AND MINERALS***

### **Affected Environment**

The proposed exploration area is located in the southern edge of the Piceance Basin of Western Colorado (Hettinger et al., 2004). The area is underlain by coal-bearing strata in several of the Cretaceous formations, the most significant of which economically is coal in the Upper Cretaceous Mesaverde Formation. Of particular interest in the proposed exploration area are coal beds stratigraphically above the Rollins Sandstone Member of the Mesaverde Formation.

The bedrock formations exposed at the surface in the proposed exploration area are the Upper Cretaceous Mancos Shale and Mesaverde Formation. The marine Mancos Shale is a dark brown to gray nonresistant clay shale with minor thin interbedded resistant sandstone, calcareous shale and sandstone, and locally thin limestones. The Mancos Shale has a maximum thickness in this region of 4,000 to 5,000 feet thick (Hail 1972a and b). The Mancos Shale is exposed at the surface between the valley of the North Fork of the Gunnison River and elevations of about 7,000 to 7,400 feet.

The Mesaverde Formation, and specifically the Rollins Sandstone Member, conformably overlies the Mancos Shale. The Rollins Sandstone is composed of light gray to white cliff

forming sandstone, interbedded with carbonaceous shale and coal with a maximum thickness in the area of about 160 feet. Overlying the Rollin Sandstone are medium-grained sandstones and gray shales and commercially important coal beds near its base (Hail 1972a and b).

Unconsolidated or surficial geologic deposits that overlie the Cretaceous bedrock formations include Holocene Alluvium, Holocene Alluvial terrace gravels, Holocene Landslide and mudflow deposits, and Upper Pleistocene High Level alluvial gravels. The Holocene or Recent alluvium is limited to the lowest reaches of Leroux Creek up to an elevation of about 6,000 feet. Refer to Hail (1972a and b) for the location and distribution of these unconsolidated deposits. The High-level alluvial gravels generally consist of basalt boulders derived from volcanic flows capping Grand Mesa and are probably mostly a result of glacial outwash (Hail 1972a and b).

Within the proposed exploration area, there is only one mapped fault. The northwest trending fault appears to have normal displacement (south side down) and is located within the Mesaverde and possibly the overlying Wasatch formations. The mapped trace of the fault is about 2 miles long. The general dip of the bedrock formations is slightly to the north (into the Piceance Basin) at 2 to 4 degrees.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

The purpose of the proposed action is to provide geologic information regarding the coal reserves that underlie the project area.

### **Cumulative Impacts**

There would be no negative impacts from the Proposed Action; therefore there would be no adverse cumulative impacts.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related geology impacts.

## ***SOCIO-ECONOMICS***

### **Affected Environment**

The area of influence for the social and economic elements of this EA includes Delta County in west central Colorado. Delta County is the area of influence for the population and demographic component because the majority of employees at the coal mining facilities and their families live within the communities in its jurisdiction.

The cumulative impact area would include Delta County. Baseline data for Delta County in the area of influence includes population and demographic data as well as current business and economic statistics information. The information in this section was obtained from the US Bureau of the Census based on the 2000 census and 2009 Census Bureau data ([www.census.gov](http://www.census.gov)). Additional information was obtained from the Colorado Department of Local Affairs (CDOLA) State Demography Office ([www.colorado.gov/cs/Satellite/DOLA-Main/](http://www.colorado.gov/cs/Satellite/DOLA-Main/)).

**Population.** Table 20 presents basic population and demographic information for Delta County and the State of Colorado.

**Table 20**  
**Population by Category, 2000 and 2009, Delta County and the State of Colorado**

Population	Delta County	Colorado
2000	27,834	4,302,015
2009	31,322	5,024,748
% Change	12.5%	16.8%
Male (2008)	49.8%	50.4%
Female (2008)	50.2%	49.6%
Under 5 years	5.8%	7.3%
Under 18 years	21.4%	24.4%
65 years and over	19.9%	10.3%
% Minority (2008)	16.4%	29%
% Below poverty (2008)	12.1%	11.2%
Source: US Census Bureau, 2008a.		

Delta County comprises 1,142 square miles with 24.4 people per square mile and a total population of 31,322 people in 2009. Delta County grew by almost 12.5% between 2000 and 2009. According to CDOLA, Delta County grew slower than the state but faster than the nation between 1970 and 2000, with an annual average growth rate of 2.7%. The median age in Delta County is 42.3 years with 21.4% of the population being under the age of 18 and almost 20% being 65 years or older. According to census data, over 80% of the people age 25 and older in Delta County have graduated from high school and just over 17% have graduated from college. The Town of Delta is the largest town in Delta County with a 2000 population of 6,400, an increase of 75% since 1990. Other communities in the county include Cedaredge (2000 population of 1,854), Crawford (2000 population of 366), Hotchkiss (2000 population of 968), Orchard City (2000 population of 2,880), and Paonia (2000 population of 1,497). The 2009 US Census reports that there were 13,391 housing units in Delta County that housed 11,058 households, indicating a vacancy rate of approximately 17%. Only 3.7% of the vacant houses are classified as seasonal, recreational, or for occasional use. Approximately 8% of rental units were classified as vacant. There were 2.43 persons per household. Delta County had a home ownership rate of 77.5% in 2000, well above the state average of 67%. The median value of an owner occupied housing unit was \$115,500, well below the state average of \$166,600.

## **Environmental Consequences/Mitigation**

### **Proposed Action**

A minor temporary increase in jobs could result from the proposed action. Approximately 15 to 25 seasonal positions, lasting up to two years, could potentially be anticipated by the proposed action.

### **Cumulative Impacts**

The Proposed Action would result in a minor, temporary increase in employment in Delta County during exploration activities. If oil and gas exploration activities occur in or near the project area, they also could provide employment. Coal lease modifications in the project area would provide continued employment to miners at the affected mines.

### **No Action Alternative**

Under the No Action alternative, there would be no project-related socio-economic impacts.

## **CUMULATIVE IMPACTS SUMMARY**

Cumulative impacts are the environmental impacts that could result from the implementation of the Proposed Action, when added to the impacts from all other past, present, and reasonably foreseeable activities, regardless of who is conducting such activities. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. The cumulative effects analysis considers the geographic scope of the cumulative effects and past, present, and reasonably foreseeable actions.

### ***Cumulative Impacts/Effects***

Cumulative impacts for each element or resource are discussed within each of the sections. Impacts resulting from the proposed coal exploration could add incrementally to impacts from other activities discussed below, resulting in a low-level increase in noise, human presence, soil erosion, invasive weeds, vegetation loss or conversion, and slight temporary decrease in access. Cumulative impacts associated with coal mining activities in the area were analyzed in greater detail in the Uncompahgre Basin Resource Management Plan, Environmental Impact Statement (BLM 1988) as well as the North Fork Coal EIS (USFS and BLM 2000).

### ***Past Actions***

The primary existing (past) disturbances within the proposed lease are associated with mining, oil and gas, livestock grazing, and residential/agricultural development.

Historic mining activities over the past century include the following:

- Hawks Nest Mine;
- Oliver Mine No. 1 and No. 2;
- Bear Mine No. 1, No. 2, and No. 3;
- Edwards Mine;
- USS Steel Mine;
- Blue Ribbon Mine;
- King Mine;
- Farmers Mine;
- Oxbow Sanborn Creek;
- Bowie No. 1 Mine

Over the last century, there has been noticeable subsidence in a number of areas above the historic mines. However, there has been no known damage to overlying resources or to structures attributable to this subsidence. Subsidence may have aggravated or contributed to some landslide movements, but this is difficult to identify given the pre-mining instability of many areas of the valley.

Past oil and gas activity within the region has included coal-bed methane wells and conventional gas wells. Existing leases occur throughout the project area and surrounding area. There are about 55 permitted wells within about 10 miles of the project area, and 17 of those are within 5 miles of the proposed project's exploration boundary. Many of these wells were completed greater than 30 years ago, and no longer produce (many were not completed and never produced). In the past 10 years, there has been an increase in oil and gas activities. About 14 of the wells within 10 miles of the project area were drilled and/or completed within the last 10 years. Many of the recent wells were drilled about 8 miles northeast of the project area in the Hubbard Creek drainage. Another cluster of activity is about 5 miles northwest of the project area in the Surface Creek drainage near Cedaredge. Three wells were drilled (2 completed)

about 10 miles northwest of the project area along Highway 65. Three additional wells were drilled along the northern edge of the exploration boundary between 2003 and 2010.

### **Present Actions**

Present actions include mining, oil and gas activity, livestock grazing, and residential/agricultural development.

### **Mining**

Three mines, Bowie No. 2, West Elk, and Elk Creek, are currently active. In addition, Bowie No. 1 is permitted, but idle; it is permitted for a production rate of 1.5 million tons per year. When active, it operated as a room-and-pillar mine and hauled its coal to the Bowie No. 1 loadout near Paonia. Bowie No. 2 was opened in 1997 as a room-and-pillar mine but converted to a longwall system in late 1999. It is located northeast of Paonia with a loadout northeast of Paonia. There are 14,543 acres permitted in the combined permits of the Bowie No. 1 and No. 2 accessed by the Bowie No. 2 mine. The Elk Creek Mine is a longwall operation north of Somerset, with a loadout immediately north of Somerset. There are 13,429 acres permitted. The West Elk Mine is a longwall operation located south and east of Somerset with a loadout about 1 mile east of Somerset. There are 17,155 acres permitted.

The North Fork Branch of the Union Pacific Railroad operates exclusively to serve these coal mines. This line branches from the main line in Grand Junction and passes through Delta, Hotchkiss, Paonia, and Somerset.

The following table contains recent production data for the three coal mines in the North Fork Valley.

**Table 1. Raw Coal Production - North Fork Valley - BLM-UFO 1 Year Averages**

<b>Average based on:</b>	<b>Bowie No. 2</b>	<b>Elk Creek</b>	<b>West Elk</b>	<b>Totals (NF)</b>
5 Year	2,808,556	4,378,814	5,721,944	12,909,314
1 Year	1,873,357	3,495,575	6,499,048	11,867,980
Periods end Sept. 30, 2011				

NOTE: The total yearly production is expected to remain about the same -- between 12 and 13 million tons. Each of these mining operations control coal reserves with a mix of Federal and fee coal; however, 90 percent or more of local production is Federal. As mining progresses, only Federal coal will be available in the reserve base.

### **Oil and Gas Leasing**

Oil and gas exploration and operations are ongoing and proposed throughout the North Fork Valley. There are approximately 418,469 total acres of federal oil and gas mineral estate within the cumulative impacts area. Approximately 124,192 unleased acres are within inventoried roadless areas which, due to on-going litigation, may have surface use restrictions related to road building if ever nominated for leasing. Overall, there are approximately 173,646 acres currently leased. This includes 54,580 acres of inventoried roadless areas which were leased prior to implementation of the USFS roadless rule. If these pre-2001 leases expire and are subsequently leased again, they will have surface use restrictions for whatever roadless rule may be in place. Approximately 120,631 acres of Federal oil and gas mineral estate remains available for nomination to be leased at this time. Drilling activities for oil and gas require specialized equipment (including drilling rigs and fracturing equipment), access roads, and constructed drill pads (normally 3 to 5 acres for single-well pads).

## ***Reasonably Foreseeable Future Actions***

Underground coal mining is expected to continue in the North Fork Valley. In addition to existing coal leasing and exploration activities, four leasing actions have been proposed by the three coal companies currently operating in the North Fork area. The following paragraphs summarize applicable information:

- **Oxbow Tract 5.** Oxbow requested a 157-acre lease modification to existing federal coal lease COC-61357. A Decision Notice and Finding of No Significant Impact (FONSI) was issued by the Grand Mesa, Uncompahgre and Gunnison National Forest (USFS-GMUG) for the project on August 3, 2011 to consent to allow the BLM to modify the existing coal lease. No new surface facilities would be required for this lease modification. Information regarding the GMUG EA is at: [http://www.fs.fed.us/nepa/project\\_content.php?project=34307](http://www.fs.fed.us/nepa/project_content.php?project=34307) . In addition, the BLM evaluated the lease modification and issued a FONSI and a Record of Decision on March 15, 2012. Information regarding the BLM EA is at: [DOI-BLM-CO-S050-2012-0013 EA](#)
- **Oxbow Lease-by-Application.** Oxbow Mining, LLC ( Elk Creek Mine) submitted a Lease-by-Application (LBA) to the BLM seeking to lease 786 acres of BLM mineral estate under public lands located adjacent to their currently operating Elk Creek Mine near Somerset. The BLM evaluated the LBA and issued a FONSI and a Record of Decision on June 7, 2011. The decision to lease was appealed, and on March 27, 2012, the Interior Board of Land Appeals upheld the BLM decision. Surface disturbance would be temporary, and would be limited to approximately 5.63 acres for gob vent boreholes, associated temporary drill pads, and light-use roads. The lease sale will be held on May 15, 2012.
- **West Elk 2009 MOD (Sunset Trails).** Mountain Coal Company (West Elk Mine) applied for modification of their West Elk Mine existing federal coal leases. The USDA USFS-GMUG (as the surface management agency) completed an EA and FONSI (November 8, 2011) to consent to allow the BLM to modify two existing coal leases (COC-1362 and COC-67232) by adding about 800 and 922 acres, respectively, to the leases. The EA was appealed to the USFS Regional Office and was remanded back to the USFS-GMUG. The USFS-GMUG is, in cooperation with BLM and OSM, currently preparing an EIS to be released for public comment on May 15, 2012. The lease modification would have limited surface impacts, with 48 methane drainage wells and about 6.5 miles of temporary road required to access those wells. A total of 73 total acres of temporary surface disturbance is anticipated over the 25-year life of the lease modifications. More information is available at <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=32459>
- **Bowie 2011 MOD (37210 and 61209).** On July 11, 2011 Bowie Resources, LLC submitted an application seeking to modify their existing federal coal leases north of Paonia, CO. The lease modifications would add about 505 acres to existing coal leases. Temporary access roads (about 2.2 miles of improved existing jeep roads and new roads) and pads for 4 new gob vent boreholes on the proposed modification as well as a single hole on one existing lease would be needed, totaling about 16.6 acres of surface disturbance. All surface disturbance would be reclaimed soon after the related mining activities are completed. On April 30, 2012 the BLM posted a preliminary EA and unsigned FONSI for a 30-day public comment period. The EA is available at: [DOI-BLM-CO-S050-2012-0001 EA](#).

Additional actions including coal lease modifications and new coal lease applications could be expected in the North Fork Valley. These factors may affect how long mining would continue in this area; however, it is likely that mining would continue for another decade at a minimum.

It is difficult to forecast future oil and gas development within the cumulative impact assessment region. The area is seeing an increase in development which exceeds the past average. Activity increases are due to changes in technology for the drilling and development of the conventional mancos shale wells and wells used to capture methane from coal mines. It is estimated that the area will average 20 new wells per year (assumes at least 2 wells per pad – 10 new pads per year). This will then create approximately 68 acres of new disturbance per year from oil and gas development.

SG Interests I, Ltd (SG) has proposed a 150 gas well Master Development Plan to develop mineral leases they hold within the Bull Mountain Unit located in Gunnison County, Colorado. SG is proposing to drill and produce 150 wells from approximately 41 individual well pads and associated infrastructure. Approximately 50% of the wells are targeting coalbed methane production and the other 50% will be exploring other potentially productive natural gas zones encountered by drilling into other geologic zones in the area of the Bull Mountain Unit.

August 2012 Oil and Gas lease sale: The BLM is currently developing an EA regarding the nominations to lease nearly 30,000 acres of federal oil and gas mineral estate which were going to be included in the Colorado BLM August 2012 Quarterly Lease Sale. A decision was made recently to defer until an adequate analysis can be made. 22,000 acres of the proposed nominations lie within the cumulative impacts assessment area of this EA.

Other past, present and reasonably foreseeable development activities in the project area and vicinity include fruit orchards and vineyards, ranching, water storage and irrigation, transmission lines, residential developments, recreation, and forest treatments (controlled burning and logging). Fruit orchards along the valley floor and low mesas have historically been important to the local economy. More recently, vineyards have expanded into the area. Sheep and cattle are grazed in pastureland around Paonia and Hotchkiss and also at higher elevations during the summer. There are a number of water storage reservoirs and canals around the North Fork Valley to serve agriculture and domestic uses. Western Area Power Administration operates the Curecanti-Rifle 230/345 kV transmission line that parallels Terror Creek. In recent years, the area around the communities of Paonia, Hotchkiss, Crawford, and Delta has been growing in population, with many new houses being built. Most of this development has been down-valley from the coal mines in broader portions of the North Fork Valley. This development has increased the traffic load and demand for maintenance on State Highway 133. There is little developed recreation in the area, but the area is widely used for dispersed recreational activities such as hunting, four-wheeling, hiking, picnicking, horseback riding, snowmobiling, and sight-seeing. Timber sales have been fairly limited in the area.

If BLM authorizes the requested coal exploration license, a separate action would be required to authorize a coal lease. The proposed exploration activities would allow Oxbow to determine whether an economically viable coal reserve is present in the project area, and then apply for a coal lease. Coal lease issuance would require BLM to conduct a separate NEPA analysis. A subsequent analysis would analyze the effects of the lease, including the proposed plan for coal extraction. The coal lease process is competitive, which means Oxbow might not be the lease recipient.

## PERSONS / AGENCIES CONSULTED

Public comments were solicited via a letter dated September 19, 2011, that was mailed to the appropriate agencies, specific interested parties, and to the general public. The letter was also posted on the BLM UFO website. Information regarding the exploration proposal was made available for public review after September 19, 2011, through legal notices published in the Delta County Independent. In addition there were announcements of the public scoping period in The Daily Sentinel in Grand Junction. Public comments were received through October 24, 2011. All comment letters were reviewed and considered in the development of the EA.

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**Appendix A. MSDS for Foamer/DeFoamer**

Preliminary EA

# Bachman Drilling & Production Specialties, Inc.

2220 S. Prospect  
Oklahoma City, OK 73143

Emergency Response: 800-535-5053  
Information: 405-677-8296

## MATERIAL SAFETY DATA SHEET

### 1. Chemical Identification

Product: **F-485**  
General Description: Foaming Agent  
Chemical Family: Blend  
Revision Date: January 4, 2012  
Primary Hazard: Combustible Liquid

Hazard Rating		Rating Scale
Health	2	4 = Extreme
Fire	2	3 = High
Reactivity	0	2 = Moderate
Personal Protection	B	1 = Slight
		0 = Insignificant

### 2. Hazardous Ingredients

Our hazard evaluation has identified the following chemical ingredient(s) as hazardous. One or more component is being claimed as a trade secret under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult section 14 for the nature of the hazard(s).

Ingredient(s)	CAS Number	Approximate Wt. %
Isopropanol	67-63-0	10

### 3. Handling Precautions

**DANGER!** Combustible Liquid. May cause irritation to skin and eyes. Prolonged inhalation of vapor may be harmful. Do not use, store, spill or pour near heat, sparks or open flame. Keep container closed when not in use. Use with adequate ventilation. Do not take internally. Avoid prolonged or repeated breathing of vapor. Avoid contact with skin, eyes or clothing. Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

### 4. First Aid Information

**EYES:** Remove victim from exposure and into fresh air. Immediately flush with water for at least 15 minutes while holding eyelids open. Call a physician at once.

**SKIN:** Remove contaminated clothing. Immediately wash exposed area with soap and water for at least 15 minutes. For a large splash flood body under a shower. Call a physician at once. Launder clothes before reuse.

**INGESTION:** Do not induce vomiting. Give water. Call a physician at once. If possible, do not leave victim unattended.

**INHALATION:** Remove to fresh air. If breathing is difficult, administer oxygen. Treat symptoms. Keep victim warm and quiet. Seek immediate medical attention.

**CAUTION:** If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

**Note To Physicians**

Based on individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

**5. Health Effects Information**

**Primary Route(s) Of Exposure:** Eye, Inhalation, Skin

**Eye Contact:** Irritating to the eyes with possible permanent damage depending on the length of exposure and on the first aid action given. Symptoms may include stinging, tearing, redness and swelling.

**Skin Contact:** Can cause mild to severe skin irritation depending on the length of exposure and on the first aid action given. Symptoms may include redness and burning. Can cause allergic contact dermatitis in susceptible individuals.

**Ingestion:** Ingestion of this product may cause central nervous system depression, abdominal distress, with nausea, vomiting and diarrhea probable depending on the first aid action given.

**Inhalation:** Prolonged inhalation of mist or vapor in excess of the recommended exposure limits can be harmful, causing nausea, irritation, dizziness, light-headedness, vomiting, fatigue, headache or unconsciousness depending on the length of exposure and the first aid action given.

**Symptoms**

**Of Exposure:** **ACUTE:** A review of available data does not identify any symptoms from exposure not previously mentioned.

**CHRONIC:** Prolonged skin contact can cause dry skin and defatting resulting in irritation and dermatitis. See Section 6 for additional information.

**Aggravation Of Existing Conditions:** A review of available data does not identify any worsening of existing conditions.

**6. Toxicological Information**

**Toxicity Studies**

This product contains isopropanol. In concentrated form, this chemical has been reported in one animal study to be fetotoxic at levels of 2.5% in drinking water. No teratogenic effects were, or have been reported. There are no reports of adverse reproductive effects in humans exposed to this chemical.

**7. Physical & Chemical Properties**

<b>Appearance:</b>	Clear, Amber Liquid	<b>Pour Point:</b>	0°F
<b>Odor:</b>	Alcohol	<b>Initial Boiling Point:</b>	180°F
<b>Specific Gravity:</b>	1.020	<b>Flash Point:</b>	53°F TCC
<b>Density:</b>	8.50	<b>Vapor Pressure:</b>	31.2 mm HG @ 100°F
<b>pH (neat):</b>	8.0 - 8.5	<b>Vapor Density:</b>	> 1.0 (Air = 1.0)
<b>Viscosity:</b>	~25 cst @ 100°F	<b>Evaporation Rate:</b>	1.7 (Butyl Acetate = 1.0)
<b>Solubility:</b>	Water Soluble		

**Note:** These physical properties are typical values for this product and not specifications.

## 8. Fire & Explosion Information

**Flash Point:** 53°F  
**Lower Explosive Limit:** 2.0%  
**Upper Explosive Limit:** 12.0%

**Extinguishing Media:** Based on NFPA guide, use water fog, dry chemical, foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For large fires, use water spray or fog, thoroughly drench the burning material.

**Unusual Fire And Explosion Hazards:** May evolve CO, CO<sub>2</sub> and/or NO<sub>x</sub> under fire conditions. Containers exposed in a fire should be cooled with water to prevent vapor pressure buildup leading to rupture.

## 9. Reactivity Information

**Incompatibility:** Avoid contact with strong oxidizers (eg. chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

**Thermal Decomposition Products:** In the event of combustion CO, CO<sub>2</sub> and/or NO<sub>x</sub> may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

## 10. Personal Protection Equipment

**Respiratory Protection:** Respiratory protection is not normally needed under typical use and handling conditions. If it is possible to generate significant levels of vapors, mists or smoke, a NIOSH approved or equivalent respirator is recommended. For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

**Ventilation:** General ventilation is recommended. Additionally, local exhaust ventilation is recommended where vapors, mists or aerosols may be released.

**Protective Equipment:** Wear impermeable gloves, boots, apron and face shield with chemical splash goggles. A full slicker suit is recommended if gross exposure is possible.

The availability of an eye wash fountain and safety shower are recommended. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

## 11. Spill & Disposal Information

**In case of transportation accident, call the emergency response phone number: 800-535-5053**

### **Spill Control And Recovery:**

**Small Spills:** Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

### 11. Spill & Disposal Information (continued)

**Large Spills:** Dike and prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

For large indoor spills, evacuate employees and ventilate area. Eliminate all sources of spark or flame. Those responsible for control and recovery should wear the protective equipment specified in Section 10. Ventilate area and evacuate employees from exposure if the airborne concentration exceeds the TLV. Refer to Section 14.

Prevent flow/discharge into lakes, ponds, streams, waterways or public water supplies.

**Disposal:** If this product becomes a waste, it meets the criteria of a hazardous waste as defined under the Resources Conservation and Recovery Act (RCRA) 40 CFR 261. Hazardous Waste D001.

As a hazardous liquid waste, it must be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to a licensed industrial waste landfill (Hazardous Waste Treatment, Storage and Disposal facility). A hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

### 12. Environmental Information

If released into the environment, see CERCLA in Section 14.

### 13. Transportation Information

The proper shipping name and/or hazard class for this product may vary according to packaging, properties and mode of transportation. Typical proper shipping names for this product are:

<b>Drums &amp; Pails:</b>	Not D.O.T. Regulated
<b>Totes &amp; Bulk:</b>	Combustible Liquid, N.O.S.
<b>UN/ID Number:</b>	NA-1993
<b>Hazard Class:</b>	3, Combustible Liquid
<b>Packing Group:</b>	III
<b>Flash Point:</b>	53°F
<b>Hazardous Components:</b>	Isopropanol
<b>RQ lbs:</b>	None
<b>RQ Component(s):</b>	None

### 14. Regulatory Information

The following regulations apply to this product:

**Federal Regulations:**

**OSHA's Hazard Communication Rule, 29 CFR 1910.1200:**

Based on our hazard evaluation, the following ingredients in this product are hazardous and the reasons are shown below.

Isopropanol – Flammable



**14. Regulatory Information** (continued from page 5)

**Clean Air Act, Sec 111 (40 CFR60), Sec 112 (40 CFR 61, 1990 Amendments), Sec 611 (40 CFR 82, Class I and II Ozone Depleting Substances):**

This product contains the following ingredients covered by the Clean Air Act:

Isopropanol – Section 111

**State Regulations:**

**California Proposition 65:**

This product does not contain any chemicals which require warning under California Proposition 65.

**Michigan Critical Materials:**

This product does not contain any ingredients listed on the Michigan Critical Materials Register.

**State Right To Know Laws:**

This product is regulated in those states using the TLV for isopropanol as a criteria for listing.

**15. User's Responsibility**

The information accumulated herein is believed to be accurate based on the information provided, although no guarantee or warranty, either expressed or implied is made as to the accuracy or completeness of this information, whether originating with this company or not. Recipients are advised to confirm in advance of need that the information is correct, applicable and suitable to their circumstances. The conditions or methods of handling, storage, use and disposal of the product and container are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage or use of this information or product. If the product is used as a component in another product, this information may not be applicable.

Prepared By: L.V. Robertson  
Original Date: February 20,2003

# Bachman Drilling & Production Specialties, Inc.

2220 S. Prospect  
Oklahoma City, OK 73143

Emergency Response: 800-535-5053  
Information: 405-677-8296

## MATERIAL SAFETY DATA SHEET

### 1. Chemical Identification

Product: **DF-104**  
General Description: Defoamer  
Chemical Family: Blend  
Revision Date: January 4, 2012  
Primary Hazard: Flammable Liquid  
RQ Component

Hazard Rating		Rating Scale
Health	2	4 = Extreme
Fire	3	3 = High
Reactivity	0	2 = Moderate
Personal Protection	B	1 = Slight
		0 = Insignificant

### 2. Hazardous Ingredients

Our hazard evaluation has identified the following chemical ingredient(s) as hazardous. One or more component is being claimed as a trade secret under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult section 14 for the nature of the hazard(s).

Ingredient(s)	CAS Number	Approximate Wt. %
Methanol	67-56-1	Confidential

### 3. Handling Precautions

**DANGER!** Flammable Liquid. Contains methanol. May cause blindness if swallowed. May be harmful if inhaled. Do not use, store, spill or pour near heat, sparks or open flame. Keep container closed when not in use. Use with adequate ventilation. Do not take internally. Avoid prolonged or repeated breathing of vapor. Avoid contact with skin, eyes or clothing. Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

### 4. First Aid Information

**EYES:** Remove victim from exposure and into fresh air. Immediately flush with water for at least 15 minutes while holding eyelids open. Call a physician at once.

**SKIN:** Remove contaminated clothing. Immediately wash exposed area with soap and water for at least 15 minutes. For a large splash flood body under a shower. Call a physician at once. Launder clothes before reuse.

**INGESTION:** If victim is conscious and alert, induce vomiting by giving syrup of ipecac or by gently stimulating victim's uvula. Give water. Call a physician at once. If victim is drowsy or unconscious, do not induce vomiting or give anything by mouth; place victim on the left side with the head down. If possible, do not leave victim unattended.

**INHALATION:** Remove to fresh air. If breathing is difficult, administer oxygen. Treat symptoms. Keep victim warm and quiet. Seek immediate medical attention.

**CAUTION:** If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

#### Note To Physicians

This product contains methanol. Ethanol decreases the metabolism of methanol to toxic metabolites. Ethanol should be administered as soon as possible in cases of severe poisoning. If ethanol therapy is indicated, administer a loaded dose of 7.6 to 10 mL of 10% ETOH in D5W over 30 – 60 minutes. Maintenance dose of 1.4 mL/Kg/Hr of 10% ETOH, to achieve a 100 to 130 mg/dL blood ETOH level during ethanol therapy. (If charcoal is administered, ethanol should be administered intravenously and not orally.)

### 5. Health Effects Information

**Primary Route(s) Of Exposure:** Eye, Ingestion, Inhalation, Skin

**Eye Contact:** Irritating to the eyes with possible permanent damage depending on the length of exposure and on the first aid action given. Symptoms may include stinging, tearing, redness and swelling.

**Skin Contact:** Irritating to the skin. Symptoms may include redness and burning. Skin adsorption possible, but harmful effects are not expected from this route of exposure under normal conditions of handling and use. Can cause allergic contact dermatitis in susceptible individuals.

**Ingestion:** Can cause blindness due to methanol. Ingestion of this product will also cause sever abdominal distress, with nausea, vomiting and diarrhea probable depending on the first aid action given. See note to physician, above.

**Inhalation:** Prolonged inhalation of mist or vapor in excess of the recommended exposure limits can be harmful, causing nausea, irritation, dizziness, light-headedness, vomiting, fatigue, headache or unconsciousness depending on the length of exposure and the first aid action given.

#### Symptoms

**Of Exposure:** A review of available data does not identify any symptoms from exposure not previously mentioned.

**Aggravation Of Existing Conditions:** A review of available data does not identify any worsening of existing conditions.

### 6. Toxicological Information

**Toxicity Studies:** No toxicity studies have been conducted on this product. However, this product contains methanol. Ingestion of methanol, even in small amounts, can cause blindness and death. This material is not listed as a carcinogen by IARC, NTP or OSHA.

### 7. Physical & Chemical Properties

<b>Appearance:</b>	Clear Liquid	<b>Pour Point:</b>	-30°F
<b>Odor:</b>	Alcohol	<b>Initial</b>	
<b>Specific Gravity:</b>	0.802	<b>Boiling Point:</b>	147 °F
<b>Density:</b>	6.69	<b>Flash Point:</b>	54 °F TCC
<b>pH (neat):</b>	7.0 – 8.5	<b>Vapor Pressure:</b>	96 mm HG @ 100 °F
<b>Viscosity:</b>	4 cst @ 100°F	<b>Vapor Density:</b>	> 1.0 (Air = 1.0)
<b>Solubility:</b>	Water Soluble	<b>Evaporation Rate:</b>	3.5 (Butyl Acetate = 1.0)

**Note:** These physical properties are typical values for this product and not specifications.

## 8. Fire & Explosion Information

**Flash Point:** 54°F  
**Lower Explosive Limit:** 2.0%  
**Upper Explosive Limit:** 36.0%

**Extinguishing Media:** Based on NFPA guide, use water fog, dry chemical, foam, carbon dioxide or other extinguishing agent suitable for Class B fires. Use water to cool containers exposed to fire. For large fires, use water spray or fog, thoroughly drench the burning material.

**Unusual Fire And Explosion Hazards:** May evolve CO, CO<sub>2</sub> and/or NO<sub>x</sub> under fire conditions. Containers exposed in a fire should be cooled with water to prevent vapor pressure buildup leading to rupture.

## 9. Reactivity Information

**Incompatibility:** Avoid contact with strong oxidizers (eg. chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

**Thermal Decomposition Products:** In the event of combustion CO, CO<sub>2</sub> and/or NO<sub>x</sub> may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

## 10. Personal Protection Equipment

**Respiratory Protection:** If it is possible to generate significant levels of vapors or mists, a NIOSH approved or equivalent respirator is recommended. For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

**Ventilation:** General ventilation is recommended. Additionally, local exhaust ventilation is recommended where vapors, mists or aerosols may be released.

**Protective Equipment:** Wear impermeable gloves, boots, apron and face shield with chemical splash goggles. A full slicker suit is recommended if gross exposure is possible.

The availability of an eye wash fountain and safety shower are recommended. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

## 11. Spill & Disposal Information

**In case of transportation accident, call the emergency response phone number: 800-535-5053**

### **Spill Control And Recovery:**

**Small Spills:** Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

### 11. Spill & Disposal Information (continued)

**Large Spills:** Dike and prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

For large indoor spills, evacuate employees and ventilate area. Eliminate all sources of spark or flame. Those responsible for control and recovery should wear the protective equipment specified in Section 10. Ventilate area and evacuate employees from exposure if the airborne concentration exceeds the TLV. Refer to Section 14.

Prevent flow/discharge into lakes, ponds, streams, waterways or public water supplies.

**Disposal:** If this product becomes a waste, it meets the criteria of a hazardous waste as defined under the Resources Conservation and Recovery Act (RCRA) 40 CFR 261. Hazardous Waste D001.

As a hazardous liquid waste, it must be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to a licensed industrial waste landfill (Hazardous Waste Treatment, Storage and Disposal facility). A hazardous liquid waste can also be incinerated in accordance with local, state and federal regulations.

### 12. Environmental Information

If released into the environment, see CERCLA in Section 14.

### 13. Transportation Information

The proper shipping name and/or hazard class for this product may vary according to packaging, properties and mode of transportation. Typical proper shipping names for this product are:

<b>All Transportation Modes:</b>	Flammable Liquid, N.O.S.
<b>UN/ID Number:</b>	UN-1993
<b>Hazard Class:</b>	3, Flammable Liquid
<b>Packing Group:</b>	III
<b>Flash Point:</b>	54°F
<b>Hazardous Components:</b>	Methanol
<b>RQ lbs:</b>	7,540
<b>RQ Component(s):</b>	Methanol

### 14. Regulatory Information

The following regulations apply to this product:

**Federal Regulations:**

**OSHA's Hazard Communication Rule, 29 CFR 1910.1200:**

Based on our hazard evaluation, the following ingredients in this product are hazardous and the reasons are shown below.

Methanol – Flammable, Systemic effects (refer to Section 5)

**14. Regulatory Information** (continued from page 4)

Methanol = TWA 200 ppm, STEL 250 ppm ACGIH/TLV

Methanol = TWA 200 ppm, STEL 250 ppm OSHA/PEL

**CERCLA/Superfund, 40 CFR 117, 302:**

This product contains methanol, a Reportable Quantity (RQ) substance. If 7,540 pounds of this product is notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C., is required at 1-800-424-8802.

**SARA/Superfund Amendments And Reauthorization Act Of 1986**

(Title III) – Sections 302, 311, 312 and 313:

**Section 302 – Extremely Hazardous Substance (40 CFR 355):**

This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance

**Section 311 and 312 – Material Safety Data Sheet Requirements (40 CFR 370):**

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories.

\*\*\*\*\* Immediate (acute) health hazard  
Delayed (chronic) health hazard  
\*\*\*\*\* Fire  
Sudden Release Of Pressure  
Reactive  
\*\*\*\*\* Indicates Primary Hazards

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of a hazardous chemical. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

**Section 313 – List Of Toxic Chemicals (40 CFR 372):**

This product contains the following ingredient(s), (with CAS# and % range) which appear(s) on the List Of Toxic Chemicals:

Methanol 67-56-1 Confidential

**Toxic Substance Control Act (TSCA) (40 CFR 710):**

The chemical ingredients in this product are on the 8 (b) inventory list.

**Resource Conservation Recovery Act (RCRA), 40 CFR 261 Subpart C & D:**

Consult Section 11 for RCRA classification.

**Federal Water Pollution Control Act, Clean Water Act, 40 CFR 401.15 (formerly Sec. 307), 40 CFR 116, (formerly Sec. 311):**

None of the ingredients of this product are specifically listed.

**14. Regulatory Information** (continued from page 5)

**Clean Air Act, Sec 111 (40 CFR60), Sec 112 (40 CFR 61, 1990 Amendments), Sec 611 (40 CFR 82, Class I and II Ozone Depleting Substances):**

None of the ingredients of this product are covered by the Clean Air Act.

**State Regulations:**

**California Proposition 65:**

This product does not contain any chemicals which require warning under California Proposition 65.

**Michigan Critical Materials:**

This product does not contain any ingredients listed on the Michigan Critical Materials Register.

**State Right To Know Laws:**

This product is regulated in those states using the TLV for methanol as a criteria for listing.

**15. User's Responsibility**

The information accumulated herein is believed to be accurate based on the information provided, although no guarantee or warranty, either expressed or implied is made as to the accuracy or completeness of this information, whether originating with this company or not. Recipients are advised to confirm in advance of need that the information is correct, applicable and suitable to their circumstances. The conditions or methods of handling, storage, use and disposal of the product and container are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage or use of this information or product. If the product is used as a component in another product, this information may not be applicable.

Prepared By: L.V. Robertson  
Original Date: January 22, 2003

## Appendix B. Noxious Weed Management Plan

This weed control plan is concerned with the control of a wide variety of noxious weeds, thistles, etc. located on mine disturbance areas.

The Delta County Noxious Weed website and personnel have been consulted regarding a Noxious Weed Program. Disturbed areas, topsoil stockpiles and reclaimed/seeded areas could be invaded by the following noxious weed species with control afforded by the described techniques:

- Musk, Scotch Thistles; Burdock, Houndstongue, Tamarisk, Puncturevine—Controlled by Banvel/2,4,-D mixture, Curtail or Redeem herbicides and non-ionic surfactant applied in spring or early summer.
- Canada thistle, Russian, diffuse and spottend knapweeds, yellow toadflax and oxeye daisy, bindweed—controlled by Curtail or Redeem or Tordon herbicides and surfactant applied in spring or fall.
- White top—controlled by Escort or Telar herbicides with surfactant in the spring.
- Leafy spurge—controlled by Tordon in spring or early summer.

Contractors and/or Oxbow employees may apply the herbicides. Procedures to be followed include but are not limited to the following:

- The herbicides and surfactant will be applied in accordance with the individual label requirements using a hand held or backpack or pickup/ATV mounted sprayer. Care will be taken to avoid drift onto desirable species and to avoid spraying in windy conditions.
- Oxbow will maintain records of herbicide use on the property for inspection by CDRMS personnel. The weed control records will document the location where weed control was performed, the type of weed control employed and the date when the weed control was performed.
- As part of its Annual Reclamation Report, Oxbow will summarize its weed control activities for the year.

Other mechanical or biological means of weed control such as discing, shoveling and insects may also be employed to control weeds on disturbed areas.

## **Appendix C. Mitigations for Coal Exploration License COC-74911**

### **Drill Pads**

- Wherever possible, existing ground surface would be used for drilling sites, and construction activities would be limited to clearing and removal of large boulders.
- Prior to construction, the limits of construction disturbance areas along the access road routes and pad locations would be clearly defined.
  - These limits would be staked and flagged.
  - All construction activities would be confined to these areas.
  - Stakes and flagging would be removed when construction and restoration are completed.

### **Access**

- Existing access roads would be used wherever possible to reach the drilling locations.
- New roads and other linear facilities would be located and constructed to follow the contour of the landform or to mimic lines in the vegetation (avoiding straight roads and steep slopes).
- Road beds would be a maximum of 14 feet wide.
- Cutting and filling, and crowning and ditching, of temporary roads would be kept to the minimum necessary.

### **Staging**

- The 7X/Bear Ranch LEX property would serve as a casting and laydown area.
- Other storage, including equipment and supply storage, would occur along new temporary access roads or at drill locations within the designated areas.
- All storage would occur away from public access areas.

### **Site Clearing**

- Where possible, areas of existing disturbance would be used.
- All of the pad sites would require clearing of brush and removal of boulders and large rocks.
- Clearing and grading would be accomplished using bulldozers, road graders or other standard earth-moving equipment.
- The topsoil component (up to 12 inches, where present) would be salvaged for use in reclamation activities.
  - In many areas, surface rock is present and topsoil salvage would be limited.
- Drill pads that require grading would have a surface area of about 0.50 acres (about 180 feet by 120 feet).
- Drill pads not requiring grading would have a surface occupation and clearing area of no greater than 0.50 acre.

### **Drilling Activities**

- Exploratory drilling would use a truck-based, self-leveling rotary drill rig with about a 53 foot mast (fully extended) and with a base dimension of about 10 by 10 feet.
- The drill rig is equivalent in size and capability to those used to drill deep water wells.
- Bore holes would be drilled using 8 ¾ inch rotary bit to a depth of up to 200 feet, depending upon ground conditions and the ultimate depth of the hole at each location.
- A steel surface casing would be installed and cemented in place. A 6 ¼ inch rotary bit would be used to drill the borehole to a preselected depth above the target coal seam.
- A 3-inch core barrel and bit would be used to recover a core from the coal seam and portions of the rock material above and below the coal seam.
- Bore holes would be drilled to the extent possible with air, air-water, air-foam, or water as the circulation medium.
- A lubricating bentonite-based mud would be used in holes that are difficult to keep open.
  - The muds used in these instances would not contain metallic compounds.
- Approximately 3,000 to 4,000 gallons of water would be used for each borehole under normal drilling conditions (0.528 acre foot of water total for all 43 boreholes).
- Water would be delivered to each borehole site by a tanker truck designed to haul water. A cuttings pit to hold soil and rock material removed from the borehole would be excavated with a backhoe within the pad area.
- The pit would be approximately 20 feet in length, 8 feet in width, and 8 feet deep (47 cubic yards each).
- All drilling locations would require construction of a pit for cuttings and containment of produced water (both water injected during air drilling and any water produced from the formation).
- If drilling mud is required to maintain hole stability and/or circulation, a portable mixing tank would be used to mix and contain the drilling mud.

### **Lighting**

- Lighting would consist of one or two “tower” lights near the top of the drill rig at a height of about 50 feet, and portable lighting units on the ground to allow drillers to monitor drill cuttings and review the drill cores.
- Ground lighting units would be aimed at work areas.
- For safety reasons, lighting cannot be artificially shielded, but natural topographic and vegetative shielding would be considered in light placement.

### **Noise**

- Noise levels from drilling operations would be about 85 decibels (dB), which does not require hearing protection for workers. Noise levels will be in compliance with state and federal standards.

### **Equipment and Personnel**

- The following personnel and equipment would be required to complete exploration activities
  - Bulldozer (1) and Excavator (1) for clearing, excavating, moving, and grading; personnel about 2 people;
  - Grader (1) for clearing, moving small amounts of soil and finish grading; personnel 1;
  - Drilling rig (1 or 2); personnel about 5 to 7 people;
  - Carpool pickup (1 for each rig crew) to transport drilling staff;
  - E-log truck (1) and equipment for digital logging of bore holes; personnel 1 to 2 people;
  - Delivery trucks and semi trucks for delivery of water tanks, and other bulk construction items; about 1-2 personnel per delivery; about 2 trips per day;
  - Water Truck for dust suppression (1); personnel 1; and
  - Pick-up trucks and SUVs with flatbed trailers (1) for small equipment transport; personnel 1.

### **Storm Water Control**

- For locations that require construction of a drill pad, the pad would be graded so that any water runs toward the cuttings pit.
- Either silt fencing or straw wattles would be placed to contain storm water runoff within the pad area.
- For locations that do not require construction/leveling of a pad, silt fencing or straw wattles would be used as needed to prevent storm water runoff from leaving the drilling operations area.

### **Site Maintenance**

- Oxbow would control dust from drilling and related activities, divert and control both natural runoff from disturbed areas and fluid loss from drilling, and would clean up any trash or debris.
- A maximum of about 0.4 acre-foot of water is anticipated to be required for fugitive dust suppression, depending on seasonal climate conditions.
  - A water truck would be used to apply water to access roads, as needed, to control dust.
- Waste construction materials and rubbish from all construction areas would be collected, hauled away, and disposed of in an approved manner.
- Food-related trash would be stored inside contractor vehicles and removed daily.
- If necessary, bear-proof trash containers would be provided.
- Where fences must be cut for gate installation or other construction activities, prior to gate cutting, the brace posts would be installed and wires attached in order to maintain adjacent wire tension.
- Any fence damaged during construction would be repaired immediately.

- Gates, where required, would be installed in accordance with landowner and BLM agreements, and would be maintained in good working order.
- All new or existing gates would remain closed and locked at all times except when attended or unless otherwise directed by the landowner.

### **Fire Prevention**

- All drilling equipment would be provided with fire extinguishers and shovels for fighting small fires, if necessary.
- Drilling crews would be equipped and trained to fight small fires.
- Spark arresters would be required for equipment generating sparks, including ATVs and chainsaws.
- Smoking would be allowed during construction activities only in designated safe-smoking areas.
- Common sense practices regarding heat/spark sources, particularly in dry conditions, would be followed.
- Parking hot vehicles on dry shrubs would not be allowed, and other logical avoidance practices would be followed.

### **Reclamation – Bore Hole**

- All drill holes would be backfilled, sealed and abandoned.
- During drilling, fluid return would be monitored to identify the depth and extent of any water producing zones. Upon abandonment, in accordance with Drill Hole Plugging Procedures agreed to by BLM and CDRMS, bentonite chips or bentonite plug gel or similar seal would be established in the bottom of the hole, extending to within ten feet of the surface.
- A cement plug would be set in the hole ten (10) feet below the ground to within three (3) feet of the surface.
- Accumulations of drill cuttings would be buried in the excavated pit.
- Part of the abandonment process includes the use of bentonite mud to seal the borehole.
- At no time during the drilling and well abandonment process will any bentonite mud be placed in the cuttings pit.
- Several of the exploration holes may be completed as ground water monitoring wells, in preparation for base line monitoring required for permit submission.
  - Identification of specific drill holes to be completed as ground water monitoring wells would occur once initial meetings with the CDRMS have occurred. Drill holes selected to be completed as monitoring wells would be completed in accordance with the guidelines agreed to by the BLM and CDRMS for monitoring wells.
  - Once monitoring is no longer required, these wells would be abandoned in the same manner as the original bore holes.
- A metal post with tag would be placed in the vicinity of the hole as a permanent marker.

### **Reclamation – Roads**

- Interim reclamation would include partially revegetating roads in order to reduce the amount of bare ground created during construction and drilling activities.
- The new road segments would be reclaimed to their original contour and rough texture in order to match the “texture” of the surrounding landscape, and revegetated in accordance with BLM direction, and using a BLM-approved seed mix.

### **Reclamation – Pits**

- Any drilling mud left in the portable mixing tank after the borehole is completed would be used along with additional bentonite in the hole abandonment process.
- The pits may be temporarily fenced and allowed to dry before backfilling with previously excavated material.
- The excavated material would be returned to the pits in such a manner as to approximate the original soil profile, particularly as related to the near-surface soils or top soil.
- During backfilling, the material would be mixed and compacted as it is replaced, by running the equipment over the backfilled area during placement of successive lifts.
- Following backfilling, disturbance areas would be graded to their approximate original configuration or to a natural looking configuration that blends with the surrounding topography and the original surface drainage reestablished.

### **Reclamation – General**

- All trash and debris would be removed from drill sites for disposal. Excavations, including pits, would be backfilled.
- Any salvaged topsoil materials would be re-spread onto the regraded surface and reseeded of the areas (pads and roads – unless the landowner requests the roads remain) would take place using the pre-determined seed mixture.

### **Reclamation – Re-seeding**

- Seeding would take place in the fall or early spring.
- A temporary perimeter fence would be placed around reclaimed areas to prevent disturbance by cattle and elk.
- Monitoring of re-seeding efforts would occur for two or three field seasons to determine stand success, re-seeding requirements and control of any noxious weeds.

#### **Reclamation Success criteria:**

- Vegetation cover in disturbed areas would be at least 70 percent of the vegetation cover in adjoining undisturbed areas. For example, if nearby undisturbed areas have approximately 75 percent vegetation cover, the reclamation success criteria would be 52.5 percent total vegetation cover.
- Vegetation cover would be comprised of species included in the seed mix and other desirable species found in the surrounding area.

- Vegetation patchiness is acceptable, as long as there are no contiguous bare areas greater than about 3 feet by 3 feet (about 9 square feet).

### **Noxious Weed Management**

- Clean equipment to remove weed seeds prior to use onsite;
- Monitor and spray/perform weed control as necessary.
- The operator and the operator's contractors will disinfect heavy equipment, hand tools, boots and any other equipment used previously in a river, lake, pond, or wetland, by routinely cleaning equipment using 140° water and high-pressure sprayers to remove dirt, mud and foreign debris before equipment is brought on-site.
- The operator and the operator's contractors will clean trucks and equipment at wash-stations in nearby towns or at the contractor's yard (off-site) to ensure that all equipment and vehicles shall be clean of all dirt and debris that can harbor weed seed.
- Monitoring and control of noxious or invasive weeds attempting to establish within the project boundaries throughout the construction and production phases should be performed in coordination with routine maintenance activities and in accordance with state law.
- The Operator will monitor for and control noxious or invasive weeds throughout the construction and production phases. Mandatory noxious weed control is required on the pads, drill holes, and access roads used by the lessee/operator for the life of the project.
- Application of pesticides and herbicides on public lands will conform to BLM and state laws.
- To prevent the entry of hazardous substances into surface waters:
  - Chemical treatments within the riparian areas shall be applied by hand and shall be applied only to specific targets.
  - Leave a 25-foot buffer along surface waters when chemicals are being applied through ground application with power equipment.
  - Always refer to chemical label instructions for additional guidance on use near water and required buffer zones.
  - To enhance effectiveness and prevent transport into streams, apply chemicals during appropriate weather conditions (generally calm and dry) and during the optimum time for control of the target pest or weed.

### **Coordination**

- Coordination with landowners and interested parties will occur throughout the drilling process, including meeting with domestic and irrigation water providers to address concerns about water supply facilities.
- Existing rights-of-way will be avoided to the extent possible. If they cannot be avoided, caution will be taken to ensure no damage to the facility or disruption of use

occurs. As necessary, right-of-way holder(s) will be contacted to coordinate activities that may influence their facilities.

### **General Design Features**

- Clearances/survey, including cultural resource surveys and biological resource surveys, would be completed for drill hole and access road locations that were not reviewed in Fall 2011 because of lack of right-of-access prior to any ground disturbing activities.
- Refueling of equipment will not occur within 100 feet of live water.
- Any lubricant, oil or grease, or fuel spills shall be reported immediately to the BLM or USFS hazardous material coordinator. Any spills would be removed from the spill area as quickly as possible and disposed of appropriately off-site. Any spills will be cleaned to the authorized officer's satisfaction using standard hazmat procedures.
- The point of access (where applicable) would be blocked as directed to prevent motorized use of a reclaimed road. To discourage access and use of reclaimed areas, natural barriers and signs would be placed near the point of entry where project roads have been reclaimed. The BLM would approve barrier locations and techniques.
- A red-tailed hawk nest located just south of West Reservoir and within ¼ mile of the OM-02 site, would be monitored for nesting activity during construction. If the nest is active, construction and drilling operations could be put off until the young have fledged. This would eliminate the chances of the nest being impacted.
- If project timing would include construction during the migratory bird nesting time frame for the project area (generally through July 15), potential impacts and modifications to project schedule needed to comply with the Migratory Bird Treaty Act would be discussed with BLM prior to exploration activities. Monitoring for migratory birds would occur if Oxbow wishes to proceed during the nesting season. If monitoring results in positive active nest data, appropriate avoidance buffers would be developed in coordination with BLM based on species and site-specific conditions.
- For drilling sites where development of a pad is necessary, the topsoil would be stockpiled, and either silt fencing or straw wattles would be placed around the stockpile.
- Straw wattles would be used to minimize erosion until the pad is revegetated.
- During and after drilling, the drill site would be fenced to keep animals out of the site to prevent damage to stormwater BMPs and newly revegetated areas. Oxbow is negotiating with individual landowners regarding the type of fence installed for reclamation purposes; electric fencing with solar panels to provide power have been used in the past and are proposed. Oxbow would be responsible for fence installation, monitoring and removal.
- Where bentonite is used, portable mixing tanks would contain all bentonite. It would not be placed in the cuttings pit.