

U.S. Department of the Interior  
Bureau of Land Management  
White River Field Office  
220 East Main Street  
Meeker, CO 81641

## ENVIRONMENTAL ASSESSMENT

**NUMBER:** CO-110-2008-273-EA

**CASE FILE/PROJECT NUMBER:** COC73175

**PROJECT NAME:** Ryan Gulch 3D Seismic (Williams/Green River Energy Resources)

**LEGAL DESCRIPTION:** Sixth Principal Meridian

Township	Range	Sections
T1S	R97W	19, 30, 31
T1S	R98W	19 through 36
T1S	R99W	24, 25, 36
T2S	R97W	6, 7, 18, 19, 30, 31
T2S	R98W	1 through 36
T2S	R99W	1, 12, 13, 24, 25, 36
T3S	R97W	6, 7, 18, 19, 30, 31
T3S	R98W	1 through 36
T3S	R99W	1, 12, 13, 24, 25, 36

**APPLICANT:** Williams Production RMT Company

**ISSUES AND CONCERNS:** None.

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

***Background/Introduction:*** Green River Energy Resources (Operator), on behalf of Williams Production RMT Company (Williams), has submitted an application to conduct a three-dimensional (3D) geophysical exploration (seismic survey) within the Ryan Gulch area of the Piceance Basin on lands administered by the Bureau of Land Management (BLM) White River Field Office (WRFO) in Rio Blanco County (RBC), Colorado (Figure 1).

The purpose of the proposed Project is to determine the potential for the occurrence of oil and natural gas resources in the underlying formations within the project area using advanced 3D geophysical seismic generation and data recording methods. A 3D seismic exploration process provides information about underground geology by using a 3D seismograph data collection system to analyze and three-dimensionally image subsurface geologic structures and stratigraphy. The proposed 3D survey would generate data that may be used to more accurately define the location of potential reservoirs of commercial quantities of oil and natural gas resources and

thereby reduce unnecessary drilling and associated roads, pads, and other surface disturbances. The survey may verify and/or supplement the existing subsurface geologic data from previous seismic surveys and drilling activities and could facilitate the collection of new data in portions of the project area where geophysical surveys and/or drilling have not occurred. Using seismic data would eliminate some areas from future exploratory drilling and would focus well drilling activity in only those areas where the resource is most likely present.

The raptor survey report for this action was received by the WRFO on 10 September 2008.

**Proposed Action:** The Operator proposes to conduct a 3D geophysical exploration to test the subsurface geologic conditions for the potential presence of oil and natural gas resources in an approximately 119-square-mile (76,224-acre) project area on federal, state, and private lands (Table 1). The 3D seismic survey would use 3 Component (3C MEMS) sensors, an advanced method of recording technology, to gather data for hydrocarbon exploration, development, and production. All operations would be conducted in accordance with BLM Best Management Practices (BMPs) and in compliance with Conditions of Approval (COAs) developed in cooperation with the BLM WRFO. Areas of Critical Environmental Concern (ACECs) have been omitted from the project area boundaries as no seismic activities would occur in those areas.

**Table 1. Surface Ownership in Project Area.**

Surface Owner	Square Miles
Federal (BLM)	96.3
State (Colorado Division of Wildlife)	0.8
Private	22.0
Total	119.1

The Project would consist of 49 source lines comprised of approximately 12,120 source points. The source lines would run northwest to southeast for a total pre-plotted length of approximately 436 miles, of which an estimated 360 miles would be located on BLM surface. The source lines would be spaced approximately 1,476 feet apart with approximately 185-foot intervals between source points. Maximum source line length would be approximately 17 miles. There would be 81 receiver lines containing 20,443 receiver stations. Receiver lines would run east to west and would be spaced 990 feet apart with 165-foot intervals between receiver stations. The total length of receiver lines would be approximately 639.6 miles, with a maximum line length of about 7.9 miles. Source and receiver line locations are shown in Figure 2.

Applicable permits and approvals would be acquired from the BLM, State of Colorado, Rio Blanco County, and surface owners, as appropriate, prior to commencing drilling operations and data acquisition. Planned operations for the seismic project are proposed to initiate in December 2008 with completion in spring 2009. Timing and location of Operations would be dictated by wildlife timing and buffer stipulations.

The Project would be conducted in three phases: survey operations, drilling operations, and data acquisition (recording/demobilization operations). Survey operations are currently ongoing under casual use stipulations (BLM 2007a) and source-point staking began in November 2008. Shot hole drilling would commence as soon as permits are in place; possibly as early as December

2008. Data acquisition would take place concurrently with drilling and would be scheduled to begin once sufficient drill lead is established. Recording operations would continue for nine to ten weeks. From survey commencement through clean-up and demobilization, project duration would continue for approximately six months until the completion of recording in spring 2009. Timing of operations would be dictated by wildlife stipulations and operations may be delayed until after August 15 if not completed prior to initiation of wildlife stipulations in affected areas.

Operations would commence in the northern portion of the project area contained within mule deer severe winter range prior to timing restrictions. Once drilling operations are completed within that portion of the project area, operations would start at the southernmost point of the project area in Township 3 South and proceed northward. The purpose of this locational approach is two-fold. First, initiating operations in mule deer severe winter range in December would minimize impacts to mule deer prior to timing restrictions while then shifting operations to the southernmost part of the project area would minimize impacts to sage-grouse populations by ensuring that project activities near known leks would occur prior to spring sage-grouse activity. Second, this locational approach would minimize conflict between the Proposed Action and the simultaneously ongoing Piceance Creek 3D Geophysical Exploration Project. By completing operations in the northernmost portion of the project area first before switching to the southern portion and working northward, operational conflict would be eliminated throughout approximately the first 30 days of operation and would minimize project conflicts as operations progress further because the Piceance Creek 3D Geophysical Exploration Project has proposed to proceed from the southern part of their survey area and work northward.

Additional details of the Proposed Action are provided below.

#### *Initial Survey Operations*

Survey operations would be conducted under “casual use” stipulations, as defined within the BLM Handbook H-3150-1 for geophysical operations (BLM 2007a). A crew of up to ten persons would locate and flag the source point and geophone locations as well as travel routes between them. Moving south to north through the project area, global positioning system (GPS) technology would be used to locate temporary pin flags at receiver locations and 4-foot lath at source points. The civil surveyors would travel on foot when conducting off-road operations. Vehicles used to deploy survey personnel throughout the project area would remain on existing roads and trails. All activities would be conducted under the supervision of the third-party quality assurance/quality control (QA/QC) monitor.

Class III cultural resource surveys and biological surveys have been conducted prior to the civil survey in order to position source points to avoid sensitive resources. Where necessary, source points have been moved to remain outside of offsets prescribed in the Resource Protection Offsets for Cultural Resource Structures and Other Facilities contained in the BLM Handbook H-3150-1 (BLM 2007a). The civil survey crew would also move source points to avoid natural resources, obstacles, and existing land use features of importance. Prior to drilling operations, avoidance areas and access routes would be flagged and differentiated by using flags of different colors. Additionally, avoidance areas and cleared access routes would be recorded using GPS units used by the drill crews to establish track files of all access routes. All repositioned source

points would be relocated on the post-plot map and revised copies would be delivered to the BLM once the source points are recorded.

*Drilling/Source Deployment*

Commencing in the northern portion of the project area within mule deer severe winter range prior to timing restrictions and before moving operations to the southernmost area and proceeding northward, shot holes, approximately 4 to 5 inches in diameter and 60 feet deep, would be drilled using either buggy drills, track drills, or heliportable drills. Drill holes would be offset to avoid cultural resources, steep slopes, or other areas of concern. Twenty-pound charges made expressly for geophysical surveys would be used for data acquisition.

The use of buggy, track, and heliportable drills would vary across the project area based on vegetation type, terrain, slope conditions, and other obstacles. The number of heliportable shot holes would be based upon the Operator’s knowledge of the area and slope analyses performed using a digital elevation model. A total of 8,789 source points (73%) would be drilled using the heliportable drill method and 3,331 source points (27%) would be drilled by buggy or track rigs (Table 2). A layout of heliportable shot holes and buggy/track shot holes is shown in Maps A1-G3, provided in Appendix A. The actual method of drilling for individual shot holes may vary slightly from what is shown as source points are physically checked by drilling crews.

Proposed locations of source and receiver lines are depicted in Figure 2. Drilling and source deployment would generally occur from south to north. Operations would be deployed with the flexibility to change course as resource or operating conditions require.

**Table 2. Source Point Locations and Source Types by Surface Owner.**

Surface Owner	Buggy/Track-drilled	Heli-drilled	Total
Federal (BLM)	2,774	7,202	9,976
State (Colorado Division of Wildlife)	57	30	87
Private	500	1,557	2,057
Total	3,331	8,789	12,120

Buggy or track drills would travel in a single track along the source lines. Up to eight buggy or track drills would travel off-road (cross-country) if existing roads and/or trails are not available and would follow the pre-surveyed source line routes.

These drills would typically proceed from one source location to the next with one pass per source line unless the terrain is such that entry to and exit from an area must follow the same route. Shot holes drilled by buggy drills would be located within the route taken by the vehicle. A drilling coordinator would disperse the buggy drills to particular areas along source lines. The buggy drills would be operated in clusters of three to five each with a separation of 1 mile or less in most cases. These buggy drills weigh approximately 28,000 pounds or less and are mounted on all-terrain-type vehicle tires. Buggy drill tires exert a pressure of 5 pounds per square inch (psi), while track rigs weigh around 15,500 pounds and exert a pressure of 1.5 psi, equivalent to or less than that of a man’s footprint. No clearing or grading of routes by heavy equipment for

the off-road drilling program would be conducted. Buggies or track rigs would maneuver around obstacles that pose a danger to vehicles or crew.

Three sets of six heliportable drills (for a total of 18 heliportable drills) would be used on slopes where terrain makes safe access by buggy or track rigs impractical. Three helicopters, one per each set of six drills, would be used to transport the heliportable drills. On steep slopes or in rugged terrain, drills would be transported by sling below a helicopter to ensure safe operations. This helicopter would move drill components (drill unit and compressor, as well as a support basket in some cases) from one shot hole location to the next in two or three trips. A portable drill would be set on the source point location, and the hole would be drilled, loaded, and plugged. The drill would then be picked up by the helicopter and moved to the next source point to be drilled. The helicopter would not land at the source point location. For work in the project area, two to three passes of the helicopter would be required to position equipment for each source point and two to three passes would be required to reposition the equipment to the next source point. Each pass would consist of less than two minutes of actual flight over the source location. Flight operations would be conducted between altitudes ranging from 100 to 1,500 feet above ground. The remainder of the daily flight time would consist of going to and from each source point or delivering personnel to the site. Approximately 5 flight hours per day per helicopter would be necessary to support this project, resulting in 40 shot holes drilled daily by each drill crew.

Surface disturbance by heliportable drill operations would result in cuttings from the borehole that would extend radially approximately 3 to 4 feet from the center. Air would be used as the return medium for all shot holes; however, drilling through loose, unconsolidated gravel may require the use of water and drilling mud for a few shot holes. Most gravel is found as alluvial fill in drainages, and in general, these riparian areas would be avoided. If a small volume of water were to be needed for stabilization of alluvial surface conditions, the Operator would use an average of 2 gallons of water for up to 5% of the overall shot holes (approximately 1,200 gallons of water). The water would be obtained from a municipal water source in the city of Rifle, Colorado, transported to the staging area for storage, and carried by either the buggy drill or transported by helicopter with the other drilling equipment where needed. The Operator does not expect to encounter subsurface water; however, any shot holes drilled through water-bearing zones would be filled with coarse-ground bentonite to a point above the water zone.

All shot holes would be loaded and plugged (backfilled) immediately after drilling according to Colorado State regulations. A nonmetallic plug would be installed within 3 feet of the surface and the remaining 3 feet would be tamped to the surface and covered with more drill cuttings and soil. Excess drill cuttings would be mixed with soil and spread over the surrounding area. Shot holes would not be drilled near springs, wells, wetlands, or riparian areas. Cuttings around the hole would be raked to a thickness of 2 inches or less. Typically, within one year or one growing season, no evidence of disturbance would be apparent.

The Operator would employ an on-site third-party monitor throughout drilling and recording operations to ensure that all cultural resource sites would be avoided. The on-site monitor would be responsible for ensuring that all operating procedures described in this proposal would be followed, including avoiding cultural resource sites that were located by GPS coordinates and identified for the field crew by flagging. The monitor would be an independent contractor with

credentials and experience acceptable to the WRFO. The Operator and the independent monitor would be held responsible by the WRFO for compliance with the COAs for this Project, including avoidance of all cultural resource sites. The Operator and the independent monitor would consent to terms of a QA/QC plan approved by the WRFO defining the type of monitoring required, in consideration of the level of buggy drill activity that would be used in support of this Project. The on-site monitor would submit a final report to the WRFO documenting the success of the avoidance measures, as outlined and verified by the QA/QC plan procedures.

### *Deployment of Receiving Stations*

Recording equipment would initially be transported to the field and to staging areas by truck using existing roads and trails. Each recording station/receiver would consist of a single 3C geophone. Equipment needed to deploy the geophone, one length of seismic cable, and their associated battery and field digitization boxes would be placed in reinforced nylon cache bags at helicopter landing sites (staging areas) and flown to the pre-determined locations for stations along each receiver line. Two, five-passenger helicopters would be used to deploy personnel and equipment for the recording operation and would operate only in daylight hours. Ferrying the receiver-station cache bags would require flights at altitudes ranging from 100 to 1,500 feet above the receiver lines, unless otherwise specified by wildlife stipulations. These helicopters would move four to six cache bags at a time, depositing one bag at a time using GPS locations provided by the surveyors. One or two additional helicopters may be necessary to deploy and retrieve personnel should access conditions become limited due to winter weather.

Teams of four to six crew members would walk to the first dropped cache bag on their receiver line, manually deploy cables and geophones and connect the field recording unit. The geophones would be pressed into a single hole, 6 inches deep. Light-duty manually operated drills (hand drills) would be used to provide a 3-inch-diameter pilot hole for the 3C geophone placement. Once geophones are deployed, the crew members would proceed on foot to the next bag and repeat the set up of the first station (receiver location). Stations, cables, and 3C geophones would be laid out in this manner along the full length of the line. The crew member teams would operate at intervals of 1 to 3 miles of separation throughout the project area.

### *Source Generation and Data Acquisition*

Controlled detonation of individual shot holes and recording of resultant energy would begin shortly after placement of all the grouping of recording stations/geophones. Source generation by radio frequency signals would be triggered from a central control truck stationed on an existing road or trail. The central control truck would contain communication, data collection, and trouble shooting/coordination equipment. The seismic charges would be detonated one at a time within the active geophone array. Depending on the number of shooters and line conditions, shots would occur between 3- and 5-minute intervals. Each charge would be detonated between 18-line groups of active geophone stations. Approximately 3,600 geophone stations may be active at a time during data acquisition.

Recording operations would record each swath of shot points in an east-to-west direction. Approximately 45 crew members would conduct the drilling operations with an additional 70

crew members to conduct recording operations, including support personnel. Crews would conduct operations for 12 to 13 hours per day. Troubleshooting would be conducted by approximately three to five crew members, repairing line problems or faulty equipment, during operations. Troubleshooting operations would be done in pickup trucks on existing roads and trails and by crew members on foot.

Equipment inside the control truck would initiate the source detonation for the active receiver site locations and would record the data. After recording in an “active” area of the receiver line, geophones, cable, and each station’s equipment would be retrieved on foot and bagged using a procedure reverse of placement and moved to a new receiver location by helicopter.

A “blowout” may occur if the detonated charge ejects the plug and drill cuttings out of the hole. Any disturbance to the surface resulting from a blowout would be anticipated to be very limited. It would be repaired as part of line restoration; including replugging and repacking the hole with drill cuttings and soil materials that were expelled. Based on experience in similar geologic settings, blowouts are unlikely to occur.

Geophysical operations, properly conducted, are not known to present risks to public safety; however, because the perception of risk may be associated with the detonation of small seismic charges below the ground surface, the immediate area would be secured prior to and during drilling operations, especially when preparing charges for loading. Prior to detonation of each seismic charge, trained personnel would be posted at the active shot hole to ensure the area is secure.

#### *Staging/Support Operations*

The Operator would identify proposed project staging sites to store equipment and vehicles, refuel the helicopter (from a helicopter service and fuel truck), and sling-load bundles of equipment for helicopter transport. Proposed staging areas are illustrated in Maps A1, C2, E2, and F2, provided in Appendix A. Fueling of helicopters would occur only at staging areas. All equipment, including the drills, would be initially brought to the project area by four or five transport trucks/tractor-trailers. Staging areas have been selected to maximize use of previously disturbed areas. Smaller staging areas of less use and duration would be located along existing trails and roads throughout the project area and would be used to expedite the placement and retrieval of equipment. The helicopters, which would land at designated staging areas, may also land on existing road and trail intersections to pick up or drop off equipment or personnel.

Up to two explosives magazines would be positioned on a 48-foot semi-trailer on private land owned by Williams to minimize public access and to optimize public safety. The proposed location of these explosives magazines is shown on Maps A1 and C1, contained in Appendix A. No surface disturbance would be required for use of this location. The explosives would be stored and secured according to U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) regulations (27 CFR Part 55, Subsection K).

One camp, where employees would be housed, would be located on private land on the Brennan site at 39° 49.31 N, 108° 20.19 W (Map E3, Appendix A).

#### *Clean Up Activities*

Clean up activities would occur concurrently with Project operations. All pin flags, flagging, and other wastes would be gathered daily as the field groups and crew members complete data-acquisition portions of the Project. The waste would be gathered as recording operations proceed and would then be ferried to staging areas from where it would be disposed at the nearest appropriate landfill. Inadvertent spills of oil or fuel from mechanized equipment would also be cleaned up and properly disposed in an approved landfill. The survey area would be spot-checked continuously by the QA/QC monitor during all phases of the survey.

*Emergency Response*

Emergency response procedures would be in accordance with applicable regulations and guidelines. Emergency response procedures would be provided in an Emergency Response Plan and one paramedic or emergency medical technician would be on staff.

*Surface Use Estimate*

Surface use associated with the proposed Project would result from drilling shot holes, using existing roads and trails, traveling cross-country along source lines, and using previously cleared areas for storage and staging. The use of existing roads and trails would minimize off-road vehicle use. Buggy drills would require a 10-foot-wide corridor. It would be assumed that the buggies would use approximately 5% in additional mileage along routes to allow for maneuvering around obstacles. Shot holes drilled by buggies would lie within the access corridor. Drilling would require approximately 50 square feet for each shot hole drilled with a heliportable drill. Table 3 summarizes surface use quantification assumptions. The acres of surface use were estimated based on pre-plot source line (Table 4).

**Table 3. Summary of Surface Use.**

Source Type	Base “Use” Assumptions
Buggy route	10-foot-wide corridor
Buggy drill holes	No additional disturbance—drilled within the path of the buggy route corridor
Heliportable drill hole	50 square feet
Vehicle travel routes	1.05 times the length of source line routes

**Table 4. Summary of Acreage<sup>1</sup> Affected by Vehicle and Drill Surface Use.**

Activity	Surface Owner	Buggy Drill	Heliportable Drill	Total Use Area
<b>Source generation</b>	Federal (BLM)	NA <sup>2</sup>	8.3	8.3
	State	NA <sup>2</sup>	<0.1	<0.1
	Private	NA <sup>2</sup>	1.8	1.8
	Total acres	NA <sup>2</sup>	10.1	10.1
<b>Travel routes</b>	Federal (BLM)	457.2	NA	457.2

Activity	Surface Owner	Buggy Drill	Heliportable Drill	Total Use Area
	State	3.7	NA	3.7
	Private	94.7	NA	94.7
	Total acres	555.6	NA	555.6
<b>Total surface use area</b>	Federal (BLM)	457.2	8.3	465.5
	State	3.7	<0.1	3.7
	Private	94.7	1.8	96.5
	Total acres	555.6	10.1	565.7

<sup>1</sup> Acreages are rounded to nearest 0.1 acre.

<sup>2</sup> Source generation disturbance is within travel route.

The total amount of BLM surface area that would be used to implement the Project is estimated to be 467.1 acres (<0.1 percent of the 61,651 acres of BLM land within the project area). Including private and state land, total surface use is estimated to be 564.7 acres.

### *Operator-committed Mitigation Measures*

The Operator is committed to minimizing impacts to the environment. Applicant-committed environmental protection measures include the following.

#### General

1. All geophysical operations would be executed in accordance with applicable federal, state, and local regulations. Measures would be taken to ensure that flagging associated with other projects is not removed.
2. All geophysical operations would be conducted in accordance with BLM Handbook H-3150-1 and Manual (BLM 2007a).
3. All geophysical operations would be conducted in accordance with COAs developed from the Resource Management Plan (RMP) for the BLM WRFO (BLM 1997a).
  - Blasting or vibrating within 660 feet of federally owned or controlled springs and flowing water wells would not be allowed.
  - No blading or other dirt work would be allowed without specific written permission from the Authorized Officer (AO).
  - Rehabilitation of disturbed areas would be performed concurrent with the exploration operation.
4. The Operator would inform the BLM AO approximately one week prior to commencement of actual surveying. Exclusion zones identified by the block inventories for biological and archeological resources would be plotted prior to commencement of civil surveying. Weekly progress reports would be provided to the AO during drilling and recording activities. Daily progress reports may be required when working in areas of sensitive wildlife resources (mule deer winter range, sage grouse, and raptor nesting).
5. The Operator would employ, at its expense, a professional third-party QA/QC monitor for the duration of the seismic survey to ensure that operations associated with the Proposed Action result in no undue impacts to surface resources.

6. Source point placement would comply with BLM Handbook H-3150-1, Illustrations 10 and 16 (Appendix E) and applicable state regulations. Safe operating distances to pipelines, telephone lines, railroad tracks or highways, electric power lines, water and oil and gas wells would be determined by the charge size and depth. All source points have been pre-positioned according to these guidelines and are shown in Figure 2.

#### Cultural Resources

7. Any possible disturbance of cultural resources would be mitigated by following the procedures specified in 36 CFR 800 on BLM and State lands. Class III cultural resource surveys have been conducted in order to position source points to avoid sensitive resources. Where necessary, source and receiver points have been moved to remain outside of offsets prescribed in the Resource Protection Offsets for Cultural Resource Structures and Other Facilities contained in the BLM Handbook H-3150-1 (BLM 2007a).
8. Cultural sites, accessible by vehicle and recommended as avoidance areas, would be designated by flagging the entire periphery of the site. The Operator would flag a cleared drive-around route. Each buggy drill would carry a GPS unit that would also identify appropriate routes and avoidance areas. Exceptions may occur if the site would be crossed by an existing road or two-track, according to BLM and/or state guidance.
9. The Operator would employ an on-site QA/QC monitor throughout drilling and recording operations to ensure that cultural resource sites are avoided.
10. Operations personnel would be informed of the restriction on collecting or harming artifacts during startup meetings and ongoing safety meetings.
11. No receiver points will be located in cultural sites 5RB322, 5RB393, 5RB831, 5RB4741, and 5RB5024.

#### Soils, Vegetation, and Weeds

12. The Operator would clean all off-road equipment to remove seed and soil that may contain seeds prior to commencing operations within the project area.
13. No off route travel except by drill buggies would be allowed.
14. Drilling would be conducted no closer than 100 feet from edges of cliffs or upland escarpments.
15. Drilling and data acquisition operations would use existing roads and trails, where possible.
16. To minimize surface disturbance, drilling vehicles would, where possible, proceed from one source location to another with one pass per source line. The number of times that vehicles pass over their designated routes would be minimized to the greatest degree possible.
17. Drill holes would be offset to avoid known riparian areas, wetlands, sensitive plants, steep slopes, or other areas of concern.
18. Residual cuttings from the drill hole would be spread to a depth of approximately 2 inches or less.

19. Prohibit blasting within 100 feet of perennial surface water features to help mitigate potential bank destabilization.
20. To minimize soil erosion, heliportable drills would be used on slopes greater than 25%.
21. No vehicle travel would occur on slopes greater than 40% and no surface-disturbing activities would occur on slopes greater than 60% or on fragile soils occurring on slopes greater than 35%.
22. Justification and potential mitigation should be described for all source points and travel ways on steep slopes and/or on fragile soils.
23. Prime and other Important Farmland soils would be avoided by the project, if possible.
24. All activities would cease when soils or road surfaces become saturated to a depth of 3 inches unless otherwise approved by the AO.
25. Disturbed areas, where a site will not naturally revegetate in a reasonable time or areas where soil stability would be threatened by operations, would be reseeded using a seed mix specified by the AO at a time when seed germination would be facilitated by natural conditions. Specific measures and locations for use would be determined by personnel from the Operator and the BLM.
26. The Operator would minimize the potential for soil compaction by having all source generation vehicles on a source line or access route slightly offset their tracks.

#### Water Resources

27. Vehicular traffic across dry drainage channels would be limited to sloping side banks or to vertical banks less than 2 feet high. Crossing routes would be aligned to be perpendicular to a stream channel, to the extent practicable.
28. Minimum distances from source point placement would conform to BLM Handbook H-3150-1, Illustrations 10 and 16 (Appendix E) (BLM 2007a) and applicable state regulations.
29. Drill holes would offset springs and wells by 660 feet and would offset perennial streams by 100 feet.
30. Vehicles would not cross perennial water features, except on existing roads.

#### Wildlife and Special Status Species

31. Impacts to wildlife, raptors, and special status species would be mitigated by practicing avoidance according to biological surveys conducted prior to the initiation of drilling and recording operations. No extended period of surface occupancy activities would occur in the vicinity of sensitive species.
32. Operations conducted inside areas of concern during seasonal timing limitations would be monitored by a BLM-approved wildlife monitor and behavior would be documented. In the event that geophysical activities are found disturbing to monitored wildlife, activities in that area would immediately cease until such time as those concerns are relieved or wildlife have completed their use of the area. No operations would be conducted within

areas that are closed due to seasonal timing limitations without prior written approval from the BLM.

33. For sections in Township 3 South and Ranges 98 and 99 West where sage-grouse habitat and nesting areas are known to occur, operations would commence in the southwest corner and consist of a single set of six heliportable drills. These operations would proceed northward clearing this area before timing limitations would present possible conflict with sensitive species.
34. For sections in Townships 1 and 2 South, Ranges 97 and 98 West, where mule deer severe winter range and mule deer winter concentration is known to exist, no operations would be conducted within areas that are closed due to seasonal timing limitations without prior written approval from the BLM. If winter conditions allow and operations are approved by BLM, operations would proceed in a direction dictated by daily planning with the BLM wildlife biologist so that wintering ungulates are avoided to the greatest degree possible.

#### Range

35. If a fence must be crossed by vehicular traffic, the contractor would provide advance notice to the appropriate AO.
36. Gates would be used for crossing fences wherever practical. If a fence must be crossed by a vehicle at a location other than an existing gate, the appropriate AO would be contacted before any activity would be started at any fence crossing location and specified procedures would be followed.

#### Air Quality/Noise

37. All vehicles and construction equipment would be properly maintained to minimize exhaust emissions and would be properly muffled to minimize noise. The Operator would have a mechanic on site to ensure proper exhaust systems.

#### Waste

38. All pin flags, flagging, and other debris would be gathered daily and disposed of at an approved site or landfill.
39. All oil, diesel, or hydraulic fluid spills would be cleaned up immediately and removed, including any contaminated soils. All spill-related materials would be hauled to an approved disposal site. An approved disposal site would be located before operations begin.

#### Safety and Fire Protection

40. The Operator's standard safety procedures and applicable federal, state, and local regulations would be followed during shot detonation. A pre-operations meeting would be held to review all safety procedures for shot detonation.
41. Each shot would be cleared and secured by the trained shooting personnel prior to its detonation. The Operator operates under Bureau of Alcohol, Tobacco and Firearms (BATF) License 9-MT-029-33-8D-00367 and in accordance with Title 27, Code of Federal Regulations (CFR) Part 55 – Commerce in Explosives. All employee possessors

would be personally authorized through BATF to handle and transport explosives, and ultimate responsibility for explosives handling rests with the Operator's principals. Explosives storage would be conducted in compliance with BATF requirements. The magazine would be located on private or state land and would meet all applicable requirements.

42. Shot holes would be distanced from wells and high-pressure pipelines by a distance of at least 202 feet if using a 20-pound charge (BLM Handbook H-3150-1, Illustration 10). All involved utility and production companies would also be contacted for compliance.
43. All all-terrain vehicles (ATVs) would be equipped with spark arrestors. All vehicles would be equipped with fire extinguishers and shovels. Any helicopter on location would be equipped with a water bucket. The Operator would coordinate project activities with fire personnel in the WRFO.

**No Action Alternative:** Under the No Action Alternative, the application would be denied and 3D seismic exploration would not be conducted in the project area.

**ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD:** None

**NEED FOR THE ACTION:** The Project is needed by the Operator to acquire subsurface geophysical exploration data in support of ongoing research and development in establishing commercial natural gas production in the Piceance Basin.

The purpose of the proposed action is to manage the exploration and development of mineral resources on Public Lands in a manner that avoids, minimizes, reduces, or mitigates potential impacts to other resource values.

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

Name of Plan: White River Record of Decision and Approved Resource Management Plan (ROD/RMP) (BLM 1997a).

Date Approved: July 1, 1997

Decision Number/Page: Page 2-5 Oil and Gas

Decision Language: Make federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values.

**AFFECTED ENVIRONMENT / ENVIRONMENTAL CONSEQUENCES/ MITIGATION MEASURES:**

## STANDARDS FOR PUBLIC HEALTH:

In January 1997, the Colorado BLM approved the Standards for Public Land Health (BLM 1997b). These standards address upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. Because a standard exists for these five categories, a finding must be made for each of them in an Environmental Assessment (EA). These findings are presented in the specific elements listed below.

## CRITICAL ELEMENTS

### AIR QUALITY

*Affected Environment:* The project area would be located in rural northwest Colorado, which is sparsely populated. Historically, there have been limited industrial facilities in the area, besides coal mines, soda ash mines, gas processing plants, and power plants. However, due to increased oil and gas operations in the basin, vehicle traffic and drilling activities have increased and effects to air quality are occurring through exhaust emissions and dust (particulate matter) generated by driving on unpaved roads and surface disturbance.

The federal government established the National Ambient Air Quality Standards (NAAQS) under the federal Clean Air Act (CAA) and its amendments for six criteria pollutants: 1) carbon monoxide (CO), 2) ozone (O<sub>3</sub>), 3) sulfur dioxide (SO<sub>2</sub>), 4) nitrogen dioxide (NO<sub>2</sub>), 5) lead (Pb), and 6) particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>). Although the Environmental Protection Agency (EPA) retains oversight authority, the federal government has delegated enforcement of the CAA to the states. In Colorado, the Air Pollution Control Division of the Department of Public Health and Environment acts as the lead agency. The state is required to develop and administer air pollution prevention and control programs; state standards must be either the same as or more stringent than federal CAA standards. Table 5 lists the NAAQS and Colorado Ambient Air Quality Standards (CAAQS).

**Table 5. Federal and State Ambient Air Quality Standards.**

Pollutant	Averaging Period	NAAQS (µg/m <sup>3</sup> )	NAAQS ppm	CAAQS (µg/m <sup>3</sup> )	CAAQS ppm
SO <sub>2</sub>	3-Hour	NA	NA	700	--
	24-Hour	365	0.14	NA	NA
	Annual Mean	80	0.030	NA	NA
PM <sub>10</sub>	24-Hour	150	--	150	--
	Annual Mean	50	--	50	--
PM <sub>2.5</sub>	24-Hour	65	--	NA	--
	Annual Mean	15	--	NA	--
NO <sub>2</sub>	Annual Mean	100	0.053	100	0.053
CO	1-Hour	40,000	35	40,000	35
	8-Hour	10,000	9	10,000	9
Pb	3-Month	1.5	--	NA	NA

Pollutant	Averaging Period	NAAQS ( $\mu\text{g}/\text{m}^3$ )	NAAQS ppm	CAAQS ( $\mu\text{g}/\text{m}^3$ )	CAAQS ppm
O <sub>3</sub>	1-Hour	240	0.12	235	0.12
	8-Hour	157	0.08	NA	NA

source "Colorado Modeling Guideline for Air Quality Permits" December 27, 2005

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter

ppm = parts per million

Although specific air quality monitoring data are not available for the project area, data have been recorded in the vicinity of the project area. The cities of Grand Junction (approximately 60 linear miles to the southwest), Steamboat Springs (approximately 80 linear miles to the northeast), and Parachute (approximately 35 linear miles to the south) contain air quality monitoring stations. All stations monitor for PM<sub>10</sub>; Grand Junction also monitors for CO. The remaining criteria pollutants are not monitored on the Western Slope. These data are considered to be the best available representation of background air pollutant concentrations near the project area and include impacts from existing sources both inside and outside the project area. Monitoring data at Grand Junction, Steamboat Springs, and Parachute indicate that the area is in attainment, meaning that the ambient concentrations of criteria pollutants are less than the applicable air quality standards (NAAQS and CAAQS).

In addition to the NAAQS, the CAA and its amendments established the mandatory federal Prevention of Significant Deterioration (PSD) program to help protect attainment areas of the country (Class I and Class II areas) and established limits to visibility impairment for Class I areas. The PSD program is applied to national parks and wilderness areas greater than 10,000 acres in size.

In its amended form, the CAA identifies two different air quality areas that receive different levels of protection: Class I and Class II. With few stipulations, Class I areas generally include national parks, federally designated wilderness areas, national monuments, and other areas of special national significance. Class I designation warrants the highest level of protection, requiring more stringent protection from air pollution damage than Class II areas. For example, the Flat Tops Wilderness Area is the closest designated PSD Class I area, located approximately 25 miles east of the project area. Additionally Dinosaur National Monument is a designated PSD Class II area with Class I protection status for SO<sub>2</sub>, and is located approximately 50 miles northwest of the project area.

Given the attainment status of the project area, it is designated as PSD Class II. New development projects in PSD areas that would be a major source of pollutants (defined as either 250 tons/year or 150 tons/year, depending on the source) require the demonstration of the Best Available Control Technology (BACT), an air quality analysis, an additional impacts analysis, and public involvement.

*Environmental Consequences of the Proposed Action:* Impacts to air quality from implementation of the Proposed Action would likely be temporary, localized, and short-term. Although a temporary increase in emissions and fugitive dust would be anticipated due to an increase in vehicular and helicopter use in the area, the degree at which this would impact the air quality is difficult to predict due to variables such as vehicle speed, distance traveled, road

conditions, and specific vehicle emissions based on the manufacturer. An increase in emissions is also difficult to quantify due to varying environmental conditions, such as wind, soil moisture, temperature, and precipitation, all of which have an affect on air quality. Any potential increase in emissions would fall well within the applicable air quality standards (NAAQS and CAAQS).

As no PSD Class I areas are located within a 10-mile radius of the project area, no adverse air quality impacts to these areas would be expected to occur from the Proposed Action. No major source of pollutants would be anticipated under the Proposed Action. However, under the Proposed Action, an increase in fugitive dust emissions due to vehicles traveling on roads and the use of buggy operations would likely occur during dry conditions. This potential impact would end once seismic exploration operations within the project area cease.

*Environmental Consequences of the No Action Alternative:* There would be no adverse impacts to air quality under the No Action Alternative.

*Mitigation:* All activities would be required to comply with all applicable local, state, and federal air quality laws, statutes, regulations, standards, and implementation plans. Documentation of this compliance would be provided to the BLM. Further mitigation of air quality impacts would also be required, including:

- limiting vehicle speeds on associated access roads to 15 miles per hour (mph) or speeds such that a dust plume would not be visible at the appropriate designated speed for that road;
- all vehicles, helicopters, and construction equipment would be properly muffled to minimize noise, properly maintained in good operating condition so that engines run efficiently, and emission controls properly maintained to ensure effective pollutant emission reductions. The Operator would have a mechanic on site to ensure proper exhaust systems.
- if project activities occur between April 15 and November 15, the Operator would apply water and/or a BLM-approved chemical dust suppressant on roads used to access the area with crews, during dry periods when dust plumes are visible at speeds less than or equal to 15 mph (the BLM shall be informed about the source and amount of all water used).

## **AREAS OF CRITICAL ENVIRONMENTAL CONCERN**

*Affected Environment:* The proposed project area includes the Ryan Creek ACEC, while the Duck Creek ACEC lies outside of the project area. These ACECs were designated to protect cultural resources and plant species that are listed as threatened and endangered, candidates for listing, BLM sensitive, State of Colorado plant species of concern, and/or remnant vegetation within WRFO-administered lands. The Ryan Gulch ACEC is a 1,440-acre protected management area located north and south of the confluence of Ryan Gulch and Piceance Creek and contains many known populations of both Dudley Bluffs bladderpod (*Lesquerella congesta*) and Piceance twinpod (*Physaria obcordata*). The Duck Creek ACEC, located 0.6 mile north of the proposed project area, is a 3,420-acre protected management area located along Duck Creek and contains the world's largest known population of Dudley Bluffs bladderpod and several

occurrences of Piceance twinpod, known only from the Piceance Basin in Rio Blanco County; both are U.S. Fish and Wildlife Service (USFWS) threatened species (Center for Plant Conservation [CPC] 2008).

*Environmental Consequences of the Proposed Action:* There would be no seismic activity, surface occupancy, or disturbance within the boundaries of the ACECs. Therefore, there would be no impacts to the Ryan Gulch ACEC under the Proposed Action. Vehicle travel through ACECs would be restricted to only county roads to minimize any disturbances or impacts.

*Environmental Consequences of the No Action Alternative:* There would be no impacts to the Ryan Gulch ACEC under the No Action Alternative.

*Mitigation:* None.

## **CULTURAL RESOURCES**

“Cultural resources” is a broad term that encompasses archaeological sites, single objects, and practices of archaeological, historical, cultural, and religious significance. Cultural resources on federal and tribal lands are protected by numerous laws, regulations, and agreements, of which Section 106 of the National Historic Preservation Act of 1966 (NHPA) and Executive Order 11593 are perhaps most widely applicable. The NHPA requires that a cultural resource survey be conducted across the entire area of potential effect (APE) of a proposed federal or tribal project, before the undertaking is begun. Resources identified during the survey are evaluated for their eligibility as historic properties on the National Register of Historic Places (NRHP). Eligibility criteria (36 CFR 60.4) include association with important events or people, distinctive construction or artistic characteristics, and the demonstrated or latent potential to yield information that is important at a local or broader level. Cultural properties generally are not eligible for listing on the NRHP if they lack diagnostic artifacts, subsurface remains, features, and/or structures. In contrast, properties that contain any or all of the above in their original contexts generally are considered eligible and are treated as though they are already listed on the NRHP, even if no formal nomination has proceeded. Executive Order 11593 requires the federal agencies to identify and treat properties that have been nominated or are eligible to the NRHP on federally managed lands as though they were already listed on the Register.

*Affected Environment:* Between May and September 2008, a Class III cultural resource inventory was completed for the Project (Schwendler et al. 2008) in accordance with the Archaeology and Historic Preservation: Secretary of the Interior’s Standards and Guidelines (48 Federal Regulation [FR] 44716) and in consultation with the Bureau of Land Management (BLM) White River Field Office (WRFO). This Class III cultural resources inventory was more extensive than the limits of the APE for the Project, because another cultural resources inventory was already underway for mineral well-field development planning in the Ryan Gulch Unit (Baer et al. forthcoming). The APE for the Project would be a generally linear corridor of seismic source and receiver alignments plus extra work spaces, while the cultural resources inventory of the Ryan Gulch Unit was a nearly comprehensive survey of the entire project block. The Ryan Gulch Unit area largely coincides with the APE for the Project, and where it did not,

block inventory rather than linear corridor inventories was generally extended across the Project APE for consistency of methodology. Thus, for the Project, a large, contiguous area was inventoried for cultural resources, and areas within which all source and receiver point alignments, shot points, staging and work areas (e.g., camps, helicopter landing pads, explosives magazines, and equipment/vehicle storage areas), cross-country routes, terrain drive-arounds, unimproved two-track roads, and other travel routes that might be used for access to federal lands during the current project were inventoried.

Cultural resources identified during the inventory of the project area were evaluated for NRHP eligibility on the basis of 1) materials exposed on the site surface, 2) materials now exposed in eroded or disturbed areas (in other words, formerly subsurface materials), and/or 3) previous eligibility recommendations and determinations. Since no intrusive methods were used on archaeological sites during field evaluation (Schwendler et al. 2008), sites were left unevaluated in those cases where a formal recommendation of NRHP eligibility could not be reached on the basis of surface evidence. For cultural resources management, pending an NRHP eligibility determination, unevaluated sites are treated in the same manner as sites that are eligible for nomination to the NRHP. To simplify the process of NRHP evaluation and to streamline the review of effects to cultural resources, the same treatment measures were established for sites recommended as not eligible for NRHP listing. As a result, virtually all prehistoric and historic archaeological sites identified within the APE, regardless of their recommended eligibility for NRHP listing, would be avoided by the proposed project design. Details on avoidance measures are provided below. In contrast, cultural resources not identified as “sites,” but rather defined as “isolated finds” (IFs) (Schwendler et al. 2008), which are not eligible for the NRHP, would not have avoidance measures established or receive further treatment.

Distances for site avoidances were, at minimum, set in accordance with the guidelines and standards set forth in the BLM 3150 regulations *Onshore Oil and Gas Geophysical Exploration Surface Management Requirements* (BLM 2007a) and the *Handbook of Guidelines and Procedures for Inventory, Evaluation, and Mitigation of Cultural Resources* (BLM 2007b). For this purpose, all canyon rims, cliffs, and rock faces, or areas otherwise identified during the records and literature review as having a high potential for the occurrence of standing structures (including wickiups) and/or rock art were investigated when they lay within 500 feet of the center of a source line or point. All source points are to avoid wickiup sites, rock art sites, and eligible standing structures by at least 100 m (300 feet), and all other non-linear sites by generally 30 m (100 feet) (please note that vibroseis methods would not be used for this project, only heliportable and buggy mounted drills). These avoidance measures are to ensure that these historic properties are not impacted by geophysical exploration operations. Exceptions to the typical distances established for cultural resource avoidance arise at long linear sites, specifically several historic brush fences that were previously and/or currently recommended as not eligible for NRHP listing. Although most receiver points were routed around sites, exceptions also occur where a few not eligible sites have receiver points within the site boundary; where receiver points occur within the boundary, no pilot hole would be used for geophone placement within the site where there is six inches of snow to allow for the packing of the geophones. If there not enough snow available, receiver points will be dropped from the cultural resource site. Receiver lines are to be hand-laid across these sites by crews on foot and are to be staked at brush fence crossings to prevent cables pulling or dragging on the resources. To ensure avoidance of impacts,

a monitor would be present during seismic work at those NRHP eligible and unevaluated sites where geophones are within the site boundary.

The Class III cultural resource inventory report for this Project (Schwendler et al. 2008) was compiled in compliance with the obligations of the BLM under Section 106 of the NHPA and provides a comprehensive review of cultural resources in the project area. Cultural setting and historic overview information for the larger region of northwestern Colorado is provided in *Colorado Prehistory: A Context for the Northern Colorado River Basin* (Reed and Metcalf 1999). A review of the cultural setting and historic overview of the region applicable to the project area is provided in that context. The project area falls within Reed and Metcalf's White River archaeological region.

A database search of Colorado Historical Society Office of Archaeology and Historic Preservation (OAHP) files indicated that 182 cultural resource compliance projects were conducted prior to September 2008 in the public land survey system (PLSS) sections containing the project area. Of these, a third (34 percent) were associated with well pads and associated access roads and a third were miscellaneous projects (31 percent). The rest of the projects were for pipelines (18 percent), exploratory core/drill holes (12 percent), and various oil/gas developments (5 percent). Combination block and linear surveys were the most common (36 percent), followed by linear surveys (29 percent), block surveys (25 percent), and miscellaneous surveys (10 percent). Combination block and linear survey projects in order of frequency include well pads and associated access roads; surveys for related well pads, roads, and pipelines; pipelines and associated facilities; and road expansions. Linear survey projects include, in order of frequency, pipelines, electric transmission lines, seismic geophysical exploration, access roads, and telecommunications. Block survey projects in order of frequency include exploratory core/drill holes, miscellaneous facilities, oil shale exploration, other mineral exploration, and access roads. Undefined miscellaneous survey projects in order of decreasing frequency include range improvements (tree thinning, land exchange, fuel wood sales, roller chopping, fire control, and fencing), airstrip expansions, wild horse trap areas, predictive modeling, sample survey, helicopter wreckage removal, Christmas tree sales, and protection fencing.

Searches of the OAHP database, in combination with results of a recent inventory associated with the Piceance Creek 3-D Geophysical Exploration Project (Reed et al. 2008), revealed that 528 previously recorded cultural resources are located within the project area. Of those, 247 (47 percent) were designated as IFs that are not eligible for nomination to the NRHP and 281 (53 percent) as archaeological sites. Of those cultural resources classified as sites, 238 are prehistoric, 38 are historic, 3 are multicomponent (i.e., they contain both historic and prehistoric occupations), 1 is of unknown temporal affiliation, and 1 (5RB1611) represents modern flint-knapping activities. In total, 25 sites were previously recommended as eligible for NHRP nomination; 144 were previously recommended as not eligible for NHRP nomination; and 112 were unevaluated and needed further data to determine their NRHP eligibility. None of the sites were already listed on the NRHP.

In addition to these previously recorded resources, 214 IFs and 55 archaeological sites were newly identified and recorded during the Class III inventory for the current project (Schwendler et al. 2008). Sites newly identified and recorded for the Project include 42 prehistoric sites, 12 historic sites, and 1 site of unknown age (Schwendler et al. 2008). Of these newly recorded sites,

3 are recommended as eligible for NRHP nomination, 42 are recommended as not eligible, and 10 remain unevaluated and need further data to determine their NRHP eligibility. As described above, avoidance measures were established for all cultural resource sites so that no project impacts occurred to any of them, including at sites where exceptions to standard avoidance distances occur.

In total, 336 previously and newly recorded sites are located within the current project APE. Time periods and NRHP eligibility recommendations for the sites are summarized in Table 6. Impacts to all sites in the project area are to be avoided by project design. During field layout of the project alignments and work areas, seismic lines were generally routed at least 30 m (100 feet) or 100 m (300 feet) around sites, based on site type (see below). The summary that follows considers all known sites within the greater project area as well as all of the sites originally identified in the project APE that now have impact avoidance measures established.

**Table 6. Numbers and Characteristics of Previously and Newly Recorded Archaeological Sites in the Project APE.**

NRHP Status	Site Type				
	Prehistoric	Historic	Multicomponent	Modern	Unknown
<b>Previously Recorded</b>					
Listed on the NRHP	0	0	0	0	0
Eligible for the NRHP	29	5	1	0	0
Not Eligible for the NRHP	158	29	1	1	1
Unevaluated for the NRHP	51	4	1	0	0
<b>Total for Previously Recorded</b>	<b>238</b>	<b>38</b>	<b>3</b>	<b>1</b>	<b>1</b>
<b>Newly Recorded</b>					
Listed on the NRHP	0	0	0	0	0
Eligible for the NRHP	1	2	0	0	0
Not Eligible for the NRHP	33	9	0	0	0
Unevaluated for the NRHP	8	1	0	0	1
<b>Total for Newly Recorded</b>	<b>42</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>1</b>
<b>Total for All Sites in the APE</b>	<b>280</b>	<b>50</b>	<b>3</b>	<b>1</b>	<b>2</b>

Approximately 53 percent (n = 150) of the 280 previously and newly recorded prehistoric occupations and 3 prehistoric components at multicomponent sites exhibit characteristics that indicate habitation and are classified as residential or camp sites. Of those habitation sites, 26 percent (n = 39) contain remnants of architecture (mostly wickiups, but also other structures), while 74 percent (n = 111) are identified as camps on the basis of non-architectural features (such as hearths) and artifact classes that suggest food processing. All of the architectural sites are located in open settings, and 99 percent (n = 109) of the camp sites are in the open; only two camps are sheltered by a rock outcrop.

All of the architectural sites contain preserved wooden structures, ranging from single-pole “leaners” to fallen former wickiup structures to multiple standing wickiups. These wooden structures most likely date to the later Protohistoric Era, although artifacts found within other sites (quantified below) suggest that some may be associated with Historic Ute occupations. Of the habitation sites that do not have architecture, most contain ground stone and some contain

ceramic artifacts. While ground stone may be present in sites dating from as early as the Archaic Era, ceramics in the project area mostly date to the Protohistoric Ute period. A minority of the recorded ceramics date to the Formative Era and are associated with the Fremont Tradition and possibly with the Gateway and Aspen traditions as well. A limited number of sites also contain rare objects, such as trade beads, again suggesting a Protohistoric or Historic association. Many of the camp sites also have one or more thermal features—most often concentrations of fire-cracked rock (FCR) and, less frequently, hearths.

The remaining prehistoric occupations—those not exhibiting architectural remains or other evidence of habitation—include lithic scatters, rock art sites, stone alignments, and isolated features. Lithic scatters represent 95 percent (n = 127) of the non-habitation sites. Only one of these lithic scatters is sheltered by a rock outcrop. In addition, there are two rock art sites, two isolated features (hearths), and one stone alignment.

Of the 50 historic sites plus the historic components on 3 multicomponent sites, 15 are brush fences, presumably used to delimit cattle or sheep grazing areas or property lines. Of the remaining sites, 16 are habitation sites, 11 are trash dumps or debris scatters without associated structural remains, 6 are wickiup sites attributed to the Historic Ute, 2 are short-term camps (5RB426 and 5RB5912), 1 is a road (5RB3404.2), 1 is the remains of a windmill (5RB5956), and 1 is a drilling derrick and associated oil well (5RB5967) probably dating to the first half of the twentieth century.

Of the historic camp sites, one is undated, and the other (5RB5912) is dated to the period 1890–1910. Of the trash dumps/debris scatters most (7 of 11, or 64 percent) are dated to 1880–1934, three are undated (5RB1890, 5RB4942, and 5RB5809), and one is dated to the period 1935–1945 (5RB5926). Only one of the trash dumps (5RB5949) can be confidently dated to the final decade of the nineteenth century, while four more (5RB5833, 5RB5921, 5RB5516, and 5RB5843) predate 1920. Site 5RB3404.2 is a segment of the historic Hunter Creek Road, which appears on General Land Office (GLO) survey maps beginning in 1884 and was probably related to Euro-American settlement of the Piceance Creek region.

Of the 16 historic habitation sites, most (10 of 16, or 63 percent) are not well dated. Most of the dated historic habitation sites pertain to the period between 1890 and 1930 (5RB47, 5RB399, 5RB481, 5RB646, and 5RB4951), and one habitation site dates from 1928 to 1948 (5RB5947). This pattern is generally consistent with the dated trash dump sites, which are also mostly from the period preceding 1930. Most historic sites in the project area are therefore related to ranching activities in the early decades of the twentieth century.

#### Native American Religious Concerns

As outlined in the BLM 8100 Regulations, specifically Sections 8160 and H-8160-1, the BLM has various coordination and consultation responsibilities regarding Native American cultural and religious concerns that may be associated with the management of public lands and resources. The BLM notified the Northern Ute and the Northern Arapaho Native American Tribes about the project. At this time, no resources of special tribal concern, such as those that may be considered to be traditional cultural properties, sacred, or otherwise sensitive to Native American peoples and their cultures or burials, have been identified in the project area.

*Environmental Consequences of the Proposed Action:* Ground disturbance by the proposed Project is the primary threat of impact to cultural resources, in the form of either direct effects to surface cultural materials or indirect disturbance of buried cultural deposits. For example, driving over cultural resource sites could affect the integrity of the resource by damaging artifacts, features, or structural remains. Laying cables through wickiup sites could affect structural remnants. Drilling shot holes on cultural resource sites could damage archaeological remains. Detonating charges in shot holes in proximity to historic buildings or geologic formations that contain sensitive or standing cultural resources, such as rock art sites or wickiups, could compromise the integrity of such structures. Indirect impacts to cultural resources may result from short-term increases in human presence in the project area during project operations, possibly resulting in the loss of artifacts from archaeological sites through illicit collection. Impacts to cultural resources that diminish their integrity and the qualities that make them eligible for NRHP listing are considered adverse effects.

*Environmental Consequences of the No Action Alternative:* There would be no impacts under the No Action Alternative.

*Mitigation:* Project operations are to result in no effects to cultural resources. This result would be obtained through avoiding impacts to significant sites and all other cultural resources of not eligible or unevaluated NRHP status. Avoidance would be accomplished by redesigning project source lines/points, and cross-country vehicle access routes to travel around cultural resource sites, and by hand-laying receiver lines across and near linear historic resources. Most cultural resource sites would be avoided by source lines, receiver lines, and other travel routes by a minimum distance of 30 m (100 feet), but all wickiup sites, rock art sites, other cultural resource sites connected to rock outcrops, and NRHP-eligible standing historic structures would receive increased avoidance of at least 100 m (300 feet) from shot holes. The open architectural features, rock art sites, and standing buildings, as well as NRHP-not eligible sites that have receiver geophones within the site boundary, have been proposed for active monitoring during project operations at these locations. An exception to this policy of site avoidance may be made in winter conditions. If a minimum of 6 inches of snow is on the ground and if the ground is frozen, receiver lines may be placed across some cultural resource sites after consultation with—and with the approval of—the BLM-WRFO (Michael Selle [BLM-WRFO], personal communication with Scott Slessman [SWCA], October 14, 2008). Where receiver points occur within the boundary, no pilot hole would be used for geophone placement within the site where there is six inches of snow to allow for the packing of the geophones. If there is not enough snow available, receiver points will be dropped from the cultural resource site. If impacts could not be avoided or if significant cultural resource sites were damaged by operations, acceptable mitigation in the form of data recovery activities would take place at the expense of the project Operator (BLM 2007b).

In addition to those described above, the *Handbook of Guidelines and Procedures for Inventory, Evaluation, and Mitigation of Cultural Resources* (BLM 2007b) requires the following measures:

1. All employees of the Operator and any subcontractors must be informed by the project Operator before commencement of operations that any disturbance to, defacement of, or removal of archaeological, historical, or cultural material (including

pot sherds and arrowheads) would be treated as law enforcement/administrative issues. The project Operator would be held accountable for the conduct of its employees and subcontractors in this regard.

2. If subsurface cultural materials are discovered during operations, all work in the vicinity of the resource would cease, and the BLM AO would be notified immediately. The Operator would take any additional measures requested by the AO, including the possibility of hiring a qualified archaeologist to carry out specific instructions. Within five working days of the reported discovery, the AO would inform the Operator as to:
  - whether the materials appear eligible for the NRHP;
  - the mitigation measures the Operator would likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and
  - the timeframe for the AO to complete an expedited review under 36 CFR 800-11 to confirm, through the State Historic Preservation Officer (SHPO), that the findings of the AO are correct and that mitigation is appropriate.

If the Operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO would assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the Operator would be responsible for mitigation cost. The AO would provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the Operator would then be allowed to resume construction.

3. Pursuant to 43 CFR 10.4(g), the holder of this authorization (i.e., the Operator) must immediately notify the AO by telephone and with written confirmation upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the Operator must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the AO.
4. No receiver points will be located in cultural sites 5RB322, 5RB393, 5RB831, 5RB4741, and 5RB5024.
5. A monitor would be required during operation and/or reclamation activities to ensure that the avoidance measures established for this project are followed, and no inadvertent damage occurs to cultural properties in the APE. While a final monitoring plan would be developed in coordination with and approved by the BLM, active monitoring would be recommended for the following:
  - a. All NRHP-eligible sites with wickiups, rock art, or standing historic structures. The monitor would ensure that all work and access occur at least 100 m (300 feet) from the established boundaries of those sites. This includes operations by both buggy and helicopter.

- b. NRHP-not eligible sites that have geophones within the site boundary (no pilot holes would be used)
- c. Post-operation inspection in the following order of priority:
  - Any site receiving operational monitoring above, in the same order of priority above (or that have been advanced along the priority queue due to concerns newly arising), to be checked after operations pass, where/when productive.
  - Sites where unimproved two-track roads pass through, but project access has not been permitted (some of these may also be inspected prior to project operations to check apparent level/recentness of existing use by non-project traffic).
6. If a minimum of 6 inches of snow is on the ground and if the ground is frozen, receiver lines may be placed across some cultural resource sites after consultation with—and with the approval of—the BLM-WRFO (Michael Selle [BLM-WRFO], personal communication with Scott Slessman [SWCA], October 14, 2008). Geophones will be placed within the site boundary (no pilot holes would be used) where there is six inches of snow to allow for the packing of the geophones. If there not enough snow available, receiver points will be dropped from the cultural resource site.
7. Additional stipulations may be added in some cases where additional protection would be needed. Examples may include, but are not limited to, the following: use of portable (helicopter) operations; cultural resource monitor for all operations in sensitive areas; weather restrictions; frequent compliance checks and contacts with all operational personnel on site; site fencing or restrictive use barriers; requirement for identification and monitoring of sites made more susceptible to vandalism or collection because of proposed land use; verification of site locations, even if a Class III inventory had previously been conducted; and special reclamation measures to reduce erosion.

## **INVASIVE, NON-NATIVE SPECIES**

*Affected Environment:* Noxious weeds are officially designated non-native plant species that are invasive and/or have the potential to become monocultures, and can cause harm to land value, native ecology, agricultural interests, wildlife habitat, livestock forage, riparian resources, and aesthetic and visual values of land. The State of Colorado maintains an official state list of weed species that are designated as noxious species. Weeds are prioritized on three lists (Classes A, B, and C), depending on noxious and invasive tendencies. Class A species are noxious weeds that have the potential to pose a significant threat to local economies, ecosystems, and habitats. Class A species currently are not present in the state or have a limited distribution. For Class A species, preventing invasions and eradicating existing infestations is the highest priority. Class B weeds are species that are limited to portions of the state. In areas with severe infestations, management plans should be designed to contain the infestation and prevent further spread. Class

C weeds are species that are widespread throughout the state. Table 7 lists 20 noxious weeds present, or potentially present, in the project area. Of these, 19 species appear on the state noxious weed list; all 19 species also appear on the noxious weed list for Rio Blanco County. Management decisions for these species should be determined at the local level based on feasibility of control and severity of infestation.

**Table 7. Noxious/Invasive Species Potentially Present in the Project Area.**

Common Name	Scientific Name	Colorado Noxious Weed List <sup>1</sup>	Rio Blanco Noxious Weed List <sup>2</sup>	Present in Project Area
Russian knapweed	<i>Acroptilon repens</i>	B	X	
Common burdock	<i>Arctium minus</i>	C	X	
Cheatgrass	<i>Bromus tectorum</i>	C		X
Hoary cress	<i>Cardia draba</i>	B	X	
Plumeless thistle	<i>Carduus acanthoides</i>	B	X	
Musk thistle	<i>Carduus nutans</i>	B	X	
Diffuse knapweed	<i>Centaurea diffusa</i>	B	X	
Spotted knapweed	<i>Centaurea maculosa</i>	B	X	
Black knapweed	<i>Centaurea nigra</i>		X	
Canada thistle	<i>Cirsium arvense</i>	B	X	
Field bindweed	<i>Convolvulus arvensis</i>	C	X	X
Houndstongue	<i>Cynoglossum officinale</i>	B	X	
Leafy spurge	<i>Euphorbia esula</i>	B	X	
Halogeton	<i>Halogeton glomeratus</i>	C	X	X
Black henbane	<i>Hyoscyamus niger</i>	B	X	
Perennial pepperweed	<i>Lepidium latifolium</i>	B	X	
Dalmatian toadflax	<i>Linaria dalmatica</i>	B	X	
Yellow toadflax	<i>Linaria vulgaris</i>	B	X	
Scotch thistle	<i>Onopordum acanthium</i>	B	X	
Common mullein	<i>Verbascum thapsus</i>	C	X	X

<sup>1</sup> U.S. Department of Agriculture (USDA) 2003.

<sup>2</sup> State of Colorado Department of Agriculture (CSD) 2007.

Invasive and non-native species observed in the project area during the SWCA Environmental Consultants (SWCA) biological surveys (which began in May 2008) include cheatgrass (*Bromus tectorum*), field bindweed (*Convolvulus arvensis*), halogeton (*Halogeton glomeratus*), and common mullein (*Verbascum thapsus*). These species are Class C state-listed noxious weeds (SWCA 2008a). Vegetation surveys have determined that bindweed, halogeton, and mullein populations are relatively small, in isolated patches, and limited to disturbed areas and roadsides. Cheatgrass is prevalent throughout the project area, especially in areas adjacent to roadways and areas of unvegetated earthen disturbance.

*Environmental Consequences of the Proposed Action:* Where soils are disturbed and native vegetation is lost, the likelihood for non-native or invasive species to be introduced and become established is increased. Direct impacts to vegetation from weed infestations in the project area may reduce structural and native species diversity, result in the loss of wildlife habitat, result in the loss of rangeland productivity, and reduce cover of desirable species. On-

road vehicle and off-highway vehicle (OHV) activity within the project area could introduce and/or spread undesirable plant species, which could lead to reduced amounts of desired species. Indirect impacts resulting from weed infestations in the project area would include changes in the fire cycle and increased economic costs from weed management efforts.

*Environmental Consequences of the No Action Alternative:* Under the No Action Alternative, there would be no additional impacts to vegetation from noxious weeds within the project area. However, the No Action Alternative may allow present populations of noxious weeds to persist or increase as no additional weed monitoring or management efforts would occur.

*Mitigation:* The Operator would conduct all surface activities in accordance with the BLM Manual 9015, *Integrated Weed Management* (BLM 1992) and Appendix B, *Management of Noxious Weeds located within the BLM White River RMP* (BLM 1997a). These activities would include the following:

- Performing pre-construction surveys for noxious weed infestations within the site boundaries and along access roads.
- Consulting with the BLM and Rio Blanco County Cooperative Extension to determine treatment for noxious weeds, if identified; materials and methods would be approved in advance by the AO.
- Requiring construction vehicles and equipment to be cleaned, power-washed, and free of soil and vegetation debris prior to entering into the project area and using access roads to prevent the transport of weed seeds.
- Requiring all seed mix, erosion control materials, and reclamation materials to be certified weed-free.
- Monitoring revegetated areas for at least three years following seeding to evaluate the need for supplemental seeding and noxious weed control.
- Monitoring seismic lines and other disturbed areas for noxious weed infestations, and controlling or eradicating new or expanding weed populations for the duration of the construction, operation, and reclamation phases.
- Developing and implementing management measures to prevent the spread of noxious weeds, due to the presence of Class C weeds in the project area.

## **MIGRATORY BIRDS**

*Affected Environment:* The Migratory Bird Treaty Act (MBTA) provides for the protection of migratory birds, including their nests and eggs. A variety of birds protected by the MBTA that use pinyon-juniper woodland and/or sagebrush habitats may be present and nesting in or near the project area during spring and summer months. In 2002, the USFWS Division of Migratory Bird Management identified priority bird species at varying geographic levels, including Bird Conservation Regions (BCRs) used by the North American Bird Conservation Initiative (NABCI) (USFWS 2002). The NABCI defines BCRs as “ecologically distinct regions

in North America with similar bird communities, habitats, and resource management issues” (NABCI 2008). The project area falls within the boundaries of BCR 16 (Southern Rockies/Colorado Plateau), which encompasses large portions of northern Arizona, western Colorado, northwestern New Mexico, and eastern Utah (NABCI 2008). Therefore, the 29 bird species listed for BCR 16 were considered for species of concern potentially present within the project area. Since BCR 16 is comprised largely of portions of other states, only those species whose ranges include western Colorado (Andrews and Righter 1992; Kingery 1998; Righter et al. 2004) were considered for analysis. This list was further reduced to those species characteristic of the pinyon-juniper woodland, sagebrush, and montane shrubland habitats in the project area. The project area list of potentially occurring priority species includes northern harrier (*Circus cyaneus*), Swainson’s hawk (*Buteo swainsoni*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), prairie falcon (*F. mexicanus*), Wilson’s phalarope (*Phalaropus tricolor*), gray vireo (*Vireo vicinior*), pinyon jay (*Gymnorhinus cyanocephalus*), Virginia’s warbler (*Vermivora virginiae*), black-throated gray warbler (*Dendroica nigrescens*), and sage sparrow (*Amphispiza belli*).

Raptor surveys were conducted by SWCA throughout the project area between May and July 2008 (SWCA 2008b). Raptors observed during the surveys included northern harrier, sharp-shinned hawk (*Accipiter striatus*), Cooper’s hawk (*A. cooperii*), northern goshawk (*A. gentilis*), red-tailed hawk (*B. jamaicensis*), golden eagle, American kestrel (*F. sparverius*), prairie falcon, great horned owl (*Bubo virginianus*), and long-eared owl (*Asio otus*).

SWCA Raptor Survey Report:

[S:\Wildlife\Raptor\\_info\\_fldr\raptor\\_survey\\_reports\FY\\_2008\Williams\\_seismic\\_nest\\_data\SWCA\Williams\\_2008raptor\\_Final\\_3sept2008.pdf](S:\Wildlife\Raptor_info_fldr\raptor_survey_reports\FY_2008\Williams_seismic_nest_data\SWCA\Williams_2008raptor_Final_3sept2008.pdf)

During SWCA’s 2008 survey, 25 active Cooper’s hawk nests were identified. Most Cooper’s hawk nests were found in mature pinyon-juniper woodland in the central to southern portions of the project area on northerly slopes. Also during the 2008 survey, 17 active red-tailed hawk nests were identified. Most red-tailed hawk nests were found in pinyon-juniper woodland or on cliffs, and most were located on easterly slopes. Other active raptor nests included one sharp-shinned hawk nest, three American kestrel nests, one prairie falcon nest, three great horned owl nests, two long-eared owl nests, and three nests that were determined to have been active in 2008 but which did not have adults or young in attendance and were therefore left unidentified to species. Surveyors recorded data on inactive nests as well. SWCA biologists recorded the status of 105 nests as either inactive or unknown. These nests may or may not be used in subsequent years. Surveyors described approximately 18% of the inactive and unknown status nests as being in poor condition. Presumably, these nests are not likely to be used in future years due to their dilapidated state. Surveyor comments and photographs indicated that a majority of the remaining nests may be considered in good condition and, thus, are considered more likely to be re-used than those in poor condition. Detailed results of the 2008 raptor surveys can be found in the Williams Ryan Gulch raptor inventory report (SWCA 2008b).

Common bird species associated with pinyon-juniper woodland or sagebrush habitat noted in the project area during SWCA biological surveys in 2008 included broad-tailed hummingbird (*Selasphorus platycercus*), gray flycatcher (*Empidonax wrightii*), ash-throated flycatcher (*Myiarchus cinerascens*), western scrub-jay (*Aphelocoma californica*), pinyon jay, black-billed

magpie (*Pica hudsonius*), common raven (*Corvus corax*), blue-gray gnatcatcher (*Polioptila caerulea*), mountain bluebird (*Sialia currucoides*), Brewer's sparrow (*Spizella breweri*), and house finch (*Carpodacus mexicanus*). The Williams Ryan Gulch raptor inventory report (SWCA 2008b) provides a full list of bird species detected in the area.

*Environmental Consequences of the Proposed Action:* Proposed seismic activities would result in temporary impacts to nesting and foraging habitat from OHVs breaking or crushing woody shrub species and/or smaller trees. Sagebrush-obligate birds would be more likely to be affected compared to woodland species because no trees would be removed. Increased human presence and noise from buggies and helicopters have the potential to disrupt nesting migratory birds and could lead to failed nesting attempts. If, as proposed, the seismic activities would occur during fall, no significant impacts to migratory birds would be anticipated as it would be during a period when birds are not nesting. The general nesting period for birds in the Piceance Basin is between February 1 and August 15; although, most nesting attempts are between the periods of May 1 and mid-July. However, if seismic activities are delayed until 2009 and are conducted during the nesting season, impacts would be anticipated. In that situation, pedestrian layout of recording equipment is unlikely to cause significant impacts to birds in the later stages of nesting; although, human presence may increase stress in the earlier nesting stages. OHVs would potentially destroy nests in disturbed vegetation. OHV and helicopter noise may also disrupt nesting raptors. Andersen et al. (1989) found that red-tailed hawks habituate to low-level air traffic during the nesting period. However, naive birds may respond negatively to low-level helicopter activity prior to habituation and other species of raptors may respond differently than red-tailed hawks. All active raptor nests, and inactive nests in good functional condition, located during the SWCA (2008b) inventory would be avoided.

*Environmental Consequences of the No Action Alternative:* There would be no project-related impacts to migratory birds under the No Action Alternative.

*Mitigation:* No on-the-ground or overhead activities (less than 300 feet above ground level) are permitted from February 1 to August 15 (or until dispersal of young) within 0.25 mile of nest sites (both active and inactive nests in good functional condition) of golden eagles and great horned owls.

No on-the-ground or overhead activities (less than 300 feet above ground level) are permitted from April 1 to August 15 (or until dispersal of young) within 0.25 mile of nest sites (both active and inactive nests in good functional condition) of all other species (except American kestrels for which there are no restrictions).

Requests for buffer and timing limitation modifications or exceptions would be handled on a case-by-case basis. Nests must be visited between May 15 and August 15 in order to determine activity status. If nests sites are determined to be inactive during the 2009 breeding season, then timing limitations would not apply to those locations. A meeting with BLM wildlife biologists would take place no later than 30 days prior to the April 1 raptor nest timing restriction to update project progress and address potential conflicts and resolution issues.

Areas within 0.5 mile of raptor nests identified in the SWCA 2008 *Raptor Inventory Report for the Williams Ryan Gulch Project, Rio Blanco County, Colorado* would not be used for helicopter

staging or landing zones unless information is provided to the BLM verifying nest inactivity. From February 1 through August 15 (or dispersal of young), helicopter support of seismic operations would not be allowed in canyons with substantive cliff series or rock outcrops, including Ryan, Corral, and Yankee gulches and Black Sulphur and Fawn creeks, unless these areas are specifically cleared for raptor nest activity.

Any new nests discovered during work should be reported within 24 hours by phone or E-mail to the BLM Natural Resource Specialist responsible for raptor monitoring oversight (i.e., Brett Smithers, Phone: [970] 878-3818, E-mail: brett\_smithers@blm.gov). Protections for these locations would be handled on a case-by-case basis.

If seismic-related activities are expected to occur beyond February 15, once seismic-related activities begin, in order to monitor possible behavioral impacts to known active woodland raptors, effective on February 1, the Operator would notify the BLM Natural Resource Specialist responsible for raptor monitoring oversight (i.e., Brett Smithers, Phone: [970] 878-3818, E-mail: brett\_smithers@blm.gov), on Monday of each week and provide an update on the status of where all ground crews associated with seismic activities are working. The individual responsible for providing this information would identify those shot and receiver lines that are expected to be visited by ground crews, and these lines would be identified either as unique line segments and submitted by phone or E-mail, or depicted in an associated map and submitted via E-mail. In addition, information related to which segments of shot and receiver lines would be visited during the week (i.e., from Monday to Sunday) would be provided.

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

*Affected Environment:* The USFWS lists seven animal species for Rio Blanco County as threatened, endangered, or candidate species under the Endangered Species Act (ESA) (Table 8) (USFWS 2008). The BLM WRFO lists an additional 21 species as sensitive (Table 9).

**Table 8. Threatened, Endangered, and Candidate Animal Species in Rio Blanco County, Colorado.**

Species	Scientific Name	Status <sup>1</sup>	Habitat
Black-footed ferret	<i>Mustela nigripes</i>	E	Open grasslands, steppe, and shrub steppe containing extensive prairie dog towns
Canada lynx	<i>Lynx canadensis</i>	T	Montane coniferous forests
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E	Colorado River system
Bonytail	<i>Gila elegans</i>	E	Colorado River system
Humpback chub	<i>Gila cypha</i>	E	Colorado River system
Razorback sucker	<i>Xyrauchen texanus</i>	E	Colorado River system
Yellow-billed cuckoo WDPS <sup>2</sup>	<i>Coccyzus americanus</i>	C	Large tracts of unfragmented cottonwood riparian with dense willow understory

<sup>1</sup> T = Threatened, E = Endangered, C = Candidate

<sup>2</sup> The USFWS does not recognize subspecific identities of yellow-billed cuckoo, but for listing purposes may distinguish geographical groups as Distinct Population Segments (USFWS 1996). In 2001, the USFWS found that

listing of the Western United States Distinct Population Segment (WDPS) of yellow-billed cuckoo was warranted but precluded by higher priority listing activities (USFWS 2007).

**Table 9. BLM Sensitive Animal Species for the WRFO.**

Species	Scientific Name	Habitat within Project Area?
Fringed myotis	<i>Myotis thysanodes</i>	Yes
Yuma myotis	<i>Myotis yumanensis</i>	Yes
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Yes
Barrow's goldeneye	<i>Bucephala islandica</i>	No
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Yes
White-faced ibis	<i>Plegadis chihi</i>	No
Northern goshawk	<i>Accipiter gentilis</i>	Yes
Ferruginous hawk	<i>Buteo regalis</i>	No
Bald eagle	<i>Haliaeetus leucocephalus</i>	Yes
Mountain plover	<i>Charadrius montanus</i>	No
Long-billed curlew	<i>Numenius americanus</i>	No
Black tern	<i>Chlidonias niger</i>	No
Midget faded rattlesnake	<i>Crotalus viridis concolor</i>	Yes
Northern leopard frog	<i>Rana pipiens</i>	Yes
Great Basin spadefoot	<i>Spea intermontana</i>	Yes
Bluehead sucker	<i>Catostomus discobolus</i>	No
Flannelmouth sucker	<i>Catostomus latipinnis</i>	Yes
Mountain sucker	<i>Catostomus platyrhynchus</i>	Yes
Plains topminnow	<i>Fundulus sciadicus</i>	No
Roundtail chub	<i>Gila robusta</i>	No
Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>	Yes

No federally listed species are expected to occur in the project area due to lack of suitable habitat. The four federally listed fish species associated with the Colorado River Basin are not likely to occur within the project area, but may occur downstream in the Colorado and White rivers.

The project area contains suitable nesting and foraging habitat for the northern goshawk and BLM-sensitive bat species. The northern goshawk and these bats typically inhabit mature stands of pinyon-juniper with well-developed forest canopies and large-diameter trees that offer nesting, foraging, and roosting habitat. Most of the project area is primarily young to mid-age pinyon-juniper with an open canopy and sagebrush; however, some stands of mature forest located near the Piceance Creek have the potential to support northern goshawk or sensitive bat species. There are no known records of sensitive bat species within the project area. The overall abundance of bats in the project area is likely constrained by the limited mature vegetation and hibernation roost habitat (e.g., caves, mines, buildings); although, the project area may support a small number of non-breeding bats during the summer months. Multiple detections of northern goshawk were noted in the project area during the 2008 raptor surveys; however, no active nests

were found and the actual number of goshawks involved was indeterminable (see SWCA 2008a for more information on northern goshawk detections in the project area).

The Colorado Division of Wildlife (CDOW) (2008) mapped Piceance Creek as bald eagle winter range and winter foraging habitat, and the eagle may occur in the project area seasonally. The nearest known summer range and nesting habitat for bald eagles is located along the White River, north of the project area. No bald eagles were observed in the project area during 2008 raptor surveys.

According to CDOW data (CDOW 2008), one historic sage-grouse lek (where viable populations have not occurred in five years or more) is located in the northwest corner of the project area. No active leks occur within the project area; however, two active leks are located within 4 miles of the project area's southwest corner. A third active lek is estimated at 4 miles west of the project area, and the BLM-stipulated 4-mile buffer zone extends to the project area border. Sage-grouse overall range (14,871 acres) includes all or part of Sections along the western border of the project area in T2S R99W and T3S R99W, and portions of Sections 25 and 36 in T1S R99W. Sage-grouse overall range in the project area further extends generally diagonally from Section 6 in T3S R98W to Section 31 in T3S R97W. Production areas (8,150 acres) include the southwest corner of the project area and adjacent areas along the project area's western border north to Section 18 in T3S R98W and southern border east to Section 33 in T3S R98W. The nearest border of other production areas is located approximately 1 mile southeast of the project area. The nearest brooding areas are located approximately 1 mile west of the project area in T3S R99W. Sage-grouse winter range (2,934 acres) is restricted to a small portion of the project area's southwestern corner.

The midget faded rattlesnake (*Crotalus viridis concolor*), a diminutive subspecies of the prairie (western) rattlesnake (*Crotalus viridis*), is known to occur in northwestern Colorado across varied habitats, including pinyon-juniper woodland and shrubland (Hammerson 1999). It is difficult to differentiate some individuals of the BLM-sensitive subspecies from individuals of other races of the species. Hammerson (1999) concluded that Rio Blanco County apparently constitutes an area of intergradation between subspecies *concolor* and the more common subspecies *viridis*. The midget faded subspecies is potentially present; although, there have been no known observations within the project area. During wildlife surveys in the project area in summer 2008, SWCA biologists photographed the only rattlesnake detected (SWCA 2008a). This individual snake was boldly patterned, a characteristic more typical of subspecies *viridis* than the generally unpatterned BLM-sensitive subspecies *concolor* (Hammerson 1999).

The northern leopard frog (*Rana pipiens*) is known to occur in Piceance Creek. Leopard frogs are associated with wet meadows and the banks and shallows of marshes, ponds, streams, and irrigation ditches (Hammerson 1999). This species has the potential to occur in the project area within wetland areas associated with tributaries of Piceance and Yellow creeks.

In Colorado, the Great Basin spadefoot (*Spea intermontana*) inhabits dry rocky slopes, broad dry basins, floodplains, and canyons below 7,000 feet elevation and vegetated by pinyon-juniper woodland, sagebrush, saltbrush, or semi-desert shrublands (CDOW 2008; Colorado Natural Heritage Program [CNHP] 2008). CNHP records indicate known spadefoot habitat east of the

project area, at the confluence of Black Sulphur and Piceance creeks, and to the northeast of the project area.

Fishes listed by the BLM as sensitive that are present in Piceance Creek include the flannelmouth sucker (*Catostomus latipinnis*) and mountain sucker (*Catostomus platyrhynchus*) (Canton, no date). BLM WRFO and CDOW surveys in February 2007 noted mountain sucker in Fawn Creek. Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) were observed in Piceance Creek in 2006 southeast of the project area near Sprague Gulch, but do not occur regularly in Piceance Creek. BLM biologists observed cutthroat trout in Black Sulphur Creek (upstream BLM reach) in 2005. .

*Environmental Consequences of the Proposed Action:* Land disturbance resulting from the Proposed Action would not be expected to result in direct, long-term adverse effects to federally listed animal species, BLM sensitive animal species, or their potential habitat. Increased human presence and noise may disturb sensitive animal species, however. All impacts would be anticipated to be short-term (less than six months for entire project) and likely would not cause a trend toward federal listing or a loss of viability of these animals. Seismic activities could create temporary disturbance to areas used by a few species, such as disturbing potential habitat of sensitive bat species, northern goshawk, Great Basin spadefoot, and midget faded rattlesnake. No impacts to northern leopard frog would be anticipated as the required 100-foot project buffers along perennial streams would avoid their habitat. The 100-foot perennial stream buffer would also protect water quality and flannelmouth sucker, mountain sucker, and Colorado River cutthroat trout habitat. Bald eagle is unlikely to occur in the project area, and this species would not be expected to be affected.

No significant effects on the greater sage-grouse population would be expected because authorized activities would occur after nesting is completed. Since only heliportable drills would be used in greater sage-grouse range, no disturbance to sage-grouse habitat would be expected. Temporary displacement of greater sage-grouse in winter would be expected from helicopter and human activities associated with geophysical activities, although long-term adverse effects would likely be negligible.

*Environmental Consequences of the No Action Alternative:* There would be no additional impacts to threatened, endangered, candidate, or sensitive animal species under the No Action Alternative.

*Mitigation:* No on-the-ground or overhead activities (less than 300 feet above ground level) are permitted from April 1 to August 15 (or until dispersal of young) within 0.5 mile of nest sites (both active and inactive nests in good functional condition) of BLM sensitive raptor species (e.g. northern goshawks).

No disruptive activity (including helicopter travel less than 300 feet above ground level) would occur within 4 miles of an active greater sage-grouse lek between April 1 and August 1. For sections in T3S R98W and T3S R99W where sage-grouse habitat and nesting areas are known to occur, operations would commence in the southwest corner and consist of a single set of six heliportable drills. These operations would proceed northward clearing this area before timing limitations would present possible conflict with sensitive species.

*Finding on the Public Land Health Standard for Threatened & Endangered Species:* Standard 4 of the *BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado* (BLM 1997b) states that special status plants and animals and their habitats should be maintained or enhanced to sustain public land health. The Project would have no effect on the land health standard with the implementation of mitigation measures.

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

*Affected Environment:* Known populations of special status plant species (SSS) within the Piceance Creek Basin all depend upon relatively barren shale exposures of the Green River Formation (Table 10). These geologic formations occur primarily in the northeast corner of the project area, from Duck Creek to the north, southeast to Ryan Gulch.

Two federally listed plants are known to occur within the ACECs inside of the project area: the Dudley Bluffs bladderpod and the Piceance twinpod. Both species are endemic to the Piceance Basin within Rio Blanco County, and both species are listed as threatened under the ESA (USFWS 1990). Identified threats to these species are the destruction of habitat from the development of oil, gas, and mineral resources and the species’ pattern of rarity, which makes them especially susceptible to surface disturbances (USFWS 1990).

A special status plant survey and habitat assessment was conducted during the SWCA biological surveys beginning in May 2008 (SWCA 2008a). Of the 13 rare plant species identified as having potential habitat within the project area, none were identified.

**Table 10. Special Status Plant Species within the Piceance Creek Basin.**

Common Name	Scientific Name	Status
Debris milkvetch	<i>Astragalus detritalis</i>	BLM Sensitive
Park rockcress	<i>Boechera fernaldiana</i> ( <i>Arabis vivariensis</i> )	BLM Sensitive
Ephedra buckwheat	<i>Eriogonum ephedroides</i>	BLM Sensitive
Utah gentian	<i>Gentianella tortuosa</i>	BLM Sensitive
Narrow-stem gilia	<i>Gilia stenothyrsa</i>	BLM Sensitive
Dudley Bluffs bladderpod	<i>Lesquerella congesta</i>	USFWS Threatened
Piceance bladderpod	<i>Lesquerella parviflora</i>	BLM Sensitive
Narrow-leaf evening primrose	<i>Oenothera acutissima</i>	BLM Sensitive
Rollins cryptanth	<i>Oreocarya</i> ( <i>Cryptantha</i> ) <i>rollinsii</i>	BLM Sensitive
Graham beardtongue	<i>Penstemon grahamii</i>	USFWS Candidate
White River beardtongue	<i>Penstemon scariosus</i> var. <i>albifluvis</i>	USFWS Candidate
Piceance twinpod	<i>Physaria obcordata</i>	USFWS Threatened

*Environmental Consequences of the Proposed Action:* The Proposed Action would occur primarily on existing roads, and no new construction would occur in habitats associated with SSS plants. No adverse impacts would be expected to any SSS from the Proposed Action. While

no new populations were identified within the project area, there is potential for unidentified populations to exist and these populations could be impacted through habitat degradation.

*Environmental Consequences of the No Action Alternative:* There would be no effect on threatened, endangered, or sensitive plant species under the No Action Alternative.

*Mitigation:* All recorded populations of sensitive plant species would be avoided by 100 feet.

*Finding on the Public Land Health Standard for Threatened & Endangered Species:* Standard 4 of the *BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado* (BLM 1997b) states that special status plants and animals and their habitats should be maintained or enhanced to sustain public land health. The Project would have no effect on the land health standard with the implementation of mitigation measures.

## **WASTES, HAZARDOUS AND SOLID**

*Affected Environment:* As defined by the BLM, a hazardous material is any substance, pollutant, or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. The term does not include petroleum products, crude oil, or natural gas. There are no known hazardous or other solid wastes within the project area. No hazardous materials or other solid wastes are known to have been used, stored, disposed of, or otherwise exist within the project area.

*Environmental Consequences of the Proposed Action:* Under the Proposed Action, typical lubricants and fuels important to implement seismic exploration would be used. However, no listed hazardous or other solid waste beyond CERCLA standards would be used within the project area. In addition, any fuels and other potentially hazardous materials would be stored off site on private lands.

To conduct seismic exploration activities, the use of explosives and shot charges would be necessary. Under the Proposed Action, shot holes are predicted to be drilled using either buggy drills, track drills, or heliportable drills. Shot hole depths would be approximately 60 feet and would be detonated with 20-pound charges.

During activities, materials such as trash and other discarded items may accumulate in the project area due to human presence. This includes stakes and flagging, as these are used to delineate a particular area for seismic activity.

*Environmental Consequences of the No Action Alternative:* No hazardous or solid wastes would be generated or managed under the No Action Alternative.

*Mitigation:* Daily, the Operator, would collect and properly dispose of all waste, including pin flags, flagging, and other debris generated by this project at the Garfield County landfill near the Town of Rifle.

The Operator would be required to submit its Spill Prevention Containment and Countermeasure (SPCC) Plan to the AO prior to scheduled start-up. If the Operator encounters any waste dump sites on or adjacent to the project area, they would be required to be reported to the BLM.

All refueling would occur on existing roads and absorbent pads would be used while refueling to prevent a potential fuel spill. In the event of a spill of lubricants, hydraulic fluid, or any other hydrocarbon during seismic activities, the Operator would immediately cease activities within the area and contain and clean up the affected area immediately. Any contaminated vegetation and soil would be removed and disposed of in an approved waste disposal facility. The Operator would have absorbents onsite for spill containment. After cleanup is complete, the spilt substance(s) and materials used for cleanup would be removed from the project area during project activities and disposed of at an approved disposal facility. All spills would be immediately reported to the appropriate surface management agency.

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

*Affected Environment:* The project area is located in the White River Basin of the Lower Colorado River Basin. Surface water in the project area drains to Piceance Creek and Yellow Creek, which are tributaries to the White River. Piceance Creek is a perennial stream; Fawn Creek, Yellow Creek, Hunter Creek, and Black Sulphur Creek are perennial in sections due to input from springs or emergence of subsurface flow. For the purposes of analysis and avoidance, it is assumed that Fawn, Yellow, Hunter, and Black Sulphur creeks are perennial within the project area. Groundwater in the proposed project area is associated with alluviums along stream channels, some unconsolidated zones in the Uinta Formation, and also formations such as the A and B groove near the Mahogany Zone. These formations express themselves in contact springs or seeps into surface waters.

Surface Water: Surface waters within the project area consist of Yellow Creek and its tributaries as well as tributaries of Piceance Creek. These tributaries include Ryan Gulch, Black Sulphur Creek, Fawn Creek, Hunter Creek, and Stake Springs Draw. Water quality standards for these streams are contained in Regulation No. 37, *Classifications and Numeric Standards for Lower Colorado River Basin* (Colorado Department of Public Health and Environment [CDPHE] 2008a). Under state water quality regulations, stream classifications identify the actual beneficial uses of the water and numeric standards are assigned to determine the allowable concentrations of various parameters. Surface water quality assessments conducted in 2007 for stream segments in the project area are summarized in Table 11 (CDPHE 2008b).

A 2007 assessment of segment 13b (Yellow Creek and its tributaries) indicated that Box Elder Gulch, Stake Springs Draw, and Duck Creek were all in attainment of the assigned standard for total recoverable iron. The assessment also showed that the lower portion of Corral Gulch and Duck Creek, in segment 13b, were in non-attainment of the Aquatic Life Use based on the chronic selenium standard, and this segment was added these waters to the 303(d) List for selenium (CDPHE 2008c). However, in August 2008, the CDPHE determined that the Yellow Creek segment warranted re-segmentation into three segments (13b, c, and d) in order to appropriately apply ambient-based site-specific criteria for total recoverable iron and dissolved selenium (CDPHE 2008a). Segment 13b includes Yellow Creek from the source to Barcus

Creek, and all tributaries to Yellow Creek. Segment 13c includes Yellow Creek from Barcus Creek to the mouth. Segment 13d includes Violet Springs Ponds. The Aquatic Life Warm 2 classification was retained for Segments 13b and 13c, but these segments were assigned different selenium and iron standards based on ambient conditions. Segment 13d was classified as Aquatic Life Cold 2, reflecting CDOW management strategies for the Violet Springs Ponds.

Within the Piceance Creek drainage system, the Ryan Gulch tributary (segment 16) was assessed for water quality. Ryan Gulch has been placed on the Monitoring and Evaluation List for further assessment due to insufficient information on *E. coli* impairment (CDPHE 2008d).

The Hunter Creek drainage was moved from segment 20 and incorporated into the mainstem of the Dry Fork of Piceance Creek drainage system (segment 18) to facilitate the adoption of appropriate temperature standards. Segment 18 consists of Willow Creek, Hunter Creek, and the Dry Fork of Piceance Creek from the source to the confluence with Little Reigan Gulch (CDPHE 2008a).

**Table 11. Status of Water Quality in the Project Area.**

Segment	Name	Designated Uses <sup>1</sup>	Use Attainment <sup>2</sup>
13b	Yellow Creek, upstream of Barcus Creek	Aquatic Life Warm 2 Agriculture Recreation N	Unknown <sup>3</sup> Fully supporting Fully supporting
13c	Yellow Creek, downstream of Barcus Creek	Aquatic Life Warm 2 Agriculture Recreation N	Unknown <sup>3</sup> Fully supporting Fully supporting
13d	Yellow Creek, Violet Springs Ponds	Aquatic Life Cold 2 Agriculture Recreation P	Unknown <sup>3</sup>
15	Piceance Creek	Aquatic Life Warm 2 Agriculture Recreation P	Fully supporting <sup>4</sup> Fully supporting Fully supporting
16	Piceance Creek Tributaries	Aquatic Life Warm 2 Agriculture Recreation P	Fully supporting <sup>4</sup> Fully supporting Insufficient information
18	Hunter Creek, Willow Creek, Dry Fork of Piceance Creek	Aquatic Life Cold 2 Agriculture Recreation N	Not Assessed <sup>5</sup>
19	Fawn Creek	Aquatic Life Cold 2 Agriculture Recreation P	Not assessed Not assessed Not assessed
20	Black Sulphur Creek	Aquatic Life Cold 1 Agriculture Recreation N	Fully supporting Fully supporting Not assessed

<sup>1</sup> Based on updated classifications in CDPHE 2008a (August 2008)

<sup>2</sup> Based on 2007 assessment results in CDPHE 2008b (April 2008)

<sup>3</sup> Segment 13b was not supporting the Aquatic Life Warm 2 standards for selenium based on the 2007 assessment (CDPHE 2008b); however, this segment was divided into three segments (b, c, and d) with site-specific standards for selenium. The use attainment based on new standards is unavailable at this time.

<sup>4</sup> Assumed based on fully supporting status for the former Aquatic Life Cold 1 standard

<sup>5</sup> Hunter Creek is included in a newly created segment that has not been assessed yet (CDPHE 2008a)

Surface water quality in the project area is affected by the interaction of groundwater with higher concentrations of dissolved solids. Except for times of storm pulses or snowmelt runoff, approximately 80% of the annual flow of Piceance Creek and Yellow Creek originates as groundwater discharge (Tobin 1987). Groundwater sources include alluvial aquifers driven by permeable substrates and fed by contact springs and seasonal recharge and the upwelling of deeper groundwater in Piceance and Yellow creeks near their confluences with the White River. This deeper groundwater contains concentrations of dissolved solids, bicarbonates, sulfates, and sodium that are discharged into the surface water and transported downstream.

Sediment loading from erosion is also a water quality characteristic of surface waters in these drainages. During large storm events, sediment loading and transport can be significant. Erosion and the resulting sediment loading occurs under natural conditions in the basin, but the increased development and land disturbance occurring in the vicinity of the project area are likely to result in larger amounts of sediment loading to surface waters.

Groundwater: The project area contains both alluvial and bedrock aquifers. The alluvial aquifers primarily consist of unconsolidated valley-fill deposits of sand and gravel formed along stream courses. The three principal bedrock aquifers underlying the Piceance Basin are the Uinta-Animas aquifer, the Mesaverde aquifer, and the Dakota-Glen Canyon aquifer system. The quality of the groundwater in these aquifers depends on the chemical and physical attributes of the material through which the water passes, the length of time the water is in contact with the material, and other conditions, such as temperature and pressure.

Unconsolidated alluvial aquifers are the most productive aquifers in the Piceance Basin (EPA 2004). However, contact springs and wells completed in unconsolidated strata in the Parachute and Uinta Groups are important sources of dispersed water for individual drinking water well sources and stock water sources. No water quality data were available for alluvial groundwater in the vicinity of the project area. Based on well records maintained by the Colorado Division of Water Resources (CDWR), the potable water wells in the Piceance Basin generally extend no farther than 200 feet in depth (EPA 2004).

*Environmental Consequences of the Proposed Action:* Impacts to surface water and groundwater depend on site-specific factors (e.g., soil, vegetation, and slope). Soil disturbance and the removal of vegetative cover increases the potential for soil erosion, which in turn, increases sediment loading during runoff-producing storm events. The amount of runoff produced by a storm event may also increase due to soil compaction. The extent of these impacts depends on the amount and type of surface disturbance at any particular time and the climatic conditions. Where multiple drill buggies travel on the same path and where soils and slope are problematic, buggies may create preferential flow paths by rutting and/or vegetation disturbance. The use of buggies off-road may create visible trails that can invite public use (OHV use) on those particular transects. This secondary use may lead to erosion from increased public use of these areas. Erosion would result from reduced vegetative cover and increased soil compaction, resulting in decreased infiltration and permeability rates. The use of drill buggies and blasting near stream channels may be detrimental to stream banks and riparian communities by increasing sediment loads and destabilizing slopes. This is especially true with travel on vertical banks greater than 2 feet in height. Disturbance to or removal of riparian vegetation would also result in the destabilization of floodplains and stream banks where it occurs. Locations of proposed source

and receiver line in relation to surface waterbodies is depicted on the various maps within Appendix A.

Impacts to groundwater could occur if pollutants from any leaks or spills are mobilized in runoff and infiltrated into the shallow aquifers. Subsurface detonation of charges would leave a residual of gases and solids (i.e., water/steam, carbon dioxide gas, nitrogen gas, calcium carbonate solid, and sodium carbonate gas); however, no impacts to water resources are anticipated. Shot holes or vibration operations near springs or seeps may result in decreased groundwater flow to local discharge points or dry out the springs.

Impacts to water resources would not be expected to affect public health and safety. The area does not have unique geographic areas that are critical for water resources. Since a majority of the project area is leased for oil and gas development, this Project would not set a precedent for future activities and it is unlikely to cause a violation of water quality standards.

*Environmental Consequences of the No Action Alternative:* There would be no additional impacts to water quality under the No Action Alternative.

*Mitigation:* All activities would be required to comply with all applicable local, state, and federal water quality laws, statutes, regulations, standards, and implementation plans. These include the following:

- Travel would be avoided within 500 feet of perennial waters and wetlands including not locating cross country routes and limiting buggies to one pass when possible.
- No removal of wetland/riparian vegetation during the placement of geophones.
- All activities would cease when soils or road surfaces become saturated to a depth of 3 inches unless otherwise approved by the AO.
- Use existing travel ways when possible and minimize operations in floodplains and riparian areas. Limit the disturbance of vegetation and the removal of ground cover when drill buggies are used off existing roads.
- In areas that receive noticeable impacts on vegetation and ground cover (e.g., locations that may create increased OHV use by the public), take care to restore ground cover and inhibit unauthorized motorized vehicle use. A report would be provided to the BLM AO that describes where this reclamation was needed and what actions took place to restore the ground cover.
- Buggies and/or other vehicles would not traverse vertical banks higher than 2 feet without prior approval from the BLM.

*Finding on the Public Land Health Standard for Water Quality:* Standard 5 of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997b) states that the water quality of all water bodies, including groundwater where applicable, located on or influenced by BLM lands must meet the water quality standards established by the State of Colorado. It is unlikely that this seismic Project would result in an exceedence of state water quality standards in the Piceance or Yellow Creek drainages. However,

cumulative impacts from this activity and others may eventually impact sediment yields to the degree that they impact listing of Yellow Creek and/or Piceance Creek.

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

*Affected Environment:* Wetlands and riparian zones are important resources that are a source of substantial biodiversity and provide key ecosystem functions. In the vicinity of the project area, wetland habitat is typically associated with perennial streams or springs, and riparian areas typically occur as narrow transition zones between stream and/or wetland areas and the adjacent uplands.

The project area encompasses a number of perennial and intermittent channel systems that support riparian vegetation and may require a form of crossing on BLM-administered lands. Riparian zones and associated wetland habitat include the tributaries and main stems of Piceance Creek and Yellow Creek. These tributaries include, but are not limited to, Ryan Gulch, Black Sulphur Creek, Yankee Gulch, Eureka Creek, Fawn Creek, Hunter Creek, Corral Gulch, and Box Elder Gulch. Piceance Creek is a perennial stream, and Fawn Creek, Hunter Creek, Yellow Creek, and Black Sulphur Creek are perennial in sections due to input from springs or emergence of subsurface flow. Although these streams support some areas with riparian and wetland communities, the stream corridors are strongly influenced by agricultural practices. In general, any native riparian and wetland vegetation associated with these streams is confined largely to the channel margin.

Other streams in the project area, including Ryan Gulch, Yankee Gulch, Eureka Creek, and Stake Springs Draw, are ephemeral or intermittent. There are also numerous unnamed ephemeral washes in the project area. The ephemeral and intermittent streams depend on spring runoff and individual storm events for flow and generate little runoff due to the arid climate and well-drained soils. Due to the limited water supply, well-developed riparian and wetland communities are not present. Where it exists, riparian vegetation is generally extremely limited, present only in isolated pockets, and consists mainly of herbaceous vegetation composed of grasses and forbs associated with semi-arid ecosystems.

*Environmental Consequences of the Proposed Action:* The Proposed Action would have little, if any, influence on channels that support riparian or wetland communities. Community effects would be confined primarily to on-line pedestrian traffic associated with geophone placement and retrieval. Drilling and source generation operations and support vehicle use that would intersect or parallel BLM-administered channels would be confined to existing roads. Until a need is established, it would be recommended that no vehicles be authorized to cross channels that contain riparian or wetland growth until crossing points and a complete rehabilitation plan is agreed to by BLM and the Operator.

*Environmental Consequences of the No Action Alternative:* The No Action Alternative would have no environmental consequences associated with riparian or wetland communities.

*Mitigation:* The Proposed Action would include the following Operator-proposed measures that are considered committed mitigation:

- Vehicular traffic across dry drainage channels would be limited to sloping side backs or to vertical banks less than 2 feet high. Crossing routes would be aligned to be perpendicular to a stream channel, to the extent practicable.
- Minimum distances from source point placement would conform to BLM Handbook H-3150-1, Illustrations 10 and 16 (Appendix E) and applicable state regulations.
- No operations, including blasting and vibrating, other than receiver placement within 660 feet of federally owned or controlled springs and flowing water wells would be performed.
- Drill holes would be offset to avoid known riparian areas, wetlands, sensitive plants, steep slopes, or other areas of concern.
- Vehicles would not cross perennial water features, except on existing roads or predesignated crossings without prior approval from the BLM. Driving and other activities would be limited and avoided, to the extent possible, during survey and seismic operations along Black Sulphur Creek. No vehicles would be authorized to cross channels that contain riparian or wetland growth until crossing points and a complete rehabilitation plan is agreed to by BLM and the Operator.
- No shot holes would be drilled within 100 feet of perennial surface water features.
- Helicopters would be used to drop equipment to support placement of recording lines to reduce surface disturbance.

*Finding on the Public Land Health Standard for Riparian Systems:* Standard 2 of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado states that riparian systems associated with both running and standing water should function properly and have the ability to recover from major disturbance. With the implementation of proposed mitigation measures, the Proposed Action would not affect the local riparian system's ability to function or recover.

### **CRITICAL ELEMENTS NOT PRESENT OR NOT AFFECTED**

No Wild and Scenic Rivers or Wildernesses exist within the area affected by the Proposed Action. There are also no Native American religious or environmental justice concerns associated with the Proposed Action.

### **NON-CRITICAL ELEMENTS**

The following elements **must** be addressed due to the involvement of Standards for Public Land Health.

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

*Affected Environment:* Soils in the project area vary depending on the topography, slope orientation, and parent material from which the soil is derived. The topographic pattern of the area consists of rolling hills and narrow valleys. Soil types in the area are interrelated to

dominant vegetation and can be associated with certain climatic or ecotones, depending on elevation and slope. Soils in the area support dominant vegetation communities, such as the sagebrush community and pinyon-juniper woodland (USDA 1982).

The 19 soil types found in the project area are described in Table 12. Three soil types are considered to be *Prime* and other *Important Farmlands* if irrigated: Forelle loam (3% to 8% slopes), Glendive fine sandy loam, and Havre loam (0% to 4% slopes). In the project area, approximately 12,816 acres have been identified as being in controlled surface use (CSU-1) areas, which indicate conditions such as fragile soil, high salt concentrations, excessive erosion, or steep slopes. A total of 2,083 source locations would be located in CSU-1 areas (Maps A1-G3, provided in Appendix A). An engineering-stabilization report that addresses activities in these areas is required.

**Table 12. Soil Types and Characteristics of the Project Area.**

Soil #	Soil Name	Description	CSU-1 Acres	Total Acres
6	Barcus channery loamy sand	2 to 8% slopes; on valleys, alluvial fans; Foothill Swale ecological site	466	2,574
15	Castner channery loam	5 to 50% slopes; on uplands, ridges, and mountainsides; Unspecified ecological site	181	351
33	Forelle loam	3 to 8% slopes; on uplands, terraces; Rolling Loam ecological site	10	302
34	Forelle loam	8 to 15% slopes; on uplands, terraces; Rolling Loam ecological site	5	119
36	Glendive fine sandy loam	2 to 4 % slopes; on valley floors, drainageways; Foothills Swale ecological site	571	4,908
40	Hagga loam	0 to 5 % slopes; on floodplains, valley floors; Swale Meadow ecological site	2	176
41	Havre loam	0 to 4% slopes; on stream terraces, flood plains; Foothills Swale ecological site	30	752
43	Irigul-Parachute complex	5 to 30% slopes; on mountainsides and ridges; Loamy ecological site	109	682
58	Parachute loam	25 to 75% slopes; on mountainsides and ridges; Brushy loamy ecological site	0	84
59	Parachute-Rhone loam	5 to 30% slopes; on mountainsides and ridges; Mountain loam ecological site	0	226
64	Piceance fine sandy loam	5 to 15% slopes; on uplands, ridges; Rolling Loam ecological site	73	2,618
70	Redcreek-Rentsac complex	5 to 30% slopes; on mountainsides; Unspecified ecological site	1,753	11,959
73	Rentsac channery loam	5 to 50% slopes; on ridges, foothills; Unspecified ecological site	8,129	39,699
75	Rentsac-Piceance complex	2 to 30% slopes; on uplands, ridges, foothills; Rolling Loam ecological site	45	4,428
82	Silas loam	0 to 8% slopes; on mountain valleys; Mountain swale ecological site	52	19
87	Starman-Vandamore complex	5 to 40% slopes; on ridges; Dry exposure ecological site	12	289
91	Torriorthents-Rock outcrop complex	15 to 90% slopes; on mountains, hills, canyons, ridges; Stony Foothills ecological site	1,338	4,111

Soil #	Soil Name	Description	CSU-1 Acres	Total Acres
96	Veatch channery loam	12 to 50% slopes; on mountainsides; Loamy slopes ecological site	56	334
104	Yamac loam	2 to 15% slopes; on terraces, uplands, fans; Rolling Loam ecological site	21	2,582

Source: Natural Resources Conservation Service (NRCS) 2008.

*Environmental Consequences of the Proposed Action:* Soils types crossed by source and receiver lines are listed in Table 13. Use of drill buggies off-road could result in temporary (less than one year) effects on soils, such as rutting and compaction. However, using low-pressure-tire vehicles for off-road seismic survey operations and applying mitigation measures to restore and revegetate these areas would likely result in negligible long-term impacts to soils in the project area. CSU-1 fragile soils would be traversed during project activities. Although the project area does not fall within RMP-designated fragile watersheds, soils developing in substrate of the Thirteenmile Creek Tongue of the Green River Formation have characteristics that may impede successful reclamation and revegetation. Surface exposures of this tongue of the Green River Formation are present in numerous locations within the project area.

**Table 13. Soils Crossed by Source and Receiver Lines.**

Soil Name	Source Line (miles)	Receiver Line (miles)
Barcus channery loamy sand, 2 to 8% slopes	11.6	22.3
Castner channery loam, 5 to 50% slopes	2.0	3.1
Forelle loam, 3 to 8% slopes	2.0	2.8
Forelle loam, 8 to 15% slopes	0.6	1.1
Glendive fine sandy loam	20.6	40.1
Hagga loam	0.1	1.8
Havre loam, 0 to 4 % slopes	2.8	6.1
Irigul-Parachute complex, 5 to 30% slopes	3.4	5.9
Parachute loam, 25 to 75% slopes	0.5	0.9
Parachute-Rhone loams, 5 to 30% slopes	1.1	2.1
Piceance fine sandy loam, 5 to 15% slopes	13.4	22.2
Redcreek-Rentsac complex, 5 to 30% slopes	65.0	99.6
Rentsac channery loam, 5 to 50% slopes	242.9	331.9
Rentsac-Piceance complex, 2 to 30% slopes	26.4	36.7
Silas loam, 0 to 8% slopes	0.0	0.2
Starman-Vandamore complex, 5 to 40% slopes	1.5	2.6
Torriorthents-Rock outcrop complex, 15 to 90% slopes	25.8	34.8
Veatch channery loam, 12 to 50% slopes	2.1	3.3
Yamac loam, 2 to 15% slopes	15.1	22.2

*Environmental Consequences of the No Action Alternative:* Under the No Action Alternative, there would be no impacts to soils within the project area.

*Mitigation:* Operator-committed mitigation measures and those in other sections (Wetlands and Riparian Zones, Vegetation, and Water Quality, Surface and Ground) would protect soil resources.

*Finding on the Public Land Health Standard for Upland Soils:* With mitigation measures implemented, the Proposed Action would be unlikely to reduce the productivity of soils impacted by surface-disturbing activities on public lands.

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

*Affected Environment:* The vegetation communities of the proposed project area include young and mid-age pinyon pine (*Pinus edulis*) and one-seed juniper woodland (*Juniperus osteosperma*), inter-mountain basins big sagebrush (*Artemisia tridentata tridentata*) or Wyoming big sagebrush (*A. t. wyomingensis*), shrubland, inter-mountain basins of mixed salt desert scrub, and Gambel Oak (*Quercus gambelii*)–mixed montane shrublands. Table 14 defines the affected landcover types and linear miles of both receiver and source lines from the Proposed Action. Impacts to these landcover types are expected to be minimal and short term.

**Table 14. Project Area Traversed Landcover Types.**

Landcover Type	Total Acreage within Project Area	Linear Miles Traversed by Proposed Action	
		Source Line	Receiver Line
Agriculture	2,271.01	8.7	17.9
Developed, Open Space - Low Intensity	5.65	<0.1	0.1
Riparian	56.22	0.2	0.3
Badland/Barren	34.69	0.6	0.2
Grasslands	263.35	1.4	2.2
Inter-Mountain Basins Sagebrush	17,102.91	98.1	146.8
Scrublands	2,951.99	14.6	24.4
Pinyon-Juniper Woodland	53,493.41	312.7	446.2
Woodlands	44.98	0.2	0.6

The pinyon-juniper woodland ecological system occurs on dry mountains and the foothills of the Colorado Plateau region from the Western Slope of Colorado to the Wasatch Range, south to the Mogollon Rim and east into the northwest corner of New Mexico. These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges. Soils supporting this system vary in texture, ranging from stony, cobbly, gravelly sandy loams to clay loam or clay.

Understory layers are variable and may be dominated by shrubs or graminoids or may be absent. Associated species include big sagebrush, mountain mahogany (*Cercocarpus montanus*), serviceberry (*Amelanchier alnifolia*), Utah serviceberry (*Amelanchier utahensis*), blackbrush (*Coleogyne ramosissima*), three-leaf sumac (*Rhus trilobata*), bitterbrush (*Purshia tridentata*), broom snakeweed (*Gutierrezia sarothae*), Oregon grape (*Mahonia repens*), Gambel oak, mountain snowberry (*Symphoricarpos oreophilus*), blue grama (*Bouteloua gracilis*) and James' galleta (*Pleuraphis jamesii*) (Southwest Regional Gap Analysis Program [SWreGAP] 2001).

The inter-mountain basin's big sagebrush ecological system occurs throughout much of the western United States and is typically found in broad basins between mountain ranges, plains, and foothills between 4,150 to 6,310 feet in elevation. Soils are typically deep, well-drained, and non-saline. These shrublands are dominated by basin big sagebrush and/or Wyoming big sagebrush. Scattered juniper, greasewood (*Sarcobatus vermiculatus*), and saltbush (*Atriplex* spp.)

may be present in some stands. Rubber rabbitbrush (*Ericameria nauseosa*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), antelope bitterbrush, or snowberry (*Symphoricarpos* spp.) may codominate disturbed stands. Perennial herbaceous components typically contribute less than 25% vegetative cover. Common graminoid species include Indian ricegrass (*Achnatherum hymenoides*), blue grama, thickspike wheatgrass (*Elymus lanceolatus*), Idaho fescue (*Festuca idahoensis*), needle-and-thread (*Hesperostipa comata*), basin wildrye (*Leymus cinereus*), James' galleta, western wheatgrass (*Pascopyrum smithii*), Sanberg bluegrass (*Poa secunda*), and bluebunch wheatgrass (*Pseudoroegneria spicata*) (SWreGAP 2001).

The vegetation of the inter-mountain basin's mixed salt desert scrub is characterized by a typically open to moderately dense shrubland composed of one or more *Atriplex* species, such as shadscale saltbush (*A. confertifolia*), fourwing saltbush (*A. canescens*), or cattle saltbush (*A. polycarpa*). Other shrubs present to co-dominate may include big sagebrush or Wyoming big sagebrush, yellow rabbitbrush, rubber rabbitbrush, and winterfat (*Krascheninnikovia lanata*). Greasewood is generally absent, but if present, does not co-dominate. The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids, such as Indian ricegrass, blue grama, thickspike wheatgrass, western wheatgrass, James' galleta, and Sandberg bluegrass or alkali sacaton (*Sporobolus airoides*). Various forbs are also present (SWreGAP 2001).

The Rocky Mountain Gambel oak–mixed montane shrubland ridges and valleys in the southern portion of the project area differ from the northern portion primarily due to elevation and rainfall. These shrublands are most commonly found along dry foothills and lower elevation mountain slopes from approximately 6,561 to 9,514 feet in elevation and are often situated above pinyon-juniper woodlands. Substrates are variable and include soil types ranging from calcareous, heavy, fine-grained loams to sandy loams, gravelly loams, clay loams, deep alluvial sand, or coarse gravel. These southern ridges are made up of dense thickets of Gambel oak, mountain mahogany, and serviceberry with a small component of Douglas-fir (*Pseudotsuga menziesii*) occurring in north-facing folds of canyons. South-facing slopes are composed of the same general species, only stands are more open and stunted in their growth habit. Other species within this association include mountain snowberry, rockspirea (*Holodiscus dumosus*), cliffbush (*Jamesia americana*), chokecherry (*Prunus americana*), Wood's rose (*Rosa woodsii*), Golden currant (*Ribes aureum*), kinnikinnick (*Arctostaphylos uva-ursi*), and mountain lover (*Paxistima myrsinites*) (SWreGAP 2001).

Aspen (*Populus tremuloides*) forests also occur in concentrated groves at higher elevations, approximately 9,000 feet, in the southwest corner of the project area. These areas appear to be in decline and slowly giving way to more shrubby growth typical of the previously described Gambel oak–mixed montane shrubland.

*Environmental Consequences of the Proposed Action:* The primary threat to the health of the native plant communities in the project area would be from the entry and proliferation of noxious and invasive species initially occurring from unmanaged surface disturbance created by the Project.

Indirect impacts would include the increased potential for non-native/noxious plant establishment and introduction, accelerated wind and water erosion, changes in water runoff due

to road deterioration from increased traffic, soil impacts that affect plant growth (soil erosion or siltation), shifts in species composition and/or changes in vegetative density away from desirable conditions, airborne dust on roadside vegetation, and changes in visual aesthetics, especially if vegetation becomes covered with dust created by operations. There may be temporary impacts to native vegetation during seismic activities. OHV activity could result in temporary to short-term (less than three years) impacts to vegetation from vehicle tracking and compression, breaking, or crushing of woody shrub species and/or smaller trees. OHV use can result in long-term vegetation impact (mortality) to sagebrush particularly if this activity occurs during a prolonged dry period.

*Environmental Consequences of the No Action Alternative:* Under the No Action Alternative, there would be no impacts to the vegetation within the project area.

*Mitigation:* If project activities occur between April 15 and November 15, the Operator would be required to water surface access roads to reduce airborne dust and damage to roadside vegetation communities. Revegetation would be required on all disturbed areas not necessary for production with a seed mix approved by the BLM. This may mean broadcast seeding and hand raking with Native Seed mixture #3 as presented below.

Species (Variety)	Pure Live Seed (PLS) pounds per acre
Western wheatgrass (Rosanna)	2
Bluebunch wheatgrass (Whitmar)	2
Thickspike wheatgrass (Critana)	1
Indian ricegrass (Rimrock)	2
Fourwing saltbush (Wytana)	1
Utah sweetvetch	1
Alternates: Needle and thread, globemallow	

The Operator would monitor the project area for a minimum of three years post completion to detect the establishment of noxious weeds on disturbed sites. Noxious weeds would be eradicated using materials and methods approved by the AO.

*Finding on the Public Land Health Standard for Plant and Animal Communities* (partial, see also Wildlife, Aquatic and Wildlife, Terrestrial): Standard 3 states that plant and animal communities of native and desirable species should be maintained at viable population levels to sustain public land health. With implementation of mitigation measures and successful revegetation, the Proposed Action would have no effect on the land health standard.

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

*Affected Environment:* The project area is located west of Piceance Creek and south of Duck Creek. Piceance Creek and its tributaries, other than Fawn Creek, are designated as Aquatic Life Warm Water – Class 2 (CDPHE 2008a). Drainages in the project area include Black Sulphur, Hunter, and Yellow creeks, Stake Springs Draw, and Ryan Gulch. These drainages flow into Piceance Creek or the White River. As described in the Water Quality, Surface and Ground Section, Yellow Creek and Fawn Creek are also designated as Aquatic Life Warm Water – Class 2. Class 2 waters are defined as not capable of sustaining an abundance or

diversity of biota due to physical habitat, water flows or levels, or water quality conditions. Native fish are present in Piceance Creek downstream of the project area and include, but are not limited to, speckled dace (*Rhinichthys osculus*), mountain whitefish (*Prosopium williamsoni*), and mottled sculpin (*Cottus bairdi*). Nonnative brook trout (*Salvelinus fontinalis*) also are present in Piceance Creek; however, their numbers are low.

Sensitive fish species, such as flannelmouth and mountain suckers, have been observed in the mainstem of Piceance Creek downstream of the project area. Mountain suckers have also been observed in Fawn Creek, despite its Class 2 designation. Amphibians, including the sensitive northern leopard frog, potentially occur within wetland areas associated with tributaries of Piceance and Yellow creeks. These species are described in the Threatened, Endangered, and Sensitive Animal Species section.

Irrigation drawdowns are a major factor limiting a suitable fishery in Piceance Creek, and sometimes reduces the discharge in Piceance Creek to very low levels. During drought years, surface flow sometimes disappears from segments of the creek.

*Environmental Consequences of the Proposed Action:* Water quality could be impacted by increased erosion from disturbing vegetation and soils, therefore having a potential impact upon aquatic wildlife. A discussion on potential impacts to BLM sensitive fish and amphibians is provided in the Threatened, Endangered, and Sensitive Animal Species section. To minimize potential impacts, vehicles would not cross perennial water features except on existing roads or pre-designated crossings, and OHV activity and source point locations would avoid wetlands.

*Environmental Consequences of the No Action Alternative:* There would be no impacts to aquatic wildlife under the No Action Alternative.

*Mitigation:* Mitigation measures described under the Water Quality, Surface and Ground section would protect aquatic wildlife.

*Finding on the Public Land Health Standard for Plant and Animal Communities (partial, see also Vegetation and Wildlife, Terrestrial):* Standard 3 of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997b) states that plant and animal communities of native and desirable species should be maintained at viable population levels to sustain public land health. With the implementation of mitigation measures and successful revegetation, the Proposed Action would have no effect on the land health standard.

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

*Affected Environment:* The project area is within the overall range for elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). The entire project area falls within elk winter range and mule deer summer range (CDOW 2008). Approximately 75.6 miles of proposed source lines and 110.1 miles of receiver lines would cross mule deer severe winter range present in the northeast corner of the project area. Small game within the project area include mountain cottontail (*Sylvilagus nuttalli*), mourning dove (*Zenaida macroura*), dusky grouse (*Dendragapus obscurus*), and greater sage-

grouse. Greater sage-grouse and Northern Goshawks are BLM sensitive species and are addressed in the Threatened, Endangered, and Sensitive Animal Species section. Raptors and other birds that typically inhabit pinyon-juniper and sagebrush habitats in western Colorado are discussed in the Migratory Birds section. The Piceance State Wildlife Area, located north of the project area along Yellow Creek and Piceance Creek, contains large populations of deer, elk, and sage-grouse.

*Environmental Consequences of the Proposed Action:* Potential, temporary impacts of seismic operations to big game ranges and migration routes would include avoidance behavior and displacement. Increased human presence and noise related to the Proposed Action, particularly helicopter noise, would disrupt big game and nesting raptors. Vehicles would be restricted to approved access roads, with the exception of drill vehicles. Scheduled fall activities could coincide with elk and deer moving onto their winter ranges. Due to the grid size required to acquire 3D seismic data, human activity will occur throughout an area. While the work is relatively temporary, it is likely that animals will respond by making short-distance movements to avoid increased activity. Such indirect herding of the animals across the range could result in increased energetic costs at a time of year when mule deer are already nutritionally and physiologically stressed. Extreme cold temperatures and deep snow depth would further exacerbate the situation. Therefore, seismic activities are prohibited in mule deer severe winter range from January 1 through April 30 which would reduce impacts associated with increased energetic costs associated with temporary moves to avoid human activities. Soil compaction and crushed vegetation may temporarily impact burrowing wildlife, such as mountain cottontail. Larger shrubs, trees, and other obstacles would be avoided where possible; no cutting or removing of shrubs, trees, or other obstacles is proposed.

*Environmental Consequences of the No Action Alternative:* There would be no additional impacts to terrestrial wildlife under the No Action Alternative.

*Mitigation:* No seismic operations (including travel over the area by helicopters within 300 feet above ground level) will be permitted from January 1 through April 30 on mule deer severe winter range.

*Finding on the Public Land Health Standard for Plant and Animal Communities (partial, see also Vegetation and Wildlife, Aquatic):* Standard 3 of the BLM Standards for Public Land Health and Guidelines for Livestock Grazing Management in Colorado (BLM 1997b) states that plant and animal communities of native and desirable species should be maintained at viable population levels to sustain public land health. The project area presently meets the public land health standards for terrestrial animal communities. With implementation of mitigation measures and successful revegetation, the proposed Project would have no effect on the land health standard.

**OTHER NON-CRITICAL ELEMENTS:**

Non-Critical Element	Not Applicable or Not Present	Applicable or Present, No Impact	Applicable and Present and Brought Forward for Analysis
Access and Transportation			X
Cadastral Survey	X		
Fire Management			X
Forest Management			X
Geology and Minerals			X
Hydrology/Water Rights			X
Law Enforcement		X	
Noise		X	
Paleontology			X
Rangeland Management			X
Realty Authorizations			X
Recreation			X
Socioeconomics		X	
Visual Resources		X	
Wild Horses			X

**ACCESS AND TRANSPORTATION**

*Affected Environment:* Rio Blanco County Road (CR) 5 is a paved road that provides the primary access to the project area. The north end of CR 5 is accessed from Colorado Highway 64 between the cities of Meeker and Rangely. The south end of CR 5 is accessed from Colorado Highway 13, north of the city of Rifle. From CR 5, several other county roads, mostly unpaved, extend throughout the project area. These roads include CRs 26, 24, and 91; CR 24 is paved to approximately 3.5 miles beyond its intersection with CR 91. Additional roads extend from CR 26 in the southern half of the project area, including CRs 85, 144, and 29; CRs 87 and 69 extend south from CR 29 and pass through the southeast portion of the project area. CRs 31, 86, 68, and 24X extend from CR 24 through the central portion of the project area. CR 70 connects CR 91 and CR 68 in the west central edge of the project area. CR 83 connects CR 20 and CR 24 and passes through the northeast portion of the project area. Several BLM roads also pass through northeast (BLM 1146, BLM 1147, BLM 1148, BLM 1019, and BLM 1019A), western (BLM 1189 and BLM 1020), central (BLM 1182A) and southern (BLM 1180, BLM 1181, BLM 1182, BLM 1183, BLM 1184, BLM 1011A, BLM 1012, and BLM 1014) portions of the project area.

As of July 2008, the average daily traffic (ADT) volume for CR 5 (Piceance Creek Road) was between 1,381 to 1,901 vehicles per day (Rio Blanco County Road and Bridge Department 2008). Although this road is not located within the project area, traffic associated with the project would use this road to access other roads within the project area. ADT volumes along other roads within or leading to the project area are provided in Table 15. CR 26 and CR 29 also experience ADT volumes that mirror those recorded on CR 5. Existing traffic volumes for other roads within the project area are unavailable, but most roads currently experience traffic associated

with energy exploration and development activities, in addition to recreational activities and livestock operations.

**Table 15. Average Daily Traffic (ADT) for Major Access Roads Within or Leading to the Project Area.**

Road	Milepost	ADT	Date ADT Measured
CR 5 (Piceance Creek Road)	0.1	1901	July 2008
CR 5 (Piceance Creek Road)	42	1381	July 2008
CR 24	0.1	248	April 2007
CR 24X	8.4	41	June 2006
CR 26	0.1	1417	October – November 2007
CR 29	0.1	1897	October – November 2007
CR 31	0.01	88	July 2006
CR 69	0.1	39	October – November 2007
CR 87	0.1	74	October – November 2007
Colorado Highway 13	18.268 (south of Meeker)	3000	2007
Colorado Highway 64	56.243 (east of Meeker)	1400	2007

Source: Rio County Road and Bridge Department (2008) and Colorado Department of Transportation (2007).

Portions of the project area or access roads that lead to the project area fall within BLM-designated OHV management areas. These sections include a small area where travel is limited to designated roads, trails, and ways (within the Duck Creek, Ryan Gulch, and Dudley Bluffs ACECs; although the project area does not include ACECs, existing roads that pass through these areas would be utilized to access the project area) and existing roads, trails, and ways (portions of the project area south of the Duck Creek ACEC and west and southwest of the Ryan Gulch and Dudley Bluffs ACECs). Travel within the remainder of the project area is limited to existing roads, trails, and ways from October 1 through April 30 of each year.

*Environmental Consequences of the Proposed Action:* Anticipated traffic volumes would result in an increase of approximately 44 vehicles per day. This is the maximum number of vehicles expected to be traveling within the project area on an given day, and may include pickups, transport trucks/tractor trailers, ATVs, and ambulances; up to eight buggy or track drills would also be operating daily but travel would be limited to seismic transects (vehicles would not return to staging area). All equipment, including the drills, would be initially brought to the project area by four or five transport trucks/tractor-trailers.

All vehicles associated with the Proposed Action, with the exception of buggy or track drills, would travel on existing, BLM-approved roadways. The Proposed Action would temporarily increase traffic on existing roadways within and near the project area, however this increase would be minor compared to the total number of vehicles traveling those roads daily, particularly CRs 5, 26, and 29. Those roads experiencing the greatest increase in ADT volume would include CRs 24X, 31, and 69. It is unknown what effect additional project-associated traffic would have on those roads where traffic data is not available; however the project would contribute, at

maximum, an additional 44 vehicles/day on those roads. During surveying operations, surveyors would travel from Meeker. This traffic represents a small proportion of the expected 44 vehicles/day and would contribute minor increases to daily traffic volumes along Colorado Highway 13, Colorado Highway 64, or CR 5 in order to reach the project area. During drilling and recording activities, workers would camp on site, thus reducing travel along access roads to the project area. Traveling from a centralized location would reduce the number of vehicle trips into and out of the project area, primarily along CR 5, Colorado Highway 13, and Colorado Highway 64, and serve to limit additional trips along these travel routes.

The roads in the project vicinity were originally designed for rural and agricultural uses and were not intended for the repeated heavy loads associated with the current increase in oil and gas development. This increase in traffic volume, frequency of vehicle trips, and size of vehicles traveling on these existing rural roads may increase surface damage to roads and require the need for more frequent maintenance, which in turn may result in higher costs associated with road repair and maintenance. Buggy or track drills traveling off road may create visible trails that can invite subsequent public use along transects by public land users.

Travel on roads, in addition to off-road travel by buggy or track drills, within areas having travel restrictions from May 1 through September 30, would occur as a result of the Proposed Action.

*Environmental Consequences of the No Action Alternative:* There would be no additional environmental consequences associated with the No Action Alternative.

*Mitigation:* All activities would be required to comply with all applicable local, state, and federal transportation laws, statutes, regulations, standards, and plans. Activities would strictly adhere to Gold Book fourth edition surface operating standards for oil and gas exploration and development (BLM 2006a) and BLM manual section 9113 on Roads (BLM 1985).

All county roads would be maintained in their current condition or better. Continuous inspection would be performed and preventative maintenance measures would be taken on a biannual basis. These measures may include grading, cleaning drainage structures, erosion control and slope stabilization, and road closures during periods of excessive soil moisture.

Access points by buggy or track drills off of existing roads would not occur perpendicular to the road, and travel between seismic testing locations would occur at angles (i.e., zig-zag fashion, not a continuous linear route) to reduce the perception to the public that such routes are open for travel.

Traffic would be limited on BLM-administered lands in the upper portions of the Black Sulphur Creek to reduce impacts to sensitive resources in this drainage.

Further mitigation of impacts to access and transportation could be achieved through management practices including:

- using a construction yard as the primary parking for personal vehicles;
- requiring contractors and employees to comply with all posted speed limits;
- complying with county and state weight restrictions and limitations;

- controlling dust along unsurfaced access roads and minimizing the tracking of mud onto paved roads; and
- ensuring post-construction restoration of unsurfaced roads to equal or better conditions than existed before construction.

## **FIRE MANAGEMENT**

*Affected Environment:* The objectives of fire management in the WRFO management area are to protect public health, safety, and property, as well as to allow fire to carry out natural ecological functions. Prescribed fire, which includes both management and natural ignition sources, may be used to achieve land or resource management objectives.

The topographic pattern of the area consists of rolling hills, broad ridge tops, and narrow valleys. Soil types in the area are interrelated to dominant vegetation and can be associated with certain climatic conditions or ecotones, depending on elevation. Soils in the area support dominant vegetation communities, such as the sagebrush community, pinyon-juniper woodland, and juniper-pinyon woodland. The most common species in the area are pinyon pine and one-seed juniper. Stand composition, site characteristics, and productivity are highly variable and are based on moisture relationships (BLM 1997a). Tree heights generally average about 15 to 25 feet. The understory consists of predominately big sagebrush, rabbitbrush, forbs, and grasses with varying degrees of scattered dead and down woody debris and slash.

The mature plant communities and relatively dry climate of the Piceance Basin make this area prone to fire, especially during the heat of summer when rains are infrequent and dry thunderstorms are common. Fires in this area typically move quickly as they gain momentum from the flashy fuels and considerable fuel loads associated with mature undisturbed pinyon-juniper woodland habitats. Fire events play an important role in this type of ecosystem, rejuvenating and maintaining healthy, diverse plant communities. Natural fire probably maintains woodlands at a constant overall acreage, but human interference in this natural cycle through fire suppression has extended the range of these woodlands. Fire suppression has greatly increased fuel buildup and enhanced the maturity and encroachment of shrubs and woodlands, thus producing older age plant communities with decreased diversity in structure and species composition.

In the spring of 1997, an interdisciplinary (ID) team met to begin the fire planning process. The process was used to establish resource and fire management objectives for public land within the WRFO. These treatments range from a strict no burn policy to using fire, either natural or prescribed, as a tool to meet resource management objectives. The result was a map outlining objectives based on the following four categories (BLM 1999).

**Category A** areas are where fire is not desired at all. These areas include ecosystems where fire never played a significant role in the function of the ecosystem. In Category A areas, suppression is required to prevent direct threats to life or property. All fires in these areas would be aggressively suppressed. The Proposed Action in the Piceance Basin would not contain any land that is designated as a Category A area.

**Category B** areas are where unmanaged wildfire is not desired. These are ecosystems where unplanned ignitions could have negative effects on identified resources unless resource constraints can be met or where mitigation can minimize or remove concerns. Fire suppression in these areas is aggressive; however, use of natural fires is not dismissed if suppression tactics could be used such that resource concerns could be mitigated. Negative effects of fire here include risks to private lands and urban interfaces, important cultural resources, areas with unnatural fuel buildups, and areas where the seed bank does not exist for natural reseeding. Mitigation efforts could include fuel reduction through mechanical means or prescribed fire to reduce fuel loading around private land and urban interfaces, creation of agreements to allow fire to cross from public to private lands, cultural resource inventories, preparation of rehabilitation plans prior to a fire event, etc. Once mitigation is in place, Category B areas could move into a C or D category where use of wildfire for resource benefit would occur more frequently.

**Category C** areas are where fire is desired but where there may be social, political, or ecological constraints that must be considered. These constraints could include air quality considerations (proximity to Class 1 airsheds or non-attainment areas), threatened or endangered species considerations (effects of fire on the survival of these species), or habitat considerations (both spatial and temporal). Use of natural ignitions to attain desired resource/ecological conditions is maximized in these areas when possible.

**Category D** areas are where fire is desired and where few, if any, constraints to its use have been identified. These areas offer the greatest opportunity to take advantage of the full range of options available to the resource manager for managing fire under the appropriate management response.

*Environmental Consequences of the Proposed Action:* The increase in human activity, including vehicle and seismic exploration activity, could increase the potential for human-related ignition of wildfires. Potential vegetation removal and soil disturbance could provide an opportunity for noxious weeds and cheatgrass to invade the project area, which could result in a shift from the natural fire regime to an unnatural, more frequent fire regime and the loss of key ecosystem components (BLM 2006b). The resultant increase in surface disturbance over existing conditions could adversely impact the fire cycle and the proper role of fire burning naturally within the ecosystem. Furthermore, due to the proposed increase in human activity within the project area, there may be an additional need to conduct fire detection flights and mission-oriented suppression flights to be aware of any fire hazard or breakout. The need for these additional flights bring with it inherent hazards not otherwise required under the No Action Alternative. Since helicopter use in this area is a concern from early spring until late fall, close coordination with the Craig Interagency Dispatch Center [(970) 826-5037] would occur.

*Environmental Consequences of the No Action Alternative:* There would be no impacts to Fire Management protocols for the WRFO under the No Action Alternative. Fire management practices, including fire suppression, would be consistent with current management actions.

*Mitigation:* Operator-committed mitigation would promote the protection and safety of public lands and crewmembers. As stated, helicopter use coordination with the Craig Interagency Dispatch would occur on a regular basis through the duration of the project. This would help

detect and prevent both natural and accidental fire ignitions and hazards. Fires located within the project area would also be reported to the Craig Interagency Dispatch.

## FOREST MANAGEMENT

*Affected Environment:* According to the 1997 White River RMP (BLM 1997a), the forest management program for the WRRRA is divided in two sections: Timberland Management and Woodland Management. Timberland management areas are lands that support commercially harvestable stands of trees dominated by Douglas-fir, spruce (*Picea* spp.), fir (*Abies* spp.), lodgepole pine (*Pinus contorta*), and aspen. Woodland management areas are lands that support stands of trees dominated by pinyon-juniper and Gambel oak. The general objectives for these management areas are to determine allowable harvest levels of commercial and non-commercial trees while maintaining productivity, extent, forest structure, and enhancement of other resources (BLM 1997a).

The pinyon-juniper woodland forest habitat found in and around the project area covers a large area between the Colorado Plateau Region of the Western Slope of Colorado to the Wasatch Range of Utah. These woodlands occur on warm, dry sites on mountain slopes, mesas, plateaus, and ridges that are present within the project area in the Piceance Basin. The most common species in the area are pinyon pine and one-seed juniper. The stand composition, site characteristics, and productivity are highly variable and are based on moisture relationships.

Within the entire WRRRA, there are approximately 24,125 acres of timberlands and approximately 622,590 acres of woodlands (BLM 1997a). Under the 1997 RMP, approximately 27,600 acres of suitable woodland habitat are available for commercial harvest in the Piceance and Douglas/Cathedral Geographic Reference Areas (GRA), with a yearly allowable cut of 45 acres (BLM 1997a). This would allow the maintenance of stand structure relative to old growth type on approximately 80% of the commercial woodland within the GRA (BLM 1997a). Vegetation within the project area is generally healthy, with insect and disease problems localized. This is a result of excess slash buildup, which has facilitated a temporary increase in bark beetles (*Dendroctonus ponderosae*). Additionally, some black-soot stain in pinyon is present, but not widespread.

The 76,224-acre project area consists of a diverse array of vegetation and topographical features. Based on a BLM landcover study for southwest Colorado completed in 2003, approximately 53,412 acres of vegetation are considered woodlands, consisting of pinyon-juniper, aspen, mixed conifer forest, and ponderosa pine (*Pinus ponderosa*). Approximately 19,868 acres are considered shrubland, approximately 263 acres are comprised of various annual and perennial grasslands, and approximately 2,271 acres are used for agricultural purposes. The remaining 409 acres are comprised of various ecosystems, such as open water, recently burned, emergent marsh, badlands, and open space (CDOW 2003).

*Environmental Consequences of the Proposed Action:* Although the Proposed Action does not anticipate the need to harvest trees, it is possible that this may be necessary. If so, potential tree removal would be limited, with individual trees strategically removed to minimize impacts. Any areas where tree removal is proposed would be analyzed in detail to understand if

the tree exhibits old growth characteristics or any other unique qualities. In addition, potential impacts to individual plants and trees due to proposed buggy activity may result in limb damage or complete tree/plant mortality in the project area.

*Environmental Consequences of the No Action Alternative:* There would be no harvesting of trees or other vegetation removal or damage under the No Action Alternative.

*Mitigation:* Forest product removed in the process of construction would be inventoried and purchased from the BLM prior to removal activities. This is in compliance with Appendix B, Conditions of Approval 7 of the RMP (BLM 1997a).

## **GEOLOGY AND MINERALS**

*Affected Environment:* The project area is located within the Piceance Basin, a structural unit that occupies approximately 7,100 square miles in northwestern Colorado (Colorado School of Mines 2007). The basin's boundaries are the White River to the north, the Cathedral Bluffs to the west, the Roan and Book Cliffs to the south, and the crest of the ridge system that serves as the head of Piceance Creek to the east. The eastern edge of the basin is roughly defined by the north/south-trending ridges, called the Grand Hogback, that run from Rio Blanco to the White River. The basin generally trends from southeast to northwest and is asymmetric, with steep beds on the eastern boundary and gentle dips on the western edge. The higher elevations, on the south side of the northwest-trending down warp, reach 9,000 feet, while at the north end, where Piceance Creek flows into the White River, the elevation is approximately 5,700 feet (BLM 2007c).

According to published geologic mappings (Duncan 1976a, 1976b, 1976c, 1976d; Johnson 1977; Hail 1977), the project area includes the following geologic units from oldest (bottom) to youngest (top).

- Surficial deposits of Holocene alluvium (Qal).
- Unit 6 of the Uinta Formation (Tu6).
- The Black Sulphur Tongue of the Green River Formation (Tgb).
- Unit 5 of the Uinta Formation (Tu5).
- Thirteenmile Creek Tongue, upper part, of the Green River Formation (Tgtu).
- Thirteenmile Creek Tongue equivalent of the Green River Formation (Tgte).
- Stewart Gulch Tongue of the Green River Formation (Tgs).
- Unit B of the Uinta Formation (Tub).
- Coughs Creek Tongue of the Green River Formation (Tgc).
- Unit A of the Uinta Formation (Tua).

Collectively, these units represent a complex sequence of intertonguing lacustrine, deltaic, and fluvial sediments that were deposited along the fluctuating shoreline of Lake Uinta, the center of

which was well to the west of the project area during the middle Eocene Epoch. Additional information regarding the geology of the Green River and Uinta Formations is provided in the Paleontology Affected Environment section of this document.

*Environmental Consequences of the Proposed Action:* Drilling the lines would only occur to a depth of 60 feet and is not anticipated to affect geological or mineral resources underlying the project area. Information obtained from the geophysical exploration and seismic survey would further increase the knowledge and understanding of subsurface geology in this area, especially in regard to the characterization of mineral resources contained within the underlying formations.

*Environmental Consequences of the No Action Alternative:* Under the No Action Alternative, there would be no impacts to the geological resources within the project area, and no seismic exploration activities would occur.

*Mitigation:* Mineral lease holders would be notified prior to initiating the seismic activities to avoid impacts to their operations.

## **HYDROLOGY AND WATER RIGHTS**

*Affected Environment:* The project area is located in the White River Basin within the Lower Colorado River Basin. Groundwater in the proposed project area is associated with the Colorado Plateau aquifer system and is located in the Piceance Basin structural unit. The project area has an arid to semi-arid climate with dry, sunny conditions and a wide diurnal temperature range. Average annual precipitation ranges from approximately 12 to 20 inches. The basin receives precipitation in the form of both rainfall and snow. Approximately 98% of this precipitation is lost to evapotranspiration (Taylor 1987). Water that remains in the system becomes surface water flow or infiltrates into the soil and recharges groundwater.

The Colorado Decision Support System (CDSS 2008) was searched to identify water rights near the project area. There are numerous water rights within and around the project area. These water rights are associated with springs, ditches, reservoirs, and wells. A variety of water uses are served by these rights, including storage, irrigation, commercial, industrial, augmentation, fishery, recreation, municipal, and domestic uses. Locations of wells and springs in relation to proposed source and seismic lines for the project can be found in the various maps within Appendix A.

*Environmental Consequences of the Proposed Action:* Impacts to surface water and groundwater flow patterns or water rights are not expected as a result of the Proposed Action. No surface water or groundwater extraction/depletion would occur. A decrease in infiltration to groundwater would only occur locally and is not likely to significantly alter natural recharge patterns. Potential impacts to water quality are addressed in the Water Quality section.

*Environmental Consequences of the No Action Alternative:* There are no environmental consequences associated with the No Action Alternative.

*Mitigation:* All activities would be required to comply with all applicable local, state, and federal water laws, statutes, regulations, standards, and implementation plans. Only properly permitted water sources would be used for dust abatement. For additional mitigation, refer to the mitigation outlined in the Water Quality, Surface and Ground section and the Geology and Minerals section of this document.

## PALEONTOLOGY

*Affected Environment:* According to published geologic mappings (Duncan 1976a, 1976b, 1976c, 1976d; Johnson 1977; Hail 1977), the project area includes the following geologic units from oldest (bottom) to youngest (top).

- Surficial deposits of Holocene alluvium (Qal).
- Unit 6 of the Uinta Formation (Tu6).
- The Black Sulphur Tongue of the Green River Formation (Tgb).
- Unit 5 of the Uinta Formation (Tu5).
- Thirteenmile Creek Tongue, upper part, of the Green River Formation (Tgtu).
- Thirteenmile Creek Tongue equivalent of the Green River Formation (Tgte).
- Stewart Gulch Tongue of the Green River Formation (Tgs).
- Unit B of the Uinta Formation (Tub).
- Coughs Creek Tongue of the Green River Formation (Tgc).
- Unit A of the Uinta Formation (Tua).

Collectively, these units represent a complex sequence of intertonguing lacustrine, deltaic, and fluvial sediments that were deposited along the fluctuating shoreline of Lake Uinta, the center of which was well to the west of the project area during the middle Eocene Epoch.

The following is a discussion of the geology and paleontology of these units, as well as their paleontological sensitivities, according to the Potential Fossil Yield Classification (PFYC) system (BLM 2007d; Murphey and Daitch 2007). The Green River and Uinta formations are discussed independently below.

Green River Formation: The Green River Formation is composed of nearly 7,000 feet of middle Eocene-age lacustrine deposits of shale, oil shale, marl, sandstone, and limestone. It preserves the transition from dominantly fluvial to dominantly lacustrine depositional environments in the Piceance Creek, Uinta, and Green River basins beginning in the early middle Eocene. At that time, a vast lacustrine depositional system, now known as the Green River Lakes, covered most of northeastern Utah, northwestern Colorado, and southwestern Wyoming (Bryant et al. 1989); although, Lake Gosiute to the north and Lake Uinta to the south may actually have never been physically connected. Lake Uinta persisted throughout much of the middle Eocene in the central Piceance Creek Basin with numerous transgressions and regressions expressed by widely fluctuating shoreline deposits. Oil shale deposits within the formation were deposited in deep

water lacustrine conditions and give the Green River Formation great economic importance. The Green River Formation interfingers with sedimentary deposits of the lateral and overlying fluvial and lacustrine Uinta Formation.

Fossils are locally abundant in some of the Eocene-age lake deposits in the Piceance Creek Basin, with large accumulations of terrestrial and aquatic vertebrates, invertebrates (particularly mollusks and insects), and plants (MacGinitie 1969; Grande 1984; Johnson and Plumb 1995). The University of Colorado Museum (UCM) has more than 4,500 vertebrate fossil specimens from the Green River Formation (member not recorded) in northwestern Colorado, including the Piceance Creek Basin. These include a diverse assemblage of fishes; amphibians (frogs); reptiles, including turtles, lizards, and crocodiles; birds, including the giant flightless carnivorous genus *Diatryma*; and mammals, including apatotheres, artiodactyls, carnivores, chiropterans (bats), condylarths, dermopterans, insectivores, marsupials, pantodonts, primates, and rodents (UCM 2001). Because of the locally abundant fossils in the Green River Formation, it is highly sensitive paleontologically and has been designated PFYC Class 5 by the BLM (Murphey and Daitch 2007).

Coughs Creek Tongue: The Coughs Creek Tongue of the Green River Formation conformably overlies the Parachute Creek Member within the study area, and joins the Parachute Creek Member just southwest of the study area. It is overlain by Unit B of the Uinta Formation, according to Hail (1977). The Coughs Creek Tongue consists of laminated buff-weathering marlstone intercalated with gray, fresh limonitic brown-weathering mudstone, siltstone, and sandstone (Johnson 1977). This tongue ranges in thickness from approximately 20 to 260 feet in the Figure Four Spring and Bull Fork quadrangles (Johnson 1977; Hail 1977). No specific information regarding the fossil content of this tongue was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Green River Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Stewart Gulch Tongue: The Stewart Gulch Tongue of the Green River Formation ranges in thickness from approximately 10 to 60 feet in the Bull Fork Quadrangle and consists of light gray to light brown laminar, even bedded to nonbedded, mostly dolomitic, variably silty marlstone, containing some marly siltstone (Hail 1977). According to Hail (1977), it is underlain by Unit B of the Uinta Formation and overlain by Unit C of the Uinta Formation. North of the Bull Fork Quadrangle, in the center of the study area, the Stewart Gulch Tongue becomes thin and silty and disappears. To the south, it contains thin beds of oil shale and eventually merges with the Parachute Creek Member (Hail 1977). No specific information regarding the fossil content of this particular tongue was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Green River Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Thirteenmile Creek Tongue, upper part, and equivalent: The Thirteenmile Creek Tongue of the Green River Formation consists of light gray to white-weathering marlstone containing a few thin, porous ostracod-charophyte-bearing limestone beds. It is underlain by Unit 4 of the Uinta Formation and overlain by Unit 5 of the Uinta Formation (Duncan 1976a, 1976b). The thickness of this unit ranges from approximately 20 to 100 feet (Duncan 1976b). No specific information

regarding the fossil content of this particular tongue was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Green River Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Black Sulphur Tongue: The Black Sulphur Tongue of the Green River Formation is composed of light gray and tan, light gray to white-weathering silty marlstone and ranges in thickness from 20 to 70 feet (Duncan 1976a, 1976b, 1976c, 1976d; Johnson 1977). It is underlain by Unit 5 of the Uinta Formation and is overlain by Unit 6 of the Uinta Formation (Duncan 1976, 1976a). No specific information regarding the fossil content of this particular tongue was found during the literature search conducted for this assessment. However, because it is an extension of the Parachute Creek Member, it should be considered paleontologically sensitive and, like the Parachute Creek Member, be designated PFYC Class 5 until additional data are available.

Uinta Formation: Strata of the Uinta Formation in the Piceance Creek Basin consist largely of distributary channel sandstone complexes with interbedded overbank deposits. In the northern Piceance Creek Basin, the distributary channels appear to have been draining into the eastern portion of Lake Uinta during Eocene time, and they interfinger extensively with the Green River Formation. In the Piceance Creek Basin, the Uinta Formation appears to be older than the type Uintan North American Land Mammal Age (NALMA) fauna of the Uinta Basin on the basis of its Bridgerian-age fossils and superpositional relationships (Hail and Smith 1994, 1997).

The Uinta Formation is scientifically important because it is the stratotype for the Uintan NALMA and represents nearly all of Uintan time (46.5 to 40.0 million years ago [Ma]) (Murphey and Evanoff 2006; Townsend 2004; Walsh 1996). Approximately 31% of modern mammalian families appear in the fossil record of North America during the Uintan NALMA (Black and Dawson 1966). Vertebrate fossils are not as common in the portion of the Uinta Formation in the Piceance Creek Basin compared to parts of the Uinta Formation in the Uinta Basin; although, this is at least in part reflective of the fact that it is more vegetated, difficult to access, and has not been as heavily prospected. Recent paleontological surveys associated with oil and gas development are adding significantly to the known fossil flora and fauna of this unit.

Plant fossils have been discovered in all Uinta Formation stratigraphic units in the Piceance Creek Basin and are considered scientifically significant because plants are relatively uncommon in the portion of the Uinta Formation in the Uinta Basin. Fossil insects are also known from the upper portion of the Uinta Formation Group C (Robinson 1978; Hail and Smith 1994, 1997). Because of the locally abundant fossils contained in the Uinta Formation, it is considered highly paleontologically sensitive and has been designated as PFYC Class 5 by the BLM (Murphey and Daitch 2007).

In the Piceance Creek Basin of Colorado, the Uinta Formation has been subdivided into Units 1 through 6 or Units A through E (Duncan 1976a, 1976b, 1976c, 1976d); however, the units are not necessarily correlative. Of those units, four (Units A, B; Units 5 and 6) are within the project area.

Unit A: Unit A of the Uinta Formation consists mostly of sandstone and siltstone in the northern part of the Bull Fork Quadrangle, brown siltstone in the southern part, platy marlstone along East

and West Willow Creeks, and silty marlstone in the western portion of the quadrangle. Unit A ranges in thickness from approximately 220 feet in the north to 50 feet in the south (Hail 1977). No specific information regarding the fossil content of this particular tongue was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Uinta Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Unit B: Unit B of the Uinta Formation is underlain by the Coughs Creek Tongue of the Green River Formation, and overlain by the Stewart Gulch Tongue of the Green River Formation. Thicknesses of Unit B range from approximately 75 to 450 feet (Hail 1977). This unit consists of sandstone, siltstone, and a few beds of marlstone; sparse clay-pebble conglomerate and tuff. Resistant beds form cliffs and ledges. No specific information regarding the fossil content of this particular tongue was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Uinta Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Unit 5: Unit 5 of the Uinta Formation consists of dominantly brown- and buff-weathering ledge-forming sandstone with minor gray and greenish-gray siltstone. The thickness ranges from 150 feet (Duncan 1976a) to 500 feet (Duncan 1976b). Unit 5 is generally overlain by the Black Sulphur Tongue of the Green River Formation and underlain by the Thirteenmile Creek Tongue of the Green River Formation (Duncan 1976a, 1976b). No specific information regarding the fossil content of this particular unit was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Uinta Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Unit 6: Unit 6 of the Uinta Formation consists of gray and buff sandstone, siltstone (Duncan 1976a, 1976d) and minor thin lenticular marlstone (Duncan 1976c), generally forming smooth upland surfaces. Thickness ranges from 80 feet (Duncan 1976b) to 550 feet and it is underlain by the Black Sulphur Tongue of the Green River Formation (Duncan 1976c). No specific information regarding the fossil content of this particular unit was found during the literature search conducted for this assessment. However, due to the high paleontological sensitivity of the general Uinta Formation, it should be considered highly paleontologically sensitive and designated as PFYC Class 5 until additional data are available.

Holocene Alluvium: According to published geologic mapping (Duncan 1976a, 1976b, 1976c, 1976d), alluvium within the project area consists of silt, sand, and gravel of modern floodplains and alluvial fans. Floodplain deposits are mostly gray, buff, and brown silt and sand. Alluvial fan deposits consist of unsorted sediments, including angular sandstone and marlstone boulders and pebbles mixed with silt and sand, and are derived from nearby hilly terrain and deposited by torrential floods. The thickness of these deposits ranges from 0 to 50 feet (Duncan 1976a, 1976b, 1976c, 1976d).

Holocene-age surficial sedimentary deposits, including alluvium, contain the unfossilized remains of modern species of animals and plants, but are too young to contain in situ fossils.

Therefore, Holocene-age alluvium within the project area has low paleontological sensitivity and has been designated PFYC Class 2 by the BLM (Murphey and Daitch 2007).

**Records Search:** To assist in the paleontological sensitivity evaluation, paleontological records maintained by the Denver Museum of Nature and Science (DMNS), UCM, Museum of Western Colorado (MWC), and the WRFO were searched to determine if any fossil localities have been previously recorded from within the project area. Fifty-seven localities have been previously documented from within the project area and are summarized in Table 16. Thirty of these localities were recorded during the paleontological survey for the Piceance Creek 3D Geophysical Investigation during the summer of 2008 (Browne et al. 2008). Types of fossils collected or observed include burrows, plants (leaves and wood), turtle, crocodile, horse, brontothere, and miacid (small carnivorous mammal).

**Table 16. Summary of Previously Recorded Fossil Localities within the Project Area (data compiled from WRFO, DMNS, MWC, and UCM).**

Field Number	Fossil Description	Geology
685	Unidentified plant	Tg
1892	** <i>Bison</i> vertebra and pelvis	?
1923	Titanotheres skull fragments	Tu
3916	Unidentified bone fragment	Tu5
3917	Brontothere skull	Tu5
3918	Brontothere skull	Tu5
3919	Unidentified foramen magnum	Tu5
3920	Unidentified teeth and tapiroid tooth	Tu5
3921	Unidentified limb element	Tu5
3922	Unidentified limb element	Tu5
3923	** <i>Bison</i> skull	Tu5
3924	Unidentified bone fragments	Tu5
3925	Unidentified bone fragments	Tu5
3930	Unidentified plant fossils	Tu5
3931	Unidentified plant fossils	Tu5
3934	Unidentified plant fossils	Tgt
3937	Unidentified plant fossils	Tu4
3938	Unidentified plant fossils	Tg
4758	Perissodactyl jaw, right m2-3 and isolated reptilian bone fragment	Tu
5054	Unidentified plant fossils, invertebrate burrows	Tu
5055	Root casts	Tu
5056	Unidentified carbonized wood	Tu
5057	Carbonized wood impressions	Tgp
5341	Plant ( <i>Macginitiea</i> )	Tu
5342	Turtle bone with internal mold of rib line	Tu
5675	6 unidentified leaves	Tg/Tu

Field Number	Fossil Description	Geology
2005017	Brontotheriidae	Tu
*080621-GEK-01	Mammalian vertebra	Tu5
*080621-PCM-01	Cf. crocodilian vertebra	Tu5
*080626-GEK-01	Turtle shell fragment (cf. Trionychidae)	Tu5
*080628-GEK-01	Fossa, possibly acetabulum	Tu5
*080630-GEK-01	Mammalian limb bone fragment	Tu5
*080710-JJS-01	Turtle shell fragment	Tu5
*080711-RKH-01	<i>Typha</i> sp.; cf. Salicaceae; unidentified stem, unidentified wood, unidentified organic plant debris	Tu5
*080712-JJS-01	Crocodilian jaw and associated fragments, turtle shell	Tu5
*080713-WLS-02	Unidentified bone fragments	Tu5
*080716-MHI-01	<i>Equisetum</i> sp.	Tu5
*080716-PAK-01	Unidentified organic plant debris, unidentified wood, unidentified dicot	Tu5
*080716-WLS-01	Mammalian astragalus, probable perissodactyl	Tu5
*080717-TLN-01	Bone fragments, gastropod and bivalve shells, possible invertebrate burrows, and plant stems	Tu6
*080718-TLN-01	<i>Parvileguminophyllum coloradensis</i> , cf. Ulmaceae,	Tu5
*080719-JJS-01	<i>Platanus</i> sp. ( <i>P. raynoldsii</i> type)	Tu5 (?)
*080719-TLN-01	Unidentified dicot	Tu6
*080720-JJS-01	<i>Rhus</i> sp.; unidentified wood, unidentified stem, unidentified organic debris; invertebrate tracks	Tu5
*080720-JMG-01	Unidentified dicot leaves	Tu5?
*080721-JMG-01	Cf. <i>Cedrelospermum nervosum</i> , insects	Tu6
*080721-MHI-01	Cf. Fagaceae leaf compression	Tu6
*080721-PAK-01	Unidentified dicots	Tu6
*080721-RKH-01	<i>Equisetum</i> sp.	Tgb?
*080721-RKH-02	Unidentified monocot or stem	Tu6
*080721-TLN-01	Cf. Leguminosae, <i>Populus cinnamomoides</i> , <i>Macginitea wyomingensis</i> , <i>Parvileguminophyllum coloradensis</i>	Tu6
*080722-RKH-01	Cf. <i>Cedrelospermum</i> sp.	Tu6
*080723-RKH-01	<i>Macginitea wyomingensis</i>	Qal (Tu6)
*080723-TLN-01	Possible beetle	Tu6
*080724-JMG-01	Unidentified plant	Tu6
*080725-TLN-01	<i>Parvileguminophyllum coloradensis</i> , unidentified fruit impressions, unidentified dicots	Tu5
*080726-PAK-01	Unidentified dicots	Tu5

\* Localities documented during the paleontological survey for the Piceance Creek 3D Geophysical Investigation.

\*\* *Bison* fossils are likely actually from either Quaternary surficial deposits or are incorrectly identified Eocene mammals.

**Field Survey:** A pre-disturbance paleontological field survey was conducted in September, October, November and December 2008 (Browne et al. 2008). The objective of the field survey

was to collect all significant fossils within seismic source points, source lines, and access routes to provide surface clearance, or to delineate avoidance areas if appropriate. Twenty-six significant fossil localities were newly recorded as well as a number of non-significant fossil occurrences. Non-significant fossils observed were poorly preserved, fragmentary, and unidentifiable. A summary of the significant localities is provided in Table 17. Fossil identifications are preliminary. All fossils collected during the field survey for this assessment are undergoing laboratory preparation, identification, and analysis; final identifications and stratigraphic positions of the significant localities will be provided in the paleontological technical report (Browne et al. 2008). After analysis, all significant fossils will be transferred along with associated data to a BLM-approved paleontological repository where they will be permanently housed and available for scientific research, education, and display.

**Table 17. Summary of Significant Fossil Localities Documented During the Field Survey.**

<b>Field Number</b>	<b>Fossil Description</b>	<b>Geology</b>
080907-DJD-01	turtle shell, large mammal premolar fragment, distal tibia	Tu5
080909-DJD-01	?Uintathere scapula	Tu5
080909-MHI-01	petrified wood, large mammal ulna, ?Uintathere skull, partial turtle shell, vertebra fragments	Tu
080913-DJD-01	nearly complete, identifiable leaf impression	Tu5
080915-DJD-01	nearly complete, identifiable leaf impression	Tu6
080917-DJD-01	nearly complete, identifiable leaf impression	Tu6
080917-MHI-01	complete, identifiable leaf impression	Tu6
080917-PAK-01	nearly complete, identifiable leaf impression	Tu5
080927-DJD-01	nearly complete, identifiable leaf impression	Tu5
080930-DJD-01	nearly complete, identifiable leaf impression	Tu6
080930-PAK-01	nearly complete, identifiable leaf impression	Tu6
081001-DJD-01	nearly complete, identifiable leaf impressions	Tu5
081002-WLS-01	nearly complete, identifiable leaf impression	Tu6
081004-LSB-01	nearly complete, identifiable leaf impression	Tu6
081008-DJD-01	nearly complete, identifiable leaf impression	Tu6
081026-DJD-01	nearly complete, identifiable leaf impression	Tu6
081027-DJD-01	nearly complete, identifiable leaf impression	Tu6
081027-PCM-01	abundant plant hash and leaves	Tu6
081117-DJD-01	nearly complete, identifiable leaf impression	Tu5
081122-DJD-01	nearly complete, identifiable leaf impression	Tu5
081122-DJD-02	nearly complete, identifiable leaf impression	Tu5
081123-SML-01	nearly complete, identifiable leaf impression	Tu6
081124-JJS-01	abundant plant hash and leaves	Tu6
081203-DJD-01	nearly complete, identifiable leaf impression	Tu6
081203-DJD-02	nearly complete, identifiable leaf impression	Tu6
081204-DJD-01	abundant plant material	Tu6

*Environmental Consequences of the Proposed Action:* Because surveys to locate, collect, and document or avoid surface fossils have been conducted for the Proposed Action, no adverse impacts to significant fossil remains as a result of the Proposed Action would be anticipated.

*Environmental Consequences of the No Action Alternative:* There would be no new impacts to paleontological resources under the No Action Alternative.

*Mitigation:* Two significant fossil localities (080909-MHI-01, 081027-PCM-01) were recommended for avoidance. No additional mitigation is recommended for the proposed geophysical investigation. The Operator would be responsible for informing all persons who are associated with the project operations that they would be subject to prosecution for knowingly disturbing paleontological sites or for collecting fossils. If additional fossils are discovered during project activities, the Operator would be required to immediately cease activities in the immediate area of the find that might further disturb such materials, and immediately contact the AO. The AO would need to inform the Operator within five working days as to whether the materials appear to be noteworthy of scientific interest and the mitigation measures that the Operator would likely have to undertake before the site could be used (assuming in-situ preservation is not feasible).

If the Operator wishes at any time to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO would assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the Operator would be responsible for mitigation cost. The AO would provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the Operator would then be allowed to resume operations.

Because of the high paleontological sensitivity of the area encompassed by the Proposed Action, additional paleontological surveys should be completed in order to provide clearance for future surface-disturbing projects that do not intersect with the source points, lines, and access routes surveyed for this assessment. Additionally, paleontological monitoring may be deemed necessary for projects that disturb paleontologically sensitive subsurface sediments.

## **RANGELAND MANAGEMENT**

*Affected Environment:* The Proposed Action would affect seven allotments (BLM 2007a). Table 18 lists the affected allotments and the total Animal Unit Months (AUMs) affected within each allotment by the Proposed Action.

*Environmental Consequences of the Proposed Action:* The Proposed Action could result in a temporary and minimal impact to livestock forage due to increased activity during the construction and cleanup of seismic lines on active rangeland. If airborne dust coats vegetation adjacent to roads, the usability of that vegetation for forage would be negatively impacted. Damage to roadside vegetation communities would also increase the potential for noxious weed infestations in the project area. Helicopter operations, OHV use, and shot detonations could cause damage to range improvements/facilities and could disrupt livestock grazing operations.

**Table 18. Project Area Affected Allotments.**

Allotment #	Allotment Name	Livestock		Authorized Use	% BLM	Total Acres	AUMs
		#	Kind				
6030	Yellow Creek	240	Cattle	5/01-5/15	100	3,150	118
		340	Cattle	5/16-6/30	100		514
		340	Cattle	10/16-12/30	100		850
6027	Square S	500	Cattle	5/16-6/10	96	24,807	410
		600	Cattle	6/11-11/30	18		178
		300	Cattle	10/16-12/15	96		578
		100	Cattle	12/16-5/15	96		477
		110	Cattle	5/1-12/15	96		795
6024	Fawn Creek	906	Cattle	5/01-6/15	70	14,853	959
		906	Cattle	6/16-10/9	5		173
		570	Cattle	10/10-11/15	70		485
		15	Horses	5/1-10/31	70		64
6026	Reagles	151	Cattle	5/1-12/15	100	9,573	953
6029	Black Sulphur	200		11/1-2/28	86	18,680	679
		50		4/1-6/15	86		107
		118		5/1-6/15	86		153
6023	Slash EV	n/a	n/a	n/a	n/a	2461.93	n/a
n/a	Null	n/a	n/a	n/a	n/a	2699.09	n/a

*Environmental Consequences of the No Action Alternative:* Under the No Action Alternative, there would be no additional impacts to livestock grazing in the project area.

*Mitigation:* Operator-committed mitigation would reduce impacts to range resources.

## REALTY AUTHORIZATION

*Affected Environment:* The project area is primarily located on BLM lands, along with some state and privately-owned properties. The Townships and Ranges for this project have over 100 authorized right-of-way (ROW) facilities located within the area. These include pipelines, power lines, flowlines, etc. For example, there is approximately 49,890 feet of powerline infrastructure and 133,069 feet of pipeline infrastructure located within the project area. Additionally, there is approximately 4,219 feet of flowline also located within the project area.

*Environmental Consequences of the Proposed Action:* No impacts to any utility structure within the project area would occur because no source lines would be located within utility ROWs. ROWs would be identified and marked in the field by survey crews prior to initiation of seismic operations. If ROWs were to be crossed, all activities would be required to comply with all applicable local, state, and federal laws, statutes, regulations, standards, and implementation plans. This would include acquiring all required state and Rio Blanco County permits, effectively coordinating with existing facility ROW holders, and implementing all applicable mitigation measures required by each permit.

*Environmental Consequences of the No Action Alternative:* None.

*Mitigation:* All activities would be required to comply with all applicable local, state, and federal laws, statutes, regulations, standards, and implementation plans. This would include acquiring all required state and Rio Blanco County permits, effectively coordinating with existing facility ROW holders, and implementing all applicable mitigation measures required by each permit. The Operator would be responsible for using data records, Colorado One Call, and physical surveys to locate existing facilities. Appropriate buffer zones, protection from cross-county travel, and safe operating procedures should be used to avoid impacts to existing facilities.

The Operator would protect all survey monuments found within ROWs. Survey monuments include, but are not limited to, General Land Office and BLM Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the Operator would be required to immediately report the incident, in writing, to the AO and the respective installing authority if known. Where General Land Office or BLM ROW monuments or references are obliterated during operations, the Operator would be required to secure the services of a registered land surveyor or a BLM cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the *Manual of Surveying Instructions for the Survey of the Public Lands in the United States* (BLM 1973).

The Operator would record such surveys in the appropriate county and send a copy to the AO. If the BLM cadastral surveyors or other federal surveyors are used to restore the disturbed survey monument, the Operator would be responsible for the survey cost.

Construction-related traffic would be restricted to routes approved by the AO. New access roads or OHV travel would not be permitted unless prior written approval is given by the AO. Authorized roads used by the Operator would be required to be rehabilitated or maintained when construction activities are complete as approved by the AO.

## **RECREATION**

*Affected Environment:* The 76,224-acre project area is located within the White River Extensive Recreation Management Area (ERMA). The BLM manages the White River ERMA for unstructured recreation activities, including hunting, dispersed camping, hiking, horseback riding, wildlife viewing, and OHV use.

The BLM's Recreation Opportunity Spectrum (ROS) classifies recreational opportunities on federal land based on elements of the setting, such as access and remoteness. Although two ROS classes are located within the project area, it should be noted that these classes have not been officially designated and are subject to change. They are Semi-Primitive Motorized and Roaded-Natural. Semi-Primitive Motorized constitutes the largest portion of the project area with approximately 61,799 acres. Lands designated under the Roaded-Natural ROS comprise approximately 14,425 acres. Factors used to determine these setting classifications include social encounters, access, naturalness, remoteness, facilities and site management, visitor impacts, and

visitor management. Generally stated, the BLM provides the following definition for these ROS classifications:

Semi-Primitive Motorized: In this class, the area has a mostly natural landscape with some evidence of others and few management controls. Activities include hunting, climbing, vehicle trail riding, backcountry driving, mountain-biking, hiking, and snowmobiling. The experience provides for isolation from human civilization, a high degree of interaction with the natural environment, and a moderate degree of personal risk and challenge.

Roaded-Natural: This class consists of areas near improved and maintained roads. Areas are mostly natural in appearance; some human modifications are evident, with moderate numbers of people, visible management controls, and developments. Activities include wood gathering, downhill skiing, fishing, OHV driving, interpretive uses, picnicking, and vehicle camping. In addition to offering these recreational activities, the BLM currently has three authorized Special Recreation Permits (SRP) for commercial outfitting and guiding during the fall big game hunting season active within the project area.

Portions of the Piceance Creek State Wildlife Area fall within the project area boundary. This State Wildlife Area provides opportunities for camping, fishing, hunting, wildlife watching, and photography. Ryan Gulch, Black Sulphur Creek, and Yellow Creek and its tributaries, including Stake Springs Draw, are designated for Recreation Secondary Contact. These surface waters are suitable, or intended to become suitable, for recreational uses other than primary contact, such as fishing and other streamside recreation. The affected segment of Piceance Creek is designated for Recreation Primary Contact. These surface waters are suitable, or intended to become suitable, for recreational activities, such as swimming, rafting, kayaking, and water-skiing.

*Environmental Consequences of the Proposed Action*: Potential impacts to recreation activities within the project area would be temporary, limited only to the duration of proposed activities. The public would lose recreation opportunities currently offered on public lands in the project area while seismic exploration activities are in progress. As such, displaced recreators would likely disperse elsewhere within the White River ERMA, thus increasing human interaction in these areas. Hunter recreational activities may be disrupted due to the seismic activities if the Proposed Action coincides with the hunting season (September through November). Furthermore, the use of helicopters in the area for fire detection and other related activities has the potential to impact hunting activities. Helicopter noise may prevent game species from inhabiting the area, subsequently diminishing the availability of these species for hunters. Recreation activities may also be temporarily impacted due to increased traffic levels resulting from seismic activities. This would also increase the likelihood of human interactions, increase the sights and sounds associated with the human environment, and create an environment that appears less natural than existing conditions. Anecdotal evidence indicates that as industry activity increases through the development of more roads, wells, pipelines and related projects, it is becoming more challenging to attract clients during the fall hunting seasons due to the general perception that no big game animals would be located in these industrialized areas. However, it is expected that recreation activities would resume to existing conditions once proposed seismic activities cease.

*Environmental Consequences of the No Action Alternative:* The No Action Alternative would have no impact on recreation within the project area.

*Mitigation:* If operations occur during the rifle hunting season, October through November, seismic operation crews would wear the appropriate amount of daylight florescent orange to make them visible to hunters using the area.

## **WILD HORSES**

*Affected Environment:* The northwest corner of the project area overlaps approximately 6,600 acres in the eastern portion of the 190,130 acre Piceance-East Douglas wild horse herd management area (HMA). BLM manages the Piceance-East Douglas herd in a manner designed to ensure a healthy, viable breeding population. The maximum number of horses sustainable on a year-long basis, or appropriate management level (AML), is 235 horses for the Piceance-East Douglas herd. To maintain the AML, the BLM occasionally gathers wild horses and offers them to the public through an adoption program. The next potential horse gather for the HMA is planned for the fall of 2009. Foaling season for this herd occurs from approximately March 1 to June 15 each year.

*Environmental Consequences of the Proposed Action:* Wild horses inhabiting the project area would be temporarily displaced during project activities. Horses may experience increased stress from human presence and noise, particularly overhead noise from the heliportable drill. Helicopter activity may interfere with wild horse gathering, if scheduled during the same time. However, the next planned gather is not until the fall of 2009. Project activities are scheduled to be conducted from December through May, which coincides with the spring breeding and foaling period. Duration of the activity in the HMA during foaling season will be short term and should not impair the movement of the horses. The Proposed Action is not expected to impact the herd population to levels below the AML.

*Environmental Consequences of the No Action Alternative:* There would be no project-related impacts to wild horses in the Piceance-East Douglas herd.

*Mitigation:* Should the Proposed Action occur simultaneous with a wild horse gather, all project-related helicopter traffic would be coordinated with the BLM and the helicopter pilots contracted for the gather. To minimize the incident of young foals becoming dislocated from their mares, helicopter should avoid flights over horses observed in the area, drilling and receiving crews would be required to slow or stop when wild horses are encountered, allowing bands to move away at a pace slow enough so that foals can keep pace and are not separated.

**CUMULATIVE IMPACTS SUMMARY:** This action is consistent with the scope of impacts addressed in the White River ROD/RMP (BLM 1997a). The cumulative impacts of energy-related development are addressed in the White River ROD/RMP for each resource value that would be affected by the Proposed Action. The short-term duration (4 months) of seismic survey activity and of impacts would result in negligible cumulative impacts for most resources and no long-term cumulative impacts following cessation and reclamation of the proposed seismic survey project.

**PERSONS / AGENCIES CONSULTED:** None

**INTERDISCIPLINARY REVIEW:**

<b>Name</b>	<b>Title</b>	<b>Area of Responsibility</b>
<b>BLM Oversight</b>		
Bob Lange	Hydrologist	Air Quality, Water Quality, Surface and Ground Hydrology and Water Rights, Soils, Wastes, Hazardous or Solid
Michael Selle	Archeologist	Cultural Resources, Paleontological Resources
Mark Hafkenschiel	Rangeland Management Specialist	Invasive, Non-Native Species, Vegetation , Rangeland Management
Ken Holsinger	Botanist	Hazardous or Solid, Areas of Critical, Threatened and Endangered Plant Species
Heather Sauls	Wildlife Biologist	Migratory Birds, Threatened, Endangered, and Sensitive Animal Species, Wetlands and Riparian Zones, Aquatic and Terrestrial Wildlife
Jim Michels	Prescribed Fire/Fuels Technician	Wilderness, Access and Transportation, Recreation, Fire Management, Forest Management Visual Resources
Penny Brown	Realty Specialist	Realty Authorizations
Paul Daggett	Mining Engineer	Geology and Minerals
Melissa Kindall	Range Technician	Wild Horses
<b>Name</b>	<b>Title</b>	<b>Area of Responsibility</b>
<b>SWCA (Third-Party Contractor)</b>		
Chad Baker	EA Manager	
LB Myers	Environmental Specialist	Water Quality, Soils, Hydrology and Water Resources
Doug Faulkner	Biologist	Migratory Birds, Wildlife, T&E Species, Wild Horses, Wetland and Riparian
Matt Loscalzo	Environmental Specialist	Air Quality, Recreation, Forest and Fire Management, Hazardous Waste, Realty
Rebecca Schwendler	Archaeologist	Cultural Resources
Timothy Oldham	Botanist	Areas of Critical Environmental Concern, Invasives, Vegetation, Sensitive Plants, Rangeland Management
Lori Browne	Paleontologist	Paleontology
Scott Phillips	Archaeologist	Cultural Resources
Hillary Browning	Environmental Specialist	Geology
Chris Haas	Environmental Specialist	Access and Transportation

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# **Finding of No Significant Impact/Decision Record (FONSI/DR)**

## **CO-110-2008-273-EA**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI)/RATIONALE:** The environmental assessment and analysis of the environmental effects of the Proposed Action have been reviewed. The approved mitigation measures (listed below) result in a Finding of No Significant Impact on the human environment. Therefore, an environmental impact statement (EIS) is not necessary to further analyze the environmental effects of the Proposed Action.

SWCA Environmental Consultants, an environmental consulting firm, with the guidance, participation, and independent evaluation of the Bureau of Land Management (BLM), prepared this document. The BLM, in accordance with 40 CFR 1506.5 (a) and (c), is in agreement with the findings of the analysis and approves and takes responsibility for the scope and content of this document.

**DECISION/RATIONALE:** It is my decision to approve the implementation of the Ryan Gulch 3D Seismic (Williams/Green River Energy Resources) Project as described in the Proposed Action and submitted plan of operations with the mitigation measures listed below.

**MITIGATION MEASURES:** Mitigation required for this project is discussed below for each resource for which mitigation is warranted.

1. Mitigation measures include the following:

- All geophysical operations shall be executed in accordance with applicable federal, state, and local regulations. Measures shall be taken to ensure that flagging associated with other projects shall not be removed.
- All geophysical operations shall be conducted in accordance with BLM Handbook H-3150-1 and Manual.
- All geophysical operations shall be conducted in accordance with Conditions of Approval (COAs) developed from the Resource Management Plan (RMP) for the BLM White River Field Office (WRFO).
- Operator shall inform the BLM Authorized Officer (AO) approximately one week prior to commencement of actual surveying. Exclusion zones identified by the block inventories for biological and archeological resources shall be plotted prior to commencement of civil surveying. Weekly progress reports shall be provided to the AO during drilling and recording activities. Daily progress reports may be required when working in areas of sensitive wildlife resources (mule deer winter range, sage grouse, and raptor nesting).

- Operator shall employ, at its expense, a professional third-party QA/QC monitor for the duration of the survey to ensure that civil survey operations result in no undue impacts to surface resources.
  - Source point placement shall comply with BLM Handbook H-3150-1, Illustrations 10 and 16 (Appendix E) and applicable state regulations. Safe operating distances to pipelines, telephone lines, railroad tracks or highways, electric power lines, water, and oil and gas wells would be determined by the charge size and depth.
2. General Mitigation
- No off route travel except by drill buggies shall be allowed.
  - Green River Energy Resources shall provide a qualified, independent third-party contractor to perform general oversight, inspection and compliance responsibilities for permitted field operations associated with the proposed seismic project on public lands. Prior to the initiation of permitted seismic operations, pre-work meetings shall be held between the BLM WRFO, Green River Energy Resources, and this Third Party Field Observer. Project procedures relating to hazard spills, trash, slopes, drainage crossings, spring/seep avoidances, seasonal restrictions, off-road travel, helicopter operations, and paleontological/cultural /biological resources and reporting requirements shall be reviewed at the meeting.
  - The operator shall coordinate activities and cooperate with all concurrent seismic operations. This includes, but is not limited to, all helicopter activity, surveying, drilling, laying line, recording and clean-up.
3. Mitigation required for cultural resources includes the following:
- Impact avoidance shall be accomplished by redesigning project source lines/points, and cross-country vehicle access routes to travel around cultural resource sites, and by hand-laying receiver lines across and near linear historic resources. Most cultural resource sites shall be avoided by source lines, receiver lines, and other travel routes by a minimum distance of 30 m (100 feet), but all wickiup sites, rock art sites, other cultural resource sites connected to rock outcrops, and NRHP-eligible standing historic structures shall receive increased avoidance of at least 100 m (300 feet) from shot holes.
  - The open architectural features, rock art sites, and standing buildings, as well as NRHP-eligible sites and unevaluated sites that have receiver geophones within the site boundary, shall have active monitoring during project operations at these locations. An exception to this policy of site avoidance may be made in winter conditions. If a minimum of 6 inches of snow is on the ground and if the ground is frozen, receiver lines may be placed across some cultural resource sites after consultation with—and with the approval of—the BLM-WRFO. If impacts could not be avoided or if significant cultural resource sites were damaged by operations, acceptable mitigation in the form of data recovery activities shall take place at the expense of the project Operator (BLM 2007b).

- All employees of the Operator and any subcontractors shall be informed by the project Operator before commencement of operations that any disturbance to, defacement of, or removal of archaeological, historical, or cultural material (including pot sherds and arrowheads) shall be treated as law enforcement/administrative issues. The project Operator shall be held accountable for the conduct of its employees and subcontractors in this regard.
- If subsurface cultural materials are discovered during operations, all work in the vicinity of the resource shall cease, and the BLM authorized officer (AO) shall be notified immediately. The Operator shall take any additional measures requested by the AO, including the possibility of hiring a qualified archaeologist to carry out specific instructions. Within five working days of the reported discovery, the AO shall inform the Operator as to:
  - whether the materials appear eligible for the NRHP;
  - the mitigation measures the Operator shall have to undertake before the site can be used (assuming in situ preservation is not necessary); and
  - the timeframe for the AO to complete an expedited review under 36 CFR 800-11 to confirm, through the State Historic Preservation Officer (SHPO), that the findings of the AO are correct and that mitigation is appropriate.

If the Operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO shall assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the Operator shall be responsible for mitigation cost. The AO shall provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the Operator shall then be allowed to resume construction.

- Pursuant to 43 CFR 10.4(g), the holder of this authorization (i.e., the Operator) must immediately notify the AO by telephone and with written confirmation upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the Operator must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the AO.
- No receiver points will be located in cultural sites 5RB322, 5RB393, 5RB831, 5RB4741, and 5RB5024.
- A monitor shall be required during operation and/or reclamation activities to ensure that the avoidance measures established for this project are followed, and no inadvertent damage occurs to cultural properties in the APE. While a final monitoring plan shall be developed in coordination with and approved by the BLM, active monitoring is recommended for the following:
  - All NRHP-eligible sites with wickiups, rock art, or standing historic structures. The monitor shall ensure that all work and access occur at least 100 m (300 feet) from the established boundaries of those sites. This includes operations by both buggy and helicopter.

- NRHP-eligible sites and unevaluated sites that have geophones within the site boundary (no pilot holes would be used).
- Post-operation inspection in the following order of priority:
  - i. Any site receiving operational monitoring above, in the same order of priority above (or that have been advanced along the priority queue due to concerns newly arising), to be checked after operations pass, where/when productive.
  - ii. Sites where unimproved two-track roads pass through, but project access has not been permitted (some of these may also be inspected prior to project operations to check apparent level/recentness of existing use by non-project traffic).
- If a minimum of 6 inches of snow is on the ground and if the ground is frozen, receiver lines may be placed across some cultural resource sites after consultation with—and with the approval of—the BLM-WRFO (Michael Selle [BLM-WRFO], personal communication with Scott Slessman [SWCA], October 14, 2008). Geophones will be placed within the site boundary (no pilot holes would be used) where there is six inches of snow to allow for the packing of the geophones. If there not enough snow available, receiver points will be dropped from the cultural resource site.
- Additional stipulations may be added in some cases where additional protection would be needed. Examples may include, but are not limited to, the following: use of portable (helicopter) operations; cultural resource monitor for all operations in sensitive areas; weather restrictions; frequent compliance checks and contacts with all operational personnel on site; site fencing or restrictive use barriers; requirement for identification and monitoring of sites made more susceptible to vandalism or collection because of proposed land use; verification of site locations, even if a Class III inventory had previously been conducted; and special reclamation measures to reduce erosion.

4. Mitigation required for air quality includes the following:

- All activities shall be required to comply with all applicable local, state, and federal air quality laws, statutes, regulations, standards, and implementation plans. Documentation of this compliance shall be provided to the BLM.
- All vehicles, helicopters, and construction equipment shall be properly muffled to minimize noise, properly maintained in good operating condition so that engines run efficiently, and emission controls properly maintained to ensure effective pollutant emission reductions. The Operator shall have a mechanic on site to ensure proper exhaust systems.
- Vehicle speeds shall be limited on associated access roads to 15 miles per hour (mph) or speeds such that a dust plume is not visible at the appropriate designated speed for that road.

- If project activities occur between April 15 and November 15, the Operator shall apply water and/or a BLM-approved chemical dust suppressant on roads used to access the area with crews, during dry periods when dust plumes are visible at speeds less than or equal to 15 mph (the BLM shall be informed about the source and amount of all water used).
5. For mitigation of noxious weeds, the Operator shall be responsible for certain activities. Materials and methods shall be approved in advance by the AO. These activities include the following:
- Performing preconstruction surveys for noxious weed infestations within the site boundaries and along access roads.
  - Consulting with the BLM and Rio Blanco County Cooperative Extension to determine treatment for noxious weeds, if identified; materials and methods shall be approved in advance by the AO.
  - Requiring construction vehicles and equipment to be cleaned, power-washed, and free of soil and vegetation debris prior to entering into the project area and using access roads to prevent the transport of weed seeds.
  - Requiring all seed mix, erosion control materials, and reclamation materials to be certified weed-free.
  - Monitoring revegetated areas for at least three years following seeding to evaluate the need for supplemental seeding and noxious weed control.
  - Monitoring seismic lines and other disturbed areas for noxious weed infestations, and controlling or eradicating new or expanding weed populations for the duration of the construction, operation, and reclamation phases.
  - Developing and implementing management measures to prevent the spread of noxious weeds, due to the presence of Class C weeds in the project area.
6. The following are mitigation for threatened, endangered, and sensitive species:
- Impacts to wildlife, raptors, and special status species shall be mitigated by practicing avoidance according to biological surveys conducted prior to the initiation of drilling and recording operations. No extended period of surface occupancy activities shall occur in the vicinity of sensitive species.
  - No operations shall be conducted within areas closed due to seasonal timing limitations without prior written approval from the BLM. Operations conducted inside areas of concern during seasonal timing limitations shall be monitored by a BLM-approved wildlife monitor and behavior shall be documented. In the event that geophysical activities are found disturbing to monitored wildlife, activities in that area shall immediately cease until such time as those concerns are relieved or wildlife have completed their use of the area.
  - No disruptive activity (including on-the-ground or overhead activities within 300 feet of ground level) are permitted from February 1 to August 15 (or until dispersal of

young) within 0.25 mile of nest sites (both active and inactive nests in good functional condition) of golden eagles and great horned owls.

- No disruptive activity (including on-the-ground or overhead activities within 300 feet of ground level) are permitted from April 1 to August 15 (or until dispersal of young) within 0.5 mile of nests (both active and inactive nests in good functional condition) of BLM sensitive raptor species and within 0.25 mile of nest sites (both active and inactive nests in good functional condition) of all other raptor species (except American kestrels for which there are no restrictions).
- Areas within 0.5 mile of raptor nests identified in the SWCA 2008 *Raptor Inventory Report for the Williams Ryan Gulch Project, Rio Blanco County, Colorado* shall not be used for helicopter staging or landing zones unless information is provided to the BLM verifying nest inactivity.
- From February 1 through August 15, helicopter support of seismic operations shall not be allowed in canyons with substantive cliff series or rock outcrops, including Ryan, Corral, and Yankee gulches and Black Sulphur and Fawn creeks, unless these areas are specifically cleared for raptor nest activity.
- Any new nests discovered during work shall be reported within 24 hours by phone or E-mail to the BLM Natural Resource Specialist responsible for raptor monitoring oversight (i.e., Brett Smithers, Phone: (970) 878-3818, E-mail: brett\_smithers@blm.gov). Protections for these locations shall be handled on a case-by-case basis.
- Requests for buffer and timing limitation modifications or exceptions shall be handled on a case-by-case basis. Nests must be visited between May 15 and August 15 in order to determine activity status. If nests sites are determined to be inactive during the 2009 breeding season then timing limitations shall not apply to those locations.
- A meeting with BLM wildlife biologists shall take place no later than 30 days prior to raptor nest timing restrictions to update project progress and address potential conflicts and resolution issues.
- If seismic-related activities are expected to occur beyond February 15, once seismic-related activities begin, in order to monitor possible behavioral impacts to known active woodland raptors, effective on February 1, the operator shall notify the BLM Natural Resource Specialist responsible for raptor monitoring oversight (i.e., Brett Smithers, Phone: (970) 878-3818, E-mail: brett\_smithers@blm.gov), on Monday of each week and provide an update on the status of where all ground crews associated with seismic activities are working. The individual responsible for providing this information shall identify those shot and receiver lines that are expected to be visited by ground crews, and these lines shall be identified either as unique line segments and submitted by phone or E-mail, or depicted in an associated map and submitted via E-mail. In addition, information related to which segments of shot and receiver lines shall be visited during the week (i.e., from Monday to Sunday) shall be provided.

- No disruptive activity (including overhead travel by helicopters within 300 feet above ground level) shall occur within 4 miles of an active greater sage-grouse lek between April 1 and August 1.
  - For sections in Township 3 South and Ranges 98 and 99 West where sage-grouse habitat and nesting areas are known to occur, operations shall commence in the southwest corner and consist of a single set of six heliportable drills. These operations shall proceed northward, clearing this area before timing limitations would present possible conflict with sensitive species.
  - All recorded populations of sensitive plant species would be avoided by 100 feet.
7. The following are mitigation for waste:
- Daily, the Operator shall collect and properly dispose of all waste, including pin flags, flagging, and other debris generated by this project, at an approved waste disposal site.
  - The Operator shall be required to submit its Spill Prevention Containment and Countermeasure Plan to the AO prior to scheduled start-up. If the Operator encounters any waste dump sites on or adjacent to the project area, they shall be required to be reported to the BLM.
  - All refueling shall occur on existing roads and absorbent pads shall be used while refueling to prevent a potential fuel spill. In the event of a spill of lubricants, hydraulic fluid, or any other hydrocarbon during seismic activities, the Operator shall immediately cease activities within the area and contain and clean up the affected area immediately. Any contaminated vegetation and soil shall be removed and disposed of in an approved waste disposal facility. An approved disposal site shall be located before operations begin. The Operator shall have absorbents onsite for spill containment. After cleanup is complete, the spilt substance(s) and materials used for cleanup shall be removed from the project area and disposed of at an approved disposal facility. All spills shall be immediately reported to the appropriate surface management agency.
8. The following are mitigation for water quality:
- Travel shall be avoided within 500 feet of perennial waters and wetlands including not locating cross country routes and limiting buggies to one pass when possible.
  - Prohibit blasting within 100 feet of perennial surface water features to help mitigate potential bank destabilization.
  - No operations within 660 feet of federally owned or controlled springs and flowing water wells shall be allowed.
  - Do not remove wetland/riparian vegetation during the placement of geophones.
  - Vehicles shall not cross perennial water features, except on existing roads.
  - Use existing travel ways when possible and minimize operations in floodplains and riparian areas. Limit the disturbance of vegetation and the removal of ground cover when drill buggies are used off existing roads.

- In areas that receive noticeable impacts on vegetation and ground cover (e.g., locations that may create increased off-highway vehicle [OHV] use by the public), take care to restore ground cover and inhibit unauthorized motorized vehicle use. A report shall be provided to the AO that describes where this reclamation was needed and what actions took place to restore the ground cover.
  - Buggies and/or other vehicles shall not traverse vertical banks higher than 2 feet without prior approval from the BLM.
9. The following are wetland and riparian mitigation measures:
- Vehicular traffic across dry drainage channels shall be limited to sloping side backs or to vertical banks less than 2 feet high. Crossing routes shall be aligned to be perpendicular to a stream channel, to the extent practicable.
  - Minimum distances from source point placement shall conform to BLM Handbook H-3150-1, Illustrations 10 and 16 (Appendix E) and applicable state regulations.
  - No operations other than receiver placement shall be performed within 660 feet of a spring or water well.
  - Drill holes shall be offset to avoid known riparian areas, wetlands, sensitive plants, steep slopes, or other areas of concern.
  - Vehicles shall not cross perennial water features, except on existing roads or predesignated crossings without prior approval from the BLM. Driving and other activities shall be limited and avoided, to the extent possible, during survey and seismic operations along Black Sulphur Creek. No vehicles are authorized to cross channels that contain riparian or wetland growth until crossing points and a complete rehabilitation plan is agreed to by BLM and the Operator.
  - No shot holes shall be drilled within 100 feet of perennial surface water features.
  - Helicopters shall be used to drop equipment to support placement of recording lines to reduce surface disturbance.
10. The following are soil mitigation measures:
- Drilling shall be conducted no closer than 100 feet from edges of cliffs or upland escarpments.
  - Drilling and data acquisition operations shall use existing roads and trails, where possible.
  - To minimize surface disturbance, drilling vehicles shall, where possible, proceed from one source location to another with one pass per source line. The number of times that vehicles pass over their designated routes shall be minimized to the greatest degree possible.
  - Residual cuttings from the drill hole shall be spread so that they are approximately 2 inches or less in depth.
  - To minimize soil erosion, heliportable drills shall be used on slopes greater than 25 %.

- No blading or other dirt work shall be allowed without specific written permission from the AO.
- Prime and other Important Farmland soils shall be avoided by the project, if possible.
- No vehicle travel would occur on slopes greater than 40% and no surface disturbing activities would occur on slopes greater than 60% or on fragile soils occurring on slopes greater than 35%.
- Justification and potential mitigation shall be described for all source points and travelways on steep slopes and/or on fragile soils.
- Disturbed areas, where a site will not naturally revegetate in a reasonable time or areas where soil stability is threatened by seismic operations, shall be reseeded using a seed mix specified by the AO at a time when seed germination is facilitated by natural conditions. Specific measures and locations for use shall be determined by personnel from the Operator and the BLM.
- The Operator shall minimize the potential for soil compaction by having all source generation vehicles on a source line or access route slightly offset their tracks to the extent possible.
- Rehabilitation of disturbed areas shall be performed concurrent with the exploration operation.

11. The following are vegetation mitigation measures:

- If project activities occur between April 15 and November 15, the Operator shall be required to water surface access roads to reduce airborne dust and damage to roadside vegetation communities.
- Revegetation shall be required on all disturbed areas not necessary for production with a seed mix approved by the BLM.
- The Operator shall monitor the project area for a minimum of three years post completion to detect the establishment of noxious weeds on disturbed sites. Noxious weeds shall be eradicated using materials and methods approved by the AO.
- Forest product removed in the process of construction shall be inventoried and purchased from the BLM prior to removal activities. This is in compliance with Appendix B, Conditions of Approval 7 of the RMP.

12. The following are general wildlife mitigation measures:

- No operations shall be conducted inside mule deer severe winter range from January 1 through April 30 without prior written approval from the BLM. If an exception or modification is granted, operations conducted inside severe winter range during seasonal timing limitations that may disrupt big game behavior or habitat utility shall be monitored and documented as directed by the WRFO ROD/RMP. Operations shall proceed in a direction dictated by daily planning with the qualified wildlife biologist so that wintering ungulates are avoided to the greatest degree possible.

13. Mitigation measures for access and transportation include the following:

- All activities shall be required to comply with all applicable local, state, and federal transportation laws, statutes, regulations, standards, and plans. Activities shall strictly adhere to Gold Book fourth edition surface operating standards for oil and gas exploration and development and BLM manual section 9113 on roads.
- All county roads shall be maintained in their current condition or better. Continuous inspection shall be performed and preventative maintenance measures shall be taken on a biannual basis. These measures may include grading, cleaning drainage structures, erosion control and slope stabilization, and road closures during periods of excessive soil moisture.
- Access points by buggies off of existing roads shall not occur perpendicular to the road, and travel between seismic testing locations shall occur at angles (i.e., zig-zag fashion, not a continuous linear route) to reduce the perception to the public that such routes are open for travel.
- Traffic shall be limited on BLM-administered lands in the upper portions of the Black Sulphur Creek to reduce impacts to sensitive resources in this drainage.
- Further mitigation of impacts to access and transportation shall be achieved through management practices including:
  - using a construction yard as the primary parking for personal vehicles;
  - requiring contractors and employees to comply with all posted speed limits;
  - complying with county and state weight restrictions and limitations;
  - controlling dust along unsurfaced access roads and minimizing the tracking of mud onto paved roads; and
  - ensuring post-construction restoration of unsurfaced roads to equal or better conditions than existed before construction.

14. The following are committed fire and safety mitigation measures:

- The Operator's standard safety procedures and applicable federal, state, and local regulations shall be followed during shot detonation. A pre-operations meeting shall be held to review all safety procedures for shot detonation.
- Each shot shall be cleared and secured by the trained shooting personnel prior to its detonation. The Operator operates under Bureau of Alcohol, Tobacco and Firearms (BATF) License 9-MT-029-33-8D-00367 and in accordance with Title 27, Code of Federal Regulations Part 55 – Commerce in Explosives. All employee possessors are personally authorized through BATF to handle and transport explosives, and ultimate responsibility for explosives handling rests with the Operator's principals. Explosives storage shall be conducted in compliance with BATF requirements. The magazine shall be located on private or state land and shall meet all applicable requirements.

- Shot holes shall be distanced from wells and high-pressure pipelines by a distance of at least 202 feet if using a 20-pound charge (BLM Handbook H-3150-1, Illustration 10). All involved utility and production companies shall also be contacted for compliance.
  - All ATVs shall be equipped with spark arrestors. All vehicles shall be equipped with fire extinguishers and shovels. Any helicopter on location shall be equipped with a water bucket. The Operator shall coordinate project activities with fire personnel in the WRFO.
  - Helicopter use coordination with the Craig Interagency Dispatch shall occur on a regular basis through the duration of the project. This would help detect and prevent both natural and accidental fire ignitions and hazards. Fires located within the project area shall also be reported to the Craig Interagency Dispatch.
15. The following are committed geology/mineral mitigation measures:
- Mineral lease holders shall be notified prior to initiating the seismic activities to avoid impacts to their operations.
16. The following are committed hydrology and water rights mitigation measures:
- All activities shall be required to comply with all applicable local, state, and federal water laws, statutes, regulations, standards, and implementation plans. Only properly permitted water sources shall be used for dust abatement. For additional mitigation, refer to the mitigation outlined in the Water Quality, Surface and Ground section and the Geology and Minerals Section of the Environmental Assessment.
17. Potential adverse impacts on paleontological resources shall be mitigated to below the level of significance by implementing the following programmatic mitigation measures. It is not necessary to monitor low sensitivity Holocene-age alluvium that is thicker than the depth of the proposed surface disturbance.
- Two significant fossil localities (080909-MHI-01, 081027-PCM-01) shall be avoided.
  - The Operator shall be responsible for informing all persons associated with the project operations that they shall be subject to prosecution for knowingly disturbing paleontological sites or for collecting fossils. If additional fossils are discovered during project activities, the Operator shall be required to immediately cease activities in the immediate area of the find that might further disturb such materials, and immediately contact the AO. The AO shall inform the Operator within five working days as to whether the materials appear to be noteworthy of scientific interest and the mitigation measures that the Operator shall have to undertake before the site can be used (assuming in-situ preservation is not feasible).
  - If the Operator wishes at any time to relocate activities to avoid the expense of mitigation and/or the delays associated with this process, the AO shall assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the Operator shall be responsible for mitigation cost. The AO shall provide technical and procedural guidelines for the conduct of mitigation. Upon

verification from the AO that the required mitigation has been completed, the Operator shall then be allowed to resume operations.

- Because of the high paleontological sensitivity of the area encompassed by the Proposed Action, additional paleontological surveys shall be completed in order to provide clearance for future surface-disturbing projects that do not intersect with the source points, lines, and access routes surveyed for this assessment. Additionally, paleontological monitoring may be deemed necessary for projects that disturb paleontologically sensitive subsurface sediments.

18. Mitigation measures for rangeland shall include the following:

- If a fence must be crossed by vehicular traffic, the contractor shall provide advance notice to the appropriate AO.
- Gates shall be used for crossing fences wherever practical. If a fence must be crossed by a vehicle at a location other than an existing gate, the appropriate AO shall be contacted before any activity is started at any fence crossing location and specified procedures shall be followed.

19. Realty mitigation shall include the following:

- All activities shall be required to comply with all applicable local, state, and federal laws, statutes, regulations, standards, and implementation plans. This shall include acquiring all required state and Rio Blanco County permits, effectively coordinating with existing facility right-of-way (ROW) holders, and implementing all applicable mitigation measures required by each permit. The Operator shall be responsible for using data records, Colorado One Call, and physical surveys to locate existing facilities. Appropriate buffer zones, protection from cross-county travel, and safe operating procedures shall be used to avoid impacts to existing facilities.
- The Operator shall protect all survey monuments found within ROWs. Survey monuments include, but are not limited to, General Land Office and BLM Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the Operator shall be required to immediately report the incident, in writing, to the AO and the respective installing authority, if known. Where General Land Office or BLM ROW monuments or references are obliterated during operations, the Operator shall be required to secure the services of a registered land surveyor or a BLM cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the *Manual of Surveying Instructions for the Survey of the Public Lands in the United States*.
- The Operator shall record such surveys in the appropriate county and send a copy to the AO. If the BLM cadastral surveyors or other federal surveyors are used to restore the disturbed survey monument, the Operator shall be responsible for the survey cost.

- Construction-related traffic shall be restricted to routes approved by the AO. New access roads or OHV travel shall not be permitted unless prior written approval is given by the AO. Authorized roads used by the Operator shall be required to be rehabilitated or maintained when construction activities are complete as approved by the AO.

20. The following are committed recreation mitigation measures:

- If operations occur during the rifle hunting season, October through November, seismic operation crews shall wear the appropriate amount of daylight florescent orange to make them visible to hunters using the area.

21. The following are committed wild horse mitigation measures:

- Should the Proposed Action occur simultaneous with a wild horse gather, all project-related helicopter traffic would be coordinated with the BLM and the helicopter pilots contracted for the gather. To minimize the incident of young foals becoming dislocated from their mares, helicopter should avoid flights over horses observed in the area, drilling and receiving crews would be required to slow or stop when wild horses are encountered, allowing bands to move away at a pace slow enough so that foals can keep pace and are not separated.

**COMPLIANCE/MONITORING:** Compliance monitoring shall be conducted by the WRFO staff in the first year of the project with a follow up in three to five years.

**NAME OF PREPARER:** Chad Baker (SWCA Environmental Consultants)

**NAME OF ENVIRONMENTAL COORDINATOR:** Caroline Hollowed

**SIGNATURE OF AUTHORIZED OFFICIAL:** *Baker S Baker*  
for Field Manager

**DATE SIGNED:** *December 5, 2008*

**ATTACHMENTS:** Figure 1. Project location of Williams 3D Geophysical Exploration (Seismic) Project, Rio Blanco County, Colorado.

Figure 2. Location of source and receiver lines for Williams 3D Geophysical Exploration (Seismic) Project, Rio Blanco County, Colorado.

Appendix A: Maps A1 – G3

APPENDIX A