United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-CO-N05-2015-0119

Wiley 3D Seismic

October 2015

U.S. Department of the Interior
Bureau of Land Management
Northwest District
White River Field Office
220 East Market St
Meeker, CO 81641

BLM

TABLE OF CONTENTS

List of Tables

1. INTRODUCTION

1.1. Identifying Information

Project Title: Wiley 3D Seismic

Legal Description: T.2N R.97W Sections 1-4;

T.3N R.96W Sections 5-8, 17-20, 3-31;

T.3N R.97W Sections 1-5, 8-17, 21-28, 33-36.

Applicant: Dawson Geophysical Company

NEPA Document Number: DOI-BLM-CO-N05-2015-0119-EA

Lease/Casefile/Project Number: COC-077400

1.2. Background

Endeavour Colorado Corporation and Augustus Energy Partners have proposed a three-dimensional (3D) geophysical data acquisition project (Wiley 3D seismic survey) to examine the subsurface geologic structure below 28.25 square miles, or 18,080 acres, in Rio Blanco and Moffat County, Colorado. A Notice of Intent (NOI) was submitted on December 18, 2013, and re-filed with updated information on September 2015 by Dawson Geophysical Company (Dawson) in the Bureau of Land Management's (BLM) White River Field Office (WRFO). Dawson requests to conduct the Wiley 3D seismic survey on behalf of Endeavour Colorado Corporation/ Augustus Energy Partners, which holds oil and gas leases in the area.

1.3. Purpose and Need for Action

The purpose of the action is to increase understanding of the subsurface geologic structure below the survey area in order to strategically plan for the development of existing leases and to determine the development potential of adjoining unleased areas. The need for the action is respond to an application to conduct a 3D geophysical survey.

1.4. Decision to be Made

Based on the analysis contained in this EA, the BLM would decide whether to approve or deny the proposed Wiley 3D Seismic project and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA), the BLM must determine if there are any significant environmental impacts associated with the Proposed Action warranting further analysis in an Environmental Impact Statement (EIS). The Field Manager is the responsible officer who would decide one of the following:

- To approve the seismic project with design features as submitted;
- To approve the seismic project with additional mitigation added;
- To analyze the effects of the Proposed Action in an EIS; or
- To deny the seismic project.

1.5. Conformance with the Land Use Plan

The Proposed Action is subject to and is in conformance (43 CFR 1610.5) with the following land use plan:

Land Use Plan: White River Record of Decision and Approved Resource Management Plan (ROD/RMP) (July 1997)

Relevant Amendments: White River Field Office Oil and Gas Development Approved Resource Management Plan Amendment (ROD/RMPA) (August 2015)

Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment (September 2015)

Decision Language: "Make federal oil and gas resources available for leasing and development in a manner that provides reasonable protection for other resource values." (Oil and Gas RMPA, page 2-34)

In priority sage-grouse habitat, "Allow geophysical exploration within PHMA [priority habitat management area] to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations only using helicopter-portable drilling, wheeled or tracked vehicles on existing roads, or other approved methods conducted in accordance with seasonal TLs [timing limitations] and other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during their season of use by GRSG [greater sage-grouse]." (Sage-Grouse RMPA, page 2-15)

2. PUBLIC INVOLVEMENT

2.1. Scoping

The principal goals of scoping are to identify issues, concerns, and potential impacts that require detailed analysis. Scoping is both an internal and external process.

Internal scoping was initiated when the project was presented to the White River Field Office (WRFO) interdisciplinary team on September 22, 2015. External scoping was conducted by posting this project on the WRFO's on-line National Environmental Policy Act (NEPA) register on September 22, 2015.

3. PROPOSED ACTION AND ALTERNATIVES

3.1. Proposed Action

3.1.1. Project Components and General Schedule

The Wiley 3D seismic survey would take place approximately 25 miles northwest of Meeker, Colorado (Figure 1).The seismic survey area would be accessed by traveling on designated roads and access granted by private surface owners for the crew and equipment. The seismic survey area includes approximately 9,480 acres of BLM-administered federal land and 480 acres of land owned by the State of Colorado. Private surface covers 8,120 acres of this 3D prospect. Table 1 displays details of the lands that would be included in the survey

Table 1. Breakdown of the acreages of the entire project area of the Proposed Action by surface ownership.

Surface Ownership	Acreage	Square Miles	Percentage
BLM	9,480	14.8	52.4
Colorado State	480	0.75	2.7
Private Lands	8,120	12.7	45
Total	18,080	28.25	100

Survey Parameters

This project will include two types of source points, vibroseis and shot-hole with drill buggy. The Wiley 3D seismic survey would primarily be with signals generated by vibroseis vehicles (vibrators). The type of energy source would be placed in areas according to terrain and slope; vibrator points would be moved around the area as long as it can stay within the movement guidelines of Dawson's operation. Vibrators would be used where slopes typically range from 0 to 20 percent in easily accessible areas before offsetting the point because slope or terrain hinders safe access with the vibrators. Twenty-six source lines would run southwest to northeast.. The source lines would be spaced 1,320 feet apart with 220-foot intervals between source points. The project design requires approximately 96 source points per square mile to ensure adequate data resolution, or 2,721 total source points. Ninety percent of this 3D program would be recorded using vibrators as the energy source. Twenty-seven receiver lines consisting of 2,838 receiver stations would run east-west for a total length of 143 miles. The receiver lines would be spaced 1,320 feet apart with 220-foot intervals between receiver stations. Out of this total number of miles, only 70 miles of receivers lines cross BLM surface.

Repairing line problems or faulty equipment may be necessary during geophone deployment and/or data acquisition. As the geophones are being deployed, they would be checked for functionality. If there is a need to further check or replace equipment, a "troubleshooter" would be sent to the problem area. The troubleshooters would travel to the closest possible point using an Utility Terrain Vehicle (UTV) on cleared routes and continue on foot to the problem area. Troubleshooting operations would use approximately three to four crewmembers.

Vibroseis

Vibrators would use GPS coordinates pre-loaded on internal tracking systems to access the project area and locate source points using pre-cleared routes (routes that have been inventoried for either cultural, paleo or Special Status Plant Species (SSPS). In order to minimize impacts to vegetation (especially shrubs), vibrators would offset their travel routes to the extent practical within the approved travel corridors. Vibrators would typically proceed from one source location to the next with one pass per source line, unless the terrain or a man-made obstacle required a vibrator to enter and exit the area using the same route. Dawson would use three vibrators at each vibrator source point. Two independent teams of three vibrators may work in tandem on adjacent blocks of source points to expedite data acquisition. Distinct vibrator teams would not travel on surveyed routes used by the other team, such that a travel route would be used only once by any vibrator team. A vibrator pad measuring 4.5 by 7.5 feet is centered under each vehicle. Each vibrator is approximately 13 feet high, 36 feet long and 12 feet wide, and weighs 62,000 pounds. A vibrator is equipped with wide, low-pressure tires, resulting in an effective 16 psi ground pressure, as compared to tires of a ¾-ton four-wheel-drive pickup, which exerts 27 psi. Ground pressure under the vibrator pads is approximately 12.3 psi.

Controlled source generation and recording would begin shortly after placement of the initial grouping of receiver stations. Approximately 40 to 50 crewmembers, organized into field groups of 4 to 6 workers, would conduct daily operations during receiver placement and data acquisition operations. Source generation would be triggered from a central control truck stationed on a designated route. Source generation from vibrators would occur between three and five minute intervals, depending on access, detours, and terrain. Approximately 2,900 receiver channels may be active at any particular time. The recording truck would be equipped with GPS technology that would allow Dawson to track the vibrators' positions in real time. After recording in an "active" receiver station area, geophones, cables, and associated equipment would be retrieved on foot, bagged, and moved to a new receiver location.

Drill Buggy

Dawson would use the detonation of explosives set in the drilled shot holes to create the seismic-energy source points for some of this seismic survey project would Dawson would use buggy mounted and/or man operated portable drills with helicopter support to create the shot holes. The drills would be used in areas not accessible to vibrators. Shot holes depth and charge size has yet to be determined. The drill buggies would travel off road and follow the path for the source line as modified by archaeological and biological surveys and obstacles. No clearing or grading by heavy equipment of routes for the off-road drilling program would be conducted. In some instances, tree limbs may be removed to allow passage of drill buggies and to prevent additional damage to the affected tree. Vegetation beneath the tires would be compressed; perennial grasses and herbaceous species would be flattened but would typically recover within the current or next growing season. More woody species, such as sagebrush, may be damaged, particularly the

older, more brittle stems, but the younger more flexible parts of the plant would likely bend under the pressure and typically recover within the current or next growing season.

Where possible, the drill buggies would proceed from one source location to the next with a single pass per source line. The drill buggies would traverse the entire seismic line where possible to complete the drilling of the line's shot holes. Existing roads and trails would be used where possible to access the next seismic line. Each 4-wheel drive drill buggy vehicle (low pressure-tired, articulated, off-road transport vehicles with mounted drill) would weigh about 28,000 pounds, and each low-pressure tire would be approximately three feet wide. Total drill buggy width is approximately 10 feet with two, 3-foot wide tire treads. To account for maneuvering flexibility to avoid obstacles or sensitive resources, travel distance between lines, and multiple passes, it is estimated that buggies would travel no more than approximately 2.0 miles for every mile of drill buggy source line. Exceptions to traveling the entire seismic line would include altered routes to avoid environmentally sensitive areas (cultural resources, sensitive biological conditions, etc.) or other obstacles.

Drill buggy tires would not be chained. The large, low-pressure tires of a drill buggy would exert a pressure of about eight psi on the surface. After placing the shot in a shot hole, a shot hole-plug would be placed in the hole as specified by the State of Colorado Oil and Gas Commission regulations for seismic exploration. Providing that no water is encountered while drilling, the hole would be back-filled with drill cuttings to within three feet of the surface and a nonmetallic plug would be installed in the hole. The remaining three feet would be backfilled 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. In the event that water is encountered during drilling, the appropriate procedures would be followed. The shots would be detonated individually within the shot pattern determined appropriate for those geologic conditions underlying each of the 22 lines of 132 receiver stations. Detonation would typically produce a small plume of dust within a few feet of the shot hole. Shot points would be triggered from a central control truck stationed on an existing road/trail and a safety officer stationed at a position with line-of-sight visibility, but at a minimum safe distance. The safety officer ultimately controls the detonation and allows detonations initiated by the control trailer (telemetric signal) only if observations indicate the absence of people and animals near the shot hole. Should the detonated explosive blow the plug and the drill cuttings out of the hole (a blowout), whatever limited disturbance to the surface would be repaired as part of line restoration/reclamation including re-plugging and replacing the hole packing materials with drill cuttings and soil materials that were expelled by the blast from the hole. Based on experience in similar geologic settings, blowouts are unlikely to occur.

Table 2: Estimated project schedule pending approval.

Project Activity	Schedule
Re-survey all source and receiver locations fill in all points on private feel lands.	November 1 – November 25, 2015
Drill infill source points.	November 15 – November 25, 2015

Crew arrival, preplanning meetings covering Emergency Response Plan & Permit Conditions.	November 16 – November 20, 2015
Prepare staging areas and begin deploying recording equipment.	November 16 – November 20, 2015
Data acquisition/ recording.	November 21 – December 20, 2015
Reclamation, if needed.	Started as soon as the crew has completed operations.

The Wiley 3D seismic survey would be conducted in phases, as described in the following sections. The approximate schedule of operations is shown in Table 2. All operations would be performed in daylight or dusk hours. All project activity and proposed schedule are dependent on receipt of approved NOI and Conditions of Approval, private lands permit restrictions and weather considerations.

Receiving Stations

Placement of receiving/recording stations, would be transported to the field to the staging areas (includes helicopter landing zones) by truck using existing roads and trails. Sufficient equipment to lay out six sets of geophones, one length of seismic cable, and appropriate battery and field recording boxes would be placed in reinforced nylon cache bags at helicopter landing sites and flown to the predetermined, flagged locations for stations along each receiver line. One helicopter would be used for the project, and would operate only in daylight hours ferrying the receiving-station cache bags to preset locations. The helicopter would move six to eight cache bags at a time suspended from a long line. The helicopter would operate at an altitude of approximately 50-75 feet above the receiver line and deposit one bag at a time using GPS pin flag locations provided by the surveyors. Equipment trucks and/or UTVs would be used to deposit some of the cash bag along the receiver lines.

Ground crewmembers would walk to the first dropped cash bag on a receiver line, prepare and connect the station, and manually deploy cables and geophones. Cables and attached geophones would be laid out by hand around each station in a pre-determined pattern. Each geophone would be mounted on a four-inch spike and placed into the soil using foot pressure. The crewmembers would proceed on foot to the second bag and repeat the set-up of the first receiver station and its network of cables and geophones. Staggered deployment and pick up of receiving stations would occur as the source sequence proceeds during data acquisition. Depending on the rate of progress after data recording starts, the first few lines of cable and equipment would be picked up and moved "leap-frog" fashion ahead of the last line laid. This pattern of picking up and moving receiver stations a few lines ahead would continue through the entire recording process. After recording in an “active” area of receiver lines, 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.

As soon as data acquisition is complete, all equipment would be removed by placing it back into the cash bags to be picked up by the helicopter or the UTVs and/or equipment trucks. Flagging and pin flags would be removed at the same time the line is being cleared.

Staging and Support Operations
All equipment, including the drill buggies and vibrators, would be brought to the project area by approximately 10 semitrailer loads as part of project mobilization. Support vehicles would include one 1-ton recording truck, one vibrator mechanic truck and trailer, six UTVs, five 1-ton equipment trucks, two crew transport vans, and approximately 10 miscellaneous trucks for crew support. The actual number of vehicles needed to support the seismic survey would vary according to different operational phases of the seismic survey; thus, the preceding figures are estimates. Dawson has identified sites that would be used as staging areas (Figure 1) for vehicle parking and equipment, water, and fuel storage locations. Staging areas were selected to maximize use of previously disturbed areas. A typical staging area would be approximately 300 by 300 feet, or approximately 2 acres in size and would be located on private surface owner properties only and not on BLM lands.

Cleanup and Reclamation
Crewmembers would conduct cleanup activities concurrently with project operations during all phases of the seismic survey. All pin flags, flagging, and other wastes would be gathered daily from source lines, receiver lines, staging areas, and any other areas used by the seismic survey crew as they complete data-acquisition portions of the project. The waste would be gathered as recording operations proceed and ferried to staging areas from where it would be disposed of at the nearest appropriate landfill. The survey area would be spot checked continuously for waste removal. Inadvertent spills of oil or fuel from mechanized equipment would be cleaned up according to the Dawson's Spill Prevention Control and Countermeasure Plan (SPCCP) and properly disposed in an approved landfill.

Surface Use Estimate
Surface area affected by proposed operations as a result from vibrators/drill buggies along source lines using designated routes and deploying receiver stations by UTV's, foot travel and equipment trucks. We estimate that approximately 143 miles of cross-country vehicle routes would be used for designated access during operations, corresponding to this would be about 190 acres of surface area that would be affected by seismic survey on BLM surface. Vibrators would use an 11-foot wide travel corridor. All receiving stations would be deployed by helicopter, UTVs, equipment trucks and on foot, resulting in little or no surface damage. Quantification of the estimated surface use area is displayed in Table 3. The total amount of surface area that would be used to implement the project would be 152 acres, or 2.3 percent of the project area. Approximately 58 miles of cross-country drill buggies/vibrator access would be needed.

Table 3: Area of surface use by the Proposed Action.

Surface Owner	Access for Vibrators/Drills		Total Use Area
	Linear Miles	Acres	Acres
Federal	58	9,480	77
Colorado State	5	480	6.7
Private	51	8,120	68
Total	114	18,080	151.7

3.1.2. Design Features

The entire Surface Use Plan of Operations (SUPO) is incorporated into the Proposed Action and is available for review at the WRFO. Key items relevant to the issues associated with the Proposed Action include:

General

1. All geophysical operations would be executed in accordance with applicable federal, state, and local regulations.

2. Measures would be taken to ensure that flagging associated with other projects would not be removed.

3. Geophysical operations would be conducted in accordance with BLM Handbook H-3150-1 (See Appendix D) for geophysical operations unless written waivers are obtained and approved by the BLM. Source point placement would comply with BLM Handbook H-3150-1, Illustrations 10 and 16.

4. Prior to the commencement of each phase of operations (such as data acquisition with the use of vibrators), personnel would be informed of the critical elements of compliance with the Archaeological Resources Protection Act, the National Historic Preservation Act, and the Endangered Species Act.

5. During daily pre-operational meetings, survey personnel would be informed of pertinent BLM requirements and expectations concerning the protection of cultural resources; biological resources; livestock management; riparian areas; soil resources, including biological soil crusts; other sensitive resources that may be found in the survey area; vehicle use in rough terrain; keeping vehicles on designated and cleared cross-country routes.

Air Quality/Noise

6. All vehicles and construction equipment would be properly maintained to minimize exhaust emissions and would be properly muffled to minimize noise.

7. The Applicant would have a mechanic on site to ensure proper exhaust systems.

Cultural Resources

8. A file search (Class I) would be completed, and a Class III archaeological inventory was conducted along source lines and cross-country vehicle travel routes.

9. Source points that were inventoried within the boundaries of an eligible site would be moved outside of the boundaries or would be dropped.

10. All vehicle traffic would be limited to the approved access corridors. Class B and D roads that bisect eligible sites may be used as access; however, no source points would occur in such locations, and traffic would be limited to the road surface.

11. At known site, consulting with the BLM archaeologist: a. Vibratos can be used on designated roads that bisect this site. b. Seismic survey operations on known sites would be avoided or limited to foot traffic only during operations occurring within these site.

12. The independent 3rd party monitor would carefully review conditions of approval that pertain to the protection of cultural recourses and would immediately notify the Authorized Officer (AO) of any instances of noncompliance. In addition, in the report at project completion, the monitor would provide the AO with an evaluation of the sufficiency of the conditions of approval as related to the protection of cultural resources.

13. Field personnel would carry maps that identify the appropriate (cleared) routes.

14. Sources would avoid eligible cultural resource structures according to the offsets in the H-3150-1 Illustration 10.

15. If a previously unidentified cultural resource were to be discovered during operations, the finding would be immediately reported to the BLM office before any other work would be allowed.

16. Should human remains be discovered during seismic survey operations, all work in the vicinity of the remains would cease; the remains would be protected from further exposure or damage; and the appropriate BLM office would be notified immediately.

17. Violation of the laws that protect cultural resources would be treated as law enforcement/administrative issues with potentially severe consequences.

Existing Facilities and Rights-of-Way

18. Safe operating distances, based on existing industry standards, would be maintained between source generation points and existing facilities, including producing oil and gas wells, pipelines, and electrical utility lines

Fire Protection

19. Vehicles with catalytic converters would be restricted to designated or authorized routes. Parking or idling vehicles would not be permitted in areas with vegetation that could potentially ignite.
20. All vehicles would be equipped with fire extinguishers and shovels.

21. The following fire prevention procedures would be followed:

a. All brush build-up around mufflers, radiators, headers, and other engine parts would be avoided. Periodic checks would be conducted to prevent this build-up.
b. Smoking would be allowed in company vehicles or in designated smoking areas only. All cigarette butts would be placed in appropriate containers and not thrown on the ground or out the windows of vehicles.
c. Campfires or uncontained fires of any kind would be prohibited.
d. Portable generators used in the project area would be required to have spark arrestors.

Range and Livestock Management

22. Gates would be used for crossing fences where possible. If a fence must be crossed by a vehicle at a location other than an existing gate, Dawson would provide notice to the AO in advance of cutting the fence. The fence would be cut and H-braces would be installed to support the existing fence. After completion of the seismic survey operations, the temporary opening or gate would be permanently re-wired and stretched to its original tension.

23. Range study areas, if present, would be avoided.

24. Existing facilities related to range management or other uses in the project area impacted by seismic survey activities would be repaired or replaced as soon as practical before the end of the project.

25. Seismic survey activities would avoid stock ponds/reservoirs, water wells, and guzzlers by a distance of 300 feet.

Recreation

26. In order to discourage public travel on source routes and reduce the visual appearance of straight lines, vibrators would enter or exit existing roads at oblique angles.

Safety

27. A pre-operations meeting would be held daily to review all applicable safety procedures.

28. All utility and production companies that may be affected by the seismic survey operations would be notified, and offsets to their facilities would be agreed upon.

29. Vehicles would travel at speeds within set speed limits of main access roads and at slower speeds appropriate for off-road conditions.

30. Signs warning the public of seismic activity would be located at the closest road/designated route intersections on either side of the next day's planned recording activities or where small staging areas may be temporarily located.

31. Crew personnel would keep the public a safe distance away from all drill buggy and vibrator activity.

32. All crew members would wear orange safety vests, hardhats, and safety glasses / goggles where required.

33. Temporary signs would be placed along roads to warn the public against off-road travel where vibrators would be operating off of designated routes.

Soils

34. Source lines would be moved to follow designated routes where possible throughout the seismic survey area.

35. Vehicle operators would be instructed to travel at slow speeds to limit disturbance to soils and vegetation.

36. Where possible, the spinning of all vehicle tires would be avoided to minimize the potential for soil displacement and impacts to biological soil crusts.

37. If a washout were to be encountered on an authorized or designated route, permission to fill the washout would be obtained from the BLM office prior to operations that would affect the washout.

Surface Water

38. Sedimentation, soil erosion, and soil compaction that may result from cross-country vibrator operations would be minimized by limiting the number of crossings of intermittent drainages as much as possible. Upon completion of the seismic survey, all bank cuts at crossings would be reconstructed to approximate the original contour and would be reclaimed according to BLM, as appropriate.

39. Source generation would not occur within 300 feet (100 meters) of known springs depicted on USGS topographic maps

Vegetation, Special Status Plant Species, and Invasive /Noxious Species

40. No wetland/riparian vegetation would be removed during the placement of geophones.

41. Prior to commencing operations within the project area, all equipment and vehicles would be cleaned to remove seed and soil that may contain seeds.

42. Larger shrubs, trees, and other obstacles would be avoided where possible. Some tree limbs (only) may be removed for access. If so, limbs would typically be limited to those of 3 to 4-inch diameters at approximately chest height.

43. If present, listed threatened and endangered plant species would be avoided.

44. Project personnel would not be allowed to collect plants.

45. In order to minimize impacts to vegetation (especially shrubs) vibrators would offset their travel routes to the extent practical within the approved travel corridors and would use one pass, to the extent practical.

Waste and Trash Disposal

46. No other hazardous or potentially hazardous materials would be brought into the project area.

47. All solid waste or trash would be transported for disposal to an approved solid waste disposal facility. All project debris, including flagging, stakes, and pin flags, would be gathered daily and disposed of at an approved site or landfill.

48. All spills or leaks of oil, diesel, hydraulic fluid, or coolant, including any contaminated soils, would reported to the BLM office, after which the spill materials would be excavated to an appropriate container and transported to an approved disposal site.

49. No potentially harmful materials or substances would be left on, or in the vicinity of, the seismic survey area.

Wildlife

50. Raptor surveys would be conducted prior to seismic operations if they would take place during raptor nesting season, if operations start before August 1,

51. Visible migratory bird nests would be avoided and not disturbed.

3.1.3. BLM Required Conditions of Approval to Mitigate Impacts to Cultural and Paleontological Resources

1. The operator is responsible for informing all persons who are associated with the project that they will be subject to prosecution for knowingly disturbing archaeological sites or for collecting artifacts.

2. If any archaeological materials are discovered as a result of operations under this authorization, activity in the vicinity of the discovery will cease, and the BLM WRFO Archaeologist will be notified immediately. Work may not resume at that location until approved by the AO. The operator will make every effort to protect the site from further impacts including looting, erosion, or other human or natural damage until BLM determines a treatment approach, and the treatment is completed. Unless previously determined in treatment plans or agreements, BLM will evaluate the cultural resources and, in consultation with the State Historic Preservation Office (SHPO), select the

appropriate mitigation option within 48 hours of the discovery. The operator, under guidance of the BLM, will implement the mitigation in a timely manner. The process will be fully documented in reports, site forms, maps, drawings, and photographs. The BLM will forward documentation to the SHPO for review and concurrence.

3. Pursuant to 43 CFR 10.4(g), the operator must notify the AO, by telephone and written confirmation, immediately 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. The operator is responsible for informing all persons who are associated with the project operations that they will be subject to prosecution for disturbing or collecting vertebrate or other scientifically-important fossils, collecting large amounts of petrified wood (over 25lbs./day, up to 250lbs./year), or collecting fossils for commercial purposes on public lands.

5. If any paleontological resources are discovered as a result of operations under this authorization, the operator or any of his agents must stop work immediately at that site, immediately contact the BLM Paleontology Coordinator, and make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. Work may not resume at that location until approved by the AO. The BLM or designated paleontologist will evaluate the discovery and take action to protect or remove the resource within 10 working days. Within 10 days, the operator will be allowed to continue construction through the site, or will be given the choice of either (a) following the Paleontology Coordinator's instructions for stabilizing the fossil resource in place and avoiding further disturbance to the fossil resource, or (b) following the Paleontology Coordinator's instructions for mitigating impacts to the fossil resource prior to continuing construction through the project area.

3.2. No Action Alternative

The No Action Alternative constitutes denial of the Notice of Intent for geophysical operations associated with the Proposed Action. Under the No Action Alternative, none of the proposed project components described in the Proposed Action would take place.

3.3. Alternatives Considered but Eliminated from Detailed Analysis

Four other alternatives were considered but were not carried forward: the original project boundary in the southern portion extended further to the west; limiting all vibroseis portions of the project in sage-grouse habitat to existing roads; requiring the project to be heliportable drilling in sage-grouse habitat; and requiring the project to be buggy drilled with shotholes for the project in sage-grouse habitat. The extended project boundary was removed by Dawson/Endeavour due to potential cultural and tribal concerns. If the project was limited to

existing roads within sage-grouse habitat, it would not be feasible for the project with the current road density leaving large gaps in the data, in order to get an adequate data set for seismic covering the project area the source points would need to be consistently spread throughout the project area, not limited to specific routes that already exist. For this specific project it is estimated that the need is 96 source points per square mile. Although heliportable drilling could have less direct surface impacts in the sage-grouse habitat, this project is proposed to begin in November and end in December, this is dependent on pending approval and weather. The overall activity (visual and audible) of heliportable drilling would be more extensive than off-road travel of the vibroseis. The drill buggy shothole method of source points within the sage-grouse habitat would be similar in nature for the vibroseis impacts to the sage-grouse.

4. ISSUES

The CEQ Regulations state that NEPA documents "must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR 1500.1(b)). While many issues may arise during scoping, not all of the issues raised warrant analysis in an environmental assessment (EA). Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between alternatives, or 2) if the issue is associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of the impacts. The following sections list the resources considered and the determination as to whether they require additional analysis.

4.1. Issues Analyzed

The following issues were identified during internal scoping as potential issues of concern for the Proposed Action. These issues will be addressed in this EA.

- **Soil Resources**: Surface disturbance associated with cross-country travel and source points could result in disturbance of local soils including saline soils.

- **Surface and Ground Water Quality**: Surface disturbance, source points, and potential spills could affect surface water and groundwater quality.

- **Vegetation**: Surface disturbance associated with the Proposed Action is 28.25 square miles. However, of that total only 14.8 square miles is located on BLM surface. The remanding surface area is on private (12.7) and state (.75) land. Some disturbance would be existing, but vehicles are planned to traveling cross-country and vegetation has the potential to be crushed.

- **Invasive, Non-Native Species**: There is the potential for non-native, invasive plant species to be introduced into the project area because of the increased human and vehicular traffic.

- **Migratory Birds:** Seismic operations have potential to reduce the availability and utility of shrubland and woodland nesting habitat for migratory birds. Proposed operations

conducted during the core nesting season would invariably disrupt ongoing nest attempts and cause mortality of eggs and nestlings.

- **Terrestrial Wildlife**: Seismic operations have potential to reduce the availability of forage and cover resources on important big game winter ranges and impose serious avoidance-induced impacts that reduce fitness and reproductive performance at the individual and population level. The Proposed Action also has potential to disrupt raptor nest activities that results in mortality of eggs or nestlings in violation of the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act.

- **Special Status Animal Species**: Seismic operations have potential to reduce the availability and utility of shrubland nesting and brood-rearing habitat for greater sage-grouse. Proposed operations conducted during the lekking, nesting, and early brood-rearing seasons would invariably have negative consequences on the nest initiation, nest success, survival of eggs and nestlings, and subsequent recruitment into the breeding population.

- **Special Status Plant Species**: A survey for special status plant species (SSPS) was conducted in 2014 by Hayden Wing Associates, LLC. No populations of SSPS were identified, but locations of suitable habitat were mapped.

- **Cultural Resources**: Seismic operations have the potential to adversely impact cultural resources as vehicles traverse cultural resources, workers unlawfully collect artifacts, and access into areas is increased due to trail creation. Certain structures/sites are also susceptible to damage from vibrations at some frequencies used in exploration.

- **Paleontological Resources**: Seismic operations have the potential to impact fossils as vehicles travel off road in sensitive formation areas. Smaller fossil could be crushed and or displaced by foot or vehicle traffic that passes over them. Vertebrate fossils that are larger can also be crushed and are susceptible to unlawful collection due to increase access to the area and increased human activity in the area.

- **Lands with Wilderness Characteristics:** The Proposed Action is located in two areas that are identified as having wilderness characteristics, lands with wilderness characteristics unit 19-North Colorow and unit 24-Pinto Gulch. Both of these areas are identified as Tier 1 management areas in the 2015 White River Field Office Record of Decision and Approved Resource Management Plan Amendment for Oil and Gas Development (Oil and Gas ROD/RMPA). Tier 1 areas are managed to protect wilderness characteristics as a priority over other multiple uses.

- **Livestock Grazing:** The proposed project area occurs within five permitted grazing allotments. These allotments are permitted to several different individuals with different utilization times and herds. There is the potential for fences (range improvements) to be used for drill buggy and vibrator movement between allotments; movement might

include fences being cut in order for equipment to travel through fences to move along routes.

- **Recreation:** The primary recreational activity that occurs in the area of the Proposed Action is big game hunting from late August through mid-November of each year. The Proposed Action would likely impact the quality of the desired hunting experiences in this area during the third (Oct. 31-Nov. 8) and fourth (Nov. 11-15) big game rifle seasons and mountain lion hunting (Nov. 16- Dec. 20) for 2015.

- **Access and Transportation**: The Proposed Action would result in the use of the BLM travel and transportation system for an estimated 143 miles of travel routes. Also, an estimated 58 miles of cross country travel for vibrator truck access is proposed. This has potential to affect the BLM travel and transportation system and potentially lead to the indirect creation of new unauthorized travel routes.

- **Hazardous or Solid Wastes**: The potential for harm to human health or the environment are presented by the risks associated with spills of fuel, oil, and/or hazardous substances used during oil and gas operations. Accidental releases could cause soil, surface water, and/or groundwater contamination.

4.2. Issues Considered but not Analyzed

- **Air Quality**: Air quality within the project area meets the established primary and secondary national ambient air quality standards (NAAQS) for criteria pollutants. Impacts to air quality from implementation of the Proposed Action would be temporary, localized, and short-term. The Proposed Action would consist of mobile equipment dispersed throughout a 28 square mile area with project duration of less than 60 days. A temporary increase in emissions and fugitive dust would be anticipated due to an increase in vehicular and helicopter use in the area for the duration of activity. It is unlikely the temporary increase in emissions of the Proposed Action would create an exceedance of the NAAQS.

- **Geology and Minerals**: There would be little to no impacts to the geologic or mineral resources. The project area is not encumbered by any active mining claims and it is outside the area identified in the ROD/RMP as available for oil shale, sodium, or coal leasing. According to the Colorado Oil and Gas Conservation Commission (COGCC) data base there are 12 plugged and abandoned wells, one oil and gas producing well, and one shut-in well. The operator would use the BLM Handbook H-3150-1 (Onshore Oil and Gas Geophysical Exploration Surface Management Requirements) required offsets for vibrator and shot hole sources to prevent impacts these wells. Underlying geologic information obtained from the survey could enable a more efficient use of resources in the development of the oil and gas leases within the project area by identifying optimum well location and spacing.

- **Floodplains, Hydrology, and Water Rights**: There are no flood plains or water rights within the project area. Implementation of the Proposed Action would have little to no impacts to the project area hydrology.

- **Native American Religious Concerns**: Consultation with tribal authorities resulted in the redesign of the project to avoid sites of particular concern and apply mitigation to other sites to avoid visual intrusions to other sites.

- **Social and Economic Conditions**: There would not be any substantial changes to local social or economic conditions.

- **Environmental Justice**: According to the most recent Census Bureau statistics (2010) and guidelines provided in WO-IM-2002-164, there are no minority or low income populations within the WRFO.

- **Prime and Unique Farmlands**: There are no prime and unique farmlands within the project area.

- **Wilderness**: There are no designated Wilderness areas or Wilderness Study Areas located near the Proposed Action.

- **Wild and Scenic Rivers**: There are no Wild and Scenic Rivers within the WRFO.

- **Scenic Byways**: There are no Scenic Byways within the project area.

- **Areas of Critical Environmental Concern:** The nearest ACEC is Blacks Gulch, which is approximately 4.8 miles to the southeast of the Proposed Action. There would be no known impacts from the Proposed Action.

- **Visual Resources**: The project is temporary in nature, scheduled to last six to eight weeks with no permanent or long term facilities. Impacts to visual resources are minimal due to the temporary nature of the activities.

- **Wild Horses:** The Proposed Action is not located within the Piceance-East Douglas Herd Management Area or the North Piceance and West Douglas Herd Areas. There would be no known impacts to wild horses.

- **Forestry and Woodland Products:** Dawson has committed to only limbing trees for the project. No trees are proposed to be removed as a result of the Proposed Action; because only limbs would be removed and not whole trees there should be no impacts to pinyon/juniper woodlands.

- **Fire Management**: The Proposed Action would take place in the winter months (November and December) where the concern for wildfires would be substantially lower. The Proposed Action would also not have any impacts on implementation of the Northwest Colorado Fire Management Plan.

- **Realty Authorizations:** It is unlikely that the Proposed Action would impact realty authorizations because Dawson would notify existing utility and production companies and agree upon offsets to their facilities prior to any operations. Dawson would also maintain safe operating distances between source generation points and existing facilities, including producing oil and gas wells, pipelines, and electrical utility lines.

- **Wetlands and Riparian Zones**: Deep Channel Creek is the only system that is capable of supporting obligate riparian or wetland vegetation in the project area. Deep Channel Creek grades from a largely perennial system in its upper reaches (upstream of the project area), through intermittent mid-reaches, and becoming largely ephemeral near its intersection with Crooked Wash. Dawson have proposed only one crossing of Deep Channel with vibroseis vehicles, and this at an established crossing in a lower ephemeral reach that possesses no obligate riparian expression. The Proposed Action would have no reasonable likelihood of influencing obligate sedge-rush or facultative channel vegetation or compromising channel processes in Deep Channel Creek.

- **Aquatic Wildlife:** There are no perennial water sources that are capable of supporting higher order aquatic communities in area potentially influenced by the Proposed Action.

5. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

5.1. General Setting & Access to the Project Area

The project area is located in the vicinity of Indian Valley, Deep Channel, Open Gulch, Colorow Gulch and Rimrock Gulch. It can be accessed off of RBC Road 77 and 71. It is upland vegetation ranging in elevation of 5,800 feet to 6,400 feet. The bottoms contain mostly sagebrush habitat with pinyon/juniper habitats on the ridges with some rolling hills dominated by cool season grasses. Cheatgrass is commonly established in the understory of these habitats.

5.2. Cumulative Impacts

5.2.1. Cumulative Impacts Analysis Areas

The geographic extent of cumulative impacts varies by the type of resource and impact. The timeframes, or temporal boundaries, for those impacts may also vary by resource. Different spatial and temporal cumulative impact analysis areas (CIAAs) have been developed and are listed with their total acreage in **Error! Reference source not found.**.

Table 4: Cumulative Impact Analysis Areas by Resource

Resource	CIAA	Total CIAA Acreage	Temporal Boundary
Soil Resources, Surface and	5th Level Hydrologic Unit Code Crooked	177,500 Acres	Duration of project through vegetation

Groundwater Quality	Wash - White River Watershed		recovery (3 growing seasons).
Vegetation	Keystone, Colorow, McAndrews, Little Toms Draw Grazing Allotments	45,567 acres	For at least 3 growing seasons until vegetation can properly recover.
Invasive, Non-native species	Keystone, Colorow, McAndrews, Little Toms Draw Grazing Allotments	45,567 acres	Effects to this resource have the potential to be permanent.
Special Status Plant Species	Suitable habitat for BLM sensitive plants	9.14 acres	Effects to this resource have the potential to be permanent.
Livestock Grazing	Keystone, Colorow, McAndrews, Little Toms Draw Grazing Allotments	45,567 acres	Project initiation until vegetation has recovered (3 growing seasons).
Lands with wilderness characteristics, Recreation, Access and Transportation, Hazardous and Solid Wastes	The Proposed Action boundary	18,080 acres	From project initiation until impacts to these resources are no longer noticeable to casual observers in this area.
Big game, including elk, mule deer, pronghorn	Game Management Unit 11 Winter Concentration Areas and Severe Winter Ranges	525 square miles	Duration of project operations (about 1 month); single period of early winter occupation.
Greater sage-grouse	Priority and General Habitats in the Crooked Wash and Sagebrush Draw watersheds	277 square miles	Duration of project operations (about 1 month); single period of early winter occupation.
Migratory birds	Pinyon juniper woodlands and big sagebrush habitats in Crooked Wash watershed	525 square miles	Duration of project operations (about 1 month); single period of early winter occupation.
White-tailed prairie dogs; burrowing owl	Mapped prairie dog habitat in WRFO	39,000 acres	Duration of project operations (about 1 month); single period of early winter

			occupation.
Breeding raptor populations; golden eagle and woodland raptors	Pinyon juniper woodlands and big sagebrush habitats in Crooked Wash watershed	525 square miles	Duration of project operations (about 1 month); single period of early winter occupation.
Cultural resources	Crooked wash drainage system including tributaries	100 square miles	Duration of exploration with potential to extend into future during development
Paleontological Resources	Fort Union and Wastach PFYC 5 formations	Fort Union formation = 16,934 acres Wasatch Formation = 154,467 acres	Duration of project

5.2.2. Past, Present, and Reasonably Foreseeable Future Actions

Cumulative effects are defined in the CEQ regulations (40 CFR 1508.7) as "...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

In 2015 the BLM published the Oil and Gas Development Proposed RMP Amendment/FEIS, which considered changes in the location, type, and level of oil and gas development within the resource area. Based on an updated 2007 RFD scenario, it is assumed that the majority of oil and gas development would occur within the Mesaverde Play Area (MPA; Piceance Basin) and consist of multi-well pads. The proposed amendment in the Proposed RMPA/FEIS considered drilling up to 15,040 wells from 1,100 well pads with an associated surface disturbance of 13,200 acres (Section 2.4.6, page 2-29 of the Proposed RMPA/FEIS). An estimated 12 acres per pad would be disturbed initially (including areas needed for associated infrastructure) however that would be reduced to 5 acres per pad following interim reclamation (see Table 4-2 of the Proposed RMPA/FEIS). Further, it was assumed there would be up to 790 miles of roads and 565 miles of utility lines (pipelines and power lines) developed to support this activity (see Table 4-3 of the Proposed RMPA/FEIS).

As of July 2015, the Colorado Oil and Gas Conservation Commission database indicated there were a total (i.e., including those drilled prior to the 1997 RMP) of 2,708 producing wells, 193 shut-in wells, and 42 wells where drilling has begun but are not yet in production within the WRFO

Additional activities that occurring in the project area includes livestock grazing and recreation; the livestock grazing that occurs is primarily cattle and sheep but may include some horse, and the recreation includes but is not limited to hunting, off highway vehicle travel and unique (cultural/historical) site visitation.

5.3. Soil Resources

5.3.1. Affected Environment

The Proposed Action is within the Crooked Wash-White River watershed. Over 93 percent of the project area is situated on slopes of less than 25 percent. Approximately 0.1 percent of the area has slopes greater than 50 percent and 0.3 percent of the area have slopes from 35 to50 percent. There are approximately 200 acres of acres of saline soils on federal surface. The ecological sites of the project area are listed in Section 5.5.1 (Vegetation), Table 7.

Table 5 contains the percent of the project area rated by the National Resource Conservation Service (NRCS) data base for the potential erosion hazard by water (off road off trail) and soil rutting hazard.

Table 5: NRCS Ratings for Erosion and Soil Rutting Hazards.

NRCS Rating	Erosion Hazard by Water (Off-Road & Off-Trail) (Percent of Project Area)	Soil Rutting Hazard (Percent of Project Area)
Slight	42%	27%
Moderate	55%	30%
Severe	3%	43%

Potential erosion hazard by water (Off-Road & Off-Trail) indicate the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. The ratings are based on slope and soil erosion factor K. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance (NRCS). The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary climatic conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion- control measures, including revegetation of bare areas, are advised.

Soil rutting hazard ratings indicate the hazard of surface rut formation through the operation of forestland equipment. Soil displacement and puddling (soil deformation and compaction) may occur simultaneously with rutting. Ratings are based on depth to a water table, rock fragments on or below the surface, the unified classification of the soil, depth to a restrictive layer, and slope. The hazard is described as slight, moderate, or severe. A rating of "slight" indicates that the soil is subject to little or no rutting; "moderate" indicates that rutting is likely; and "severe" indicates that ruts form readily.

5.3.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Direct impacts could include minor rutting, soil compaction, removal of vegetation, loss of topsoil productivity, and an increase in the susceptibility of soils to wind and water erosion. Compaction and rutting of soils could occur from cross-country travel and vibrator pad source points which could reduce aeration, permeability, and water-holding capacities of soils. The applicant's use of low pressure tires, low ground pressure vibrators, and offset travel routes would result in minimal soil compaction and rutting throughout the project area. Precipitation events would increase the soil water content and could change the physical properties of the soil and increase the potential for rutting of cross-country and existing routes.

The majority of activity associated with the Proposed Action would not result in the removal of vegetation. However, minor amounts of vegetation could be associated with drilled source point shot holes, drainage crossings, and spinning of tires. The project proponent has indicated approximately 10 percent of all the proposed source would be drilled shot hole sources. Removal of vegetation would expose soils to erosion from rainfall, wind, and surface runoff. An increase in surface runoff and sedimentation could be expected from impacted soils and are likely to be less resilient to erosion from surface runoff. The wide distribution and small area of vegetation removal is unlikely to have long term adverse effects on the impacted soils.

The Oil and Gas ROD/RMPA has WR-NSO-12 for slopes of 50 percent or greater, WR-CSU-10 for slopes from 35 to 50 percent, and WR-CSU-11 for saline soils on federal surface. The proposed cross-country routes would avoid slopes of 35 percent or greater. A little over one mile, or less than one percent, of the proposed cross-country routes would be located in saline soils on federal surface. As previously mentioned the applicant's use of low pressure tires, low ground pressure vibrators, and offset travel routes would result in minimal soil compaction and rutting in these soils. It is unlikely the scale of the Proposed Action within WR-CSU-10 areas would result in any long term decrease in site productivity or increased erosion. To limit impacts mitigation measures should be taken if ruts greater than four inches occur from adverse weather conditions or soil properties.

Indirect impacts from this project could result in contamination of surface and subsurface soils due to unintentional leaks or spills from mobile equipment. Spills could affect the productivity of soils. An applicant committed design feature would mitigate these indirect impacts by the reporting and removing spills or leaks of oil, diesel, hydraulic fluid, or coolant, including any contaminated soils, to an approved disposal site.

Cumulative Impacts

The CIAA is the 5th -Level Hydrologic Unit Code Crooked Wash-White River Watershed. Approximately 58 percent of the Federal oil and gas mineral estate within the CIAA is currently leased for oil and gas. The southern 18 percent of CIAA is within the area identified in the Oil and Gas ROD/RMPA Mesaverde Play Area (MPA). Eighty-five percent of this portion of the CIAA is leased for Federal oil and gas mineral estate. The MPA is an area within the WRFO

where 95 percent of the future oil and gas activity is predicted to occur. The remaining five percent of oil and gas activity within the WRFO would occur outside of the MPA.

In addition to mineral development activity, dispersed recreation (hunting) would seasonally use public access which could, during poor conditions, result in rutting and failure of drainage control features and increase the potential of soil erosion.

The short-term duration (less than 60 days) of seismic survey activity and of impacts would result in negligible cumulative impacts for soil resources and no long-term cumulative impacts following cessation of the proposed seismic survey project.

5.3.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

No impacts to soils would occur.

Cumulative Impacts

Impacts would be similar to those described for the Proposed Action.

5.3.4. Mitigation Measures and Residual Impacts

1. Operations will be suspended if weather conditions or soil/slope conditions would result in ruts four inches deep or greater. Ruts are measured from the top of the tread indentation to the undisturbed soil surface. Reclamation of any ruts in excess of four inches deep shall include hand raking and seeding the disturbed area (type of seed mix to be approved by the BLM).

2. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Formation of ruts of less than four inches deep could occur.

5.4. Surface and Ground Water Quality

5.4.1. Affected Environment

The Proposed Action is located in the 5th Level Hydrologic Unit Code Crooked Wash-White River Watershed. The northern half of the project area is bisected by intermittent Deep Channel Creek which drains into Crooked Wash approximately 7.2 drainage miles upstream from the White River. Approximately 2,400 acres of southwest portion are outside of the Deep Channel drainage system and fall within the Colorow Gulch ephemeral drainage system that drains into the White River approximately two miles upstream from the confluence of Crooked Wash and the White River. The White River flows west out of Colorado into Utah to its confluence with the Green River, which ultimately drains into the Colorado River. Table 6 describes the water segment of the White River Basin that may be impacted by this project.

Table 6: White River Basin Water Quality Classification Table (Colorado Water Quality Control Commission (CWQCC 2014).

Stream Segment	Segment Name	Designation	Classification
13a	All tributaries to the White River, including all wetlands, from a point immediately below the confluence with Piceance Creek to a point immediately above the confluence with Douglas Creek, except for the specific listings in Segments 13b through 20.	Use Protected	Aquatic Life Warm 2 Recreation N Agriculture

The use-protected designation is assigned to state waters and provides a level of water quality protection that ensures uses are maintained and protected. Use-protected waters are allowed to degrade to the level of the water quality standards.

The Warm classification standards would be protective of aquatic life normally found in waters where the summer weekly average temperatures frequently exceed 20 degrees Celsius. The 2 classification indicates waters that are not capable of sustaining a wide variety of cold or warm water biota, including sensitive species, due to physical habitat, water flows or levels, or uncorrectable water quality conditions that result in substantial impairment of the abundance and diversity of species.

Recreation Class N is defined as surface waters not suitable or intended to become suitable for primary contact recreation uses.

Agriculture classification are for surface waters suitable or intended to become suitable for irrigation of crops and which are not hazardous as drinking water for livestock.

Average rainfall in the general area ranges from 12 to 16 inches annually. Precipitation in the area generally moves from areas of recharge to surface waters via alluvial aquifers and on the surface during spring melt and rain storms. A portion of annual precipitation infiltrates to deeper bedrock aquifers.

The Colorado Division of Water Resources (CDWR) database does not indicate any existence of water rights within the project area. However there are close to 100 small man-made sediment control/water storage features ranging in size from 0.03 acres to approximately one acre with the majority at the 0.03 acres. These features are used by livestock and are in various states of repair and functionality. There are also three permitted constructed water wells (CDWR) and an unconfirmed spring in the within the project area.

The project contains both alluvial and sedimentary bedrock aquifers. The alluvial aquifer primarily consists of unconsolidated valley-fill deposits along Deep Channel Creek. Sedimentary bedrock aquifers could occur within the Fort Union aquifer and Mesaverde aquifer hydrogeological units (Topper).

5.4.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Impacts to surface water could result from vehicles crossing Deep Channel Creek and ephemeral drainages, unintended surface disturbance (spinning tires), severe rutting, and spills and/or leaks from mobile equipment. These impacts would be mitigated by proponent design features that avoid spinning vehicle tires; reporting and removing spills or leaks of oil, diesel, hydraulic fluid, or coolant, including any contaminated soils, to an approved disposal site. The applicant's use of low pressure tires, low ground pressure vibrators and mitigation added in Soils Resources Section 5.3.4 would mitigate rutting impacts. Impacts from drainage crossing would be mitigated by limiting the number of crossings and utilizing single pass cross-county routes travel routes.

Groundwater resources alluvial aquifers and water wells could be impacted by shot holes and vibrating source points. The proponent's design features avoiding stock ponds/reservoirs, water wells, and guzzlers by a distance of 300 feet would mitigate potential impacts to the groundwater resources.

Approximately 60 vibrator sources points (approximately two percent of the total source points) would be located within areas identified in the ROD/RMPS as WR-CSU-12 for water resources and WR-CSU-11 for saline soils. Both of these CSUs have exception language that would allow activity within these areas if the proposed activity would not or the activity could be conditioned so as to not degrade the resources identified. The applicant's use of low pressure tires, low ground pressure vibrators, and offset travel routes would result in minimal soil compaction and rutting in these soils. And the proponent's design features avoiding stock ponds/reservoirs, water wells, and guzzlers by a distance of 300 feet would mitigate potential impacts to the groundwater and surface water resources.

It is unlikely the scale of the Proposed Action within the WR-CSU -11 and WR-CSU-12 areas would result in any long term decrease in site productivity or increased erosion.

Cumulative Impacts

The CIAA for surface water and groundwater resources is the same as the Soil Resource Section 5.3.2 and the cumulative impacts to surface waters would be similar. In addition, with the increase in the number of well pads and associated wells within the CIAA, there would be an increase for the potential of spills. According to the COGCC, approximately 0.006 percent of produced water and 0.003 percent of produced oil was spilled in 2014.

The increased number of oil and gas wells drilled would increase the potential for impacts to the groundwater from operations drilling through fresh water aquifer zones.

The short-term duration (less than 60 days) of seismic survey activity and of impacts would result in negligible cumulative impacts for water resources and no long-term cumulative impacts following cessation of the proposed seismic survey project.

5.4.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

Neither surface water nor groundwater quality would be impacted by the No Action Alternative.

Cumulative Impacts

Impacts would be similar to those described for the Proposed Action.

5.4.4. Mitigation Measures and Residual Impacts

No additional mitigation measures are required (See soils 5.3.4).

5.5. Vegetation

5.5.1. Affected Environment

The Proposed Action Area is located within 10 different ecological sites, these sites and associated plant species are listed in **Table 7**.

Table 7. Ecological Sites, Woodland Types and Associated Plant Species located within the Proposed Action Area.

Ecological Site / Woodland Type	Predominant Plant Species in the Plant Community
Alkaline Slopes	Wyoming big sagebrush, winterfat, low rabbitbrush, wheat grasses, Indian rice grass, squirreltail
Clayey Foothills	Western wheatgrass, mutton grass, Indian rice grass, squirreltail, June grass, Wyoming big sagebrush, black sagebrush
Clayey Slopes	Salina wildrye, mutton grass, western wheatgrass, June grass, squirreltail, shadscale
Deep Clay Loam	Western wheatgrass, slender wheatgrass, mutton grass, squirreltail, June grass, Letterman and Columbia needle grasses, mountain big sagebrush
Foothill Swale	Basin wildrye, western wheatgrass, slender wheatgrass, streambank wheatgrass, Indian rice grass, Nevada bluegrass, basin big sagebrush, fourwing saltbush, rubber rabbitbrush
PJ Woodlands	Pinyon pine, Utah juniper, mountain mahogany, bitterbrush, serviceberry, Wyoming big sagebrush, beardless bluebunch wheatgrass, western wheatgrass, June grass, Indian rice grass, mutton grass

Rolling Loam	Wyoming big sagebrush, winterfat, low rabbitbrush, horsebrush, bitterbrush, western wheat grass, Indian rice grass, squirreltail, June grass, Nevada and Sandberg bluegrass
Sandy Foothills	Needle-and-thread, Indian rice grass, sand dropseed, Sandberg bluegrass, squirreltail, galleta, shadscale, winterfat, rubber rabbitbrush
Rock Outcrop	Beardless bluebunch wheatgrass, needle-and-thread, June grass, Indian rice grass, fringed sage, buckwheats
Stoney Foothills	Beardless bluebunch wheatgrass, western wheatgrass, needle-and-thread, June grass, Indian rice grass, fringed sage, Wyoming big sagebrush, black sage, serviceberry, pinyon and juniper

5.5.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

The Proposed Action would result in vegetation disturbance due to drilling shotholes and driving vehicles off-road along source lines. Disturbance around shotholes would come from clearing vegetation in order to drill the holes. Any vegetation, herbaceous or woody, that is located along source lines would be crushed by human traffic, vibroseis trucks or by drill buggies traveling along the lines.

Large trees would be avoided whenever possible, but some cutting of limbs may be necessary for drill buggy and vibrator access. Woody plant species along source lines are susceptible to crushing by vehicles. However, the extent of damage depends on plant species, size, age class, time of year, moisture conditions and amount of traffic from vehicles. Older shrubs are more likely to be damaged because of being brittle and decadent, but younger shrubs still are flexible and damage is less likely. The operator has committed to minimize impacts to vegetation by having vibrators offset their travel routes (whenever possible) within the approved travel corridors and would use one pass, to the extent practical. Limiting vehicle travel within woody and herbaceous vegetation sites would help crushed vegetation recover quicker.

The primary direct impact to the native plant community would be the potential introduction of invasive and noxious plant species into the project area from other surrounding range sites. The proposed project area already possesses several weedy plant species. However, the potential for new types of weedy plant species to be introduced is heightened with increased vehicle and human traffic, as well as equipment coming into the area which might have been used in other projects where weeds were found and the equipment was not properly cleaned. If the applicant follows there committed measures as well as the mitigation provided in the Invasive, Non-Native Species section then introduction of weedy species would be limited.

Indirect impacts to vegetation would come from fugitive dust as a result of increased traffic in the area. Fugitive dust may coat roadside and off-road vegetation which can adversely affect plant photosynthesis and lead to decreased productivity. Decreased productivity can result in

fewer and smaller plants reducing available browse for wildlife and livestock in the proposed project area. Smaller and/or lack of vegetation can increase erosion issues in the project area as well.

Cumulative Impacts

The Proposed Action when added to the other projects and development, in and near the project area, as well as within the Indian Valley and Crooked Wash areas as a whole, would result in a slight decrease of vegetation on public land. However, of the potential vegetation to be crushed as a result of the proposed project overall there is no noteworthy increase in vegetation disturbance or long-term changes in the surrounding plant communities.

5.5.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

Under the No Action Alternative no disturbance would occur to vegetation within the project area.

Cumulative Impacts

Denial of the Proposed Action would have no impact on the cumulative impacts to vegetation communities within the Indian Valley and Crooked Wash area.

5.5.4. Mitigation Measures and Residual Impacts

1. Residual cuttings from drill hole would be spread so that they are approximately one inch or less in thickness.

2. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Impacts to crushed or buried vegetation would be ongoing until the plants have successfully regenerated and the range sites are back to their original states prior to seismic disturbance.

5.6. Invasive, Non-Native Species

5.6.1. Affected Environment

The Colorado Noxious Weed Act (Title 35 Article 5.5, enacted 1996) defines noxious weeds as plant species that are not indigenous to the State of Colorado and which aggressively invade or are detrimental to economic crops or native plants; are poisonous to livestock; are carriers of detrimental insects, diseases, or parasites; or the presence of the plant is detrimental to the environmentally sound management of natural or agricultural ecosystems. Recognized noxious weeds are grouped into three categories: Lists A, B, and C (Colorado Weed Management Association 2009). List A includes species in Colorado that are designated by the Commissioner for eradication. List B includes species for which a state noxious weed management plan is

required to stop their spread. List C includes species that are common in Colorado, prevention of these weed species is not state-mandated.

The Proposed Action occurs in an area where there is a high level of recreational use and permitted livestock grazing. The area supports a high level of several invasive species which include, but are not limited to; cheatgrass (*Bromus tectorum*), saltcedar (*Tamarix* app.), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), common mullein (*Verbascum thapsus*), white top (*Cardaria draba*), Russian knapweed (*Acroptilon repens*), spotted knapweed(*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), houndstongue (*Cynoglossum officinale*), musk thistle (*Carduus nutans*), scotch thistle (*Onopordum acanthium*) and Russian olive (*Elaeagnus angustifolia*).

5.6.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

The proposed project would cause surface disturbance, which would impact native vegetation by increasing the potential for establishment of noxious weeds. Surface disturbing activities could facilitate the spread of weeds into previously non-weedy or slightly weed infested areas by introduction of seed into newly disturbed soils. This proposed project relies heavily on the use of equipment; there is the potential for invasive weed seeds to be brought into the project area on the equipment. However, if applicant committed measures and the below specified mitigation is followed the potential for introduction and spread of noxious invasive weeds would be lowered.

Cumulative Impacts

Noxious and invasive weeds present in the general area are primarily associated with existing areas of development/disturbance and livestock grazing. Further actions associated with the Proposed Action would create additional opportunity for noxious/invasive weed establishment. Existing roads, development and livestock grazing throughout the general area are common sources of weeds so elimination of these species from the general area is unlikely.

5.6.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

Noxious and invasive plants would continue to be present within the vicinity of the proposed development and, depending on the aggressiveness of weed treatment activities, may continue to spread.

Cumulative Impacts

Cumulative effects would be similar to those from the Proposed Action cumulative impacts.

5.6.4. Mitigation Measures and Residual Impacts

1. 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, of the WRFO RMP (BLM 1997 b).

2. All equipment and vehicles would be cleaned/pressure washed and inspected to remove seed and soil that may contain noxious seeds prior to commencing operations within the project area. If vehicles encounter noxious weeds on private lands during operations, they would be pressure washed prior to returning to public lands.
3. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Even with project equipment being cleaned there would still be ground disturbance occurring and soils would be disturbed. By having suitable conditions present (non-vegetated disturbed areas) there is the potential for weeds to be introduced by other vectors (i.e., wildlife or livestock). These other vectors are located within the project area regardless if the proposed project is approved.

5.7. Migratory Birds

5.7.1. Affected Environment

A number of migratory birds nest in the project area's lower elevation big sagebrush and Utah juniper-dominated pinyon-juniper woodlands. For most migrants, peak nesting activity takes place from about May 15 through July 15, although several species begin nesting as early as March and many species extend nesting activity well into August. Based on breeding bird surveys conducted throughout the WRFO over the past decades, nest densities in similar shrubland and woodland habitats consistently average about one nest per acre. Birds of higher conservation concern that are common breeding species and well distributed in their respective habitats include Brewer's sparrow (sagebrush; BLM-sensitive and FWS Bird of Conservation Concern (BCC)), and the juniper titmouse and pinyon jay (woodlands; BCC).

5.7.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Nest habitat involvement would be limited to dispersed sagebrush canopy modification attributable to overland travel by vibroseis (up to 198 BLM acres) and drill buggies (1 BLM acre) and the vibrator imprints (6 total BLM acres). It is estimated that from 73 to 205 acres of sagebrush canopy would be subject to surface effects of heavy equipment operation. The stems of larger, more mature sagebrush plants would be broken or bent to the ground in parallel, more or less linear configurations at 0.25 mile intervals. Sagebrush stems that are broken would die; those that are bent would continue to live. Assuming the vehicles wheel-tracks were offset, each source line would involve irregular swaths of sagebrush up to 18 feet wide with reduced canopy density and height. Younger sagebrush plants and regeneration in these swaths would remain largely unaffected and their subsequent growth would likely accelerate in response to reduced

competition of mature canopies. The Proposed Action would involve such modifications across 1.3 to 3.6 percent of the BLM sagebrush shrubland available in the project area. The dispersed nature, limited extent, and retained shrubland character of affected vegetation would not be expected to measurably diminish the utility or capacity of shrubland habitat for subsequent nesting.

Woodland habitats would remain relatively unaffected by the Proposed Action. Woodland stands in the project area are typically open canopied and discontinuous. Although seismic vehicle tracks, as proposed, intersect about two miles of woodland, their design has taken advantage of openings and lower density inclusions to avoid the need for clearing. Seismic operations would be expected to have no measurable influence on the utility or character of woodland nesting habitat.

Proposed seismic operations would represent a substantial source of disruption to bird nesting activity if conducted during the nesting season. Although disturbances at any given point would be relatively brief, buggy/vibrator operation, helicopter support, and recording crew activity would be pervasive, intensive, and recurrent. It is likely that any ongoing nest efforts intersected by vibrator/drill buggy vehicle paths (i.e., 36 feet wide corridor assuming offset) would be destroyed or abandoned. Nests in close proximity to these vehicle operations, and to a lesser extent, those encountered by recording crews would also by subject to levels of disturbance that may compromise incubation or brooding activities sufficient to cause mortality of eggs or nestlings. These physical and behavioral effects would extend across a minimum of 410 acres of BLM shrubland and 15 acres of woodland habitat and, based on average nest densities, involve the loss of 400 or more nest attempts, including a relatively large fraction (estimated 30-50 percent) of BLM-sensitive Brewer's sparrow. Scheduling seismic operations outside the core nesting season (May 15 to July 15) would substantially reduce the number of nests subjected to destruction or failure. Efforts to avoid nests through advance survey are considered futile, since detection is inordinately time-consuming and avoidance of each site would make effective seismic application impractical.

Cumulative Impacts

Seismic operations, as conditioned, would contribute cumulatively with wildfire and low-density oil and gas operations in modifying the physical availability and compromising the utility of shrubland and woodland habitat.

5.7.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

There would be no action authorized that would influence migratory bird habitat availability or have potential to disrupt ongoing nest attempts.

Cumulative Impacts

There would be no contribution to previous or existing disturbances under the No Action Alternative.

5.7.4. Mitigation Measures and Residual Impacts

1. No seismic operations would be authorized to take place during the core migratory bird nesting season (from May 15 to July 15) in order to minimize mortality of eggs or nestlings in violation of the Migratory Bird Treaty Act.

2. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Although complete protection of migratory bird nesting activities may be impractical, avoiding the core nesting period would reduce the certainty and minimize the prevalence of nest destruction and egg/nestling mortality attributable to the Proposed Action.

5.8. Terrestrial Wildlife

5.8.1. Affected Environment

The project area is associated with Game Management Unit 11 and supports large numbers of elk, mule deer, and pronghorn, primarily during the winter and early spring months (November through April). About 70 percent of the project area is mapped as deer and elk winter concentration area, which by definition supports animal densities as least double that of surrounding winter ranges. The project area encompasses about four percent of the more important winter ranges in GMU 11 (i.e., winter concentration areas, severe winter ranges).

Three golden eagle nests (likely associated with a single pair of birds) were located in the east-central portion of the project area during nest surveys in 2015. Although few surveys have been conducted in the project area's woodlands, it is likely that these scattered, open-canopied stands support low density nesting by Cooper's hawk and long-eared owl. Golden eagles begin nesting activities as early as February and young may not be independent of the nest until late August. Woodland raptors generally begin nesting activity in early April and young are normally independent of the nest by mid-August.

5.8.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Cross-country seismic operations would temporarily reduce the height and density of big sagebrush as a winter forage base for big game, but these effects would be minor in extent (about 3 percent of that available in project area). Crushing and thinning of mature shrub canopies would also be expected to accelerate growth of younger plants and seedlings, thereby increasing the vigor of forage production and reducing the duration of forage reductions.

Behavioral effects imposed on big game wintering in the project area, particularly coincident with sport hunting seasons, would likely be profound. Although seismic operations may be limited to 30 days, much of the project area would be exposed to operational disturbances simultaneously given the open nature of the country and paucity of woodland or topographic cover. Disruptive activities and avoidance of human activities, regardless of form, have important implications on big game energetics (e.g., avoidance movements, heightened state of alert) and nutrition (e.g., reduced time foraging and access to available forage), which in turn can have deleterious consequences on fitness and reproductive performance at the individual and population levels.

Nutritional deficits and environmental challenges to forage acquisition, movements, and thermoregulation generally become more pronounced as the winter season progresses (e.g., snow accumulations and increasingly cold temperatures). Under these circumstances, avoiding harassing influences during the mid to late winter period (January 1 to February 29) and allowing dispersal back into the project area after the sport hunting season is considered most important.

Raptors as a group and eagles in particular are afforded protection under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act (BGEPA). This group receives pronounced management attention due to their relatively low abundance and reproductive potential. Raptors are considered to be among those birds most susceptible to reproductive failure caused by human activities.

Seismic activity tends to be relatively brief in duration, but intensive and recurrent in nature, particularly when helicopter support is involved. Timing limitations, applied to areas around a nest site according to a species tolerance to disturbance, are routinely applied to occupied raptor nests and are designed to prevent disturbance-induced absences of incubating or brooding adults that increase the risk of mortality in eggs or nestlings. Relative to the Proposed Action, the eagle nest sites are considered those at most risk of project-related failure (an explicit violation of the BGEPA).

Cross-country vibroseis/drill buggy routes intersect woodland stands that may harbor woodland raptor nests, but with remarkably few exceptions, amounting to less than 700 feet, they have been designed to take advantage of low density canopies, openings, or areas where young conifers are encroaching—areas that have little or no potential as raptor nest substrate. The intersects of juniper stands are generally along a stand's short axis and average about 300 feet. Although vehicle returns on the same route would occur frequently, the duration of disturbance imposed on raptors nesting in stands better suited for nest placement would be measured in minutes and are not expected to result in substantial risk to reproductive outcomes. As discussed in the Migratory Bird section, physical alteration of woodland canopies is expected to be discountable and would not have subsequent influence on nest habitat utility.

Additionally, considering all woodland intersects on BLM lands, buffered by 150 feet to each side, involve less than 100 acres of low potential woodland canopy, the probability of encountering an active raptor nest is considered remote and does not justify further survey effort.

Cumulative Impacts

As conditioned, the Proposed Action would not be expected to adversely influence nesting attempts by golden eagle. Although seismic operations would involve woodland canopies as nest substrate for woodland-nesting raptors, the risk is considered low and would not add appreciably to those more pervasive and expansive woodland effects caused by fluid mineral development elsewhere in the WRFO and northwest Colorado.

5.8.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

None.

Cumulative Impacts

There would be no contribution to previous or existing disturbances under the No Action Alternative.

5.8.4. Mitigation Measures and Residual Impacts

1. Seismic operations would not be authorized to take place on BLM lands associated with big game winter concentration areas from January 1 through February 29. This condition would apply to all BLM land within the project area. This measure would not avoid animal displacement and avoidance-related effects imposed on wintering big game (e.g., elevated energetic demands, reduced foraging efficiency), but it would confine disruptive activities that may occur in the winter months to that portion of the season when animals are in a more favorable physiological and nutritional state.

2. Surface-disturbing and disruptive activities associated with the Proposed Action would not be allowed within 0.5 mile of golden eagle nest sites during the period from nest territory establishment to dispersal of young from the nest (within a period from February 1 through August 31). This Condition would be applicable to the following legal subdivisions under all ownerships and differ in application among ground-based and helicopter support activities:

    Vibroseis and drill buggy operation/recording operations

    T3N R97W

    Section 22: NE

    Section 26: NWNW

    Section 27: N2NE

Helicopter staging and flights

T3N R97W

Section 22: E2

Section 26: NW

Section 27: NE

3. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: These raptor nest conditions would be expected to prevent disruption of golden eagle reproductive functions and maintain the integrity of nest sites for subsequent use.

5.9. Special Status Animal Species

5.9.1. Affected Environment

A number of special status animals occupy the project area on a seasonal or year-round basis, namely the BLM-sensitive white-tailed prairie dog, Brewer's sparrow (discussed in the Migratory Bird section), golden eagle and burrowing owl (each discussed in the Terrestrial Wildlife section), and greater sage-grouse.

White-tailed prairie dogs have limited and discontinuous distribution in the larger drainages within the project area. Approximately 300 acres of prairie dog towns have been mapped in a half-dozen or more widely-separated groups. Prairie dogs represent the primary prey and habitat base for populations of the endangered black-footed ferret that have been reintroduced into northwest Colorado and northeast Utah, but earlier reintroduction efforts (2001-2007) and known occupation by ferret are separated from the nearest project-related disturbance by over 14 ground miles. There is no reasonable potential for these widely scattered prairie dog towns to support black-footed ferret.

The project area is a southern extension of the larger Sagebrush Draw-Crooked Wash-Deep Channel greater sage-grouse population area and supports sage-grouse throughout the year. Two leks are associated with local breeding and nesting functions: one located about 0.8 mile west of nearest proposed operations; the other located in the midst of proposed operations about 100 feet off the edge of BLM road 1512. Colorado Parks and Wildlife has delineated about 4,445 acres of Priority Habitat Management Area and 620 acres of General Habitat Management Area in the project area. These habitats represent nearly 90 percent of sagebrush habitat encompassed by the project area. Priority habitats possess attributes that have the highest conservation value in maintaining sustainable sage-grouse populations, and include lekking, nesting, brood-rearing, and important winter use functions. General habitats support seasonal or year-round habitats outside priority habitat and, under these circumstances, are intermixed as lesser quality habitats among the more prevalent priority habitats.

All priority habitats in the project area are used as nesting and brood-rearing habitats. These important reproductive functions take place from March 1 through July 15. CPW has also mapped the lower reaches of Open Gulch (west-central portion of project area) as an important winter use area. These areas are especially important in providing forage and cover resources during winters with heavy snow accumulations (generally within the period between December 16 and March 15).

5.9.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

About three miles of seismic source lines and 44 vibration source points are located within mapped prairie dog towns. Assuming a 36-foot wide disturbance corridor, overland vehicle passage would involve about 14 acres of habitat and actual source vibrations would take place on a total of about 0.1 acre. Overland use by vibrators/drill buggies, which exert ground pressures substantially less than a light pickup truck, would not be expected to compromise the integrity of subterranean burrow systems. Source vibrations likely pose a limited degree of risk in damaging burrow systems directly beneath the pads, but at proposed patterns of dispersion (lines 0.25 mile apart, source points 220-feet apart) have no reasonable probability of effecting mortality that would measurably influence the abundance or distribution of resident populations (Menkens and Anderson, unpublished report).

On the other hand, it has been demonstrated that white-tailed prairie dogs have a narrow breeding window that, if disrupted, precludes annual reproduction by affected individuals. The 2015 Oil and Gas Development ROD/RMPA established a land use decision that calls for avoiding the conduct of seismic activity in active prairie dog colonies from March 1 to July 1. This COA is designed to minimize disruptions to prairie dogs during their reproductive season. This timeframe is coincident with the applied sage-grouse nesting stipulation.

Sagebrush shrublands that support greater sage-grouse reproductive and winter use in the project area would be subject to physical habitat modification as described in the Migratory Bird section. Considering only those shrublands in priority and general sage-grouse habitats, the Proposed Action would involve canopy modifications on up to 107 acres of BLM priority habitat (about 1 to 2.2 percent available in project area) and 63 acres of sagebrush in general habitat (about 1.3 to 3.2 percent of total BLM sage-grouse habitat available in the project area). The dispersed nature, limited extent, and retained shrubland character of affected vegetation would not be expected to measurably diminish the utility or capacity of shrubland habitat for subsequent nesting, brood-rearing, and winter use by sage-grouse.

It has been well established that sage-grouse respond negatively to disturbance, particularly during their reproductive timeframes (e.g., lekking, nesting, early brood-rearing). As discussed in the Migratory Bird section, proposed seismic operations would represent a substantial source of disruption to bird nesting and brood-rearing activity and prompt adverse behavioral responses that would be expected to elevate mortality and reduce annual recruitment if conducted during those timeframes. Although disturbances at any given point would be relatively brief, drill buggy/vibrator operation, helicopter support, and recording crew activity would be pervasive,

intensive, and recurrent and may be especially influential in small populations such as this. The proposed project area would influence about 11 percent of priority and general habitats available in the Sagebrush Creek-Crooked Wash-Deep Channel Creek watersheds. The 2015 Northwest Colorado Greater Sage-Grouse Approved RMP Amendment explicitly directs BLM to apply timing limitations to priority habitats during sage-grouse reproductive periods (March 1 to July 15). Further the Sage-Grouse Approved RMP Amendment (page 2-1) directs that existing decisions in RMPs would be followed if they provide more restrictive management direction for sage-grouse than the Sage-Grouse Amendment. The 1997 White River RMP, as amended by the 2015 Oil and Gas Development RMP Amendment, provides for a timing limitation for important winter use habitat (December 1 to March 15). Modifications to the dates of the timing limitation can be made by the Authorized Officer (AO) if " site specific information and ensuing environmental analysis indicates that the Proposed Action could be conditioned or conducted so as not to contribute cumulatively to adverse effects on the condition or distribution of wintering birds, winter use behaviors, or sustained fidelity to and occupation birds within the area influenced by development activity."

Cumulative Impacts

As conditioned, proposed seismic operations would confine disruptive activities to timeframes outside the sage-grouse reproductive season and minimize influences that would likely have negative demographic consequences on this small population. The activities are likely to have minor consequences due to elevated energetic demands of avoidance and displacement, which would contribute cumulatively to impacts imposed on regional sage-grouse populations and habitat from fluid and solid mineral development, recreation, and livestock grazing.

5.9.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

None.

Cumulative Impacts

There would be no contribution to previous or existing disturbances under the No Action Alternative

5.9.4. Mitigation Measures and Residual Impacts

1. Seismic operations and support activities would be prohibited within priority habitat on BLM surface during lekking, nesting, and early brood-rearing timeframes, i.e., from March 1 to July 15. Due to the complex interspersion of priority and general habitat within the project area, this Condition of Approval would apply to all BLM lands within the following legal subdivisions:

   T2N R97W

   Sections 1-4.

T3N R97W

Sections: 1-9, 11-15, 17-22, 24-29, 33-36.

T3N R96W

Sections: 5-8, 17-20, 30.

2. Seismic operations and support activities would be prohibited within mapped winter use habitat on BLM surface from December 16 to March 15. This Condition of Approval would apply to all BLM lands within the following legal subdivisions:

   T3N R97W

   Sections: 21, 22.

   Section 27: N1/2.

   Section 28: E1/2NE1/4.

3. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: These conditions would relegate project-related disturbance to periods outside sage-grouse reproductive timeframes and thereby minimize population-level influences caused by mortality and reduced nest success and recruitment.

5.10. Special Status Plant Species

5.10.1. Affected Environment

The Wiley Seismic proposed project area is located in an area that has the potential to provide habitat for BLM sensitive plant species, debris milkvetch (*Astragalus detritalis*) and tufted cryptantha (*Cryptantha caespitosa*), due to the geology, vegetation, and soil types.

Special status plant surveys were conducted on BLM and state land June 26-28, 2014 by Hayden Wing Associates, LLC (Hayden Wing 2014). No special status plant surveys were permitted on private land during the 2014 surveys. No populations of special status plant species (SSPS) were found during the 2014 plant surveys. However, 9.14 acres of suitable habitat for BLM sensitive plants was mapped.

5.10.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

There should be no conceivable direct impacts to SSPS because of the distance of the Proposed Action to the nearest known occupied populations. The proposed project at this time does not have vibrator points or drill buggy vehicles passing through any mapped suitable habitat. It does have potential receiver points that would travel through suitable habitats. While these receiver points would be hand walked in there is still the potential for invasive species to be carried in with the human traffic.

Fugitive dust from the vibrator/drill buggy vehicles that would travel close to suitable habitat may indirectly impact the pollinator species by negatively affecting plant reproduction through stigma competition depending on the time of year when the project takes place. Dust inhibits pollen transfer by coating the stigma.

Cumulative Impacts

With ground and vegetation disturbance there may be the potential for an increase of non-native or exotic plant species being introduced into the project area. Habitat of SSPS is limited to specific geologic formations and soils, any invasions of non-native species could potentially negatively impact suitable habitat.

5.10.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

There would be no direct or indirect impacts to special status plant species or associated habitats under the No Action Alternative.

Cumulative Impacts

There would be no contribution to previous or existing disturbances under the No Action Alternative.

5.10.4. Mitigation Measures and Residual Impacts

1. If project activities do not occur before April 2017, special status species surveys must be updated and re-done. The results of the survey must be provided to the BLM before ground disturbing activities occur.

2. Project personnel walking receiver lines will keep out of mapped suitable plant habitat. This Condition of Approval would apply to all suitable plant habitat within the following legal subdivisions:

   T3N R97W

   Section 9: S1/2 SWSE, S1/2 SWSW

   Section 16: N1/2 NWNW, NENW

Section 21: N1/2 NESE, N1/2 SESE

Section 28: N1/2 NENE

3. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: If mitigation is followed then no disturbance within mapped suitable habitat should occur. . Residual impacts that could occur would be from invasive or non-native plant species being introduced into the area. Invasives can spread into the mapped suitable habitat making it hard for SSPS to establish into the area.

5.11. Cultural Resources

5.11.1. Affected Environment

Current theory proposes that man has occupied North America for at least 1,300 years and was initially composed of small groups, likely extended families, that followed large ice age mammals referred to as mega-fauna, which were the primary food resource. As the larger meg-fauna declined subsistence strategies shifted to include smaller animals and a wider variety of vegetal resources. This later strategy persisted until horticulture was established later in time though not all area saw the same level of horticultural development. The ages are generally classified as Paleo-Indian which extended from the first human presence until around six to eight thousand B.C. followed by what is termed the Archaic period characterized by smaller projectile points, the appearance of more ground stone tools and evidence of more settled settlement patterns and perhaps smaller territories for resource exploitation. The end of the Archaic began between about 200 B.C and about A.D four hundred and was replaced by what is referred to as the Formative Period where smaller projectile points indicative of adoption of the bow and arrow show a shift from darts and lances, the appearance of pottery and horticultural pursuits involving *zea maize* or corn, beans and squash type material. The times are variable depending on a number of factors such as elevation, which greatly affects temperatures critical in horticultural pursuits, rain fall and soil conditions suitable for growing crops. It is important to note that not all groups adopted horticultural activities in Colorado so that some groups continued a more archaic economy of seasonal rounds hunting and gathering resources as they came in season while their neighbors planted crops. Climate change may have resulted in an abandonment of horticulture in western Colorado between A.D. 1200 and 1350 and resulted in a life style more similar to the preceding archaic economy of seasonal rounds as resources became available that lasted well into the period of contact with European cultures. Reed and Metcalf (1999) provide a more comprehensive discussion of human occupation in northwest Colorado and the reader is referred to that publication for a more comprehensive discussion of the various time periods.

The first known and documented European exploration north of the Colorado River did not occur until 1776 with the Dominguez-Escalante expedition as the Spanish Friars sought a route from

Santa Fe, New Mexico to the missions in California that avoided the harsher deserts to the south. The expedition traveled north to the confluence of Douglas Creek and the White River near the present town of Rangely, Colorado before turning west towards California. By that time the then current occupants, the Ute, had been in contact with Spanish missions and settlements to the south and had acquired horses and various trade goods that show up archaeologically. The new found mobility provided by the horse also allowed the Ute to travel east of the Continental Divide and make contact with plains cultures from whom they adopted many of the traits of the plains horse culture such a tack, tipis etc. Further incursions of Europeans into northwest Colorado are not recorded until much later when fur trappers and explorers followed the rivers in search of beaver for the fashion industry in the eastern states and Europe. Military expeditions occurred some years later as the growing nation sought connections to the interior of the nation and the west coast. Settlement came late to the far northwest corner of Colorado due in part the presence of the White River Indian Agency over a large portion of the area and the generally difficult travel in the area due to the lack of roads or trails suitable for heavy wagons. Church *et al.* (2007) provide an extensive discussion of Euro-American expansion into the area and the interested reader is referred to that publication.

Historic documentation suggests that the area of the geophysical exploration was heavily occupied by groups of Ute prior to the removal of the Ute to the reservations in Utah in 1881 (*c.* Silbernagle 2011, Miller 1997). White settlement in the area likely did not occur until after the removal of the Ute in 1881.

A search of the BLM General Land Office Records (www://glorecords.blm.gov, accessed 10/5/2015) indicates that homesteading in the project area did not occur until after the end of World War I. Homesteads were patented under the original 1862 Home Stead act or the 1916 Stock Raising Home Stead act with the 1916 act accounting for the larger acreages of homesteads. Completion of US 40 in the years immediately following the end of World War I may have been an important factor in the homesteading activity with the first patents recorded in 1922.

According to the records of the Colorado Oil and Gas Conservation Commission (COGCC) the first interest in oil and gas exploration in the project area occurred in 1956 with the Trident Company drilling several wildcat wells that apparently never produced (http://cogcc.state.co.us/data.html#/cogis, accessed 10/5/2015). No further interest was recorded in the area until 1974 when Oxy Petroleum and Cities Services Company drilled five wells within the project area. Once again the COGCC records indicate that the wells were dry holes (*ibid.*). This exploration activity took place before inventories for cultural resources were typically performed for oil and gas production and no records exist showing any were performed. Archaeological inventories began in the project area in 1978 (Hewett and Irwin-Williams 1978 compliance dated 5/22/1978) for proposed pipelines and continued irregularly with several proposed 2D geophysical projects (Arthur 1986 compliance dated 5/18/1986, Polk 1985 compliance dated 6/25/1985, Scott 1989 compliance dated 2/28/1990, Sullivan *et al*. 1985, compliance dated 3/4/1986) and subsequent well pads with their associated access routes and pipelines (Conner 1993a compliance dated 8/12/1993, 1993b compliance dated 8/13/1993, 1993c

compliance dated 9/14/1993, 1994 compliance dated 10/25/1994, Conner and Hutchins 1993a compliance dated 4/6/1993, 1993b compliance dated 6/1993, 1993c compliance dated 7/1/1993, 1993d compliance dated 7/7/1993, 1993e compliance dated 7/7/1993, Conner *et al.* 2008 compliance dated 10/9/2008, Davenport 2012 compliance dated 10/1/2012, Fife *et al.* 2013 compliance dated 3/6/2013, Gibson *et al.* 2014 compliance dated 6/25/2015, Hope 1981 compliance dated 4/15/1981, Karpinski 2010 compliance dated 5/25/2010, McDonald 2003a compliance dated 5/5/2003, 2003b compliance dated 8/27/2003, Pope 1991 compliance dated 9/11/1991, 1992a compliance dated 5/6/1992, 1992b compliance dated 5/7/1992). The southeastern portion of the project area has seen three multi state gas transmission lines proposed (Pennefather-O'Brien *et al*. 1992 compliance dated 12/17/1992, Pfertsh *et al.* 2009 compliance dated 5/3/2010, Redman and Chandler 2004 compliance dated 6/24/2005) though only two have been built to date.

Initially project inventories appear to have focused on the identification of prehistoric artifact scatters and open camp sites while more modern features may have been overlooked. In the intervening years a variety of sites have been identified including rock shelters, wickiup villages, historic brush fences associated with homesteading and ranching, and sites that are interpreted as prehistoric celestial observatory sites (*c.* Hauck 2004). Prehistoric and historic rock art is also found in the project area. Historic homestead sites may be located on the private lands within the project area but permission was not granted to inventory those areas and it would be speculative to identify specific features such as log cabins or dugouts in the un-inventoried areas though those types of features are relatively common in northwestern Colorado. Isolated finds of one or a few artifacts are common and may represent expedient episodes of tool refurbishment or loss of single fragments of tool stone. Isolated Finds can also present a problem in interpretation as they may represent the remains of what was once a more complicated site that has been lost to the effects of erosion or perhaps portions of a site that is just beginning to be exposed via the erosion process. Determining which of the two situations is represented is often beyond the scope of basic inventory work as it involves extensive and perhaps complicated test excavations. Historic camp sites associated with livestock herding or recreational camping are also common but at times distinguishing between the two types of camp can be difficult.

Within the current project area the only site type that is not currently known to be present is the prehistoric celestial observatory site. However, there is one such site located approximately 1,000 feet (305 meters) east of one of the proposed access routes into the project area, BLM road 1511 where it splits off from BLM road 1509.

Another type of site not known from the project area is the lithic tool stone quarry site. Neither the Wasatch nor the Fort Union formations that underlie the project are known to produce quantities of suitable cryptocrystalline silica material commonly used by prehistoric people for tool manufacture. Descriptions of the materials commonly found are consistent with materials that are traded or transported in from known quarry sites north and/or west of the project area.

Inventory for this project identified portions of at least six historic brush fences in the project area, sites 5MF.7848.1, 5MF. 7849.1, 5MF.7850.1, 5RB.6364.1, 5RB.8456.1, and 5RB.8455.1. These features are generally historic in nature and represent early ranching activity and livestock

control prior to the ready availability of wire for fencing purposes. Most of these sites are probably directly related to the first homesteads in the area though ascribing a particular fence to a particular ranch operation might prove challenging. Brush fences are generally considered National Register of Historic Places (NRHP) eligible and subject to special consideration during project planning.

5.11.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Direct impacts to cultural resources that could occur without appropriate mitigation measures could include, but not necessarily be limited to, crushing of individual artifacts – particularly more fragile ceramics or organic items should they be present- displacement of more durable artifacts, disturbance or total destruction of other features such as hearths or rock cairns or other similar features should they be present. Unlawful collection of exposed artifacts is always a potential indirect impact when there is an increase in human activity in an area associated with exploration or development in that area. Illicit removal of artifacts diminishes the overall context of the site and the completeness of the information that proper scientific study might provide. Mitigation that requires avoidance of cultural sites by vehicle traffic that supports the exploration, the drill rigs or the vibrator trucks also prevents many of the direct impacts to sites such as crushing of artifacts and eradication of features. However, the indirect impacts of artifact collection remain due to the increased human activity in the area and the potential down time where crews are exploring the area while waiting between specific tasks.

Given the fine, sandy nature of some of the soils in the project area and their susceptibility to wind or water erosion there is a potential for an increase in erosion in some areas as a result of off road travel by drill rigs or vibrator trucks as they travel from one source point to the next. Extend of erosion is dependent on factors such as intensity and duration of wind or rain events in areas where soil has been disturbed by vehicle passage. Erosional activities can potentially result in loss of artifacts, particularly smaller, lighter artifacts, as water washes fine soils off of disturbed areas. Conversely, on areas where sites and artifacts are down slope from areas of disturbed soil artifacts and features could be buried with sediment. Burial of material may help in preservation of the artifacts and their context but it also masks sites making them difficult if not impossible to relocate and avoid during future activities. Sites that cannot be relocated could be adversely impacted by development at a later date as a result of crushing if heavy equipment passes over the site location. Excavation could destroy feature such as hearths or basin house features, if present, as well is displacing artifacts if the site is not accurately relocated before development.

Cumulative Impacts

It is not possible, at the present time, to quantify the potential cumulative impacts as the amount of unlawful collection of artifacts is unknowable. Some potential erosion will likely occur but may not all be related to exploration activities in the area but, erosion could result in loss archaeological contextual data from sites. These losses might be very small and hard to measure and quantify with currently available technology.

5.11.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

Under the No Action Alternative there would be no geophysical exploration in the area which means there would be no vibrator trucks or drill rigs traveling along existing roads, two track roads or cross country and therefore not directly impacting any known or previously unknown or identified cultural resources. With no geophysical activity there would also be no geophone/receiver lines that could potentially intrude upon cultural resources with foot traffic or wires from the receiver lines/cables. Without increased human presence and activity in the area associated with exploration there would no indirect impacts from potentially increased illicit collection of artifacts during exploration activities.

Recreation activity such as hunting, horseback riding or hiking would continue to occur as it has for generations which may result in some ongoing illicit artifact collection. Livestock grazing would continue as it has for nearly 100 years with associated impacts from trampling in concentration areas which can destroy site contexts. Sheet erosion would also likely continue to occur as part of the natural processes in the area but, there would not be any potential acceleration in erosion without the disturbance associated with geophysical exploration.

Cumulative Impacts

Under the No Action Alternative cumulative impacts are related to slow weathering of artifacts and features such as has been occurring since the time the various artifacts were deposited on the landscape. Likewise various cultural features would continue to weather in a similar fashion which could result in either the slow removal of surfaces and non-portable artifacts such as hearths or occupation surfaces as a result of sheet erosion or animal activity. Some artifacts and features that are down slope from erosional events could potentially be buried be downhill movement of soil. These processes have been occurring for centuries and would continue into the future.

Limited human activity in the area as a result of recreational activities or work related to livestock grazing would also continue with the occasional unlawful collection of artifacts. The rate of unlawful collection of artifacts is not currently quantifiable so there is no way to measure trends or enumerate rates of artifact loss.

5.11.4. Mitigation Measures and Residual Impacts

Mitigation for brush fences:

1. Sites 5MF.7848.1, 5MF. 7849.1, 5MF.7850.1, 5RB.6364.1, 5RB.8456.1.and 5RB.8455.1. All receiver lines must be hand carried and passed over the fences. All wires must be staked to the ground to prevent movement of the wires over the fences. No climbing on the fences is allowed, personnel must pass through gaps where the fence is passable without climbing on elements of the fence. A monitor would be required to ensure mitigation measures above are adhered to.

Mitigation for Wickiup sites:

2. All wickiup sites in the revised project area, 5RB.7166 and 5RB.7171, must be avoided by a minimum of 100 meters by all vibrator or drilled hole source points. Placement of geophone receiver lines through these sites is not permitted. An Archeological monitor would be required to ensure the sites are avoided by travel routes, source points and geophone receiver lines.
3. Vehicular traffic through cultural sites would only be permitted on BLM or county numbered and maintained roads. Otherwise all sites except as mentioned below must be avoided by 100 meters minimum distance by all vehicles.

Exceptions to the 100 meter avoidance rule:

4. Site(s) 5MF.7826 100 feet (30 meters) except along numbered roads 1512, 5RB.5160 – all traffic restricted to county road 77 maintained area only, 5RB.8445 - 40 meters for all vehicle traffic, traffic would be limited to the bladed surface of BLM 1727 only through 5MF.7828, all traffic would be limited to the bladed surface of BLM road 1726 through site 5MF.7829, 5MF.3676 all traffic would be limited to the bladed surface of BLM road 1512 near the site. Shot/source points shall remain those identified as part of site avoidance distances during the cultural resources inventory. Site 5RB.8456.1: the road identified in the consultant report as BLM 1511 running parallel to the site approximately 92 feet (28 meters) is not numbered as BLM 1511 (Tedford 2015) all traffic would be strictly limited to the road and shown in the 2013 National Agricultural Image Program (NAIP) aerial photographs and the site would be monitored by an archaeologist with vehicle traffic limited to two passes per day per vehicle. Each vehicle shall be limited to two passes per day, to be monitored by the archaeologist to ensure compliance, when passing the above listed sites.

5. All shot/source points and travel to them must exactly follow routes inventoried and GPS mapped by the archaeological consultant and accepted by the BLM.

6. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual impacts: Some potential loss of archaeological data may occur as a result of minor erosion that might occur along the routes used by the drill rigs and the vibrator trucks despite the use of low pressure balloon tires due to the nature of the soils in the project area. Some natural weathering or erosion would continue to occur with or without project approval in the area. Due to increased human activity in the area by the geophysical crews and potential increased activity in the area as people not associated with the project become curious and explore the project area there is a potential for an unquantifiable loss of artifacts due to illicit artifact collection. This activity likely occurs as a result of recreation in the area but might be increased as an indirect result of project approval.

5.12. Paleontological Resources

5.12.1. Affected Environment

The proposed geophysical project overlies three formations the Wasatch, Fort Union and Quaternary Alluvium (Tweto 1979). The Wasatch is categorized by the BLM as a Potential Fossil Yield Classification (PFYC) 5 formation indicating it is known to produce scientifically noteworthy fossils(*c.* Armstrong and Wolny 1989, Doi 1990). The Fort Union is currently categorized as a PFYC 3 formation indicating its fossil bearing potential is not well understood in the project area. Quaternary alluvium is more recent material that has developed in place and/or been deposited by water over a period of time and is not generally considered to be fossiliferous. Quaternary alluvium is generally categorized as a PFYC 2 formation. Paleontological inventory of a geophysical project to the east of and partially overlapping the current project identified a number of

Source lines were inventoried for the project (Britt and Scheetz 2014 compliance dated 5/28/2015) which identified ten fossil localities in the general project area. The inventory identified four localities in the Fort Union formation and six localities were identified in the Wasatch Formation along or immediately adjacent to the source lines for this project. All but one of the localities identified were of vertebrate fossils while the remaining locality contained clams and gastropods.

During inventory and monitor of the Rockies Express/Entrega 36 inch natural gas pipeline project, which runs through the eastern end of the project area five fossil localities were identified (Bilbey *et al.* 2010 compliance dated 1/23/2010). Three of the localities involved vertebrate fossils and the remainder involved inchno fossils, or trace fossils. The two remaining sites consisted primarily of insect burrows of some sort. Burrow fossils can occur in a variety of environments and while interesting are not considered scientifically important.

All of the remains located and recorded were weathered and fragmentary at the time of recording. Most of the vertebrates identified were aquatic such as turtles, crocodilians, fish, and a possible *champsosaur*, a type of semi-aquatic lizard like animal. Only two potential mammal fossils were identified, but one was too fragmented to make any identification beyond a mammal of some kind. The second specimen appears to be a portion of a *coryphodon* tooth.

5.12.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Direct impacts to fossils would likely occur if source points are located within the boundaries of mapped fossil localities. Impacts to fossil resources if source points are vibrator initiated/activated as the pressure plates have the potential to crush all fossils located directly under the pressure plates. The low tire pressure would also likely crush some of the smaller and more fragile fossils as the machines traverse the site.

Drill buggies can also have direct impacts to fossil resources though perhaps not as severe as those caused by vibroseis equipment. Buggy mounted drills may have low pressure tires but there is still a potential to crush the smaller more fragile fossils in a locality. The shot hole is an area of more intensive impacts due to human trampling during the drilling, charging and backfilling of the shot hole. These impacts may not be as severe as those associated with the pressure plates of vibrator rigs. The drilling of the shot hole and explosive charge that is detonated in it could also potentially adversely impact any subsurface fossils that are not identifiable from the surface.

Stringing cable connected geophones has the potential to adversely impact fossil resources if the cables are dragged along the ground during the process of placing the receivers. Dragging the receiver cables across a fossil locality has the potential to displace fossils from their depositional context. Larger fossils could be dislodged or even broken if a wire snags on a protruding portion of a fossil and is pulled forcefully over the surface. Smaller more fragile fossils could potentially be crushed by either pedestrian traffic through the locality or the dragging of the cables across the surface of the locality. Impacts to vertebrate fossil localities would be considered more detrimental to the regional paleontological database than impacts to invertebrate fossils localities though it still represents a loss of data from the regional fossil database.

Indirect impacts could include unlawful collection of fossils by crews or others that access the area during or after the exploration activities as they consider following drill buggy or vibrator routes. There is a potential for some erosion on those off road routes followed by drill buggies or vibrators depending on how well and rapidly the vegetation recovers after the exploration exercise is completed. Erosion has the potential to transport the smaller, lighter fossils off site after a rain event. The tumbling that might accompany such overland transport of small fossils has the potential to completely remove any potentially diagnostic attributes that might have been present on the fossil remains.

Landing zones associated with staging and distributing geophone lines and associated cables have the potential to adversely impact fossil resources should landing zones be located on fossil localities. The trampling associated with human activity and gathering of materials at the landing zones has the potential to adversely affect fossils by crushing the smaller, more fragile fossils as well as displacing larger fossils from their depositional context.

Potential direct or indirect impacts to trace fossils (ichno fossils) at localities 5MF.7855, 5RB 4827, and 5RB.4829 are not going to be considered as scientifically detrimental as impacts to vertebrate fossil localities. Potential impacts to vertebrate fossils is considered more unacceptable from a scientific perspective since vertebrate fossils are so relatively rare in the fossil records, even if the remains are fragmentary. The scientific data that is lost from the loss of vertebrate fossil resources is considered to be very severe and detrimental to the regional paleontological database.

Cumulative Impacts

If geophysical source/shot points or geophones are placed within the boundaries of fossil localities there is the potential for a large loss of data from the regional paleontological data base as vertebrate fossils are displaced or crushed during geophysical exploration. If trace fossils are impacted during exploration that is also considered an adverse cumulative impact to the database but, it is not considered as detrimental to the regional paleontological database as the loss of data from vertebrate fossil localities. All of the losses result in an unquantifiable loss of individual fossils and associate data from the regional paleontological database.

5.12.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

If the proposed geophysical project is not approved there would be no direct or indirect impacts to fossils from geophysical exploration. There would be no increase in traffic along existing roads nor would there be any cross country travel by drill buggies or vibrator trucks, which could potentially crush and/or displace fossils. The lack of large pedestrian crews to lay geophones and pack shot holes would reduce the potential for unlawful surface collection of fossils. There would be no potential erosion from actions associated with geophysical activity that could accelerate the loss of fossil resources in the project area.

The natural weathering processes that have been occurring in the project area for many centuries would continue as before. The erosion process is relatively slow and while exposed fossils may be washed out of their depositional context the process is very slow. Exposed fossil might also be exposed to weathering action with would fragment the elements that are exposed. These processes are slow enough that they are not currently considered unacceptable.

Cumulative Impacts

There would be a slow, natural weathering of the exposed formations which could result in a very slow loss of fossils, particularly the smaller fossil elements due to erosion which washes these elements which are easily displaced. Large fossils that aren't so easily moved would weather in place and eventually crumble in to small hard to identify elements. These losses are slow and not considered unacceptable at the current time.

5.12.4. Mitigation Measures and Residual Impacts

1. Shot/source points and wire connected geophone receivers will not be permitted within the boundaries of vertebrate fossil localities 5RB, 4828, 5RB.4830, 5RB.5752, 5RB.8478, 5RB.8479, 5RB.8480, 5RB.8481, 5RB.8482, 5RB.8483, 5RB.8484, 5RB.8485, and 5RB.8486 to avoid direct adverse impacts to fossil resources.

2. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Unlawful collection and loss from erosion due to disturbance in the general area may continue to occur after completion of the geophysical exploration but the loss of data would likely be very slow and limited.

5.13. Lands with Wilderness Characteristics

5.13.1. Affected Environment

During the summer of 2013 the BLM-WRFO completed an inventory to identify all lands with wilderness characteristics following direction in BLM Manual 6310. This resulted in the identification of 35 units that met the minimum requirements for lands with wilderness characteristics.

This review included only BLM lands and did not include existing Wilderness Study Areas (WSAs). Areas evaluated for wilderness character consisted of roadless areas greater than 5,000 acres or roadless areas less than 5,000 acres adjacent to a WSA. These areas were inventoried to determine if they meet all the minimum criteria, which also includes that areas must exhibit "naturalness" and provide outstanding opportunities for solitude and/or primitive and unconfined types of recreation.

The 2015 Oil and Gas ROD/RMPA established management objectives for all areas within all lands with wilderness characteristics units. The management objectives include three tier of management for these areas. Some of the 2015 Oil and Gas ROD/RMPA management actions for lands with wilderness characteristics include: New road construction or improving/maintaining primitive roads would not be allowed within Tier 1 areas and timing restrictions on use of helicopters may be applied during big game hunting seasons. All lands with wilderness characteristics area within the Proposed Action boundary are Tier 1 areas that are managed to protect wilderness characteristics as a priority over other multiple uses. The Proposed Action includes approximately 240 acres of the 10,800 acre unit 19-North Colorow and approximately 470 acres of the 5,000 acre unit 24-Pinto Gulch.

5.13.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

During implementation of the Proposed Action, the wilderness characteristic of solitude found within these lands with wilderness characteristics units would be temporarily impacted by the sights and sounds of vehicles, equipment, flagging, helicopters, people, and any other unnatural items associated with this project. This would be considered a temporary impact from November 1-December 20, 2015. The landing or touching down of a helicopter in lands with wilderness characteristics would not conform to the Oil and Gas ROD/RMPA Tier 1 management objective and it is recommended that this not occur as part of the proposed project.

The primary outstanding primitive recreation opportunity found within these lands with wilderness characteristics units is big game hunting. The Proposed Action overlaps with the third

and fourth big game rifle seasons. These recreational impacts are discussed in more detail in the Recreation section of this document. However, the use of helicopters can severely impact big game hunting opportunities. According to the estimated project schedule in Table 2, helicopter use would begin on November 16, 2015. This would be the day after the fourth rifle big game hunting season and would eliminate the impact of helicopter use during big game seasons. It is therefore recommended that helicopter use would start no earlier than November 16, 2015.

The Proposed Action would result in vegetation disturbance due to drilling shot holes and driving vehicles off-road along source lines. Disturbance around shot holes would come from clearing or trampling vegetation in very small areas in order to drill the holes. Any vegetation, herbaceous or woody, that is located along source lines could be crushed by human traffic or by vibrator/drill buggy's traveling along the lines. Large trees would be avoided whenever possible, but some cutting of limbs may be necessary for vibrator/drill buggy access. Woody plant species along source lines are susceptible to crushing by vehicles. However, the extent of damage depends on plant species, size, age class, time of year, moisture conditions and amount of traffic from vehicles. Older shrubs are more likely to be damaged because of being brittle and decadent, but younger shrubs still are flexible and damage is less likely. This type of disturbance would likely impact the wilderness characteristic of naturalness. Naturalness is defined in BLM Manual 6310 as "Affected primarily by the forces of nature, and any work of human beings must be substantially unnoticeable." The crushed or disturbed vegetation may take up to a growing season for the grasses to appear natural. Depending on the location and amount of large woody vegetation disturbed, these impacts may appear unnatural for several growing seasons in very small localized areas.

The amount of cross country travel could result in the indirect creation of unauthorized travel routes which would impact the solitude found in these units. The design feature that states "In order to discourage public travel on source routes and reduce the visual appearance of straight lines, vibrators would enter or exit existing roads at oblique angles" would help to reduce the likelihood that this would occur. See the Access and Transportation section of this document for more details about these impacts. In order to prevent these types of impacts to the naturalness found in these areas, source points would only be allowed along existing travel routes identified in Figure 2. However, no improving or maintaining any of these routes is allowed. All other areas in lands with wilderness characteristics only receive lines would be placed by foot travel only. Helicopters may assist with transporting the equipment but may not touch down or land within lands with characteristics areas.

The drilling of the numerous shot holes would cause small, minor individual surface disturbance areas within to lands with wilderness characteristics. Cumulatively these numerous holes and the equipment used to access these areas could cause noticeable impacts across the landscape within these areas. For this reason source points would only be allowed along existing travel routes identified in Figure 2. In all other areas in lands with wilderness characteristics only receiver lines would be placed and by foot travel only. Helicopters may assist with transporting the equipment but may not touch down or land within lands with characteristics areas.

Overall, the recommended mitigation should serve to meet the 2015 Oil and gas ROD/RMPA management objective for Tier 1 lands with wilderness characteristics areas that are to be managed to protect wilderness characteristics as a priority over other multiple uses.

Cumulative Impacts

Combining the above mentioned impacts to solitude, naturalness, and recreational opportunities, the combined 710 acres of the lands with wilderness characteristics within the project boundary would be impacted directly for almost two months. However, the recommended mitigation should serve to prevent any long term impacts to lands with wilderness characteristics. Should the project result in subsequent development of the federal minerals, Tier 1 areas are open to leasing with an NSO stipulation with no expectations. Therefore, it is unlikely that the Proposed Action would result in any long term indirect or residual impacts to lands with wilderness characteristics.

Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

By not conducting the proposed project, there would be no new impact to lands with wilderness characteristics as a result of this alternative.

Cumulative Impacts

There are no identified cumulative impacts to lands with wilderness characteristics as a result of this alternative.

5.13.3. Mitigation Measures and Residual Impacts

1. Helicopter use will not start earlier than November 16, 2015 to prevent impacts to the primary outstanding primitive recreation opportunity found in these lands with wilderness characteristics units which is big game hunting. Also, no landing or touching down of the helicopters in lands with wilderness characteristics will be allowed in order to protect wilderness characteristics.

2. In order to prevent impacts to the naturalness found in lands with wilderness characteristic areas, source points would only be allowed along existing travel routes identified in Figure 2 in these areas. No improving or maintaining these travel routes is allowed. Within all other areas in lands with wilderness characteristics units only receiver lines will be placed, maintained, and removed and by foot travel only. This includes any maintenance requirement throughout the duration of the project. Helicopters may assist with transporting the equipment for receiver lines, but helicopters may not touch down or land within lands with characteristics areas.

3. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Even with the recommended mitigation and design features, there would still be short term impacts to the solitude wilderness characteristic for the approximately two months of activity required to implement the Proposed Action. However, it is likely that solitude will still be able to be found during this time in other areas within the lands with characteristics units 19-Pinto Gulch and unit 24-North Colorow that are topographically screened and located further from the Proposed Action.

5.14. Livestock Grazing

5.14.1. Affected Environment

One of the dominate land uses in the proposed project area is livestock grazing. Federal grazing allotments are designated rangeland areas used for grazing livestock and are managed by the BLM. The BLM stipulates livestock kind, number and period of use for each grazing allotment.

The Proposed Action area is located within four livestock grazing allotments: Colorow, Little Toms Draw, Keystone, and McAndrews. Within these allotments, there are eight different pastures.

5.14.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

The proposed project would not preclude any cattle, horse, or sheep grazing within the grazing allotments. The primary impact to livestock grazing would be inaccessibility to available forage. Increased human presence, vehicle activity and increased noise levels would be the reasons for the inaccessibility resulting in temporary displacement of livestock within the project area. The displacement would only occur during the drilling and recording portions of the proposed project. Once drilling and recording is completed animals are expected to re-occupy the project area.

Proposed seismic operations have the potential to damage grazing allotment and pasture boundary fences. It is proposed by the proponent that fences would be cut in order for vehicles to travel along proposed route lines. If fences are not fixed correctly or fixed in a timely manner, there is the potential for livestock to move freely between different pastures and/or allotments. This free movement of livestock could cause over utilization in an area and increases the chances for permittees to lose livestock.

Cumulative Impacts

There is the potential for vegetation being disturbed and crushed by drill buggy and vibroseis vehicles. Most crushing of vegetation is expected to occur to older shrubs which are more used by wildlife species for browsing. Grasses are used more often by livestock; however shrubs can be used during winter months by livestock when forage is not abundant. Grasses are not expected to be greatly disturbed unless operations occur during wet weather conditions, and then there is the potential for grasses to be up-rooted by vehicle tires.

Actions associated with the Proposed Action would create additional opportunity for noxious/invasive weed establishment within the project area. An increase in noxious/invasive weeds could impact available forage for livestock in the proposed project area.

5.14.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

Under the No Action Alternative no disturbance would occur and there would be no impacts to livestock grazing within the project area.

Cumulative Impacts

Denial of the Proposed Action would have no impact on the cumulative impacts to livestock grazing within the Indian Valley and Crooked Wash area.

5.14.4. Mitigation Measures and Residual Impacts

1. Gates will be used for crossing fences where possible. If a fence must be crossed by a vehicle at a location other than an existing gate, the fence will be carefully let down for the vehicles to drive over and immediately replaced. After completion of the specific seismic survey operations, the fence will be permanently re-wired and stretched to its original tension.

2. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Noise from the seismic operations has the potential to temporarily displace livestock, which would move livestock into other portions of grazing allotments that might have already been used. If heavy utilization occurs, then it would take vegetation even longer to properly recover and begin growing effectively again. Water availability is somewhat limited within the project area. If displacement occurs livestock might be left without a reliable water source until operations allow them to return to an area where there is reliable water.

5.15. Recreation

5.15.1. Affected Environment

The primary recreational activity that occurs within the boundaries of the Proposed Action and when this is proposed is big game hunting for elk, deer, and bear, as well as mountain lion hunting. The project would take place during the third (Oct. 31-Nov. 8) and fourth (Nov. 11-15) rifle seasons for big game hunting and during the first half of mountain lion hunting season, which is November 16, 2015 through March 31, 2016. The project is located in CPW Game Management Unit (GMU) 11. According to CPW statistics, in 2014 GMU 11 had 4,841 elk hunters and 611 deer hunters. Of these hunters, there were 1,765 elk hunters during the third and fourth rifle seasons and 614 deer hunters during these seasons. This GMU also has unlimited over-the-counter bull elk tags for the third rifle season. This area is popular with big game

hunters during these seasons and contains portions of two lands with wilderness characteristics units and the entire non-motorized Indian Valley area.

5.15.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

The sights and sounds of the blasting holes, cross country vehicle travel, and the use of a low flying helicopter is likely to displace some big game animals from the area during the project time of November 1 through December 20, 2015 and also impact the expected quality of big game hunting in this area. It is unknown the number of big game hunters that would be affected by this activity. The project boundary encompasses approximately 5 percent of GMU 11. The majority of the proposed project that could impact big game hunting such as low flying helicopters and blasting operations would occur after the big game seasons (November 15-December 20) but could impact mountain lion hunters during this time. The primary impact to big game hunters would likely be from the re-survey of all source and receiver locations that is proposed from November 1-November 25, 2015. During this time the cross country-type travel may impact the desired hunting experience of those that have planned to hunt in close proximity to these locations. Overall, it is likely that big game hunters would be able to find suitable hunting opportunities outside the project boundaries on nearby public lands within GMU 11 if there is any impact to their expected hunting opportunities or experiences during this time. The direct impacts could involve moving their planned camping location, scouting unfamiliar areas, and potentially reducing their overall success rate.

Cumulative Impacts

Combined with existing oil and gas developments and operations, grazing activities, and other non-hunting vehicle travel in this area, the Proposed Action is likely to impact big game hunting opportunities and experiences of small numbers of hunters in small localized areas of GMU 11 from November 1-December 20, 2015.

5.15.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

This alternative would result in no new impacts to big game hunting opportunities and experiences in GMU 11 during November 1-December 20, 2015.

Cumulative Impacts

There are no cumulative impacts identified for recreational activities as a result of this alternative.

5.15.4. Mitigation Measures and Residual Impacts

None

5.16. Access and Transportation

5.16.1. Affected Environment

The travel and transportation network within the proposed project boundary consists of short sections Rio Blanco County (RBC) Roads 71 and 77 and a variety of BLM roads that vary in condition from graveled two wheel drive roads to rough, technical All-Terrain Vehicle (ATV) trails. The southeast portion of the project is located in an area that does not allow the general public to use motorized vehicles called Indian Valley. All other areas require the general public to remain on existing routes from October 1 through April 30 of each year.

5.16.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

The amount of traffic related to this project includes approximately 10 semitrailer loads as part of project mobilization and support vehicles that would include up to three 1-ton recording truck, one vibrator mechanic truck and trailer, six UTVs, five 1-ton equipment trucks, two crew transport vans, and approximately 10 miscellaneous trucks for crew support. However, the Proposed Action states that the actual number of vehicles needed to support the seismic survey would vary according to different operational phases of the seismic survey; thus, the preceding figures are estimates. This amount of travel during a time of year when travel routes surfaces may be saturated could cause considerable impacts to the BLM travel routes. In order to prevent the degradation of BLM travel routes during this time of year, it is recommended that all activity shall cease when soils and road surfaces become saturated to a depth of four inches unless otherwise approved by the Authorized Officer. Also, the cross country travel has the potential to indirectly create unauthorized travel routes. Because current WRFO travel rules limit motor vehicle to existing routes and not designated routes, motor vehicle operators are able to legally travel on any existing route. If a cross country route used during this project is identified and used repeatedly as an existing route by the public, then an unauthorized route could be created. A standard term or condition from BLM Handbook H-3150-1 Onshore Oil and Gas Geophysical Exploration on Surface Management Requirements states: ruts and vehicle tracks would be filled with soil and/or obliterated by either hand raking or similar method. Another condition from this handbook states: Any and all tire tracks one hundred feet, leading away from an established dirt or two track road situated on public lands, would be hand raked to blend into the surrounding soil surface. These requirements should serve to prevent any future use of the cross country routes and prevent the creation of unauthorized travel routes as an indirect result of this project.

Cumulative Impacts

The traffic related to the Proposed Action combined with the existing traffic in this area during this time of year could contribute to slightly longer travel times and a higher volume of traffic than is typical. There is potential for the cross country travel associated with the Proposed Action to be perceived by the public as acceptable or legal public travel in this area during this time of year. This could result in illegal cross country travel by the public as an indirect result of implementing the Proposed Action.

5.16.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

By not implementing the Proposed Action, there would be no new impacts to the BLM travel and transportation system and no change to access of public lands.

Cumulative Impacts

There are no cumulative impacts identified for access and transportation as a result of this alternative.

5.16.4. Mitigation Measures and Residual Impacts

1. All activity shall cease when soils and road surfaces become saturated to a depth of four inches unless otherwise approved by the Authorized Officer.

2. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: If all Conditions of Approval and mitigation measures are adhered to and implemented appropriately, there should be no residual impacts to the BLM travel and transportation system. Formation of ruts of less than four inches deep could occur. If these are not closely followed and implemented appropriately, there could be unauthorized routes indirectly created as result of the Proposed Action. Unauthorized routes could impact a variety of other resources and values found on public lands.

5.17. Hazardous or Solid Wastes

5.17.1. Affected Environment

The project area is located approximately 3.25 miles north by northwest of the local land fill. There is a disposal well for produced water located within the project area. Some hazardous substances have likely been used in previous oil and gas development with the project area and some solid wastes have been generated by previous activities in the area.

5.17.2. Environmental Consequences – Proposed Action

Direct and Indirect Impacts

Various vehicle and equipment fuels (e.g., diesel, gasoline, and jet fuel), lubricants, and hydraulic fluid would be used in the field during the seismic survey in support of vehicle and helicopter operations and maintenance. These substances would be stored in transportable containment trailers and vehicles at staging areas in the project area. Solid waste would be gathered timely and disposed of at the nearest appropriate landfill. Spills and leaks have the potential to occur with the use of equipment. The Operator has committed to “All spills or leaks of oil, diesel, hydraulic fluid, or coolant, including any contaminated soils, would reported to the

BLM office, after which the spill materials would be excavated to an appropriate container and transported to an approved disposal site." helping to mitigate these potential impacts.

Cumulative Impacts

The Proposed Action and Design Features are have been submitted with components to comply with storage, use and transport legal requirements and to prevent or minimize any adverse impacts. Unintentional spills from equipment and storage of substances such as equipment fuels (e.g., diesel, gasoline, and jet fuel), lubricants, and hydraulic fluid would be reported to the BLM and materials would be excavated to appropriate container and transported to an approved disposal site. All solid wastes would be removed and disposed of at the nearest appropriate landfill. Any impacts would be temporary and minimal to the cumulative impacts of the project area.

5.17.3. Environmental Consequences – No Action Alternative

Direct and Indirect Impacts

Under the No Action Alternative any of the above listed wastes would not be generated or have the potential for leaks or spills from equipment.

Cumulative Impacts

The cumulative impacts for this alternative would be similar to those of the Proposed Action.

5.17.4. Mitigation Measures and Residual Impacts

1. Comply with all Federal, State and/or local laws, rules and regulations, including but not limited to onshore orders and notices to lessees, addressing the emission of and/or the handling, use, and release of any substance that poses a risk of harm to human health or the environment.

2. All spills or leakages must be reported by the operator, regardless of a substance's status as exempt or nonexempt and regardless of fault, verbally to the BLM WRFO (970) 878-3800 within 24 hours of identifying the spill, with written documentation to be submitted within 72 hours.

3. All vehicle fueling will be completed at identified staging areas where possible to minimize the extent of spills or leakages.

4. All equipment and vehicles would be cleaned/pressure washed and inspected to remove seed and soil that may contain noxious seeds prior to commencing operations within the project area. If vehicles encounter noxious weeds on private lands during operations, they would be pressure washed prior to returning to public lands.

5. Dawson will employ an independent third-party monitor for Quality Assurance/Quality Control compliance oversight for the approved NOI, Plan of Operations and Conditions of Approval.

Residual Impacts: Any transportation or storage of equipment fuels (e.g., diesel, gasoline, and jet fuel), lubricants, and hydraulic fluid would retain the potential for spill. If applicant committed Design Features and mitigation is adhered to, then impacts should be minimal if they were even to occur.

5.18. Colorado Standards for Public Land Health

In January 1997, the Colorado BLM approved the Standards for Public Land Health. These standards cover upland soils, riparian systems, plant and animal communities, special status species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. If there is the potential to impact these resources, the BLM will note whether or not the project area currently meets the standards and whether or not implementation of the Proposed Action would impair the standards.

5.18.1. Standard 1 – Upland Soils

Implementation of the Proposed Action with design features, mitigation provided in this Environmental Assessment, and Standard Terms and Conditions of a geophysical permit would meet the upland soils standard for healthy rangelands. Potential impacts to upland soils would be reduced with low pressure tires, low ground pressure vibrator pad, single pass offset travel routes for vibrators where feasible, and rutting depth standards. Slopes greater than 35 percent would be avoided. Decreased soil cover resulting from disturbances to vegetation is expected to be short term.

5.18.2. Standard 2 – Riparian Systems

The Proposed Action would not influence riparian or wetland systems and would, therefore, have no effect on the status of the land health standards.

5.18.3. Standard 3 – Plant and Animal Communities

Upland plant communities in the project area currently meet the Standard. With implementation of mitigation measures the Proposed Action would have little negative effects on the status of Land Health Standard 3 in the project area or at a landscape scale

5.18.4. Standard 4 – Special Status Species

The Proposed and No Action Alternatives are not expected to affect populations or habitats of plants or animals associated with the Endangered Species Act and/or BLM sensitive species if mitigation measures are followed. If so, there should be no influence on the status of applicable Land Health Standards.

5.18.5. Standard 5 – Water Quality

The water quality standard for healthy rangelands is currently met and the proposed geophysical operations would not affect water quality. Design features incorporated into the Proposed Action, mitigation developed in this Environmental Assessment, as well as the Standard Terms and

Conditions of a geophysical permit contain several protection measures that would maintain the water quality of the affected stream segments.

6. SUPPORTING INFORMATION

6.1. Interdisciplinary Review

Table 8: List of Preparers

Name	Title	Area of Responsibility	Date Signed
Paul Daggett	Mining Engineer	Air Quality; Geology and Minerals; Soil Resources; Surface and Ground Water Quality; Floodplains, Hydrology, and Water Rights; Prime and Unique Farmlands	10/14/2015
Ed Hollowed	Wildlife Biologist	Wetlands and Riparian Zones, Special Status Animal Species, Migratory Birds, Aquatic and Terrestrial Wildlife,	10/22/2015
Heather Woodruff	Ecologist	Vegetation, Invasive, Non-Native Species, Special Status Plant Species, Wild Horses, Forestry and Woodland Products, Livestock Grazing, Areas of Critical Environmental Concern	10/9/2015
Michael Selle	Archaeologist	Cultural Resources, Paleontological Resources, Native American Religious Concerns	10/23/2015
Kyle Frary	Fire Management Specialist	Fire Management	10/9/2015
Ryan Snyder	Natural Resource Specialist/Project Lead	Hazardous or Solid Wastes, Social and Economic Conditions	10/26/15
Aaron Grimes	Outdoor Recreation Planner	Lands with Wilderness Characteristics, Recreation, Access and Transportation, Wilderness, Scenic Byways , and Visual Resources	10/13/2015
Stacey Burke	Realty Specialist	Realty Authorizations	10/8/2015
Heather Sauls	Planning & Environmental Coordinator	NEPA Compliance	10/26/2015

6.2. Tribes, Individuals, Organizations, or Agencies Consulted

Personal meeting with Brian Holmes, CPW biologist, September 1, 2015, with regard to project impacts, resource prioritization, and intended mitigation.

Phone call with Brett Smithers, CPW land use specialist, October 22, 2015, with regard to project impacts, resource prioritization, and CPW concurrence and support of intended mitigation.

Colorado SHPO 9/21/2015

Ute Mountain Ute Tribe
Hopi Tribe
Eastern Shoshone
Pueblo of Jemez
Northern Ute
Southern Ute Indian Tribe

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APPENDIX A. FIGURES

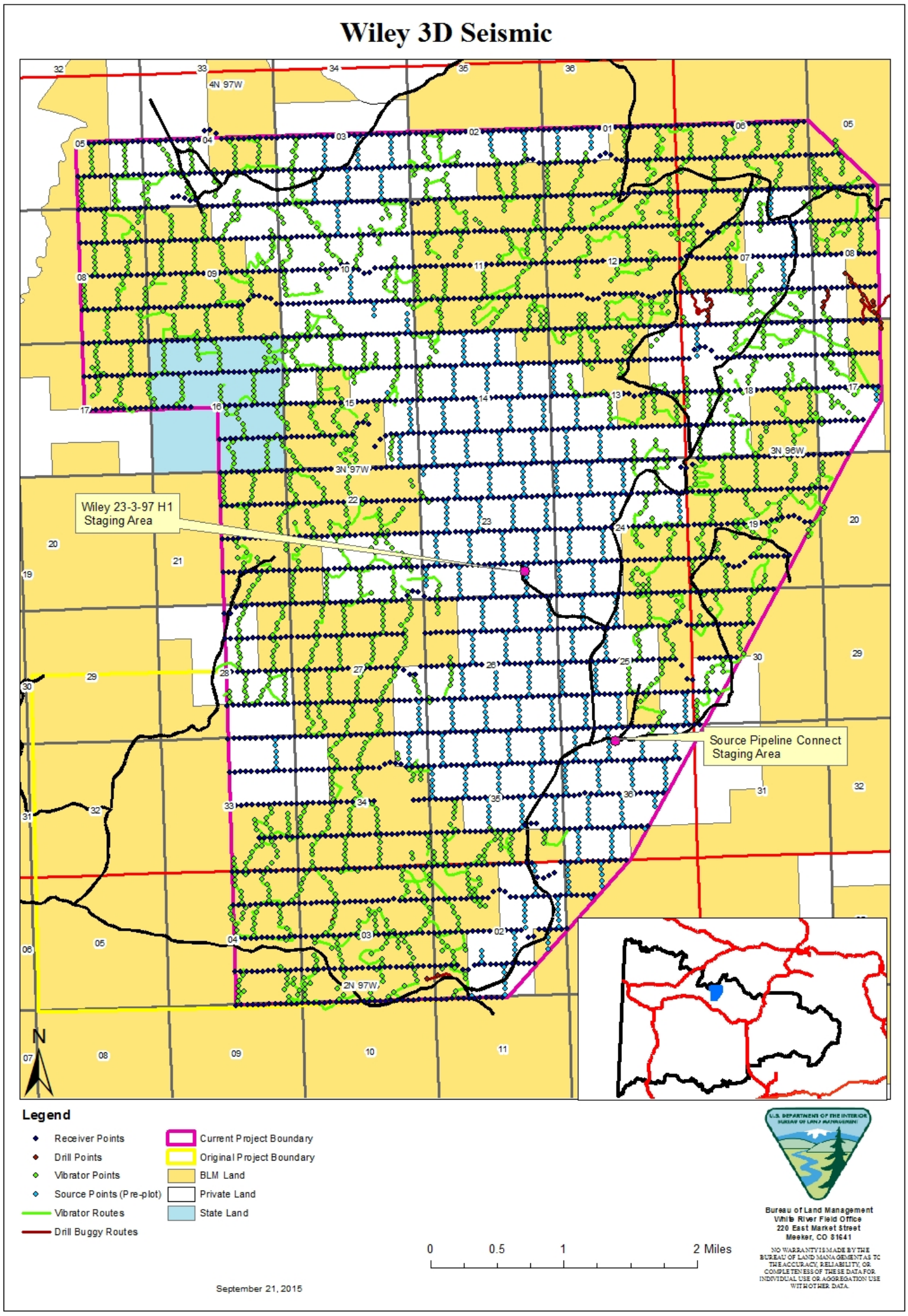

Figure 1: Overview map of the Proposed Action depicting source point, receiver lines and staging areas. Black lines on the map are existing roads.

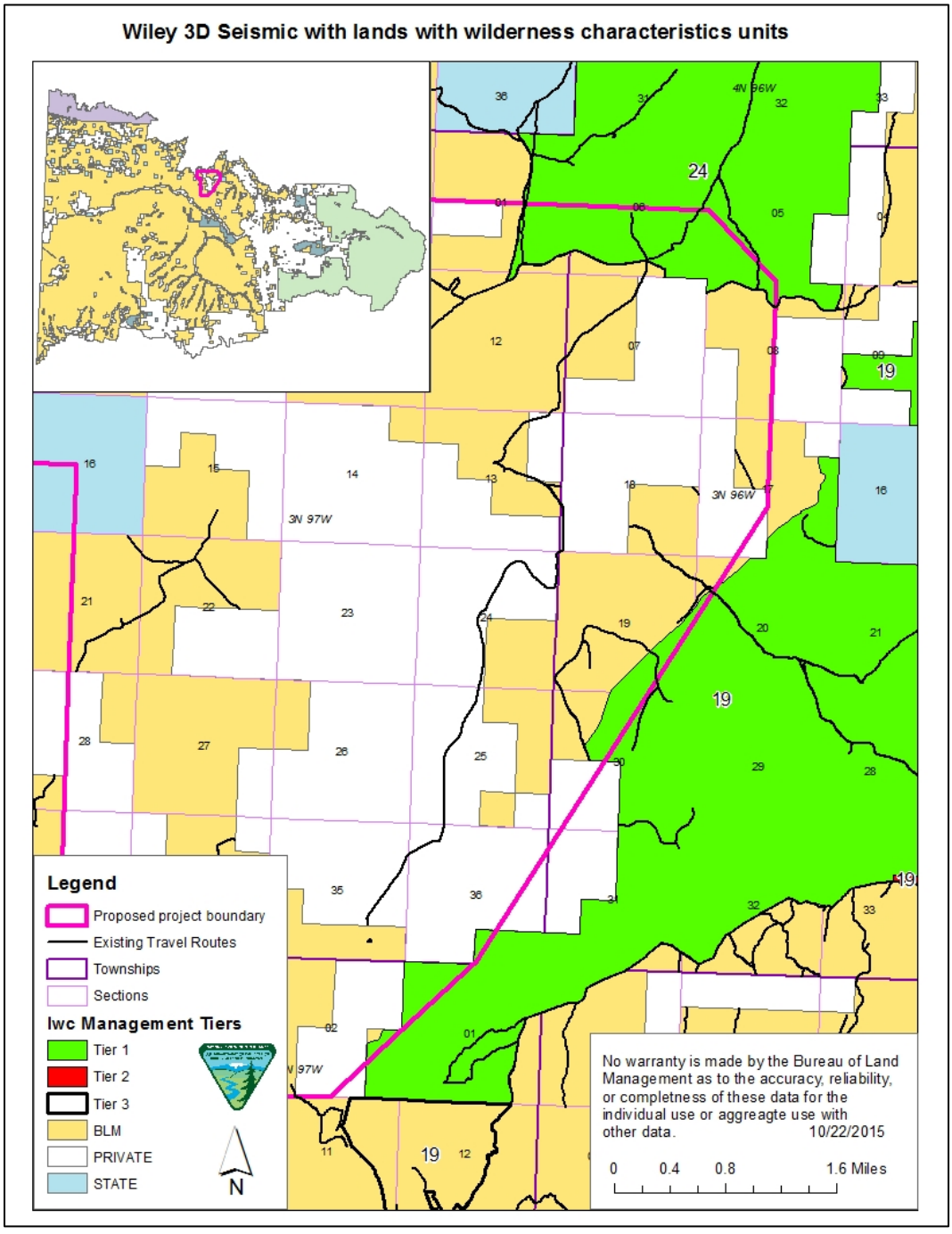

Figure 2: Map of the Lands with Wilderness Characteristic areas within and adjacent to the project area.