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**Dashboard 3D Geophysical Survey Project
Environmental Assessment**

***Location:* Juab County, Utah
Township 15 South, and Ranges 2 West, 1 1/2 West, and 1 West;
Township 16 South, and Ranges 2 West and 1 West: and
Township 17 South, and Ranges 2 West and 1 West
(Salt Lake Base & Meridian)**

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Washboard 3D Geophysical Survey Project

UT- 010-08-010

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1.0 Chapter 1: Purpose and Need

1.1. Introduction

This Environmental Assessment (EA) has been prepared to analyze the potential effects of Pioneer Natural Resources USA, Inc. proposed three-dimensional (3D) geophysical seismic survey. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the Bureau of Land Management (BLM) in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact” (FONSI). A Decision Record (DR), which includes a FONSI statement, is a document that briefly presents the reasons why implementation of the selected action will not result in “significant” environmental impacts (effects) beyond those already addressed in the House Range Resource Area Resource Management Plan (HRRRMP)(BLM, 1987). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a DR may be signed for the EA approving the alternative selected.

1.2. Background

Pioneer Natural Resources USA, Inc. (Pioneer) proposes to conduct a 3D geophysical exploration or seismic survey to test the subsurface geologic conditions for the potential presence of oil and natural gas resources in a 92 square mile (59,192 acres) Project Area (Appendix A, Figure 1-1). Ownership of the surface estate is predominantly private (59 percent) followed by federal (BLM-administered) (35 percent) and state (3 percent). Lakes and reservoirs make up the remaining 3 percent of the Project Area (Appendix A, Figure 1-2). The proposed Project Area occupies portions of Juab County and townships:

Township 15 South, and Ranges 2 West, 1 1/2 West, and 1 West;
Township 16 South, and Ranges 2 West and 1 West: and
Township 17 South, and Ranges 2 West and 1 West (Salt Lake Base & Meridian).

To initiate the permitting process on federal lands in the Project Area, Pioneer submitted on October 18, 2007 a Notice of Intent (NOI) to Conduct Oil and Gas Exploration Operations to the Bureau of Land Management (BLM), Fillmore Field Office. The intent of Pioneer’s Proposed Action is to determine the potential for occurrence of oil and gas resources in the underlying geologic formations and to identify areas where drilling wells would have a higher probability of finding commercial quantities of hydrocarbons that if such seismic data were unavailable. The proposed survey has been named the Washboard 3D Seismic Survey.

1.3. Purpose and Need

1.3.1. Need for the Proposed Action

The need for the Proposed Action is to determine the potential for occurrence of oil and gas resources in the underlying formations and to identify areas where drilling wells would have a higher probability of finding commercial quantities of hydrocarbons than if such seismic data were unavailable. A 3D seismic exploration process provides information about underground geology by utilizing a 3D seismograph data collection system to analyze and three-dimensionally image subsurface geologic structures and stratigraphy. The proposed 3D survey could generate data that may be used to more accurately define the location of potential reservoirs of commercial quantities of hydrocarbons and thereby reduce unnecessary drilling and associated roads, pads, and other surface disturbances. The survey may verify and/or supplement the existing subsurface geologic data from previous geophysical surveys and drilling and could facilitate collection of new data in areas of the Project Area where geophysical surveys and/or drilling have not occurred. Use of geophysical data would eliminate some areas from future exploratory drilling and focus well drilling activity in only those areas where the resource is most likely present. There is the potential that results of the seismic survey could indicate the absence of additional viable drilling opportunities in the Project Area. Therefore, the results of the seismic survey may or may not lead to additional exploratory drilling in the Project Area.

The Proposed Action involves activities by a private entity on federal, BLM-administered lands. Based on Council of Environmental Quality (CEQ) regulations (40 CFR 1508.25), the BLM has the responsibility to analyze the effects of a proposed action that includes not only federal lands, but also state and private lands when the proposed action are “independent parts of a larger action and depend on the larger action for their justification.”

Oil and gas development and drilling are occurring near the Project Area and are likely to continue. New exploratory successes in adjacent areas have been dramatically impacted by the use of seismic surveys. Not only do these surveys boost success rates, they also provide a means to “smart development” with their high resolution, spatially correct image of the subsurface. Similar 3D seismic survey projects are currently planned in the area.

Although previous exploration in the Project Area indicates a likely presence of potentially recoverable hydrocarbons, completion of additional seismic surveys may not necessarily lead to additional drilling and oil and gas development. The proposed 3D seismic survey, if implemented, may not identify additional targets for additional exploratory drilling or field development.

This proposed 3D survey follows a previous Pioneer 2D seismic survey project (CUT 1) that was completed fall of 2007 within portions of the proposed Washboard 3D Project Area. This previous 2D survey produced data that has provided positive indicators for the presence of potential hydrocarbon drilling targets. To further refine and evaluate the opportunities in the area, Pioneer has proposed a more thorough 3D survey to provide more effective and location-specific 3D seismic survey data to more clearly target areas

for exploratory drilling and for development of potential producing formations underlying the Project Area.

The effectiveness and value of a 3D survey is its generation of a relatively continuous image of subsurface conditions in essentially all dimensions. In contrast, a 2D survey produces an image of a vertical slice directly beneath only the seismic line. Two dimensions are represented, the vertical dimension and the horizontal dimension beneath the line. Typically, these vertical slices contain reflection energy “out of the plane” which cannot be correctly positioned in space; this issue confuses interpretation with misinformation. Conditions between lines must also be estimated. Interpretation based on 2D surveys is by definition more uncertain.

Three-dimensional data allows a much more reliable interpretation of stratigraphy, depths, and subtle contrasts in rock quality and trends in these characteristics for essentially every subsurface position within the entire survey area. Three-dimensional surveys are necessarily more intensive, with a greater number of source points and receiver locations than 2D surveys. As a result, certain critical “density” of data must be achieved to provide the interpretive advantages of the 3D survey.

In acquiring 3D seismic data, the distance between source lines and the distance between receiver lines is generally dictated by the depth of desired imaging as explained in Chapter 2. The relatively low density of source and receiver lines in this survey reflects that the main focus is on depths at or below 3,000 feet. Thoroughly imaging shallower formations would require more closely spaced lines.

The distance between individual source point and receiver locations controls the resolution and detail of the 3D images generated by the survey. This survey would generate an image component for every 110-foot by 110-foot area in the subsurface. This resolution is consistent with data density needed to provide the interpretive capabilities necessary for the targeted objectives and is also consistent with typical industry practices for 3D seismic surveys.

Line spacing for source points (drilled shot-holes, submerged air guns, and vibroseis) and receiver points influence the overall data quality. Every data point generated by the seismic survey is a summation of the recorded and processed signals from multiple shot detonations, submerged air-gun discharges, and vibroseis pulse generation.. The number of individual processed signals that contribute to the final imaged point is known as the fold number. This survey is designed to provide a maximum fold number greater than 66 to provide sufficient data quality for this complex geologic area.

1.3.2. Purpose of the Proposed Action

Private exploration and production from federal oil and gas leases is an integral part of BLM’s oil and gas leasing program under authority of the Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.) as amended, by the Federal Land Policy and Management Act of

1976 (FLPMA)(43 U.S.C. 1701 et seq.) as modified, and the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (30 U.S.C. 181 et seq.). The BLM oil and gas leasing program encourages development of domestic oil and gas reserves and the reduction of U. S. dependence on foreign energy sources. BLM considers approval of proposed actions in a manner, which avoids or minimizes impact on other resources and activities as identified in the HRRR RMP.

1.4. Conformance with BLM's Land Use Plan

Federal lands in the proposed Project Area are under the jurisdiction of the BLM Fillmore Field Office (FFO) and policies for development and land use decisions are contained in the HRRR RMP. The HRRR RMP decision calls for compliance with FLPMA's multiple use mandate. The decision is to lease by non-competitive procedures, all areas within the fluid mineral leasing Categories 1, 2, and 3 (Category 2 lands are crossed by the proposed seismic lines), to continue the oil and gas program in accordance with the category system, and to stipulate Notices of Intent to ensure surface protection. Further, the decision addresses that elk critical winter range, as described in the plan, should remain under Category 2 with a seasonal restriction to protect elk crucial winter range. Thus, geophysical operations are allowed under the HRRR RMP, subject to the seasonal restriction for elk winter range and other category restrictions, as well as any site-specific stipulations needed to ensure protection of resources and land uses. Because seismic exploration is a necessary part of gas and oil operations, the Proposed Action would be in conformance with the HRRR RMP, and it has been determined that the Proposed Action would not conflict with the plan's other decisions.

1.5. Relationship to Statutes, Regulations, or Other Plans

This EA was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and in compliance with the CEQ regulations (40 Code of Federal Regulations [C.F.R.] Parts 1500-1508) and U.S. Department of the Interior (USDI) requirements (Department Manual 516, Environmental Quality).

There are no comprehensive State of Utah plans for the vicinity of the proposed action. The State of Utah School and Institutional Trust Lands Administration (SITLA) has leased a majority of the state lands in the Project Area for oil and gas exploration and production. Because the objectives of SITLA are to produce funding for the state school system, and because geophysical exploration on federal leases could foster further interest in drilling state leases in the area, the Proposed Action is therefore consistent with the objectives of the State of Utah and SITLA.

The proposed seismic exploration would be consistent with the Juab County Land Use Code (7/2/2007) which allows for oil and gas development in most county land use districts without special conditions (A-1, RA-1, GA, O-1) and in the GMRF-1 district with conditions. These land use districts cover nearly all the Project Area.

Pioneer and its geophysical survey contractors are bonded nationwide on BLM lands.

A listing of all known major federal, state, and local approvals and permits is presented in **Table 1-1**.

Table 1-1. Major Federal, State, and Local Permits and Approvals for the Washboard 3D Seismic Survey Project

Agency	Permit Approval or Action
U.S. Bureau of Land Management (BLM)	Approval of the Notice of Intent to Conduct Oil and Gas Geophysical Exploration Operations and authorization for the geophysical seismic survey to proceed. Antiquities and cultural resource permits on BLM-managed land.
U.S. Fish and Wildlife Service (USFWS)	Coordination, consultation, and impact review on federally listed threatened and endangered (T&E) species.
U.S. Department of Transportation	Permit for transport of explosives.
U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives	Permit for handling and storage of explosives. Permit for use of high explosives.
Utah Governor's Public Lands Policy Coordination Office	Cultural resources survey review and consultation
Utah Division of Wildlife Resources	Coordination on impacts to wildlife and state-sensitive species.
Utah Division of Oil, Gas and Mining	Permit to Conduct Seismic Exploration
Utah Department of Transportation	Conformance with applicable size and weight limits for trucks. Permit to transport explosives.
Utah State Historic Preservation Office	Consultation for cultural resource inventory, evaluation, and mitigation.
Utah School and Institutional Trust Lands Administration	Right-of-way easements on state sections.

	Cultural resources survey review and consultation
Utah State Parks	Consultation regarding Yuba Lake State Park
Juab County	Conditional Use Permit. Digging Permit. Control of noxious weeds.

1.6. Identification of Issues

As part of internal scoping, BLM resource specialists in the Fillmore Field Office reviewed Pioneer's Proposed Action and conferred with other agencies and the public to assess type and magnitude of impacts to the critical elements of the human environment and other resources. The scoping process has continued through the development of this document. The concerns and issues are listed below by resource/discipline and are consistent with relevant concerns and issues presented in Appendix B Interdisciplinary Team Analysis Record. The BLM has conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS), State Historical Preservation Office (SHPO), and five Native American Tribes. The BLM Fillmore Field Office officially posted the proposed project on the Environmental Notification Bulletin Board (ENBB) on December 13, 2007.

An interdisciplinary team has analyzed the potential consequences of the Proposed Action and the No Action alternative. A list of preparers is included in Chapter 5. Appendix B of this EA presents a checklist of all environmental elements considered in this analysis.

1.6.1. Relevant Issues

Threatened, Endangered or Candidate Plant Species

- Potential impacts to Ute ladies' tresses (*Spiranthes diluvialis*)

Fish and Wildlife including Special Status Species other than FWS Candidate or Listed Species

- Potential impacts to least chub, leather side chub, and spotted frog
- Potential impacts to cutthroat trout (Little Chicken Reservoir)
- Potential impacts to burrowing owl and other raptors
- Potential impacts to other migratory birds
- Potential impacts to Yuba Lake fisheries

Cultural Resources

- Potential impacts to eligible sites potentially present within the Project Area.

Native American Religious Concerns

- Potential impacts to Native American ethnographic features and/or conditions located within the Project Area

1.7. Summary

This chapter has presented the Purpose and Need for the proposed exploratory, seismic survey project, as well as the relevant issues, i.e., those elements that could be affected by the implementation of the proposed project. The BLM has considered a range of alternatives. These alternatives, as well as the No Action alternative, are presented in Chapter 2. The potential environmental impacts or consequences resulting from the implementation of the Proposed Action and No Action alternatives on current conditions for affected resources are described in Chapter 3 and analyzed in Chapter 4 for each identified issue. Chapter 5 describes the public and agency involvement process.

2.0 Chapter 2: Proposed Action and Alternatives

2.1. Introduction

This chapter presents the description of Pioneer Natural Resources USA, Inc's. (Pioneer's) proposed Washboard 3D Seismic Survey Project (Proposed Action), the No Action alternative, and alternatives considered but not analyzed in detail. No other alternatives are required as there are no unresolved conflicts regarding alternative uses of available resources.

2.2. Proposed Action

In support of alternatives development, including the Proposed Action, planning civil and environmental surveys were initiated fall of 2007 to identify and record site locations for ground vibration source points and receiver points. Surveys for cultural resources followed the initial civil survey of locations. Where cultural resources would be encountered by seismic survey activities, the locations of conflict were provided to the civil surveyors for their reassignment of source or receiver point locations to avoid direct impacts. Both civil and subsequent cultural surveys continued until weather conditions (snow accumulation) terminated field survey activities for the winter.

Civil and cultural surveys were completed in spring 2008. Biological field surveys were also conducted in spring 2008 as required by the Surface Management Agencies, BLM and SITLA (SMAs). Should additional biological clearance surveys (burrowing owl) be required prior to project implementation, surveys for nesting burrowing owl would occur as needed in suitable habitat in areas that would be affected by the proposed project prior to September 1, 2008. The results of necessary burrowing owl surveys would be used to modify the seismic survey operations so to ensure avoidance of impacts.

Pioneer proposes to conduct a three dimensional (3D) geophysical exploration or seismic survey to test the subsurface geologic conditions for the potential presence of oil and natural gas resources in an approximately 92.5 square mile (approximately 59,192 acres) area (Project Area)(Appendix A, Figure 1-1). The seismic survey would involve the generation of ground vibration by the sequential 1) detonation of individual explosives placed underground at depth in source-point drilled boreholes (shot holes), 2) pulse generation by vibroseis equipment operating on land, and 3) pulse generation by submerged air guns in aquatic/lake habitat within the Project Area. For all three source types, the reflected sound waves and patterns from the different underground geologic strata would be recorded by an array of geophones (terrestrial locations) and hydrophones (aquatic environments) centered around and either side of a line of source points (Appendix A, Figure 2-1). The survey would be conducted from one side of the Project Area to the other by a crew of up to 100 personnel over an approximate four-month period.

The proposed source points (vibroseis, shot holes, and air-gun points) are arranged into lines that are positioned approximately in a southwest-northeast array and are oriented diagonally to the east-west receiver lines within the Project Area (Appendix A, Figure 2-1). The ideal configuration of continuous and parallel source lines has been modified in several areas for this proposed project due to topographic constraints to continuous source-vehicle travel across the Project Area. The source lines would ideally run parallel, 1,760 feet apart, with vibroseis, drilled, and air-gun source points spaced approximately 246 feet apart; and eight added lines of air-gun source points spaced approximately 123 feet apart within Yuba Lake. Based on the civil survey, there would be a total of approximately 6,809 source points totaling approximately 317 miles of source lines (approximately 34 source lines).

The recording of seismic information would involve a total of approximately 47 parallel lines of receiver (geophone/hydrophone) stations laid out in a northeast-southwest orientation (Appendix A, Figure 2-1). The parallel lines would ideally be spaced approximately 1,320 feet from each other and the geophone/hydrophone stations would be spaced at approximately 220-foot intervals. Ideal receiver locations would also be modified where topographic constraints on land and water depth in Yuba Lake affect access. Depending on the location of a source point, the number of receiver lines and number of individual, stand-alone stations of six receiver geophones or a station of a single hydrophone (channel) would be in at use at any one time for recording the seismic data. Four patterns or patches consisting of 12 lines by 176 channels, 12 lines by 184 channels, 12 line by 192 channels, and 14 lines by 176 channels would be used in the Project Area. There would be a total of approximately 2,112, 2,208, 2,304, or 2,408 geophone/hydrophone groups in use for a point of source generation, respectively, depending on the point's location. The survey would include approximately 366 miles of receiver lines.

The method of accessing the source point locations on land where holes would be drilled and explosives placed would vary across the Project Area based on vegetation type, terrain, slope, and other conditions. Vibroseis equipment mounted on articulated, off-road buggies would be used on lower land elevations, less steep portions of the survey located mainly on private lands. Vibroseis source generation comprises about 82 percent of the proposed total project mileage. Approximately 12 percent of the acquisition would use explosive source methods; mainly on affected public lands which are characterized by the more challenging terrain of BLM- and SITLA-administered lands above the agricultural valley bottoms. It is anticipated that 73 percent of the shot holes would use buggy-drill equipment with the remaining 27 percent being drilled by heliportable drills. The remaining 6 percent of the acquisition would use air gun sources in Yuba Lake (Sevier Bridge Reservoir).

2.2.1. Source Generation

Pioneer would use pulse-generating vibroseis equipment (82 percent of source points) and explosives detonation (12 percent of source points) set in the drilled shot holes at

source points on land, and air guns in the aquatic environment of Yuba Lake (6 percent of source points) to generate ground vibrations as part of the seismic survey process.

2.2.1.1. Vibroseis – Terrestrial

Pulse-generating vibroseis equipment mounted on an articulating buggy (buggy-vibe) would be used to produce energy waves at source points located in more accessible, lower elevation, less steep, and less rugged portions of the Project Area (Appendix C, Picture C-1). Using vibroseis as a source of energy allows for the use of broadband-width source signals to override ambient noise. Typically, three to four buggy-vibes are operated synchronously as they travel in-line or in a zigzag pattern from one source point to another spaced 246 feet apart (Appendix C, Picture C-2). When the vibrator plunger/plate (pulse-to-ground transfer apparatus) of a buggy-vibe lines up on the specified source point (central position), an on-board electronically controlled hydraulic system both lowers and presses the plunger/plate against the ground and also raises the 62,000 lb vehicle into the air supported by the lowered plunger/plate. The hydraulic system then vibrates or “shakes” the mass of the vehicle over a precisely controlled frequency (Hz) band and for a specified time (seconds). The contact between the lowered vibrating plate and the ground allows for the transfer of pulse energy from the plate into the ground.

Buggy-vibes are approximately 11 feet high by 35 feet long and 9 feet wide. Tires are typically over-sized, about 26 inches wide and approximately 5 feet high. The size of the tires allows the vehicle’s weight to be more evenly distributed on the ground beneath each wheel thereby reducing impacts in comparison to conventionally-tired vehicles. The plunger/plate on all buggy-vibes is located on the underside and in the center of the vehicle. This plunger/plate is driven by hydraulic cylinders and is approximately 4 feet by 7 feet in dimension. Pioneer proposes to use the buggy-vibes to conduct 6 to 8 sweeps with 7 to 70 Hz frequency bandwidth at each source location.

To account for maneuvering flexibility to avoid obstacles or sensitive resources and travel distance between lines, it is estimated that buggies would travel no more than 2.0 miles for every mile of buggy vibe 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 obstacles such as rock features or trees. The large, low-pressure tires of a buggy vibe would exert a pressure of about 10 psi on the surface. (For comparison, a ¾ ton 4-wheel drive truck exerts approximately 17 psi on the surface).

Approximately 10 crew members would conduct buggy-vibe operations for 12 to 14 hours per day during the source generation/recording phase of the survey. A majority of crew members would travel daily to and from staging areas within the Project Area and nearby accommodations in Nephi, Utah. An estimated three roundtrips per day to and from Nephi, Utah area by vehicle may be necessary to acquire needed materials and supplies and to meet personnel needs. Approximately six vehicles comprised of pickups and multi-passenger vehicles would be used in total, with an estimate of three of them used to commute from the Nephi area.

2.2.1.2. Shot Hole Drilling and Charge Detonation – Terrestrial

To place explosive charges for detonation at depth beneath the surface, two types of transportable drills would be used to create the shot holes, drill-mounted articulated buggies (buggy-drills) and drills transported by sling below a helicopter (heliportable drills). Shot holes and explosives charge or shot placement would be spaced approximately every 246 feet along source lines. Approximately 15 crew members would conduct daily drilling operations for 12 to 14 hours per day. A majority of crew members would travel daily to and from staging areas within the Project Area and nearby accommodations in Nephi, Utah. An estimated three roundtrips per day to and from Nephi, Utah area by vehicle may be necessary to acquire needed materials and supplies and to meet personnel needs. Approximately seven vehicles comprised of pickups and multi-passenger vehicles would be used in total, with an estimate of four of them used to commute from the Nephi area.

2.2.1.2.1 Buggy-Drills

Buggy-drills would operate off road on slopes ranging from level to approximately 25 percent slope (Appendix C, Picture C-3). Source points on slopes greater than approximately 25 percent or in areas of vehicle-access-limiting, rugged terrain would be accessed for shot hole drilling by heliportable drills. Buggy drills and the heliportable drills would create 40- to 120-foot deep holes. Each shot hole would be 3.5 inches in diameter and loaded with 10- to 17-pound charges/shots of the explosive GEOPRIME dBX that is made expressly for seismic point source generation (shot detonation).

Pioneer proposes to use up to three buggy-drills for this task. The buggy-drills would travel off road and follow the path for each source line as modified by the results of the archaeological and biological surveys and obstacles. No clearing or grading of routes for the off-road drilling program would be conducted. In some instances, tree limbs may be broken in the process of buggy drill passage along source lines. Vegetation beneath the tires would be compressed.

A buggy-drill would proceed from one source location to the next location with a single pass per source line, where possible. A maximum of two passes per source line is anticipated; however, should a buggy-drill break down off-road and not be able to return to an existing road for service, a buggy support vehicle would travel within a cleared (cultural and biological resources) 100-foot wide corridor to the immobilized buggy drill. Due to the density of trees (pinyon-juniper woodland) in portions of the Project Area, travel to and from an immobilized buggy-drill may require use of the existing tracks resulting in as many as four passes of a vehicle over the same tracks for limited track segments. Where possible the support vehicle would use a different path within the 100-foot wide cleared (cultural resources) corridor to limit repeated tracking to two passes. Such breakdowns are infrequent; therefore, the repeated use of a set of tracks of up to four times is expected to be both limited in frequency and distance.

Existing roads and trails would be used, where possible, to access the next seismic line. Each 4-wheel-drive buggy-drill vehicle (low pressure-tired, articulated, off-road transport vehicles with mounted drill) would weigh about 29,000 pounds, and each low-pressure tire would be approximately 26 inches wide. Total buggy width is approximately eight feet with two, 26-inch wide tire tracks. To account for maneuvering flexibility to avoid obstacles or sensitive resources and travel distance between lines, it is estimated that buggies would travel no more than 2.0 miles for every mile of buggy drill 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 obstacles such as rock features or trees. The large, low-pressure tires of a buggy drill would exert a pressure of about 10 psi on the surface. (For comparison, a $\frac{3}{4}$ ton 4-wheel drive truck exerts approximately 17 psi on the surface). Shot holes would not be drilled on roads or trails. Planned shot hole locations that would coincide with a road or trail surface would be re-located adjacent to the road or trail surface.

2.2.1.2.2 Heliportable Drills

For source locations located off roads/trails that cannot be safely reached by buggy drills, approximately 5 heliportable drills (Appendix C, Picture C-4) and one to two helicopters would be used to access and to drill suitable shot hole locations within steeper, more rugged terrain. Heliportable drill equipment would be transported to and from drill (source point) locations slung on a tethered line beneath the helicopter (Appendix C, Picture C-5). At heliportable drill locations, the drilling crew would access the location on foot, un-tether the heliportable drill equipment, connect the drill components, drill the hole, place the charge, backfill and plug the hole, re-tether the drill equipment to the helicopter line for transport, and complete any necessary surface raking before walking to the next heliportable shot hole location. Surface effects of heliportable drill operations would extend out from the shot hole approximately two feet, creating a 4-foot diameter circle of minimal and temporary surface disturbance from cuttings deposition centered on the drill hole (Appendix C, Picture C-6). Following completion of the drill hole, placement of the shot, and backfilling, the remaining cuttings would be raked into the existing soil adjacent to the backfilled shot hole.

2.2.1.2.3 Shot Hole Charge Placement and Detonation

Immediately after the drilling of a shot hole, the explosive shot would be placed, followed by 1) back filling with cuttings, 2) placement of the shot-hole plug in the hole as specified by the State of Utah regulations for seismic exploration, and 3) final backfilling of the hole to the surface. Providing that no water is encountered while drilling, the hole would be back-filled with drill cuttings to within three feet of the surface where the nonmetallic plug would be installed in the hole. The remaining three feet would be backfilled to the surface and covered with drill cuttings and soil. Excess drill cuttings would be raked/mixed with soil to level the materials over the affected 13 square-foot area that received cuttings during drilling operations. In the event that water is encountered during drilling, the appropriate State of Utah procedures would be followed to backfill the hole with bentonite to seal the saturated layer. Loaded and backfilled shot

holes would pose no danger to the public or animals, as a detonation device is needed to set off the charge.

The shots would be detonated individually within the shot pattern determined appropriate for those geologic conditions underlying each of the 10-line groups of receiver stations. Although standard safety procedures do not allow a person to stand at a shot hole during detonation, a person, if standing at the site, would hear a noticeable thud-like sound while feeling a noticeable vibration. The vibration would not be sufficient to cause any instability to a standing person.

Shots at source 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. As part of standard procedures, 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. Pioneer anticipates the percentage of those shot holes for which a blowout of plug and back-filled drill cuttings would be less than three percent.

2.2.1.3. Air Gun Discharge – Aquatic

Air guns would be used to generate the seismic source pulse (sound waves) in Yuba Lake (Sevier Bridge Reservoir). Air guns (Appendix C, Picture C-7) are capped, hollow steel cylinders in which air is compressed, held under pressure, and then released suddenly under water to generate the sound waves. Prior to air release, the air guns are lowered into the water from the air-gun boat using electric winches. Typically, several air guns suspended from boat-mounted winches in an array are used for source generation. Appendix C, Picture C-8 shows a total of 12 individual air guns, six on each side of an air-gun boat, suspended above the water waiting to be lowered into the water. Once submerged to the desired depth, the air guns are “fired” by releasing compressed air using electrical solenoid switches (Appendix C, Picture C-9). Typical air-gun arrays in lakes are 500 to 1500 cubic inches in size and are operated at pressures of 1500 to 2200 psi. Single air guns can range in size from 40 to 150 cubic inches. An array usually consists of 5-16 individual air guns of different sizes. One or more arrays of single air guns are typically used in an operation.

Air-gun source generation would occur at GPS-located source points spaced approximately 110 feet apart as the boat with the lowered air-gun array travels in a line across the lake. The air-gun boat routes would cross the underwater hydrophone lines making up the receiver array (Appendix C, Picture C-10). At each source point position on the lake, proposed air-gun operations in Yuba Lake would involve the initial “firing” of the air guns at lower pressures or “softer” pulses, followed by ramping up of pressure and sound intensity to required levels to generate the necessary seismic source for the project. The initial “softer” sound intensity and the process of ramping-up the intensity causes fish or other wildlife in the vicinity of the suspended air guns to move away from the increasing sound intensities thus avoiding harm.

2.2.2. Data Acquisition

2.2.2.1. Terrestrial Environments

Recording equipment would be transported to the field and to approximately eight staging areas (including helicopter landing zones) by truck using existing roads and trails. The locations of the active staging areas for use by the helicopters would change as receiver lines are moved and the proposed survey progresses. Sufficient equipment to lay out six geophones per receiver station, 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 pre-determined, flagged locations for stations along each receiver line. A helicopter would move four to six cache bags at a time suspended from a long line. The helicopter would operate at an altitude of approximately 100 to 150 feet above the receiver line and deposit one bag at a time using GPS pin flag locations provided by the surveyors. Up to two helicopters would be used for the Project, and would operate only in daylight hours to ferry the heliportable drills and receiver-station cache bags in separate operations.

Ground crew members would walk to the first dropped cache bag on their receiver line, prepare the battery-powered, radio-telemetric receiver station, and then manually connect cables and geophones to the station box. Seismic cable and attached geophones would be laid out by hand around each receiver station in a pre-determined pattern (Appendix C, Picture C-10). The geophones mounted on a four-inch spike would be placed into the soil using foot pressure. The crewmember would then proceed on foot approximately 220 feet to the next or second bag containing a radio-telemetric receiver station, cables, and geophones and would repeat the process that was used to set up the first station (receiver location) and its network of cable and geophones. Stations, cable, and geophones would be laid out in this manner on each line across the Project Area at 220-foot intervals. Each receiver station and its six geophones would be connected to the control vehicle through a telemetric or radio wave link. An array of up to 10 lines of 208 receiver stations and cable-attached geophones would be active at any time throughout the data acquisition task. This array of receivers would migrate across the Project Area in response to the migration of source generation at each source point. The receiver array would migrate across the landscape in a way such that the source point generation would be located within the relative center of the receiver array. Within the array of receivers and along source lines, source energy would be generated by buggy vibes shaking and by the sequential detonation of underground charges placed previously in drilled shot holes.

After recording data from vibroseis and shot hole detonation sources in an “active” array or area of receiver lines, geophones, and cable; each station’s equipment would be retrieved on foot and/or by personnel on ATVs and bagged using a reverse procedure of placement. The bagged equipment would then be moved to a new receiver location by helicopter to effect the shifting of the array in the direction of movement of source points, again with the purpose of maintaining source generation with the general center of the receiver array.

Approximately 60 crewmembers would conduct daily operations for 12 to 14 hours per day. Crewmembers would be organized into field groups of four to six personnel, each group performing tasks as assigned within the overall seismic program. Groups would typically operate at intervals of two to three miles throughout the Project Area. A troubleshooting crew of two to four people would repair electrical problems during the Project operations, and gather data recorded in the field boxes. A majority of crew members would travel daily between the Project Area and accommodations in Nephi, Utah. An estimated five roundtrips per day to and from Nephi, Utah by vehicle may be necessary to acquire needed materials and supplies and to meet personnel needs. Approximately 25 pickup and multi-passenger vehicles would be used in total, with an estimate of five of them used to commute to the Nephi area. As data acquisition efforts progress, field groups would periodically complete data acquisition tasks and would then move on to the demobilization tasks discussed below.

The recording control truck containing the data collection equipment would be located on an existing road or trail to initiate the source detonation for the active receiver site locations and to record the returning ground vibration data.

2.2.2.2. Aquatic Environments

Before the seismic survey operations would commence specifically in the vicinity of Yuba Lake and on lands surrounding the lake, civil surveyors would be sent out to check the location of seismic line entrances into and exits from the lake and of avoidance areas such as buildings, wells, dams, and other structures along the lake edge. Then a second set of civil surveyors would determine the location of source and receiver points on land around the lake and determine the paths for the sound generation and recording equipment that would cross the lake. A ground crew would then deploy cables and geophones on the lines around the lake. At the same time, a boat crew would deploy the cables and hydrophones in the lake and connect them to cables and to the buoys. Completion of both the terrestrial and aquatic deployments would create and maintain configuration of the array of receivers (geophones and hydrophones) in keeping with the array design used on the terrestrial landscapes within the Project Area.

Linear receiver lines of attached hydrophones would be deployed by boat. As many as four small work boats and eight crew members would place the recording equipment in the lake. The hydrophones would be enclosed in plastic and connected to a rubber or plastic coated cable that would be lowered to the lake bottom. Weights and anchors would be used to keep the equipment in place on the bottom. At intervals along the submerged, linear cable, the cable would be brought to the surface where they would be connected to buoys with recording equipment, antennas and batteries located atop the buoy above the water line (Appendix C, Picture C-11). From a buoy, the cable would return to the bottom for the run along the receiver line to the next buoy. Each linear line of receivers would be comprised of submerged hydrophones that would be connected to the submerged cable at the required spacing interval of 220 feet along the line of submerged cables and buoys spanning the lake (Appendix C, Picture C-12). The buoys would be periodically accessed by boat for repair, to collect data, and to change batteries.

Data acquisition from air gun sources would occur as the air gun boat would deploy and discharge submerged air guns to generate sound waves into the recording equipment in and around the lake. The cables and equipment would remain in the lake until all the source generation in and around the lake has been fired into the recording equipment. The total time for the cables and phones to be in the lake would be two to four weeks depending on conditions. The air gun source generation would occur over a one to two week period. Two crew members would operate the air gun boat.

2.2.3. Demobilization

2.2.3.1. Terrestrial

Demobilization activities follow immediately with the completion of data acquisition in each portion of the Project Area. All pin flags, flagging, and other debris would be gathered daily as the field groups and crew members complete data-acquisition on portions of the Project. Materials and debris would be collected at points on roads or trails and transported by vehicle to staging areas where personnel would organize materials, handle equipment, and dispose of used/unusable materials. This task would be completed within about five days after conclusion of the data acquisition task. This same crew as used in data acquisition (Section 2.2.2) of approximately 60 people would continue to travel to and from Nephi for the duration of demobilization. Estimated vehicle use and trips to and from Nephi, Utah would remain as described in Section 2.2.2.

2.2.3.2. Aquatic

After source wave reflections have been received by recording equipment deployed in the lake, the hydrophones and cables would be retrieved by lifting the equipment from the water into boats. The buoys holding the recording boxes and batteries would also be removed from the water. As many as 10 people in as many as five boats would be involved in removing the equipment.

The air gun source boat other work boats would be loaded onto a boat trailers and pulled from the water.

2.2.4. Support Operations

All equipment, including the buggy-drills, buggy-vibes, and boats would be initially brought to the Project Area by 10 to 15 transport trucks/tractor trailers as part of project mobilization. All equipment would be power-washed prior to entering state, private, and federal lands to help mitigate the spread of noxious plants. Operation of most terrestrial support vehicles, including pickups, would be limited to existing roads and trails. Buggy-drills and buggy-vibes would be unloaded from the transport semi-trailers at appropriate locations (road, staging area) within the Project Area. A repair-buggy may need to travel off road if a buggy-drill needs repair and cannot return to a staging area or road/trail. The repair vehicle would limit travel to routes/areas surveyed and cleared previously for archaeological, paleontological, and biological resources. Servicing and re-fueling of

buggies would take place at designated staging areas and/or road access points with mobile service vehicles that would be restricted to existing roads/trails.

Project boat(s) would be unloaded and serviced at approved launch and docking locations. The cooling system would be flushed before putting the air-gun boat into the water.

Pioneer proposes to use four wheelers (ATVs) or mule vehicles to facilitate access to portions of the source lines where their agility to maneuver through some tight locations would be beneficial. ATV/mule use would be limited to designated OHV and existing trails, roads, and culturally-surveyed cross-country routes. Drivers would be required to wear safety vests and hard hats and to have current certification.

To support seismic survey operations, shot-hole drilling operations, vibroseis operations, aquatic air-gun operations, and seismic data acquisition efforts would require staging areas, including docking/launching areas to provide locations for staging and storing equipment and materials and other areas for explosives storage. Pioneer proposes to establish one main on-land staging area, three on-land drill staging areas, two boat launching locations, and one explosives storage site to be located within the Main Staging Area in the Project Area (Appendix A, Figure 2-1). Pioneer also proposes to use a number of temporary landing zones for emergency landings and to drop off and pickup personnel. Staging areas and the landing zones may be used for safety landing or medical evacuation points for helicopters. Proposed locations were selected to maximize use of previously disturbed areas (Appendix A, Figure 2-1).

2.2.4.1. Main Staging Areas

Within the Project Area, a single two-acre site located on private land would be used for storing equipment, refueling the helicopter (helicopter service and fuel truck), and sling-loading heliportable drill equipment and bundles of recording equipment for helicopter transport (Appendix A, Figure 2-1). Several equipment trailers would be parked at this Main Staging Area for the duration of the Project. Mobile equipment would use existing roads to move from the Main Staging Area to three Drill Staging Areas. No mowing or clearing of vegetation or blading of soils within the Main Staging Area would likely occur as the site is a previously disturbed, gravel-covered level surface (Appendix C, Picture C-13).

2.2.4.2. Drill Staging Areas

Three 0.2-acre sites on private lands would be used by the shot-hole drilling contractors to stage their equipment and to provide additional staging support to the seismic acquisition contractor (Appendix A, Figure 2-1). Drilling equipment may be stored or parked at the four Drill Staging Areas overnight to a few days. Heliportable drill usage of these staging areas may include the positioning of one or two vehicles and a small trailer with a fuel tank and tools to service/refuel the helicopters during their operations in the immediate vicinity of the drill staging area. Again, mobile equipment would use

existing roads to move from staging area to staging area. No mowing or clearing of vegetation or blading of soils within the staging areas would occur.

2.2.4.3. Explosives Storage Sites

The explosive shot and blasting cap magazines would be temporarily located at the Main Staging Area (Appendix A, Figure 2-1). The proposed location within the staging area would be situated so as to minimize public access and to optimize public safety in compliance with Bureau of Alcohol, Tobacco, and Firearms and Explosives requirements. Explosives storage would consist of parking one or two semi trailers for a period of approximately five weeks. The trailered magazines would be removed from the Project Area at the conclusion of shot hole drilling. The details related to safety procedures for explosives handling are addressed in the Traffic and Blasting Safety Plans submitted to and on file at the BLM Fillmore Field Office.

2.2.4.4. Boat Launch Facilities

The air-gun and recording deployment pickup boats would be launched and retrieved from two existing boat-launch facilities maintained by the Utah Department of Natural Resources, Yuba Lake State Park. The air-gun boat is similar to a small pontoon or house boat (Appendix C, Picture C-9). No special equipment or facilities would be required to service, launch, and retrieve the boats.

2.2.4.5. Landing Zones

A number of open, safe landing sites would potentially be used by helicopter operations mainly during the seismic survey's drilling and acquisition phases. Their primary use would be for emergency landings, including medical evacuations, and for brief landings of up to a few minutes to drop off/pickup personnel and geophones/cables.

2.2.4.6. Water Requirements

Approximately 21,000 gallons (0.06 acre-feet) of water would be required to complete the proposed project. The water would be used principally in shot hole drilling by buggy drills. The 21,000 gallons of water would be obtained from available and approved local sources.

2.2.5. Surface Use Associated with the Project

Proposed surface use associated with vibroseis activities, drilling shot holes, and using lands for staging areas are shown in Table 2-1.

Table 2-1. Source Generation and Associated Surface Use – Proposed Action

Activities/ Facilities	Source Points/ Staging Areas		Effects			
			New Surface Disturbance		Off Road Use	
	Number	Percentage	Acreage ¹	Percentage ²	Acreage ¹	Percentage ²
Vibroiseis Source Points						
Buggy Vibe	5,580	82			271.0	0.46
Plunger/Plate	5,580				14.4	0.02
Drilled Shot Holes						
Buggy Drill	573	8	0.17	<0.01	27.8	0.05
Heliportable Drill	215	4	0.11	<0.01	N/A	N/A
Air-Gun Source Points						
Aquatic discharges	441	6	NA	NA	NA	NA
Subtotal	6,809	100	0.28	<0.01	313.2	0.53
Staging/Work Areas						
Main Staging and Explosives Storage Area	1		0	<0.01		
Drill Staging Areas	3		0.6	<0.01		
Boat Docking / Launch Facilities	2		NA	NA		
Subtotal			0.6	<0.01	0	
TOTAL	N/A	N/A	0.9	<0.01	313.2	0.53

¹ Basis for assessment of acreage of surface use by seismic source:

Vibroiseis – Effects from the passage of a buggy-vibe and source generation would be the compression of vegetation and some soil compaction within the 4.3-foot wide tire tracks and beneath the four feet by seven feet plunger/plate. No actual surface disturbance to soils beyond some limited compaction is anticipated.

Distance between source points would be 246 feet which is multiplied by a factor of 2.0 to account for tortuosity of the route between source points and travel between lines; width of possible effects from passage of buggy drill vehicle would be 4.3 feet (width of tires); surface effects at a shot point would be kept within the area for buggy drill activity; 246 feet x 2.0 x 4.3 feet x number of source points / 43,560 square feet per acre = number of acres. Surface effects from passage of low pressure-tired buggies would be temporary (<1 year) and would not require reclamation.

Acreage of effects from plunger/plate compression would equal the area of the plunger/plate times the number of vibroiseis points times the number of buggy vibes operating at each source point; 28 square feet x number of source points x 4 buggy vibes per source point / 43,560 square feet per acre = number of acres.

Buggy Drill – Surface Disturbance would occur within a 4-foot diameter circle centered on the 4-inch diameter drill and shot hole location; 13 square feet x number of shot holes / 43,560 square feet per acre = number of acres. Shot holes would be backfilled, and the remaining cuttings would be leveled by spreading the cuttings within the 13 square feet of affected surface.

Distance between source points (shot holes) would be 246 feet which is multiplied by a factor of 2.0 to account for tortuosity of the route between source points and travel between lines; width of possible effects from passage of buggy drill vehicle would be 4.3 feet (width of tires); surface effects at a shot point would be kept within the area for buggy drill activity; 246 feet x 2.0 x 4.3 feet x number of source points / 43,560 square feet per acre = number of acres. Surface effects from passage of low pressure-tired buggies would be temporary (<1 year) and would not require reclamation.

Heliportable Drill – Surface Disturbance would occur within a 4-foot diameter circle centered on the helicopter-placed drill and the shot hole location; 13 square feet x number of source points / 43,560 square feet per acre = number of acres. Shot holes would be backfilled, and the cuttings would be leveled/spread per the procedure used for buggy drill holes.

Staging Areas/Explosives Storage Area

Main Staging Areas – A single Main Staging Area would be located on a previously disturbed location on private land.

Drill Staging Areas – Three Drill Staging Areas would be located on private lands.

Boat Launch Facilities – Existing boat access-to-water locations would be used.

Explosives Storage Area – A single location for magazine storage would be situated within the boundaries of the Main Staging Area.

² Percentage of 59,192-acre Project Area (acreage of sub-area within the Project Area/59,192 acres x 100)

Temporary (one growing season) to short-term (one to three years) effects from surface use proposed for seismic survey operations, including buggy-vibe and buggy-drill passage to source locations, buggy-drilling, and heliportable drilling and supporting staging areas, would total approximately 314.1 acres (approximately 0.4 percent) of the estimated 59,192-acre Project Area (Table 2-1). Surface use would be limited to:

- Two, 26-inch wide tracks (total effect of 4.3 feet) from the low pressure tire-equipped, 8-foot wide buggy-drills and 9-foot wide buggy-vibes,
- Approximately 788 locations of 13 square-foot areas where drill cuttings are deposited on the surface surrounding each shot hole, and
- Approximately 22,320 locations (5,580 locations multiplied by four buggy-vibes) of 28 square-foot plunger/plate surface compressions.

Acreage of effects of vehicle passage/tracking cross-country and vibroseis plate compression, and of limited disturbance at staging areas and drill locations are summarized by ownership in Table 2-2 below. Combined effects and disturbance do not exceed 0.6 percent of BLM-administered lands, state lands, or private lands. Actual surface effects that may require some form of reclamation in accordance with land owner agreements, other than minimal hand-raking as part of backfilling a shot hole following explosive shot placement, would total approximately 0.6 acres.

Table 2-2. Combined Effects and Disturbance Acreage by Ownership

Ownership	Total Acreage	Effects/Disturbance Acreage	Percentage
BLM	20,889	110	0.5
State	1,995	11	0.6
Private	34,502	193	0.6
Water (Yuba Lake)*	1,806	NA	
Total	59,192	134	

* Mixed federal, state, and private ownership.

2.2.6. Project Activities and Schedule

Seismic survey activities would proceed systematically from one side of the Project Area to the other beginning approximately August 1, 2008 and conclude by December 1, 2008. Specific activities in order of occurrence would include:

1. The drilling of shot holes and placement of explosive shots - The duration of drilling activity is projected to be approximately five weeks. The explosive shot would be loaded into the hole immediately following drilling and then backfilled/plugged.
2. Placement of up to five east to west lines of geophones (up to 10 lines of geophones total) on both sides of zone of source generation (shot hole detonations) on source lines between the 5th and 6th geophone line (or two middle lines if the total number of geophone lines is less than 10). Placement of geophones would begin near the beginning of September.
3. Vibroseis pulse generation, controlled detonation of explosive shots, air-gun discharges, and recording would begin shortly after placement of the initial grouping of receiver stations/geophones. Time between vibroseis pulse generation, shot detonations, and air-gun discharges is typically a minimum of five to 10 minutes and can take longer depending on terrain and accessibility of source points to the safety officer. Vibroseis, explosive shot, and air-gun sources at points on a line situated between two receiver lines would be generated/detonated/discharged individually. Vibroseis pulse generation, shot detonation, and air-gun discharge activities would progress north to south between receiver lines.
4. After all source generation is completed for an east-west grouping between two receiver lines, the farthest north receiver line would be picked up and moved ahead (“leap-frog”) of the southern-most receiver line and laid out to form the new southern edge of the receiver array prior to re-initiating source generation (detonations). These “leap-frog” movements result in the migration of the receiver array across the Project Area.

Mobilization, drilling, recording, and demobilization are expected to take about 15 weeks.

2.2.7. Workforce

A work crew of approximately 15 personnel would be required for the duration of approximately five weeks to mobilize and complete the shot-hole drilling program. Approximately four weeks after the start of drilling, an additional work crew of approximately 60 personnel would be required for the remaining 11 weeks to mobilize and complete data acquisition and to conduct demobilization activities for the Project. The 15-person work crew responsible for the drilling program would depart after their five weeks of activity. During the final 11 weeks of the Project, approximately 60 personnel would be on-site daily.

2.2.8. Applicant-committed Design Features

2.2.8.1. Fire Protection

- Vehicles with catalytic converters would be restricted to existing roads and trails; parking or idling would not be permitted on segments of roads or trails with vegetation taller than the vehicles undercarriage.
- Off-road buggy vibes and drills would be diesel-powered (no catalytic converter).
- All terrain vehicles (ATVs) would be equipped with spark arresters.
- All vehicles would be equipped with fire extinguishers and shovels.
- Helicopter landing zones at the main and drill staging areas would be equipped with fire extinguishers.
- Up to two helicopters would be on location during the majority of the project; each would be equipped with a large water bucket to support any fire fighting effort.
- Fire protection related operational procedures to be followed:
 - All brush build-up around mufflers, radiators, headers, and other engine parts would be avoided; periodic checks would be conducted to ensure compliance.
 - Smoking would only be allowed in company vehicles and/or designated smoking areas; all cigarette/cigar butts would be discarded in appropriate containers and not thrown on the ground or out of vehicle windows.
 - Uncontained campfires of any kind would be prohibited.
 - Portable generators used in the Project Area would be required to have spark arresters.
 - Pioneer would coordinate project activities with appropriate fire personnel.
 - A fire communications protocol would be developed with the appropriate SMA to facilitate emergency contacts.

2.2.8.2. Hazardous and Solid Waste Management / Trash Disposal

- Fuel and lubricants would be temporarily stored in transportable containment trailers or vehicles at main and drill staging areas as approved by the appropriate SMA to minimize potential for accidental releases/spills; no other hazardous or potentially hazardous materials would be brought into the Project Area.
- Any spill or leak of diesel fuel, hydraulic fluid, lubricating oil, or coolant, including any contaminated soil material, would be picked-up/excavated and placed in an appropriate container for transport to an approved disposal site.
- All solid waste or trash, including flagging, stakes, and cap leads would be picked-up and disposed of at an approved site.
- Should the detonated shot blow the plug and the drill cuttings out of the hole (a blowout) and prior to the crew leaving the area, whatever limited accumulation of blowout cuttings around the hole would be raked back into the hole with the remaining cuttings next to the hole blended with the surrounding soils.

- Any excess bentonite left after plugging of any wet holes would be collected and removed from the location.
- No potentially harmful materials or substances would be left on, or in the vicinity of, the Project Area.

2.2.8.3. Existing Facilities, Rights-of-Way (ROWs), & Livestock Management

- The proposed 3D seismic survey project would be subject to valid prior existing ROWs; these ROW holders have been and would be contacted to coordinate access to existing ROWs prior to project implementation.
- Pioneer would maintain a safe operating buffer between shake points/shot holes and existing facilities, including oil and gas wells, pipelines, and electrical utility lines, based on accepted industry standards and BLM Handbook 3150.
- Buggy-vibe, buggy-drill, and heliportable drill activity would avoid corrals, fences, stock wells, and other structural range improvements, where possible.,
- Any existing facilities related to range management or other uses in the Project Area impacted by the proposed seismic survey would be repaired or replaced as soon as practical.
- Temporary gates would be used for crossing fences whenever practicable. If a vehicle must cross through a fence other than at an existing gate, the fence would be cut and H-braces would be installed to support the existing fence. A temporary gate or fence would be installed to prevent undesirable livestock movement between pastures. Upon termination of activities, the temporary opening would be permanently wired shut and the wires stretched to their original tension.
- Pioneer would coordinate seismic survey operations, including helicopter activity, with affected private landowners, grazing lessees, and SMAs to avoid or minimize adverse impacts to the management of livestock for the duration of the proposed project.
- Helicopter operations would comply with a project standard rule to carefully check (visually) areas before landing and to avoid areas possibly occupied by livestock and/or wild game to minimize adverse impacts. Helicopter would fly at a safe distance above the ground/canopy and would avoid any inadvertent driving/herding of livestock or wild game.
- Helicopter activity would be coordinated with the BLM and grazing permittees to minimize impacts to livestock
- Helicopter use of airspace would be coordinated with Clover Control - current use at 801-777-7575 or advance scheduling at 801-777-4401.
- Seismic survey crew personnel would be instructed to minimize contact and to avoid harassment of livestock.
- Survey activities would avoid stock ponds by a distance of 300 feet.

2.2.8.4. Cultural Resources

- Pioneer has utilized the services of a qualified archaeological firm to complete all Class I and Class III cultural resource surveys along and near all source lines, and

- approximately one half of the receiver lines, as staked on the ground and where permitted by the SMA or landowner.
- All off-road buggy-vibe and buggy-drill access routes have been inventoried.
 - Those receiver lines to be used for ATV traffic (approximately one half of the proposed receiver lines) have been inventoried.
 - Inventories for seismic lines consisted of a 100-foot (30-meter) wide survey corridor along the total length of all proposed source lines (with the exception of where source lines cross slopes in excess of 30 degrees [57 percent]) and along those selected receiver lines that comprise approximately one half of all receiver lines.
 - As proposed receiver lines would be selected and surveyed for buggy access routes, Pioneer and its cultural resource consultants would coordinate with the BLM-Fillmore Archeologist to further minimize potential effects to cultural resources.
 - In areas of sensitive depositional environments (to be determined in consultation with BLM-Fillmore), vehicle traffic would be restricted to rubber-tired vehicles under conditions where resulting tire ruts are four inches or less in depth.
 - Areas of sensitive sediments, if present in the Project Area, to be traveled by ATVs, a 15-meter wide corridor of the receiver line would be inventoried prior to project implementation.
 - In areas where soils are not sensitive and a single pass of an ATV cannot be expected to affect a historic property, ATV's will be required to use multiple paths for repeated visits to locations.
- Class I and III surveys and reporting have been completed for those portions of all proposed main and drill staging areas to be located on previously undisturbed lands. Surveys of undisturbed portions of all staging area locations were completed unless landowner permission was not provided.
 - Any prehistoric or historic archaeological sites discovered during the new inventory have been recorded.
 - In all cases, Pioneer has avoided all identified NRHP eligible cultural resources through re-routing buggy routes and repositioning source points and receiver points in order to ensure no effects to cultural resources.
 - If archaeological sites and/or properties would be found at anytime during the Project, all surface-disturbing work at such site would immediately cease and the lead surface management agency (SMA) would be contacted. Work at that site would not resume until and unless authorized by the lead SMA.
 - 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 lead SMA would be notified immediately.
 - Prior to the commencement of each phase of operations, survey crew members would be briefed on the critical elements of compliance with the Archaeological Resources Protection Act (ARPA) and the National Historic Preservation Act (NHPA), along with pertinent SMA requirements and expectations concerning the protection of natural and cultural resources, and current approved land uses (such

as livestock/wild horse management, wildlife, protection of water resources/features, wetlands, riparian areas, and public water reserves) as they may pertain to a crew member's responsibilities and actions.

- All crew members would be informed before commencement of operations that any disturbance to, defacement of, or removal of archaeological, historical, or sacred material would not be permitted. Violation of the laws that protect these resources would be treated as law enforcement/administrative issues with potentially severe consequences.
- Pioneer would use a helicopter to deliver recording equipment, which would then be laid out by personnel on foot. ATVs would be used principally for trouble shooting by recording crews, and their use would be limited to archaeologically-cleared routes. However, any geophone line segments that would be used for access by buggy-vibes or buggy-drills, as well as any other cross-country access routes that may be required, would be subject to a Class III Inventory.
- Accessible proposed heliportable drill shot hole locations have been individually inventoried for cultural resources to a minimum of a 50-foot radius around each shot hole.
- Where proposed heliportable shot holes were located in areas of very steep or inaccessible terrain, the field archaeologist used discretion to either undertake or waive a Class III Inventory on connecting lines; however, any accessible benches, ridge tops, or other relatively flat areas within areas of very steep slopes were subjected to a Class III cultural resource inventory.
- No vehicle used in geophysical operations, including ATVs, pickup trucks, service trucks, and buggies, would depart from any road that traverses an area where cultural resources have been identified.
- Before commencing with shaking/drilling/recording operations, edges of roads within cultural resource sites would be clearly and completely identified with flagging, fences, lath, or other visible markers.
- No shot holes would be drilled on any road segments located within the boundaries of a cultural resource site.
- Avoidance of sites not located near or across existing roads would be achieved by means of flagged cross-country site avoidance routes; flagging would be removed once operations have moved through the area.
- Water, as a dust control measure, would be applied as required by the appropriate SMA to all affected roads to reduce any impacts of dust deposition.
- An archaeological monitor would be available during seismic operations to monitor and survey if determined to be necessary by the appropriate SMA.

2.2.8.5. Public Safety

- To protect against injury from rock falls, buggy-drill and heliportable-drill locations would be set back from escarpments as necessary to prevent rock displacement and fall from canyon sideslopes when a source point charge is detonated.
- With the exception of the buggy-vibes, buggy-drills, and ATVs, vehicle traffic would be restricted to existing roads and trails.

- Vehicle speeds would be limited to maximums set for main access roads; project vehicles would travel at slower speeds appropriate for the more primitive road and trail conditions and for cross-country travel (buggy-vibes and buggy-drills and ATVs only).
- Pioneer would post signs at locations along roads entering the proposed Project Area to alert people entering the area that seismic operations would be occurring, including the dates and more specifics as to the area of impact.
- Pioneer would post people around areas to be shot to provide an adequate safety zone between the areas to be shot and any people or vehicles so that no injury or property damage would occur. Pioneer personnel and their contractors would stay at least 100 feet away from shot holes during detonation, and other people would be kept at least 300 feet away from shot holes during detonation. Personnel would be posted to ensure that nobody unknowingly drives into an area being detonated.
- Survey crewmembers would wear hardhats, safety goggles/glasses, and safety vests where required.
- Pioneer requires their personnel and subcontractors to wear hunter orange during the hunting season as a safety precaution.
- Helicopters would follow flight paths chosen to be efficient while also being in compliance with activity-specific aviation operational safety standards for flight altitudes.
- Helicopter operations would take precautions to avoid or minimize activity near people on horseback or leading horses.
- Explosives and detonator caps would be stored in or near the Project Area in large, secure magazines (large locked steel boxes) per Federal Bureau of Alcohol, Tobacco, and Firearms (ATF) requirements. Signage would comply with ATF requirements.
- Transportation of explosives and detonator caps would comply with ATF requirements.

2.2.8.6. Aquatic/Lake Operations

- Prior to the air gun boat and other seismic support boats being launched into Yuba Lake, UDWR and State Parks staff will supervise the cleaning of the boats and the replacement of bilge and ballast waters to prevent introduction of potentially harmful non-native aquatic species.
- Boat fuel and lubricants would be stored in approved areas at the launch facility not subject to direct access by water.
- Any spill or leak of diesel fuel, hydraulic fluid, lubricating oil, or coolant would be cause for immediate cessation of activity until the situation is remediated.
- All solid waste or trash will be kept on board the vessel and off-loaded at designated locations on shore.
- No potentially harmful materials or substances would be left on, or in the vicinity of, the Project Area.
- Equipment deployed in the water area will be in sealed waterproof units.
- All deployment and air-gun boats will be operated at low speeds and in accordance with standard codes of conduct on public waterways.

- Personnel on board the boats will wear high visibility reflective vests at all times during the operations.
- All personnel on board the boats will use and have available personal flotation devices.
- Equipment/buoys deployed in the water will be marked by highly visible (day and night) and light-reflective buoys.
- Equipment deployed in the water will be deep enough below the surface to cause no damage or interference with boats passing over the equipment.
- Air-gun source generation would occur in waters no shallower than approximately 10 feet and in general at minimum distance of about 20 to 30 feet from shore to avoid disturbance of the lake bottom (sediment disturbance) and to aquatic life/fish that may be present beneath the boat and between the air-gun boat and the shore.
- At each source point position on the lake, proposed air-gun operations in Yuba Lake would involve the initial “firing” of the air guns at lower pressures or “softer” pulses, followed by ramping up of pressure and sound intensity to required levels to generate the necessary seismic source for the project. The initial “softer” sound intensity and the process of ramping-up the intensity causes fish or other wildlife in the vicinity of the suspended air guns to move away from the increasing sound intensities thus avoiding harm
- Lake operations would occur during off-peak periods for water recreation: late September-early October or later.

2.2.8.7. Paleontology

- Should any unrecorded paleontological resources be discovered during seismic survey operations, the discovery would be reported immediately to the appropriate SMA.

2.2.8.8. Soils, Vegetation, & Invasive, Non-native Species (Weeds)

- Cross-country, off-road/trail travel would be limited to slopes equal to or less than approximately 25 percent. With the exception of off-road, low-pressure-tired, 4x4 buggy vehicles and smaller ATVs, all other vehicles would be restricted to existing roads and trails.
- Off-road buggy vehicle traffic would be planned to minimize the number of passes over the same ground, and to minimize the potential for excessive damage to vegetation and soil compaction.
- In areas of pinyon, juniper, or other trees, Pioneer would avoid damaging trees to the extent practicable. Large trees would be avoided.
- Off-road buggy-vibes, buggy-drills, and ATVs would be instructed to travel cross-country at speeds of less than 15 miles per hour to limit effects on soils and vegetation.
- The spinning of all vehicle tires would be avoided where possible to minimize the potential for soil displacement and associated effects on vegetative cover.

- Off-road buggy-vibes, buggy-drills, and ATVs would not be operated during periods of saturated soil conditions when surface ruts deeper than 4 inches would occur unless authorized by the appropriate SMA.
- Any rutting or soil displacement caused by seismic operations would be repaired where authorized by the appropriate SMA.
- The tires of off-road buggy vehicles would not be chained to lessen impacts to soils.
- As needed, dust suppressant water or other SMA-approved agent would be applied to reduce fugitive dust from project-related traffic.
- All on-road and off-road equipment/vehicles would be cleaned to remove soil/weed seed prior to commencing operations on public lands within the Project Area. Areas affected by project-related activities would be monitored for potential sites of infestation. Infestations of invasive, non-native weeds would be treated as necessary and as approved by the appropriate SMA to control and prevent the additional spread of weeds.
- As part of pre-survey field meetings prior to project initiation, survey personnel would be provided with description and pictures of the key noxious weeds to be avoided and reported to the SMA if observed.
- Observed infestations of noxious weeds would be avoided and their locations would be reported to the SMA.
- Project personnel would not be allowed to collect plants.

2.2.8.9. Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves

- Pioneer would not drill/shoot or cause surface disturbance within 300 feet (100 meters) of a wetland, riparian area, spring, or water well except on existing roads or as otherwise approved by the appropriate SMA.
- No drilling or shooting would occur within 300 feet of any flowing stream unless approved by the appropriate SMA.
- Water needed for seismic survey operations would be obtained from municipal or other sources.
- The presence of any water/water table in a drill hole would be recorded and provided to the BLM field office within five business days.

2.2.8.10. Wildlife

- An anticipated start date of August 1, 2008 for the seismic survey Project and anticipated 15-week duration for completing the survey results in an anticipated completion date of approximately December 1, 2008. Pioneer anticipates completing the Project prior to the stipulated dates for elk and mule deer crucial winter range.
- The proposed seismic survey would comply with the HRRRA RMP's wildlife seasonal restrictions unless a waiver, exception, or modification is requested and granted by the BLM.

2.2.8.11. Threatened, Endangered, Candidate, Proposed and Sensitive Plant and Animal Species

- Project activities would be conducted in compliance with the applicable requirements of the Endangered Species Act of 1973, as amended.
- If suitable habitat for TECP or BLM Sensitive plants is present within the Project Area, clearance surveys would be conducted during the appropriate spring flowering period as required by the SMAs.
- On BLM land, no drilling would occur and no explosives would be detonated during raptor seasonal buffer protection periods within BLM-stipulated buffer zones of active nests as defined in USFWS' Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. Helicopter flight operations would avoid flying over active raptor nests.
- Pioneer has committed to not begin seismic survey operations until after August 1, 2008 to avoid the raptor breeding/nesting season for all species with the exception of the burrowing owl. Pioneer would conduct a survey this spring/summer of 2008 of suitable burrowing owl habitat for nesting owls (subject to landowner approval) as required by the SMAs. Burrowing owl nesting information would be provided to the appropriate SMAs for their consideration for granting an exception should Pioneer propose to initiate the seismic survey prior to the end of the burrowing owl breeding/nesting seasonal restrictions.
- No drilling or explosives detonation on public lands would be permitted within two miles of active greater sage grouse leks during the breeding and nesting season (March 15 to June 30) unless authorized through an exception, waiver, or modification granted by the BLM.

2.2.8.12. Air Quality

- Dust control measures would be applied on roads as directed by the appropriate SMA.
- All vehicles and construction equipment would be properly maintained to minimize exhaust emissions and would be properly muffled to minimize noise.

2.2.8.13. Recreation

- Pioneer would coordinate seismic survey operations in and around Yuba Lake/Yuba Lake State Park with Utah State Parks and with the BLM for operations in and around Yuba Lake Recreation Area to minimize potential impacts to recreational activities, and Pioneer proposes no operations within Yuba State Park and Yuba Lake Recreation Area until mid-September, 2008.

2.2.8.14. Standard Field Requirements

- In order to minimize impacts to the environment from personnel involved in the proposed project, employees and contractors would be subject to the following requirements:

- no firearms are permitted,
- no harassing or shooting of wildlife, livestock, or wild horses is permitted,
- no trash is to be left in any unauthorized location,
- no unauthorized off-road driving is permitted,
- collection of plants is not permitted, and
- collection or disturbance of any cultural or historical artifacts is not permitted.

2.3. No Action Alternative

Implementation of the No Action Alternative would likely result in the continuation of current land uses and the maintenance of resource development trends on BLM-administered lands in the Project Area. The BLM has leased a majority of the federal minerals, including oil and gas, within the boundaries of the Project Area. These federal leases grant to the lessee the right to explore, drill, and remove the leased resource in the leasehold. Although selection of this alternative would preclude implementation of the proposed geophysical seismic exploration project, this alternative would not preclude other oil and gas exploration or development on BLM-administered lands based on future analyses and approval of specific proposals. In addition, oil and gas exploration activities could still occur on state and private lands in the Project Area.

2.4. Alternatives Considered but Eliminated from Further Analysis

Alternatives considered but eliminated from further analysis are those that were determined to not meet the purpose and need of the Proposed Action.

2.4.1. Use of 2-D Seismic Techniques

The 2D seismic techniques are similar to 3D seismic techniques. The principal difference is that in 2D seismic the same line is used for both the source and the receivers, whereas in 3D seismic the source and the receivers are located along different lines. The advantages of 3D over 2D seismic techniques include 3D providing:

- True structural dip
- More and better stratigraphic information
- Map view of reservoir properties
- Much better aerial mapping of fault patterns and connections
- Better resolution

Overall, 3D techniques provide more accurate spatial data in support of minimizing exploration risks to resource development and to the environment. 2D techniques provide less accurate spatial data that would result in greater exploration risks and

potentially greater impacts to the environment. Therefore, a 2D seismic alternative is not considered further in this EA.

2.4.2. Use of Surface Shots as an Energy Source

The quality of data recorded from the reflection of energy signals generated from using surface shots is inferior to that recorded using shot-hole explosives. Use of surface shots was dropped from further analysis because the method would not provide the quality of data necessary and would likely result in greater environmental impacts.

2.4.3. Use of Heliportable Equipment for All Shots off Existing Roads and Trails

The use of helicopters to drill all shot holes located off existing roads and trails was dropped from further analysis due to an increased safety risk factor from the necessary increase in numbers of helicopters to complete the project and the added increase in indirect effects of helicopter noise and general presence on the human and natural environment. In addition, the use of buggy vehicles to access source points in place of helicopters would result in only minimal and mostly temporary to short-term impacts (BLM, 2003a) that do not warrant the greater safety risks, the added noise and helicopter activity, and the greater financial costs associated with helicopter transport of drills versus the buggy vehicles.

2.4.4. Limit Seismic Exploration to Existing Roads and Vehicle Trails

The confinement of source energy points to existing roads and trails in the Project Area was considered but not analyzed in detail. Restriction of source points to the existing road and trail network would result in unacceptably large voids in the data needed to assess the oil and gas resource in the Project Area due to insufficient number and distribution of source points to provide the necessary data. In addition, source lines need to be relatively straight and parallel to provide adequate data, and roads in the Project Area do not meet these requirements.

Inadequate data would not meet the purpose and need for the geophysical survey, that is to develop a 3D projection of the structure and layers of rocks underlying the Project Area, and to aid in determining the appropriate number and location of future wells, assuming analysis identifies target zones for oil and gas, that would optimize the recovery of the resource with the least amount of impacts and surface disturbance. The incomplete database would reduce the overall quality of the data set and could drive the need for a more expensive and intrusive exploratory drilling program that would in turn cause more impacts and disturbance in the Project Area. Therefore, this alternative is not considered further in this EA.

3.0 Chapter 3: Affected Environment

3.1. Introduction

This chapter presents a description of the potentially affected existing environment of the area likely to be impacted by implementation of either the Proposed Action or No Action alternatives described in Chapter 2 based on the purpose and need and issues identified in Chapter 1 and as identified in the Interdisciplinary Team Analysis Record (Appendix A). Baseline conditions for each potentially affected resource are described to a sufficient level to allow an impact analysis of sufficient detail to clearly describe in Chapter 4 the direct, indirect, and cumulative impacts of each issue raised in scoping and to allow for the comparison of impacts between the Proposed Action and the No Action alternatives.

3.2. General Setting

The proposed 92-square mile Project Area is located in Juab County, Utah within portions of Township 15 South, and Ranges 2 West, 1 1/2 West, and 1 West; Township 16 South, and Ranges 2 West and 1 West; and Township 17 South, and Ranges 2 West and 1 West (Salt Lake Base & Meridian). The Project Area occupies lands in the Gunnison Plateau-Valley Mountains Section and Pavant Range-Canyon Range Section of the Great Basin-Colorado Plateau Transitional Province (Stokes, 1988). The dominant landforms of the Project Area are north-south trending mountains and plateau features separated by canyons and broad valleys. From west to east, principal valley/watershed features consist of Little Valley, and upland divide (unnamed), Mills Valley (Sevier River), another upland divide (unnamed), the Washboard with Yuba Lake (Sevier Bridge Reservoir), the West Hills to the north and the South Hills to the south, and Juab Valley, which contains Chicken Creek Reservoir.

Upland elevations range from a high of approximately 5,900 feet in the West Hills on the northern boundary of the Project Area to highs ranging from 5,300 to 5,600 feet in the Southern Hills and uplands east, south, and west of Yuba Lake in the southern part of the Project Area. The low point of approximately 4,900 feet is located at the northwest boundary of the Project Area where the Sevier River leaves the Project Area.

The upland hills in the Project Area representing lower elevation features of adjacent mountain ranges are comprised of principally of Tertiary sedimentary and volcanic rocks with both Paleozoic and Mesozoic strata confined to mostly the western part of the Project Area (Stokes, 1986; Nelms and Ashland, 2001). Most of the more extensive areas of bottomland valleys, alluvial flats, and alluvial floodplains are underlain by Quaternary unconsolidated deposits mostly alluvial in origin. The Project Area is likely underlain by a thrust-fault system that extends to north and south of the Project Area (Stokes 1986). Potential geologic hazards in the Project Area consist of primarily mass wasting in the form of limited rock fall; landslides, slumping, and debris flows are

possible. No landslides have been identified within the Project Area (Harty, 1991); however, mapping of landslide susceptibility shows areas of moderate to low potential associated with the uplands/hills present within the Project Area and the remaining, majority of the Project Area, which is comprised of nearly level bottomlands, is identified as having very low potential (Giraud and Shaw, 2007). Potentials for mass wasting of steeper uplands in the Project Area may be exacerbated by ground shaking from earthquakes in the region. The Project Area occurs within a zone mapped as having moderate potential for strong ground shaking from earthquakes (Utah Geological Survey, 1997). Those bottomland portions of the Project Area along the Sevier River (Mills Valley) and the Juab Valley are mapped as having high potentials for liquefaction hazard during ground shaking events.

Soils forming on the uplands of residuum and colluvium are mostly shallow, high in coarse fragment or rock content with limited a limited mostly loamy soil content that are developing on steeper slopes (NRCS, 2008). Lower slopes of colluvium and alluvium support development of moderately deep to deep gravelly and stoney, silt and sandy loams. The extensive bottomland soils are dominated by very deep silt loams, fine sandy loams. Wind erosion potential for the bottomland, silty soils is high. Water erosion potential for the upland soils is high on steeper slopes and moderate as slopes reduce toward the nearly level bottomlands.

Air quality in the vicinity of the Project Area is considered good to excellent. The primary pollutant in the vicinity is expected to be particulate matter (PM), occurring as fugitive dust originating from natural sources, unpaved roads, surface disturbance associated with construction, recreation, and livestock grazing. Generation of fugitive dust is intermittent, depending on winds and presence of dust-causing activities. Precipitation in the Project Area occurs primarily in the spring and fall months with lower monthly averages during the winter months. Winter precipitation occurs as snow with scattered intense precipitation events occurring in the summer associated with thunderstorms. Average annual precipitation in the Project Area ranges from about eight inches to 10 inches, increasing from north to south with increasing elevation the Project Area.

The principal drainage in the Project Area is the Sevier River. Tributary to the Sevier River are intermittent and ephemeral stream courses that drain the Project Area. Streams flow in response to snow melt in the spring and to short-duration, high intensity storms during the summer. Both volume and water quality of flows are dependent on the amount of runoff and the chemical nature of the soil and channel bottoms over which sheetflows and channelized flows pass, respectively.

Vegetation in the Project Area reflects mostly terrain and soil conditions. Dominant vegetation types are sagebrush (46 percent) and grassland (18 percent). These types occupy the broad alluvial fans and erosional-plain deposits, deep to moderately deep soils, that extend into centers of wide valley bottoms from the base of north-south trending hills within the Project Area and from mountains that bound the Project Area. An additional 20 percent of the vegetation consists of pinyon-juniper on upland hills,

ridges, and divides (7 percent), greasewood on bottomland alkali-affected soils (7.5 percent), and salt desert shrub on bottomland saline soils (6 percent). About 6 percent is in agriculture.

The Visual Resource Management Class for most of the BLM-administered lands in the Project Area is Class III, which allows moderate change to characteristic landscape that may attract attention but not dominate the view (BLM, 1987). Class II lands are designated for BLM-administered lands bordering Yuba Lake. The level of change for Class II lands to the characteristic landscape should be low. Activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (BLM Manual 8431).

Current land uses in the Project Area include irrigated and dryland agriculture; livestock grazing; recreational boating, fishing, and camping (Yuba Lake); dispersed recreation (mostly hunting); and wildlife habitat. Interstate Highway I-15 roughly bisects the Project Area from north to south with several interchanges providing ingress and egress to intersecting state highways and county roads. Mule deer crucial winter habitat is present in portions of the Project Area along the northern, western, and southeastern boundaries.

3.2.1. Resources/Issues Brought Forward for Analysis

The BLM performed an initial assessment of potential impacts from implementation of the Proposed Action. Results of the assessment are included in Appendix A. Resources that have one or more issues that were identified include:

- Cultural Resources
- Native American Religious Concerns
- Vegetation
- Wildlife and Fisheries
- Special Status Species

3.3. *Critical Elements of the Human Environment and Other Resources Brought Forward for Analysis*

3.3.1. Cultural Resources and Native American Religious Concerns

3.3.1.1. Cultural Resources

There were 49 previously recorded sites within ½ mile of the project area, including 42 prehistoric and 7 historic sites, identified by the Class I inventory. Within the project

APE there were 49 newly recorded sites, and 71 isolates were identified by the Class III inventory. Ten of the previously recorded were located within the APE of the current Project Area and were revisited by SWCA. Six of the previously recorded sites within the APE have been recommended as eligible to the National Register of Historic Places (NRHP), and 4 of the previously recorded sites were recommended as not eligible to the NRHP (Table 3-1). Of the 49 archaeological sites newly recorded during the course of the Class III cultural resource inventory of the Project Area, 21 were recommended as eligible for the National Register of Historic Places (NRHP) and 28 newly recorded sites were recommended as not eligible for the NRHP (Table 3-2). In total, 27 eligible sites were either revisited or newly recorded within the project APE. In all cases it was possible to reroute either source or receiver lines with a minimum 20 meter buffer and avoid any project effect.

3.3.1.1.1 Newly Recorded Sites

Of the 49 newly recorded sites, 14 are single component Historic, 26 are single component Prehistoric and 9 are multicomponent Prehistoric and Historic sites. The 21 sites recommended eligible to the NRHP include 6 Historic sites comprising: 1 Historic trash scatter and associated road (42JB001584), 1 Historic debris scatter (42JB001595), 2 historic trash scatters and associated features (42JB001596 and 42JB001602), 1 Historic road and fence line (42JB001609), and 1 Historic telegraph/utility line (42JB001610). The 11 Prehistoric sites recommended eligible include 9 lithic scatters (42B001549, 42JB001579, 42JB001580, 42JB001585, 42JB001586, 42JB001591, 42JB001592, 42JB001597, and 42JB001598), and 2 combined lithic and groundstone scatters (42JB001573 and 42JB001601). Of the 4 newly recorded multicomponent sites which have been recommended eligible (42JB001571, 42JB001572, 42JB001575, and 42JB001589), 2 are recommended eligible for their prehistoric components and 2 are recommended eligible for their historic components.

The newly recorded sites recommended eligible are all considered to have potential to contain information that may further the understanding of either the prehistory or history of the area as defined under Criterion D. Five of the Historic sites recommended eligible are also considered eligible under Criterion A, their association with early developments of ranching in the area.

Table 3-1. Previously Recorded Sites within the Pioneer Washboard 3D Seismic Survey Project APE

Site Number	Eligibility Recommendation	Site Type	Management Recommendations
42JB000201	Eligible (Historic, D)	Prehistoric Isolate, Historic trash scatter and associated features	Avoid
42JB000315	Not Eligible	Prehistoric lithic scatter	No further work
42JB000373	Eligible (D)	Prehistoric lithic and groundstone scatter	Avoid
42JB000407	Not Eligible	Prehistoric lithic and groundstone scatter	No further work
42JB000412	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB000466	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB000479	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB000491	Eligible (Prehistoric, D)	Prehistoric lithic and groundstone scatter, Historic can scatter	Avoid
42JB001296	Not Eligible	Prehistoric lithic scatter	No further work
42JB001349	Not Eligible	Historic artifact scatter	No further work

Table 3-2. Newly Recorded Sites within the Pioneer Washboard 3D Seismic Survey Project APE

Site Number	Eligibility Recommendation	Site Type	Management Recommendations
42JB001543	Not Eligible	Historic road	No further work
42JB001544	Not Eligible	Historic road/trail	No further work
42JB001545	Not Eligible	Historic debris scatter	No further work
42JB001546	Not Eligible	Historic debris scatter	No further work
42JB001547	Not Eligible	Prehistoric lithic scatter	No further work
42JB001548	Not Eligible	Historic debris scatter	No further work
42JB001549	Eligible	Prehistoric lithic scatter	Avoid
42JB001550	Not Eligible	Prehistoric lithic scatter	No further work
42JB001551	Not Eligible	Prehistoric lithic scatter	No further work
42JB001552	Not Eligible	Prehistoric lithic scatter and Historic isolate	No further work
42JB001571	Eligible (Historic A & D)	Historic mining operation and camp; Prehistoric isolate	Avoid
42JB001572	Eligible (Historic, D)	Prehistoric lithic scatter, Historic debris scatter	Avoid
42JB001573	Eligible (D)	Prehistoric lithic scatter and groundstone scatter	Avoid
42JB001574	Not Eligible	Prehistoric lithic scatter	No further work
42JB001575	Eligible (Prehistoric,	Prehistoric lithic scatter and Historic debris	Avoid

Site Number	Eligibility Recommendation	Site Type	Management Recommendations
	D)	scatter	
42JB001576	Not Eligible	Prehistoric lithic scatter	No further work
42JB001577	Not Eligible	Prehistoric lithic scatter	No further work
42JB001578	Not Eligible	Prehistoric lithic scatter, Historic debris scatter	Avoid
42JB001579	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001580	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001581	Not Eligible	Historic trash scatter	No further work
42JB001582	Not Eligible	Prehistoric lithic scatter	No further work
42JB001583	Not Eligible	Prehistoric isolate, Historic trash scatter	No further work
42JB001584	Eligible (D)	Historic trash scatter and road	Avoid
42JB001585	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001586	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001587	Not Eligible	Prehistoric lithic scatter	No further work
42JB001588	Not Eligible	Prehistoric lithic scatter	No further work
42JB001589	Eligible(Prehistoric, D)	Prehistoric lithic scatter, Historic fence line	Avoid
42JB001590	Not Eligible	Prehistoric lithic scatter	No further work
42JB001591	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001592	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001593	Not Eligible	Prehistoric lithic scatter	No further work
42JB001594	Not Eligible	Ephemeral Prehistoric lithic and ceramic scatter, Historic glass scatter	No further work
42JB001595	Eligible (A & D)	Historic debris scatter	Avoid
42JB001596	Eligible (D)	Historic trash scatter and rock foundation	Avoid
42JB001597	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001598	Eligible (D)	Prehistoric lithic scatter	Avoid
42JB001599	Not Eligible	Prehistoric lithic scatter and Historic isolate	No further work
42JB001600	Not Eligible	Prehistoric lithic and groundstone scatter	No further work
42JB001601	Eligible (D)	Prehistoric lithic and groundstone scatter	Avoid
42JB001602	Eligible (A & D)	Historic trash scatter and associated features	Avoid
42JB001603	Not Eligible	Prehistoric lithic scatter	No further work
42JB001604	Not Eligible	Prehistoric lithic scatter	No further work
42JB001605	Not Eligible	Prehistoric lithic scatter	No further work
42JB001606	Not Eligible	Historic can and glass scatter	No further work
42JB001607	Not Eligible	Historic debris scatter	No further work
42JB001609	Eligible (A & D)	Historic road and fence	Avoid

Site Number	Eligibility Recommendation	Site Type	Management Recommendations
		line	
42JB001610	Eligible (A & D)	Historic telegraph/utility line	Avoid

3.3.1.1.2 *Previously Recorded Sites*

During the course of the project, SWCA archaeologists visited 10 previously recorded sites (Table 3-1). Of the 10 sites, 7 are prehistoric, 1 is historic, and 2 have both historic and prehistoric. Of the prehistoric sites, 5 are lithic scatters and 2 are lithic scatters with some ground stone present. One multicomponent site is primarily a historic trash scatter with a prehistoric isolate and the other is a prehistoric lithic and groundstone scatter with a historic can scatter, and the historic site is comprised of a mixed historic artifact scatter. All of the eligible previously recorded sites were avoided. The 2 prehistoric sites previously recommended not eligible were still represented by a low density and diversity of artifacts with no potential for intact subsurface deposits and were resting on thin and deflated soil deposits.

3.3.1.1.3 *Isolated Occurrences*

During the course of the cultural resource inventory, SWCA recorded 71 isolated occurrences (IOs). The IOs consisted of 36 prehistoric, 33 historic and 2 mixed historic and prehistoric IOs were recorded. By definition, all of the isolates do not qualify as sites and are not eligible for the NRHP. Project activities will have no effect on these cultural resources.

3.3.1.1.4 *Recommendation*

All sites recommended as eligible for the NRHP would be avoided by proposed seismic survey activities, including shot hole drilling and shot detonations or vibroseis buggies or vehicles. Tables 3-1 and 3-2 indicate the sites to be avoided and in each case avoidance routes were flagged in the field by the archaeological survey team and the routes were also recorded by GPS. Pioneer has committed to avoiding impacts to these sites by complying with the recommended avoidance distance from each site; therefore, no impacts to these cultural resources will occur. In the absence of impacts, cultural resources are not addressed further in this analysis.

3.3.1.2. Native American Religious Concerns

In response to letters sent to the Confederated Tribes of the Goshute Reservation, Paiute Indian Tribe of Utah, Kanosh Band of the Paiute Tribe, Skull Valley Goshute Tribe, and the Uinta Ouray Tribe regarding this proposed exploratory Washboard 3D Geophysical

Survey Project, one response was received from the Confederated Tribes of the Goshute Reservation. The Confederated Tribes requested that they be notified of the sites found during the Class I and Class III inventory of the Project Area. The absence of concerns forthcoming from the Tribes/Bands may indicate there is an absence of sites, features, or locations for traditional cultural properties of value to these peoples. The results of the Class I and Class III inventory summarized in the previous section supports the supposition that no known traditional cultural properties of consequence are present in the Project Area. Therefore, with the commitment to avoid all sites recommended as eligible for the NHRP, which as a group, would most likely include a site with traditional cultural properties if one were present, and the absence of known traditional cultural properties in the area, traditional cultural properties representing and including Native American Religious Concerns are not addressed further in this analysis.

3.3.2. Vegetation Resources

Vegetation within the Project Area is characteristic of the Utah Central Basin ecoregion (EPA, 2008). The Utah Central Basin is composed of northerly trending ranges and intervening dry basins. Vegetation within this ecoregion is composed of semiarid basin rims, lake terraces, valleys, alluvial fans and plains, and stream terraces. The vegetative communities dominating this landscape are typically sagebrush-grasslands, woodlands, primarily pinyon-juniper, wetlands and riparian, and agricultural lands (Utah GAP Data).

3.3.2.1. Sagebrush-Grasslands

Sagebrush communities within the Project Area grow on foothills, low mountains, and in valleys that have not been converted to agricultural use. Arid shrub species such as Wyoming big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Chrysothamnus nauseosus*), low rabbitbrush (*Chrysothamnus viscidiflorus*), and broom snakeweed (*Gutierrezia sarothrae*) are the dominant species in this vegetative community. Grasses also occur within sagebrush communities; grass species include bluebunch wheatgrass (*Elymus intermedium*), crested wheatgrass (*Agropyron cristatum*), and cheatgrass (*Bromus tectorum*).

Grasslands in the Project Area occur at lower elevations in the valley where this community has not been converted to agricultural uses. Much of the grassland within the Project Area is rangeland. Common grass species in the valleys includes a mixture of native and invasive species. The native grasses include Indian rice grass (*Oryzopsis hymenoides*), needle and thread grass (*Stipa comata*), bluebunch wheatgrass, and sheep fescue (*Festuca ovina*). The principal non-native, invasive grass in the Project Area is cheatgrass (*Bromus tectorum*). Russian thistle (*Salsola iberica*) and tumbling mustard (*Sysimbrium altissimum*) are two weed species that are present and can dominate local areas with the grassland community. Cheatgrass is a dominant species in major portions of the valley grasslands in the Project Area.

3.3.2.2. Woodland

Woodland communities are common in the low mountains, hills, foothills, and ridges within and adjacent to the Project Area. This vegetative community is comprised of principally pinyon-juniper and mountain brush vegetation types.

The more prevalent pinyon-juniper woodlands occur on foothills and ridges in the Project Area. Utah juniper (*Juniperus osteosperma*) is the predominant species occurring in this community and it is interspersed with pinyon pine (*Pinus edulis*). Shrub species occurring in this community include big sagebrush, rabbitbrush, and broom snakeweed and are intermixed with various forbs and grasses.

The less prevalent mountain brush communities are dominated by species of mountain mahogany (*Cercocarpus spp.*), serviceberry (*Amelanchier spp.*), gambel oak (*Quercus gambelii*), and chokecherry (*Prunus virginiana*) with grasses and forbs present in the understory (Goodrich and Neese, 1986). These communities occur in localized areas of higher elevation and more favorable moisture conditions such as north-facing slopes within the Project Area.

3.3.2.3. Wetlands and Riparian

Lowland riparian habitat within the Project Area is present along the Sevier River, small portions of Chicken Creek, and various ephemeral washes. The vegetative species include narrowleaf cottonwood (*Populus angustifolia*), Fremont cottonwood (*Populus fremontee*), box elder (*Acer negundo*), Russian olive (*Eleagnus angustifolia*), willows (*Salix spp.*), salt cedar (*Tamarix ramossisima*), rushes (*Scirpus spp.*), and sedges (*Carex spp.*).

Wetlands and marshes in the Project Area are associated with the Sevier River flood plain and a large area encompassing the Mills Valley Meadows. Marshy areas are vegetated by species such as alkali bulrush (*Scirpus ameritimus*), cattails (*Typha latifolia*), and common reed (*Phragmites australis*). Wet meadows are also present in the Project Area and are likely to include emergent vegetation such as wiregrass (*Juncus balticus*), prairie cordgrass (*Spartina pectinata*), and inland saltgrass (*Distichlis spicata*).

3.3.2.4. Agricultural Vegetation

The large private lands portion of the Project Area is predominately under agricultural. Agricultural lands are mostly rangelands and but includes cultivated croplands (alfalfa, corn, and grains).

3.3.2.5. Noxious Weeds

Noxious weeds potentially occurring in the Project Area include the previously noted cheatgrass (*Bromus tectorum*) and Russian thistle (*Salsola iberica*) plus halogeton

(*Halogeton glomeratus*), salt cedar (*Tamarix ramossisima*), common reed (*Phragmites australis*), and curly cup gumweed (*Grindelia squarossa*).

3.3.3. Wildlife and Fisheries

The Project Area has diverse landscape features supporting a variety of vegetative communities including pinyon-juniper, sagebrush, grasslands, cultivated fields, pastures, lowland riparian areas and wetlands, and aquatic lake/reservoir and river environments. These habitat types support a diverse array of wildlife including big game, raptors and other migratory birds, various small mammals, reptiles, and fish.

Common wildlife species in the Project Area are likely to include small mammals such as desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), bushytail woodrat (*Neotoma cinerea*), meadow vole (*Microtus pennsylvanicus*), deer mouse (*Peromyscus maniculatus*) and various bats. Reptiles potentially found in the vicinity include common garter snake (*Thamnophis sirtalis*), sagebrush lizard (*Sceloporus graciosus*), desert horned lizard (*Phrynosoma platyrhinos*), and western skink (*Eumeces skiltonianus*).

3.3.3.1. Big Game

Elk (*Cervus canadensis*) are ungulates that occupy many ecosystems in Utah but likely attain their greatest densities in mountainous areas characterized by rough, broken terrain and abundant areas for grazing. They are a hunted species that provide an important recreational activity on BLM lands and private lands, and bring considerable economic activity to local communities. Elk eat grasses, sedges, and forbs during summer, but in winter they also browse on the leaves, twigs, and bark of shrubs and deciduous trees (Nature Serve, 2006). Calving grounds are usually characterized by aspen, montane coniferous forest, grassland/meadow, and mountain brush habitats and are generally in locations where cover, forage, and water are in proximity (Fitzgerald et al., 1994). The Project Area has not been identified as important habitat for the species; however, a small portion of elk winter substantial range has been identified within the Project Area. These designated habitats occur on the western edge and southeastern corner on foot slopes of ridges/mountains bordering the Project Area and total approximately 1 square mile.

Mule deer (*Odocoileus hemionus*) occupy most ecosystems in Utah but likely attain their greatest densities in shrublands on areas characterized by rough, broken terrain and abundant browse and cover. Mule deer are also a hunted species again providing an important recreational activity on BLM lands and private lands, and bringing considerable economic activity to local communities. Mule deer graze on herbaceous plants during the spring and summer, and browse current year's growth of leaves and stems of shrub species during the fall and winter (UDWR, 2004).

Approximately 9.5 square miles of mule deer crucial winter range is present within the Project Area. The majority of this crucial winter range, approximately 5.0 square miles of the 9.5 square miles, located along the northern boundary of the Project Area, burned in the late 1990's. This area classified as winter range is currently vegetated with cheatgrass (UDWR, 2006), and is currently of limited value to wintering mule deer. The remaining winter range areas are located along the western boundary and in the southeastern corner of the Project Area on foot slopes of ridges/mountains bordering the Project Area.

3.3.3.2. Migratory Birds

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711). The MBTA prohibits "taking" which is the killing, possession, or transport of any migratory bird species, their eggs, parts, or nests, except as authorized by a valid permit. The Project Area is composed of a variety of habitat types able to support a diversity of migratory bird species. Habitats potentially utilized by breeding migratory bird species include pinyon-juniper woodlands, sagebrush, grasslands, wetlands and riparian areas.

The western half of Utah, including the Project Area, is referenced as the Great Basin Ecoregion by the Utah Partners in Flight. A large diverse group of migratory birds is known to occur within this ecoregion due to the presence the Great Salt Lake and adjacent lands and habitats in this ecoregion. Appendix D, Migratory Bird Species table identifies species from the Partners in Flight Avian Conservation Strategy and the USFWS Birds of Conservation Concern potentially occurring in the Project Area. These species are identified in the appendix with their scientific name, habitat association and potential to occur in the Project Area. Common species include greater sage grouse (*Centrocercus urophasianus*), horned lark (*Eremophila alpestris*), sage thrasher (*Oreoscoptes montanus*), Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza belli*), black-throated sparrows (*Amphispiza bilineata*), lark sparrow (*Chondestes grammacus*), and house finches (*Carpodacus mexicanus*). Common raptor species include burrowing owl (*Athene cunicularia*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsonii*), rough-legged hawk (*Buteo lagopus*), prairie falcon (*Falco mexicanus*), and golden eagle (*Aquila chrysaetos*). Corvids such as common raven (*Corvus corax*), black-billed magpie (*Pica hudsonia*), and pinyon jay (*Gymnorhinus cyanocephalus*) are also common.

3.3.3.3. Fisheries

Fisheries within the Project Area are generally limited. Fish species potentially found in the Project Area include northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), black bullhead (*Ictalurus melas*), yellow perch (*Perca flavescens*), walleye (*Stizostedion vitreum*), and carp (*Cyprinus carpio*). Yuba Lake (Sevier Bridge Reservoir) and the Sevier River within the Project

Area are classified as 3B with portions that are considered 3A (UDWR, 1999). These designations indicate that for 3A: waters are protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their foodchain; and 3B: waters are protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their foodchain. Fishing within the Sevier River has been reduced since 1900 to current status of limited or nonexistent fishery (UD Water Res. 1999). Fishing in Yuba Lake is important recreational activity within the Project Area.

3.3.4. Special Status Species

A listing of the potential special status species (threatened, endangered, candidate, proposed for federal listing and BLM Sensitive Species) that may be present in the vicinity of the Project Area is presented in Appendix E. Habitat characteristics and a determination of potential for the species to present within the Project Area are addressed in the appendix table. Those species likely to occur within the Project Area are discussed below.

3.3.4.1. Threatened, Endangered & Candidate Species

Ute ladies'-tresses (*Spiranthes diluvialis*)

Ute ladies'-tresses orchid is federally listed as a threatened species. This species is commonly associated with riparian and wet meadow habitats and is often observed along stream banks, abandoned oxbows, marshes, and raised bogs at 4,500 to 6,800 feet (UNPS, 2003-2007). They establish themselves at on alluvial deposits of sandy and gravelly substrate in open areas, and lacking a dense vegetation cover (USFWS, 1995). This species is a perennial herb with a flowering stem, 20-50 cm tall that arises from a basal rosette of grass-like leaves. The flowers are ivory-colored, arranged in a spike at the top of the stem, and bloom mainly from late July through August (UDWR, 2008).

The Ute-ladies'-tresses has not been documented in Juab County; however, potentially suitable wetland and riparian habitat is present along the Sevier River and in marshy areas within the Project Area.

3.3.4.2. BLM Sensitive Species

3.3.4.2.1 *Ferruginous Hawk (*Buteo regalis*)*

The ferruginous hawk is listed as a BLM sensitive species. Ferruginous hawks are found in grasslands, agricultural lands, sagebrush, saltbush, greasewood shrub lands, and the periphery of pinyon-juniper forests (Parrish et. al., 2002). Breeding habitat includes grassland or shrub-steppe vegetation in flat to rolling terrain (Parrish et. al., 2002). Nests are built on elevated areas such as buttes, cliffs and creek banks (Parrish et. al., 2002). Nesting ferruginous hawks have also been observed nesting in electrical transmission towers near the Project Area (Grasslands, 2008).

3.3.4.2.2 Long-billed Curlew (*Numenius americanus*)

The long-billed curlew is listed as a BLM sensitive species. The long-billed curlew occurs in habitat consisting of dry, uncultivated rangelands and pastures, and sagebrush/grasslands, with aquatic areas nearby (Parrish et. al., 2002). Curlews forage in moist meadows, wetlands and upland habitats preying on invertebrates and berries (Parrish et. al., 2002). Nests can be found on bare ground or in short grasses with abundant invertebrate prey present (Parrish et. al., 2002). Uncultivated rangelands support most of the Long-billed curlew breeding population in Utah (Parrish et. al., 2002). Long-billed curlews have been observed throughout the Project Area (Grasslands, 2007).

3.3.4.2.3 American White Pelican (*Pelecanus erythrorhynchos*)

The American white pelican is listed as a BLM sensitive species. The American white pelican inhabits small lakes, ponds, rivers, marshes, and riparian areas (UDWR, 2004). They are colonial nesters and can be found nesting on small islands of large, freshwater lakes (UDWR, 2004). Utah represents a critical breeding region for this species (UDWR 2006). Utah's only colony of breeding pelicans occurs at Gunnison Island on the north arm of the Great Salt Lake (UDWR, 2006). Potentially suitable habitats are present in the Project Area in the Sevier Bridge Reservoir, along Sevier River and tributaries, Chicken Creek Reservoir, and the Mills Valley Meadows.

3.3.4.2.4 Bobolink (*Dolichonyx oryzivorus*)

The bobolink is listed as a BLM sensitive species. Bobolinks inhabit mesic and irrigated meadows, riparian woodlands, and subalpine marshes at lower elevations (UDWR, 2006) (2,800 to 5,500 feet). Suitable breeding habitat for this ground nester includes tall grass, flooded meadows, prairies, and agricultural fields (Parrish et. al., 2002). Potentially suitable habitats are present in the Project Area.

3.3.4.2.5 Burrowing Owl (*Athene cunicularia*)

The burrowing owl is listed as a BLM sensitive species. Burrowing owl habitat consists of open grasslands, shrublands and desert floors with flat to slightly rolling topography, short vegetation and a high percentage of bare ground (Lanze et. al., 2004). In Utah, burrowing owls typically select high density prairie dog (*Cynomys spp.*) colonies for nesting (Vanner, 2002), although other small mammal burrows may be utilized. Burrows are used for shelter, nesting, roosting, and hunting (Vanner, 2002). Burrowing owls have been observed in the vicinity of the Project Area using ground squirrel colonies for nesting. Suitable prairie dog habitats are not present within the Project Area; however, ground squirrel colonies are abundant and there is potential for the owl to be present in the Project Area.

3.3.4.2.6 Greater Sage Grouse (*Centrocercus urophasianus*)

The greater sage grouse is listed as a BLM sensitive species. Greater sage-grouse are considered sagebrush obligates depending on sagebrush for food, shelter and nesting purposes (Connelly et. al., 2004). Their habitat consists of sagebrush flats, mountain valleys and foothills composing of a variety of sagebrush community types including big sagebrush, (*A. tridentata*) silver sagebrush, (*A. cana*) and three-tip sagebrush (*A. tripartita*), and other brush species including rabbitbrush (*Chrysothamnus spp.*), antelope bitterbrush (*Purshia tridentata*), and horsebrush (*Tetradymia canescans*) (Connelly et. al., 2004).

Breeding habitat (lek sites) consists of gentle terrain, with less herbaceous or shrub cover and are typically located adjacent to dense sage brush stands. Nesting and brooding typically occurs within 2-miles of the lek site in sagebrush stands with an understory composed of grasses and forbs (Connelly et. al. 2004). During the winter, greater sage grouse often utilize sagebrush habitats at sub-montane elevations that commonly compose of low sagebrush (*A. arbuscula*) and black sagebrush (*A. nova*) communities (Connelly et. al., 2004).

Greater sage grouse leks have not been identified within the Project Area; however, suitable habitat for the species is present and sage grouse are likely to occur.

3.3.4.2.7 Grasshopper Sparrow (Ammodramus savannarum)

The grasshopper sparrow is listed as a BLM sensitive species. Grasshopper sparrows prefer grassland habitats of intermediate height (~30 cm) with clumped vegetation interspersed with patchy bare ground, and sparse shrub cover (Slater, 2004). They typically occupy large areas of contiguous grasslands (8 hectares or larger). Nests are built on the ground at the base of grass clumps far from edge habitats where they are less vulnerable to predation (UDWR, 2004). The grasshopper sparrow is only known to breed in the northern portion of Utah; however, they are known to occur in Juab County.

3.3.4.2.8 Short-eared Owl (Asio flammeus)

The short-eared owl is listed as a BLM sensitive species. The short-eared owl inhabits open areas including prairie, shrublands, grasslands, pastures, and marshlands (Johnsgard, 2002)(UDWR, 2004). This species selects habitats that have an abundance of small mammals and perches for hunting (Johnsgard, 2002). Nests are built in open habitat on the ground in a small depression excavated by the female (UDWR, 2004). Suitable habitats for this species are present within the Project Area.

3.3.4.2.9 Townsend's Big-eared Bat (Plecotus townsendii)

The Townsend's big-eared bat occupies semi-desert shrublands, pinyon-juniper woodlands, and open montane forests (Fitzgerald et. al., 1994). They are frequently associated with caves and abandoned mines for day roosts, but they will also use abandoned buildings and rock crevices for refuge (Fitzgerald et. al., 1994). Suitable shrubland and pinyon-juniper woodland habitats are present within the Project Area.

3.3.4.2.10 Fringed Myotis (*Myotis thysanodes*)

The fringed myotis is listed as a BLM sensitive species. The fringed myotis is widely distributed across the state of Utah and found in a wide range of habitats including; coniferous forests, woodlands, grasslands, lowland riparian, and shrublands, although it is most common in xeric woodlands, such as juniper, ponderosa pine, and Douglas-fir (Oliver, 2000). This species forages over water, along forest edges, or within forests and woodlands in search for beetles, which are plucked from leaves or the ground (Fitzgerald et. al., 1994; Oliver, 2000). The fringed myotis utilizes shelters such as caves, mines or abandoned buildings for sleeping and rearing young. Suitable habitats are present in the Project Area and the species has the potential to occur.

3.3.4.2.11 Kit Fox (*Vulpes macrotis*)

The kit fox is listed as a BLM sensitive species. Kit fox are found exclusively in arid and semi-arid landscapes composed of saltbrush, shadescale, sagebrush, and greasewood communities below 5,500 feet (Jensen et al., 2006) (Fitzgerald et. al., 1994). These low growing shrubby communities rolling hills, and gully washes provide excellent cover for the kit fox while hunting (Jensen et al., 2006). Den sites are excavated in areas with few predators, abundant prey, and suitable soils (Jensen et al., 2006). Numerous dens are used year-round for shelter and protection from predators (UDWR, 2006). Den sites are typically found in barren areas with silty, clay soil, elevated above surrounding terrain. In Utah, kit foxes may be found throughout the Great Basin area as well as in the southwestern and southeastern parts of the state (Jensen et al., 2006). Suitable habitats for kit fox are present in the Project Area.

3.3.4.2.12 Pygmy Rabbit (*Brachylagus idahoensis*)

The pygmy rabbit is listed as a BLM sensitive species. They are typically found in dense, tall stands of sagebrush. Pygmy rabbits are the only rabbits in North America to dig their own burrows. Landscape selection by rabbits is linked very closely with the availability of deep, loose soils in which to construct burrows with several openings. Suitable pygmy rabbit habitat can often be found by searching for areas with deeper soils, as recognized by distinctly taller patches of sagebrush (UDWR, 2003). Such habitat is present in the Project Area.

3.3.4.2.13 Least Chub (*Lotichthys phlegethontis*)

The least chub is listed as a BLM sensitive species. Least chub are found in slow-flowing streams and springs with dense aquatic vegetation (UDWR, 2004). In Juab County they are found in the Snake Valley, Mills Valley of the Sevier River drainage, and the Mona Springs complex in the Utah Lake Drainage (Horns, 2005). Suitable habitats for least chub associated with the Sevier River and marshy areas are present within the Project Area, and the species is known to occur.

3.3.4.2.14 Leatherside Chub (*Gila copei*)

The leatherside chub is listed as a BLM sensitive species. This species inhabits low-velocity rivers with coarse substrate and a minimal presence of silt and gravel (UDWR,

2006). They can be found naturally in the Snake, Bear, and Sevier River drainages and Utah Lake (UDWR, 2004). Suitable habitats for least chub are present within the Project Area and the species are known to occur.

3.3.4.2.15 Western Toad (*Bufo boreas*)

The western toad is listed as a BLM sensitive species. The western toad inhabits slow moving streams, wetlands, desert springs, ponds, lakes, meadows and woodlands (UDWR, 2004). Potentially suitable habitat for this species is present within the Project Area along the Sevier River and in marshy areas.

4.0 Environmental Impacts

Elements of the human environment and project-specific resource issues presented in Section 1.7 of this EA include cultural resources, Native American religious concerns, vegetation, wildlife and fisheries, and special status species. Direct and indirect impacts stemming from implementation of the Proposed Action and No Action Alternative are assessed by resource issue in the following sections of Chapter 4. Limited cumulative impacts for affected resource issues are addressed at the end of this chapter.

4.1. Vegetation

4.1.1. Proposed Action

Implementation of the Proposed Action would result in a combined effects and disturbance total of approximately 314.1 acres. Impacts to vegetation as a result of this surface use are anticipated to be approximately 0.9 acres of surface disturbance from drill holes and staging areas. In addition to the 0.9 acres of surface that will be physically disturbed by this project, approximately 313.2 acres would be affected by off-road buggy drill and buggy vibe off-road, cross-country travel. Off-road buggy travel typically results in compression of non-woody species and both compression and some breakage of woody parts of shrub and other plant species. However, past BLM monitoring of post-survey conditions for several previous seismic survey projects concludes that off-road buggy travel over vegetation has caused minimal impacts in terms of damage to plants and in terms of duration of the impact (BLM, 2003a; BLM, 2003b; and BLM, 2003c). Buggy travel may break off limbs and brittle portions of shrubs; however, vegetation would recover within days or weeks (BLM, 2003a). Buggy drill and heliportable drill locations have a minimal impact of temporarily burying any vegetation next to the drill hole beneath drill cuttings within approximately two feet of the hole. The cuttings would be immediately raked back into the shot hole as part of backfilling the charged shot hole. Cuttings left over after backfilling the shot hole are raked within the four-foot diameter of disturbance to restore contours and to un-bury underlying vegetation. Buggy travel and heliportable drilling do not result in the removal of vegetation.

4.1.2. No Action Alternative

Selection of the No Action Alternative would preclude implementation of seismic survey in the Project Area and associated effects and any limited disturbance to vegetation and to the habitats to which vegetation is a key component.

4.2. Wildlife and Fisheries

4.2.1. Proposed Action

As discussed in Section 3.3.3, the Project Area supports a diverse array of wildlife including big game, raptors and other migratory birds, various small mammals, reptiles and fish. Impacts in common for terrestrial wildlife and migratory birds are likely to be limited to displacement from habitats in the immediate vicinity of the transient concentrations of geophysical survey activities, primarily associated with off-road buggy vehicle activity and helicopter operations. These moving source of impact is anticipated to affect a locale temporarily and terrestrial wildlife is expected to be able to return to areas from which they have been displaced at night and at a minimum, with a few days of being displaced to areas previously occupied with no or minimal alteration of their habitats.

4.2.1.1. Big Game

Areas of mule deer crucial winter range and elk substantial winter ranges are present within the Project Area (Section 3.3.3). Due to the anticipated duration of geophysical seismic survey operations between approximately August 1 and an anticipated completion date prior to December 1, impacts to wintering big game are not anticipated. No direct impacts to big game species are anticipated due to the lack of any loss of habitat use or forage. Indirect impacts would be limited to some increase in stress levels from noise and human presence, as well as temporary displacement of individuals during the short duration of project activities in a particular area. Following the passage of activities within an area to other areas, big game habitats would again be available to the species.

4.2.1.2. Migratory Birds

With the exception of burrowing owls, which are likely to utilize nest burrows until mid-to late-August, migratory birds including the BLM-sensitive American white pelican, long-billed curlew, grasshopper sparrow, greater sage grouse, short-eared owl, and other non-BLM-sensitive raptor species would have completed the nesting period prior to the anticipated earliest project start date of August 1, 2008. Therefore, geophysical survey activities would not directly impact bird reproductive efforts; and adult, juvenile, and fledged young would be able to move away from any activity to which they may be sensitive. Migratory birds may avoid project-related activities during daylight hours; however, habitats within the Project Area would be available for use during the day away from the concentration of activity and during the evening and night for loafing. The potential indirect impacts to migratory birds are anticipated to be limited to this displacement away from concentrations of project activities that would be transient and

of short duration in any one locale. In addition, migratory birds are likely to begin migration prior to the end of project activities thus further avoiding any extended period of impact.

4.2.1.3. Fisheries

Fisheries resources or habitat in the Project Area include Yuba Lake, which is classified as a 3B water and is likely to support warm water fisheries (UD Water Resources, 1999) and Sevier River downstream of the Sevier Bridge Reservoir (Yuba Lake) dam which has portions that are classified 3A and 3B, cold and warm water fisheries, respectively. In addition, suitable habitats for the BLM-sensitive leatherside chub and least chub are present within the Project Area. These species are most likely to occur in the Sevier River, but they have the potential to occur in Yuba Lake. The Applicant-committed Design Feature (Section 2.2.8.9) to avoid flowing streams and wetland and riparian habitat by 300 feet would result in the avoidance of direct impacts of vehicle incursion into the stream where fish could be injured and avoidance of indirect impacts from stream sedimentation and altered water quality from bank or terrace disturbance. No impacts to fish including BLM-sensitive fish species in the Sevier River are anticipated.

Project activities within Yuba Lake would require the use of boat mounted air-guns for source generation. Approximately 441 air-gun source points would be utilized. With the application of Applicant-committed Design Features (2.2.8.6) which include avoiding use of air guns in shallow water and gradually increasing from low intensity air pulses from the air guns and ramping up to full strength source pulse, fish in the vicinity of the activities are likely to swim away and impacts would be avoided. Potential impacts to fish as a result of seismic exploration in aquatic habitats using air guns include startle, biochemical stress responses, and the potential for damage to hearing.

Fish behavioral changes have been documented in response to seismic exploration in aquatic environments (BJO, 2006). These documented responses included a startle response in the form of a temporary increase in swimming velocity and/or a lateral shift in swimming direction (Engas et al., 1996). Repeated exposure to air gun pulses has also resulted in habituation to the disturbance with increasingly reduced startle responses. In the study, under severe conditions with fish held in field enclosures near the source for 50 repeated pulses, no direct mortality or obvious physical damage to the fish were observed (BJO, 2006). Potential impacts to fish hearing from use of field enclosures in proximity to air-gun pulses have been documented in the form of damaged sensory epithelia that failed to repair following seismic activities (McCauly et al., 2003). On the other hand, this study has been repeated with three other fish species and found little impact to hearing (Popper et al., 2005). Other potential impacts to fish as a result of air-gun pulses may include a biochemical stress response. This response has been documented in fish with stress hormones returning to normal levels within 72 hours following exposure (Santulli et al., 1999). Based on the previous reports, there is a potential for adverse impacts to fish to result from aquatic source generation by air gun equipment in Yuba Lake. However, due to the proposed methodology to gradually increase the strength in air gun discharge at each source point prior to releasing the actual source generating

discharge, the ability for the fish to move away from the air-gun source in response to the ramping-up of discharge intensity, and the commitment to avoid the use of air guns in shallow waters, impacts on fish would be minimized with only anticipated increase stress levels for the duration of nearby source generation activities. Additional injury to fish, particularly fish hearing, could occur on occasion should the fish not move away from source generating activity in response to the “warning” discharges from the air guns.

4.2.2. No Action Alternative

Selection of the No Action Alternative would preclude implementation of seismic survey in the Project Area, which would result in no impacts to wildlife and fisheries within the Project Area.

4.3. Special Status Species

4.3.1. Proposed Action

4.3.1.1. Threatened, Endangered & Candidate Species

4.3.1.1.1 *Ute ladies'-tresses*

Impacts to Ute ladies'-tresses orchid are not anticipated as a result of this project. Pioneer proposes design features that are specified in Section 2.2.8.9. These design features will avoid drilling and shooting within 300-feet of wetlands and riparian habitats. Avoidance of these habitats would avoid potential impacts to Ute ladies'-tresses orchid.

4.3.1.2. BLM Sensitive Species

4.3.1.2.1 *Burrowing Owl*

As discussed in Section 3.3.4, suitable habitat for burrowing owl is present throughout the Project Area in areas of alluvial fans and plains where burrowing animals, principally ground squirrels in the area, provide potential nesting opportunities. Although no nesting burrowing owls or owl nests have been identified within the Project Area, the presence of suitable habitat (observed squirrel burrows) and past observations of nesting owls in areas adjacent to the Project Area would indicate there is potential for the species to be present. Should project activities be scheduled prior to the August 31, the end of the burrowing owl nesting timing limitation, clearance surveys would be conducted in areas of suitable habitat to determine the presence of any nesting burrowing owls. In the event that nesting burrowing owls are identified during a survey within the Project Area, geophysical survey activities would avoid an area within ¼-mile of the nest or nesting territory if more than one burrow is being used. Due to the commitment to survey for the presence of the species, and to avoid any nests and associated individuals that are identified, no impacts to burrowing owl are anticipated.

4.3.1.2.2 *Townsend's Big-eared Bat and Fringed Myotis*

As discussed in section 3.3.4 and in Appendix E, suitable habitats for BLM-sensitive bat species are present within the Project Area. No direct impacts to these species are anticipated from implementation of the Proposed Action as no habitat loss or damage is anticipated. Potential indirect impacts would be limited to temporary displacement of individuals from concentrations of geophysical survey activity. This impact would only occur in occupied habitats and would last for the short duration of project activities as they pass through a particular area. No impacts to bat habitat components of hibernacula or roost sites would occur as a result of the conducting the project.

4.3.1.2.3 *Kit Fox*

Suitable habitat for kit fox is present within the Project Area (Section 3.3.4)(Appendix E); however, no individuals or kit fox den locations have been documented in the area. No direct impacts to the species are anticipated from implementation of the Proposed Action; seismic survey activities would not directly endanger individuals, dens, or prey as no excavation would occur plus the speed of activities would allow a fox and most prey species to avoid contact and possible harm. Potential impacts to this species would be limited to the possible displacement of individuals, if present, during the transient movement of activity concentrations through a particular area. The magnitude and duration of the displacement impacts are anticipated to be minor and temporary. No other impacts to individuals, suitable habitat, or prey sources would be anticipated.

4.3.1.2.4 *Pygmy Rabbit*

Suitable pygmy rabbit habitats are also present within the Project Area (Section 3.3.4)(Appendix E) although communities of tall sagebrush, most suitable habitat, are limited in number and in size. Pygmy rabbits are secretive and typically retreat to their burrows when threatened. Possible direct impacts to the species could include source generation adjacent to occupied burrows and some associated stress response and possible, but unlikely, damage to burrow integrity from drilling shot holes and vibroseis “shaking”. Potential indirect impacts to the species would be limited to a possible general increase in stress from nearby and temporary human presence and noise.

4.3.1.2.5 *Least Chub, and Leatherside Chub*

The Sevier River segment flowing through portions of the Project Area provides suitable habitats for the BLM-sensitive least chub and leatherside chub (Section 3.3.4)(Appendix E). Both species are likely to be present within the Project Area. These species are not known to occur within Yuba Lake; however, the leatherside chub has been documented in Utah Lake and therefore, due to the species’ presence in the Sevier River near Yuba Lake, has the potential to occur in Yuba Lake. Applicant-committed Design Features (Section 2.2.8.9) implemented to avoid seismic activities within 300-feet of flowing streams or wetland and riparian habitats would result in avoidance of impacts to the Sevier River and these BLM-sensitive fish. No impacts to BLM-sensitive fish species in the Sevier River are anticipated.

Due to the potential for leatherside chub to also occur in lake habitats, and therefore, the potential to occur in Yuba Lake, potential impacts to the species, if present, would be similar to those described in Section 4.2.2. Due to a lower potential for the species to be present within Yuba Lake, impacts to the species are less likely. In addition, the leatherside chub commonly occupies shallow water habitats of less than a few feet and would likely keep close to shore that would be avoided by the Applicant-committed Design Feature (2.2.8.6) to avoid use of air guns in waters less than 10-feet deep plus keep some 20 to 30 feet away from the shore line.

4.3.1.2.6 Western Toad

As discussed in Section 3.3.4, suitable habitat of slow moving streams, wetlands, desert springs, ponds, lakes, meadows, and woodlands is present in the Project Area for the western toad (Appendix E). Avoidance of water-related habitats in including riparian areas by geophysical survey buggies per applicant-committed measures (Section 2.2.8.9) would avoid or minimize any impacts to the western toad.

4.3.2. No Action Alternative

Selection of the No Action Alternative would preclude implementation of seismic survey in the Project Area and associated impacts to special status species and their habitats.

4.4. Cumulative Impacts

Implementation of the Proposed Action in combination with past, current, and reasonably foreseeable future actions could have cumulative impacts on those resources of concern that have been identified for this proposed project. Those resources for which concern has been expressed are:

- cultural resources and Native American religious concerns;
- vegetation, as it pertains to wildlife and special status species habitat;
- wildlife and fisheries; and
- special status species, federally-listed threatened, endangered, candidate, and proposed animal and plant species plus BLM-sensitive species.

The direct and indirect effects from oil and gas development projects are dramatically different from effects of seismic exploration, primarily in that oil and gas development results in long-term surface disturbance from construction and continued use of well pads, pipelines, and access roads, whereas geophysical seismic exploration is mostly temporary to short-term in nature and doesn't involve any permanent structures or activities. Within the Project Area, past oil and gas exploration/development activity has resulted in approximately seven plugged and abandoned wells and one abandoned location. It is likely that all of these locations have reclaimed naturally or through the application of reclamation measures or have been restored to agricultural use.

Most other use and disturbance in the Project Area has resulted from agricultural operations, both cultivated and pasture applications; livestock and wildlife grazing on federal and state allotments; transportation ROWs including highways, roads, and utilities; some light industrial locations; and farm/ranch facilities and residences. This development is consistent with a rural, agricultural setting in the State of Utah.

As exploratory geophysical surveys do not necessarily lead to subsequent oil and gas development, such development is not reasonably foreseeable. Therefore, the assessment of cumulative impacts of this proposed project is based on the addition of impacts from this proposed geophysical survey project with the past, existing, and continued disturbance and impacts of maintaining the rural, agricultural setting of the lands comprising the Project Area. Given the five conditions listed below that apply to this proposed project and Project Area, and the analyzed resources (direct and indirect impacts) of concern; no cumulative impacts are anticipated from implementation of the Proposed Action. Selection of the No Action Alternative would result in no cumulative impacts.

1. The nature of land use in the Project Area and that this land use has remained mostly unchanged for decades,
2. The temporary effects of large low-pressure-tired vehicles and small ATVs traveling cross-country while avoiding wetlands and riparian areas,
3. The drilling of small diameter holes in mostly isolated, less accessible terrain,
4. The use of helicopters to provide access to the inaccessible portions of the Project Area, where buggy drills can not go, and to ferry gear and equipment through out the survey program; and
5. The use of primarily pedestrian means to distribute and place the array of recording receivers and equipment would preclude a contribution of this proposed project to cumulative impacts.

Reasons this project's assessed absence of cumulative impacts are described below by resource for which concerns for direct and indirect impacts were identified (Appendix B). The potential for future development in the area is purely speculative in nature and is therefore not carried forward for analysis as reasonable foreseeable actions.

4.4.1. Cultural Resources, including Native American religious concerns

The completion of cultural resources inventories for the Project Area identified locations of cultural resource sites that would be recommended as eligible for the NRHP. The locations of these sites were used to make adjustments to seismic line and point locations so that these sites would be avoided with adequate setbacks as requested by the BLM. Therefore, implementation of the Proposed Action would have no direct or indirect impacts to cultural resources, and therefore, no cumulative impacts. As no sites of Native American religious concern have been identified by Tribes with interest in the Project

Area, and no such sites have been identified in the Class I and III cultural resource inventory completed for the Project Area, no impacts to Native American religious concerns from implementation of the Proposed Action, and therefore no cumulative impacts, would occur.

4.4.2. Vegetation

Although vegetation resources were not identified as a resource of concern (Appendix B), vegetation contributes to the extent, location, and quality of habitat for both wildlife and special status species. Cumulative impacts to vegetation and therefore habitats from implementing the Proposed Action are not anticipated as the effects of compressing vegetation with some limited breaking of woody shrub species by cross-country travel of low-pressure-tired vehicles would be temporary in duration with recovery of vegetative cover and habitat quality to occur almost immediately to short-term (one year).

4.4.3. Wildlife and Fisheries Resources

Direct impacts to wildlife would be limited primarily to temporary displacement away for the localized seismic survey operations such as the passage of groups of buggy drills, groups of buggy vibes, low flying helicopters, and other human/vehicle actions as part of the transient-based seismic survey operations that call for activities that migrate across the Project Area. Breeding seasons and winter habitat impacts would be avoided by conducting the seismic survey outside of critical seasonal periods. Indirect impacts could result from impacts to habitat as noted above for vegetation; however, the effects would be temporary to short-term and actual disturbance from drilling shot holes would total less than one acre for the entire Project Area. Important, sensitive habitats such as wetlands and riparian zones plus flowing streams would be avoided and buffered, so that no impacts to these habitats would occur. Impacts to fisheries in the Sevier River would be protected by avoidance using the same measures. Seismic operations in Yuba Lake would also be conducted so that impacts would primarily be the temporary displacement within the lake with no lasting impacts to the lake's fishery. With the absence of any impacts of consequence or duration for the Proposed Action, no cumulative impacts to wildlife and fish species are anticipated.

4.4.4. Special Status Species

Direct and indirect impacts to the endangered Ute ladies'-tresses orchid from implementation of the Proposed Action would be avoided by avoiding activity with suitable habitat and a buffer. BLM-sensitive species and their habitat would be avoided where feasible. Where impacts may not be totally avoidable, their nature would be the same as those described above for wildlife and fisheries – there could be temporary displacement and/or breeding seasons would be avoided by responsively timing project activities. Indirect impacts to habitat would also be temporary to short-term. Again, with

the absence of any impacts of consequence or duration for the Proposed Action, no cumulative impacts to special status species are anticipated.

5.0 Consultation and Coordination

5.1. Introduction

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. Appendix B provides the rationale for issues that were considered but not analyzed further. The issues were identified through the public and agency involvement process described in Sections 6.2 and 6.3 below.

5.2. Persons, Groups, and Agencies Consulted

Table 5-1. List of all Persons, Agencies and Organizations Consulted for Purposes of this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Utah State Historic Preservation Office (SHPO)	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	Consultation with the SHPO has been initiated. Section 106 consultation will be completed following site-specific cultural clearances. A copy of this EA has been submitted to the SHPO for review.
Tribes with historic ties to the Uinta Basin	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	The BLM will consult, as necessary, with applicable Tribes regarding the identification of sacred sites or traditional cultural properties within the Project Area.
Utah Division of Wildlife Resources	Information and coordination on wildlife and fisheries and their habitats associated with the Washboard 3D Seismic Survey Project Area.	Data and analysis regarding big game species incorporated into Chapters 3 and 4.
Utah State Parks	Consultation on potential impacts to Yuba Lake State Park.	Seismic survey activities around and in Yuba State Park are to be coordinated with Yuba State Park officials.

5.3. Summary of Public Participation

During preparation of the EA, public notification occurred when the proposed project was posted to the Utah Environmental Notification Bulletin Board (ENBB) on October 30, 2007.

A 15-day public comment period is being provided for this document. The comment period will begin on July 16, 2008 and end on July 30, 2008. Any comments submitted during the 15-day public comment period for this document will receive a formal response in the Final EA.

5.4. List of Preparers

This EA was prepared by a third-party contractor, Petros Environmental Group, Inc. of Littleton, Colorado and Grasslands Consulting of Denver, Colorado with support from SWCA Environmental Consultants of Salt Lake City, Utah; and was reviewed by the BLM Fillmore FO staff members listed below and accepted by the BLM Fillmore FO Authorized Officer.

Table 5-2. List of Preparers

BLM		
Name	Title	Responsible for the Following Section(s) of this Document
Jerry Mansfield	Project Manager	NEPA Compliance, Project Management, Geology/Mineral Resources/Energy Production, Paleontology
Matt Rajala	NEPA Coordinator	Air Quality, Environmental Justice, Farmland (Prime and Unique), Floodplains, Soils, Socio-economics
Joelle McCarthy	Archaeologist	Cultural Resources, Native American Religious Concerns
David Whitaker	Rangeland Management Specialist	TECP Plant Species, Vegetation-BLM Sensitive Species
Steve Bonar	Outdoor Recreation Specialist	ACECs, Wild & Scenic Rivers, Wilderness/WSAs, Recreation, Visual Resources, Wilderness Characteristics
R.B. Probert	Biological Science Technician	Invasive, Non-native Species
Brent Crosland	Range Technician	Wastes (hazardous or solid), Woodland/Forestry
Paul Caso	Rangeland Management Specialist	Water Quality (drinking/ground)
Bill Thompson	Rangeland Management Specialist	Wetlands/Riparian Zones, Rangeland Health Standards and Guidelines, Livestock Grazing
Clara Stevens	Realty Specialist	Lands/Access
Eric Reid	Rangeland Management Specialist	Wild Horses and Burros
Justin Johnson	Fuels Program Manager	Fuels/Fire Management
Non-BLM Preparers		
Name	Title	Responsible for the Following Section(s) of this Document
Richard Bell	NEPA Project Manager –	Analysis Coordination/Editing

BLM		
Name	Title	Responsible for the Following Section(s) of this Document
	Petros Environmental Group, Inc.	
Charles Bollong	Sr. Scientist – Cultural Resources SWCA Environmental Consultants	Cultural Resources, Native American Religious Concerns
Chris Gayer	Biological Resources Lead Grasslands Consulting	Vegetation, Wildlife and Fisheries, Special Status Species (T&E and BLM Sensitive)
Gina Sanchez	Technical Editor Petros Environmental Group, Inc.	Document Compilation/Coordination

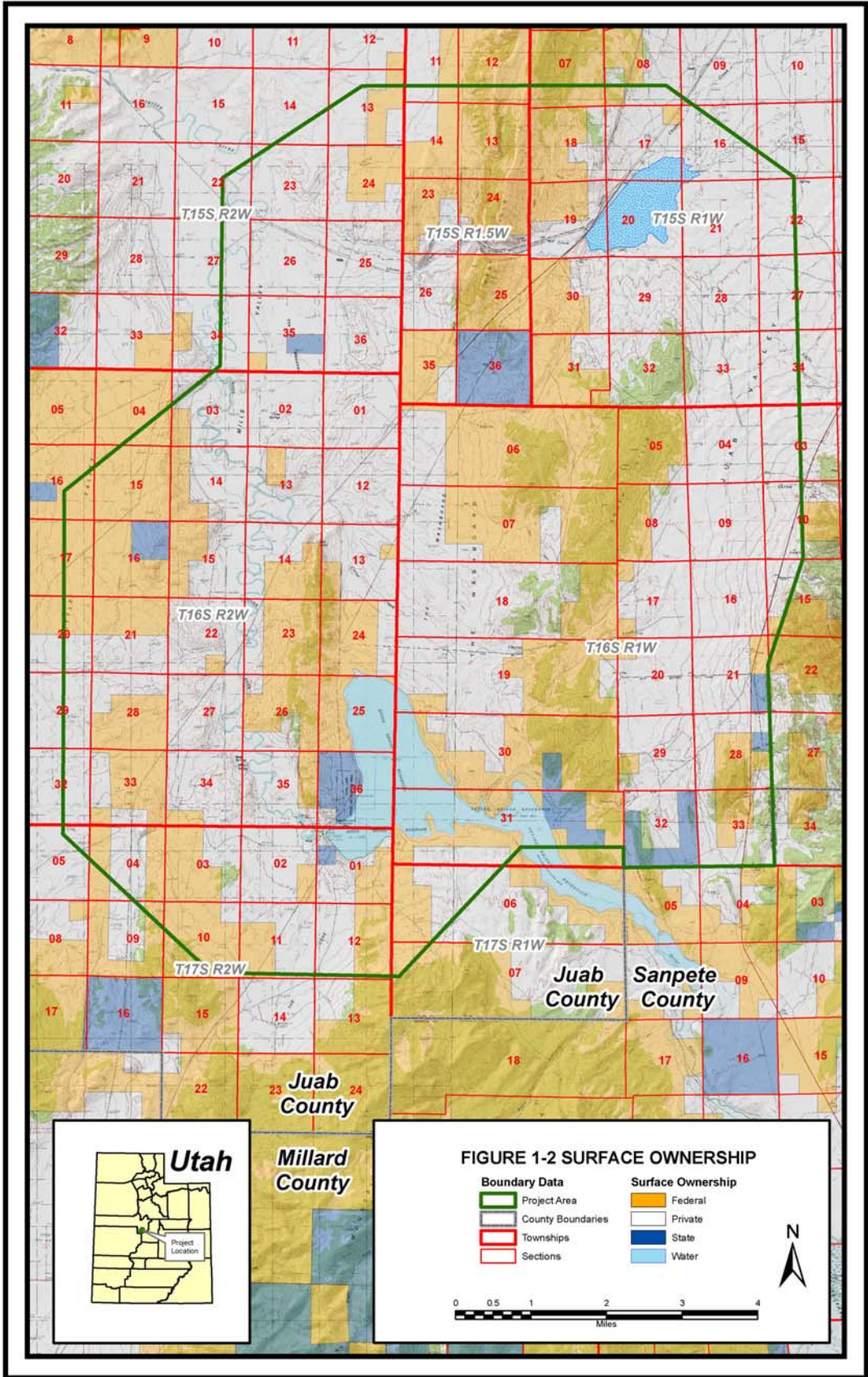
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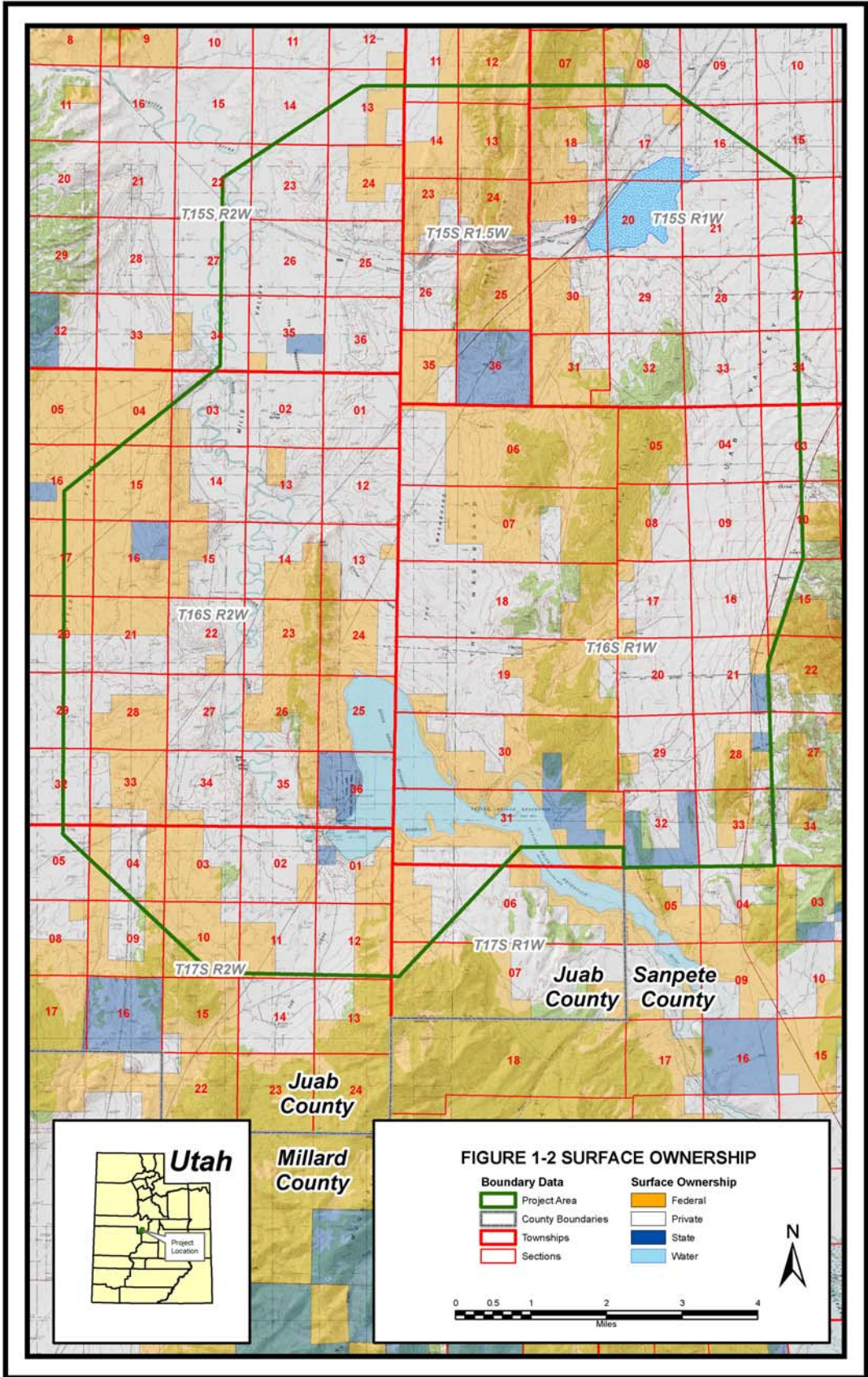
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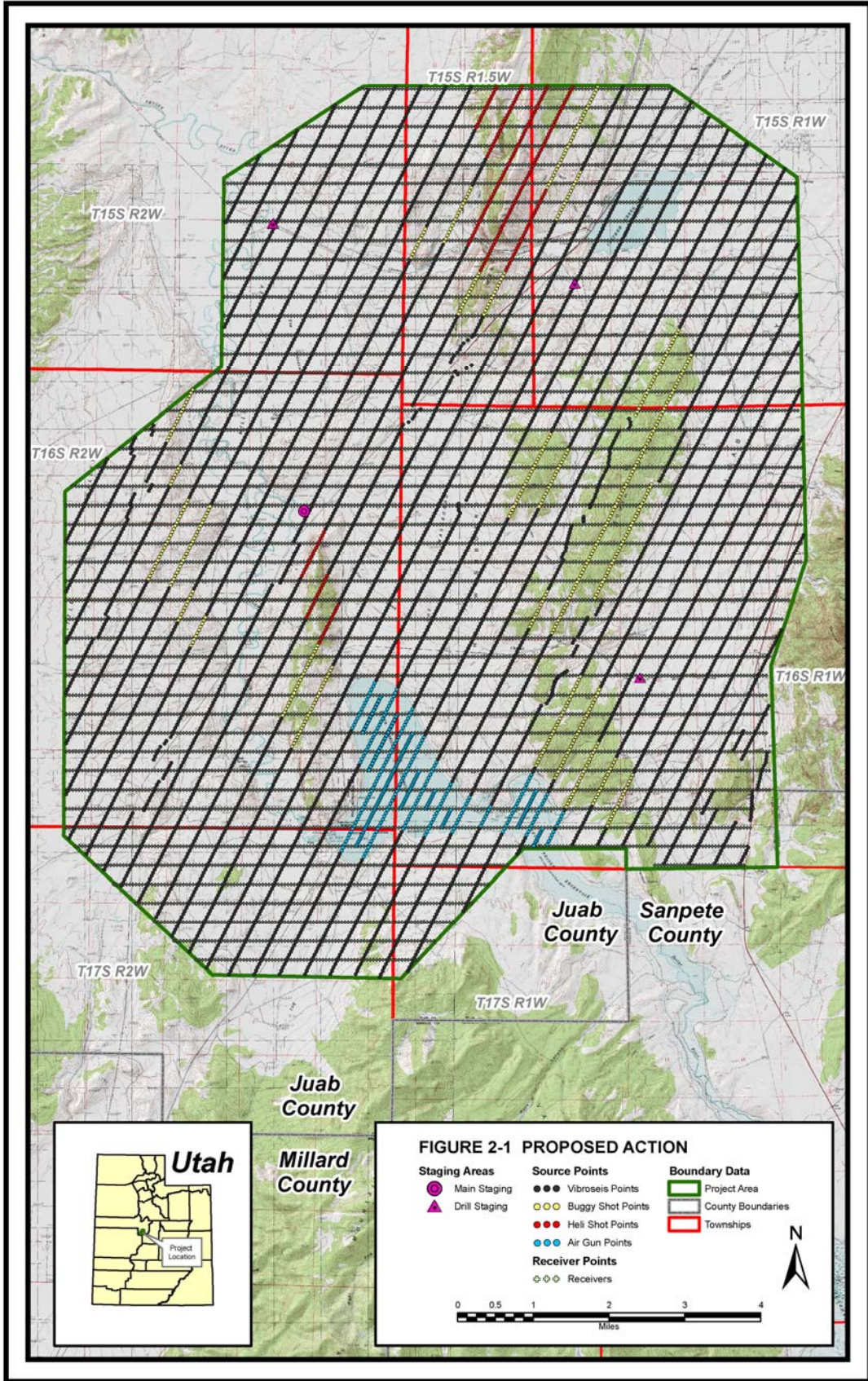
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Appendix A







Appendix B

APPENDIX B

Interdisciplinary Team Analysis Record Checklist

Project Title: Washboard 3D Geophysical Survey (2008)

NEPA Log Number: UT010-08-010

File/Serial Number: UTU 85885

Project Leader: Jerry Mansfield

Project Description:

Pioneer Natural Resources USA, Inc. (Pioneer) proposes to conduct a 3D geophysical exploration or seismic survey to test the subsurface geologic conditions for the potential presence of oil and natural gas resources. The objective of the proposed exploratory 3D survey and data collection and analysis is to help determine the structural orientation of strata in the subsurface and the possible trapping of hydrocarbons as targets for further investigation. The proposed 3D survey would further refine and provide increased resolution to existing 2D data in the area.

Project Location:

Township 15 South, and Ranges 2 West, 1 1/2 West, and 1 West;
 Township 16 South, and Ranges 2 West and 1 West: and
 Township 17 South, and Ranges 2 West and 1 West (Salt Lake Base & Meridian).

DETERMINATION OF STAFF:

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

- NP = not present in the area impacted by the proposed or alternative actions
- NI = present, but not affected to a degree that detailed analysis is required
- PI = present with potential for significant impact analyzed in detail in the EA; or identified in a DNA as requiring further analysis
- NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section C of the DNA form.

Determination	Resource	Rationale for Determination*	Signature	Date
CRITICAL ELEMENTS				
NI	Air Quality	Isolated fugitive dust is the only anticipated impact and due to the short duration and low intensity is not expected to cause an impact to air quality.	/s/ Matt Rajala	3/19/2008
NP	Areas of Critical Environmental Concern	There are no ACEC's within the project area.	/s/SBonar	1-30-08
PI	Cultural Resources	Appropriate Cultural Inventories will be completed as determined through consultation with the SHPO and other agencies. All identified sites will be documented and evaluated for the NRHP. NRHP eligible sites will be avoided during all phases of the project; therefore a finding of No Historic Properties Affected, eligible sites present but not affected as defined by 36 CFR 800.4 under the Utah Protocol VII.A.C.4.	/s/ Joelle McCarthy	2-27-08

Determination	Resource	Rationale for Determination*	Signature	Date
NI	Environmental Justice	There are no identified low income or minority populations within the affected area.	/s/ Matt Rajala	2/26/2008
NI	Farmlands (Prime or Unique)	The proposed action would not permanently removal any land from agricultural use.	/s/Matt Rajala	2/26/2008
NI	Floodplains	While it is recognized that 100yr floodplains would be intersected by the proposed project the nature of the proposed action presents no foreseeable impacts to floodplains.	/s/ Matt Rajala	2/26/2008
NI	Invasive, Non-native Species	See attached report.	/s/ RB Probert	02/20/2008
PI	Native American Religious Concerns	Letters were sent to the Confederated Tribes of the Goshute Reservation, Paiute Indian Tribe of Utah, Kanosh Band of the Paiute Tribe, Skull Valley Goshute Tribe and the Uinta Ouray Tribe on Dec. 14, 2007. Responses were due on January 22, 2008. One response was received from the Confederated Tribes of the Goshute Reservation. They requested to be notified of the sites found during the inventory.	/s/ Joelle McCarthy	2-27-08
PI	Threatened, Endangered or Candidate Plant Species	There are no known federally listed plants on BLM lands within the area of the proposed seismic project. However, The Fish and Wildlife Service (FWS) website identifies <i>Spiranthes diluvialis</i> (Ute lady's tresses) as occurring in mesic sites in Juab County. As such, prior to doing any proposed seismic lines or seismic work in potential Ute lady's tresses habitat along streams, bogs, or open seepage areas, plant surveys for Ute lady's tresses would need to be completed.	/s/DWhitaker	4/9/08
NP	Threatened, Endangered or Candidate Animal Species	There are no known federally listed animals on BLM lands within the Project Area.	/s/ CKeefe	4/16/08
NP	Wastes (hazardous or solid)	All hazardous materials used or produced must be reported to the FFO. They must be removed and disposed in an appropriately permitted disposal facility. Solid waste must be removed and properly disposed.	/s/ BCrosland	1/9/08
NI	Water Quality (drinking/ground)	No impacts to water quality would be expected from geophysical operations as described in the project proposal. The applicant proposes to avoid water wells and culinary springs by accepted setback distances (300 feet), thus effectively minimizing impacts to drinking water thus ensuring that established standards would not be exceeded.	/s/ PCaso	2/26/08
NI	Wetlands/Riparian Zones	A majority of the Wetland/riparian zone crossings by the proposed seismic lines are located on private or state land. The applicant will be required to conduct seismic activity in a manner that will result in no ground disturbance within wetlands or riparian areas. This means that surface disturbing activities will not be allowed within 100 meters of riparian areas and wetlands on public lands unless it can be shown that there are no practical alternatives and all long term impacts can be fully mitigated. To comply with this requirement the applicant commits to avoiding wetlands and riparian areas by a distance of 30 feet for buggy-vibes and by a distance of 300 feet for buggy-drills and heliportable drills, thus effectively mitigating potential impacts.	/s/ Bill Thompson	1/30/08

Determination	Resource	Rationale for Determination*	Signature	Date
NP	Wild and Scenic Rivers	There are no listed wild & scenic rivers within the FFO.	/s/SBonar	1-30-08
NP	Wilderness/WSA's	There are no wilderness/WSA's within the project area.	/s/SBonsr	1-30-08
OTHER RESOURCES / CONCERNS**				
NI	Rangeland Health Standards and Guidelines	BLM Standards and Guidelines would not be affected by the small-scale surface disturbance and short-term nature of the Proposed Action.	/s/ Bill Thompson	1/30/08
NI	Livestock Grazing	Effects on livestock grazing activities and forage availability would be negligible. The applicant commits to installing temporary gates and upon completion of survey activities, to permanently rewire and stretch the fence line to its original tension. The applicant will also keep buggy-vibes, buggy-drills and heliportable drills at a distance from wells, pipelines, corrals, fences and other structural range improvements that will prevent any damage to them. The applicant commits to coordinating helicopter activity with the BLM and grazing permittees to minimize impacts to livestock, and to replace or repair any damaged range management facilities.	/s/ Bill Thompson	1/30/08
NP	Woodland / Forestry	No Impacts	/s/BCrosland	1/9/08
NI	Vegetation including Special Status Plant Species other than FWS candidate or listed species	A map and description of the project were sent to the Utah Department of Wildlife Resources (DWR) on March 25, 2008, requesting a list of plant species within or near the proposed seismic project area. On March 27, 2008, the DWR replied. The DWR had a record of one plant specie, <i>Townsendia jonesii</i> var. <i>lutea</i> (Sevier townsendia), in the vicinity of the project area. Sevier townsendia occurs in salt desert shrub and juniper communities at 5,500 to 6,000 feet elevation on Arapien shale and clays in volcanic rubble. Plant surveys in all potential habitat for this specie, as described above, will need to be completed by a qualified Botanist and the survey reports will need to be approved by the BLM. If plants are found, mitigation measures and avoidance of this specie may need to be employed.	/s/DWhitaker	2/26/08
PI	Fish and Wildlife Including Special Status Species other than FWS candidate or listed species e.g. Migratory birds.	Seismic survey operations could impact <ul style="list-style-type: none"> • BLM-sensitive species least chub, leatherside chub, and spotted frog • Bonnieville cutthroat trout in and above Chicken Creek Reservoir • Burrowing owls and other raptors • Other migratory birds • Fishery in Yuba Lake 	/s/ CKeefe	4/16/08
NI	Soils	Overland travel of vehicles may impact soils during periods of high soil moisture. To prevent damage to soils overland travel would be postponed during periods of inclement weather or when rutting deeper than four inches is occurring from overland travel. Any rutting or soil displacement resulting from the proposed action would be repaired at the authorized officer's discretion.	/s/ Matt Rajala	3/19/2008

Determination	Resource	Rationale for Determination*	Signature	Date
NI	Recreation	The Yuba lake Recreation Area is in the middle of the seismic project. Heavy visitation use to Yuba is generally from late April thru mid September. The Painted Rocks Campground, located on the south east portion of the lake. There is a new well and culinary waster system adjacent to this campground. Also, Temple road that is between the North Beach area and Painted Rocks Campground has heavy traffic use with vehicles pulling boats during this time of the season. If testing is conducted during this timeframe, sufficient warning sign, etc need to be in place.	/s/SBonar	1-30-08
NI	Visual Resources	There would be no impacts to the VRM Classification from this project.	/s/SBonar	1-30-08
NI	Geology / Mineral Resources/Energy Production	<p>Impacts or conflicts with authorized mineral operations are not anticipated. If mining claim monuments are found on the ground, those should not be disturbed. The seismic operations should not conflict with any other mineral operations.</p> <p>Geophysical operations are an integral phase of oil and gas exploration and development and are beneficial for exploring for oil and gas. Such operations are an initial stage of exploration and can be completed coincidentally with drilling. Geophysical operations provide subsurface information that is useful for interpreting the stratigraphy and structure, which is useful for selecting drilling targets. Seismic operations are beneficial as those provide subsurface geologic information with minimal surface disturbance.</p> <p>Exploration for oil and gas provides knowledge of regional geology, when companies release such proprietary data. Exploration can lead to development and production, when oil and/or gas are discovered in paying quantities. This has a socioeconomic benefit.</p>	/s/ J Mansfield	01/09/2008
NI	Paleontology	<p>No known Scientifically Significant fossils in the project area.</p> <p>The proposed lines cross Quaternary alluvium and Tertiary sedimentary formations that may contain vertebrate fossils. Surface disturbance related to seismic operations are anticipated to be relatively minor in extent; thus, impacts to fossils are considered unlikely.</p> <p>If vertebrate fossils are discovered, those should be avoided and the SMA should be notified. If any substantial invertebrate or plant fossils are found, then the SMA should be notified.</p>	/s/ J Mansfield	01/09/2008
NI	Lands / Access	As described, the proposed action would not affect access to public land. No roads providing access to public land would be closed. Any subsequent proposed oil and gas development project would be subject to valid prior existing rights and any associated activities would be coordinated with right-of-way (ROW) holders and adjacent non-federal landowners. Off-lease ancillary facilities that cross public land, if	/s/ CStevens	1/15/07

Determination	Resource	Rationale for Determination*	Signature	Date
		any, may require a separate authorization. Existing ROWs in proposed operation areas would not be affected because site-specific mitigation applied would ensure that they would be avoided, restored or replaced. The described area is located within identified ROW corridors (I-15 and Mona South Transmission Line). See Realty/Access Report for mitigation measures. Also attached are Master Title Plats for ROW locations and Geographic Cross Reference Report showing ROW serial numbers, holder's names and addresses, ROW type and width, and ROW location.		
NI	Fuels / Fire Management	There will be no impacts to Fuels.	/s/ J Johnson	2-20-2008
NI	Socio-economics	While it is recognized that the results of the proposed action may lead to socioeconomic impacts within the local area it would be a purely speculative assumption. The direct impacts of the proposed action present little foreseeable impacts to socioeconomics.	/s/ Matt Rajala	2/26/2008
NP	Wild Horses and Burros	There are no wild horse Herd Management Areas within project area.	/s/ Eric Reid	02/08/2008
NP	Wilderness characteristics	There are no Wilderness characteristics in the project area.	/s/SBonar	1-30-08

FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
NEPA / Environmental Coordinator			
Authorized Officer			

Follow the italicized instructions below and then delete the asterisks "" in the checklist, this sentence, and the instructions.*

**Rationale for Determination is required for all "NIs" and "NPs." Write issue statements for "PIs"*

***Varies by specific location and BLM Field Office*

Appendix C



Picture C-1: Vibroseis buggy (buggy-vibe) with plunger/plate lowered into "shake" position.



Picture C-2: A line of four buggy-vibes moving between source points.



Picture C-3: Buggy-drill with drill mast raised into drilling position.



Picture C-4: Heliportable drill.



Picture C-5: Heliportable drilling equipment being moved by helicopter.



Picture C-6: Drill cuttings surrounding drilled shot hole.



Picture C-7: An individual air gun.



Picture C-8: Air-gun boat with air guns suspended above the water surface.



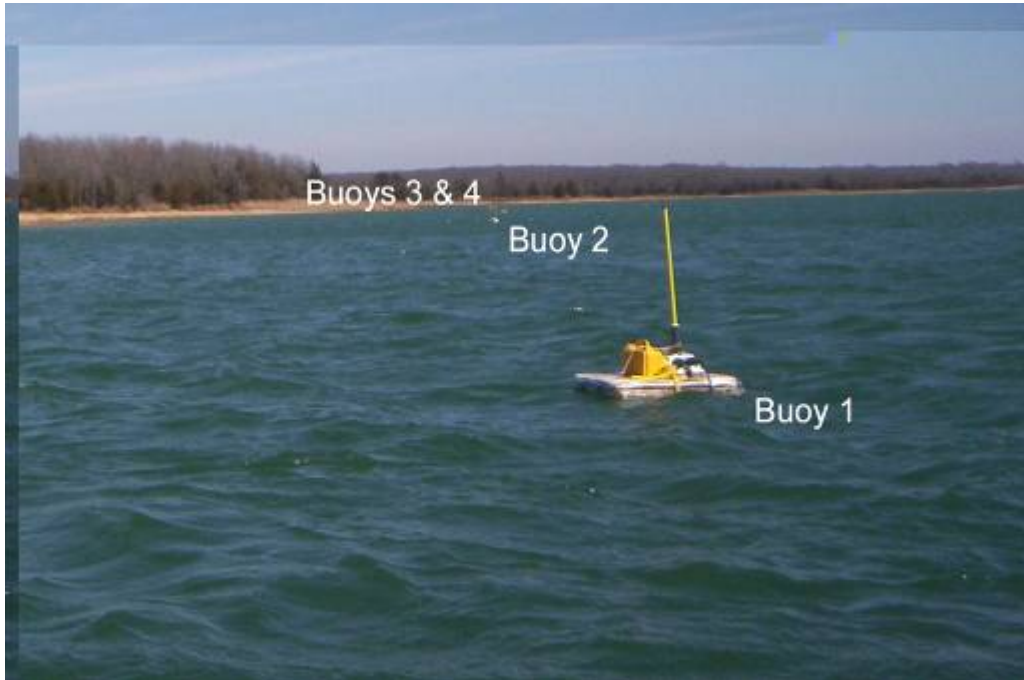
Picture C-9: Effects on water surface from firing the air-gun array.



Picture C-10: Air-gun boat crossing a connected submerged and on-land receiver line during operations.



Picture C-11: Buoy mounted with recording equipment, batteries, and antenna plus cable connection.



Picture C-12: A series of buoys above a line of submerged cable and attached hydrophones.



Picture C-13: Main Staging Area located just west of I-15 interchange 202 in Juab County.

Appendix D

Appendix D

Migratory Birds List for Washboard 3D Geophysical Survey Project Area – Partners in Flight and USFWS Migratory Birds of Conservation Concern

Common Name <i>Scientific name</i>	PIF*	BCC**	Habitat	Potential for Occurrence in the Project Area	Basis for Occurrence Potential
Abert's Towhee (<i>Pipilo aberti</i>)	X		Lowland Riparian	Yes	Suitable habitat occurs within the Project Area
American Avocet (<i>Recurvirostra americana</i>)	X	X	Wetland / Playa	Yes	Suitable habitat occurs within the Project Area
American Golden-Plover (<i>Pluvialis dominica</i>)		X	Wetland / Grassland	Yes	Suitable habitat occurs within the Project Area
American White Pelican (<i>Pelecanus erythrorhynchos</i>)	X		Water / Wetland	Yes	Suitable habitat occurs within the Project Area
Bell's Vireo (<i>Vireo bellii</i>)	X		Lowland Riparian / Cliff	Yes	Suitable habitat occurs within the Project Area
Black Rosy-Finch (<i>Leucosticte atrata</i>)	X		Alpine	No	No suitable habitat exists within the Project Area
Black-Necked Stilt (<i>Himantopus mexicanus</i>)	X		Wetland / Playa	Yes	Suitable habitat occurs within the Project Area
Black Swift (<i>Cypseloides niger</i>)	X	X	Lowland Riparian / Cliff	Yes	Suitable habitat occurs within the Project Area
Black-Throated Gray Warbler (<i>Dendroica nigrescens</i>)	X		Pinyon-Juniper / Mountain Shrub	Yes	Suitable habitat occurs within the Project Area
Bobolink (<i>Dolichonyx oryzivorus</i>)	X		Wet Meadow / Agricultural	Yes	Suitable habitat occurs within the Project Area
Brewer's Sparrow (<i>Spizella breweri</i>)	X	X	Shrubsteppe / High Desert Scrub	Yes	Suitable habitat occurs within the Project Area
Broad-tailed Hummingbird (<i>Amazilia cyanura</i>)	X		Lowland Riparian / Mountain Riparian	Yes	Suitable habitat occurs within the Project Area
Burrowing Owl (<i>Athene cunicularia</i>)		X	High Desert Scrub / Grassland	Yes	Suitable habitat occurs within the Project Area
Ferruginous Hawk (<i>Buteo regalis</i>)	X	X	Pinyon-Juniper / Shrubsteppe	Yes	Suitable habitat occurs within the Project Area

Common Name Scientific name	PIF*	BCC**	Habitat	Potential for Occurrence in the Project Area	Basis for Occurrence Potential
Flammulated Owl (<i>Otus flammeolus</i>)		X	Ponderosa Pine / Sub-Alpine Conifer	No	No suitable habitat exists within the Project Area
Gambel's Quail (<i>Callipepla gambelii</i>)	X		Low Desert Scrub / Lowland Riparian	Yes	Suitable habitat occurs within the Project Area
Golden Eagle (<i>Aquila chrysaetos</i>)		X	Cliff / High Desert Scrub	Yes	Suitable habitat occurs within the Project Area
Gray Vireo (<i>Vireo vicinior</i>)	X	X	Pinyon-Juniper / Northern Oak	Yes	Suitable habitat occurs within the Project Area
Greater Sage Grouse (<i>Centrocercus urophasianus</i>)	X	X	Shrubsteppe	Yes	Suitable habitat occurs within the Project Area
Lewis's Woodpecker (<i>Melanerpes lewis</i>)	X	X	Ponderosa Pine / Lowland Riparian	No	No suitable habitat exists within the Project Area
Loggerhead Shrike (<i>Lanius ludovicianus</i>)		X	High Desert Scrub / Pinyon-Juniper	Yes	Suitable habitat occurs within the Project Area
Long-Billed Curlew (<i>Numenius americanus</i>)	X	X	Grassland / Agricultural	Yes	Suitable habitat occurs within the Project Area
Lucy's Warbler (<i>Vermivora luciae</i>)	X		Lowland Riparian / Low Desert Scrub	Yes	Suitable habitat occurs within the Project Area
Marbled Godwit (<i>Limosa fedoa</i>)		X	Grasslands / Wetlands	Yes	Suitable habitat occurs within the Project Area
Mountain Plover (<i>Charadrius montanus</i>)	X		High Desert Scrub	Yes	Suitable habitat occurs within the Project Area
Prairie Falcon (<i>Falco mexicanus</i>)		X	Cliff / High Desert Scrub	Yes	Suitable habitat occurs within the Project Area
Peregrine Falcon (<i>Falco peregrinus</i>)		X	Cliff / Lowland Riparian	Yes	Suitable habitat occurs within the Project Area
Sage Sparrow (<i>Amphispiza belli</i>)	X	X	Shrubsteppe / High Desert Scrub	Yes	Suitable habitat occurs within the Project Area
Sanderling (<i>Calidris alba</i>)		X	Water / Wetlands	Yes	Suitable habitat occurs within the Project Area

Common Name <i>Scientific name</i>	PIF*	BCC**	Habitat	Potential for Occurrence in the Project Area	Basis for Occurrence Potential
Sharp-Tailed Grouse (<i>Tympanuchus phasianellus</i>)	X		Shrubsteppe / Grassland	Yes	Suitable habitat occurs within the Project Area
Snowy Plover (<i>Charadrius alexandrinus</i>)		X	Playa	Yes	Suitable habitat occurs within the Project Area
Solitary Sandpiper (<i>Tringa solitaria</i>)		X	Water / Wetlands	Yes	Suitable habitat occurs within the Project Area
Swainson's Hawk (<i>Buteo swainsonii</i>)		X	Agriculture / Aspen	Yes	Suitable habitat occurs within the Project Area
Three-Toed Woodpecker (<i>Picoides tridactylus</i>)	X		Sub-Alpine Conifer / Lodgepole Pine	No	No suitable habitat exists within the Project Area
Tricolored Blackbird (<i>Agelaius tricolor</i>)		X	Grasslands / Wetlands	Yes	Suitable habitat occurs within the Project Area
Virginia's Warbler (<i>Vermivora virginiae</i>)	X	X	Northern Oak / Pinyon Juniper	Yes	Suitable habitat occurs within the Project Area
Whimbrel (<i>Numenius phaeopus</i>)		X	Marshes / Grasslands	Yes	Suitable habitat occurs within the Project Area
White-Headed Woodpecker (<i>Picoides albolarvatus</i>)		X	Ponderosa Pine Woodlands	No	No suitable habitat exists within the Project Area
Williamson's Sapsucker (<i>Sphyrapicus thyroideus</i>)		X	Sub-Alpine Conifer / Conifer	No	No suitable habitat exists within the Project Area
Wilson's Phalarope (<i>Phalaropus tricolor</i>)		X	Wetland / Water	Yes	Suitable habitat occurs within the Project Area
Yellow-Billed Cuckoo (<i>Coccyzus americanus</i>)	X	X	Lowland Riparian / Agriculture	Yes	Suitable habitat occurs within the Project Area
Yellow Rail (<i>Coturnicops noveboracensis</i>)		X	Wetlands / Lowland Riparian	Yes	Suitable habitat occurs within the Project Area

*Partners in Flight Priority Species.

**USFWS Birds of Conservation Concern.

Appendix E

Appendix E

Special Status Species – Potential Occurrence in the Washboard 3D Geophysical Survey Project Area

Common Name	Scientific Name	Status	Habitat Association	Potential for Occurrence Within the Proposed Project Area and Cumulative Effects Area	Eliminated From Detailed Analysis (Yes/No)
MAMMALS					
Fringed Myotis	<i>Myotis thysanodes</i>	S	Are found in a wide range of habitats, including coniferous forests, woodlands, grasslands, and shrublands, although it is most common in xeric woodlands, such as juniper, ponderosa pine, and Douglas-fir (Oliver, 2000). They forage over water, along forest edges, or within forests and woodlands (Fitzgerald et. al., 1994).	Moderate: Potentially suitable habitats for the species are present within the Project Area.	NO
Kit Fox	<i>Vulpes macrotis</i>	S	Kit fox are found exclusively in arid and semi-arid landscapes composed of saltbrush, shadscale, sagebrush, and greasewood communities (Fitzgerald et. al., 1994). They predominately feed on rabbits and hares (Jensen et. al. 2006). Numerous dens may be utilized for shelter and protection from predators (Jensen et. al., 2006).	Moderate: Potentially suitable habitats for the species are present but limited in the Project Area.	NO
Townsend's big-eared bat	<i>Plecotus townsendii</i>	S	The townsend's big-eared bat occupies semidesert shrublands, pinyon-juniper woodlands, and open montane forests (Fitzgerald et. al. 1994). They are frequently associated with caves and abandoned mines for day roosts, but they will also use abandoned buildings and rock crevices for refuge (Fitzgerald et. al. 1994).	Moderate: Potentially suitable habitats for the species are present within the Project Area.	NO
Dark Kangaroo Mouse	<i>Microdipodops megacephalus</i>	S	Occupies regions of the Upper Sonoran desert and is associated with sage, shadscale, and fine, gravelly soil and sand dunes (UDWR, 2006).	Low: suitable habitats for the species are not present within the Project Area.	YES
Pygmy Rabbit	<i>Brachylagus idahoensis</i>	S	Inhabits tall, dense sagebrush in deep soils. Pygmy rabbits excavate their own burrows underneath tall, dense clusters of sagebrush (UDWR, 2006).	Low: Potentially suitable habitat is limited in the Project Area. There are only small patches of tall sagebrush are present within the Project Area.	NO
BIRDS					
American White Pelican	<i>Pelecanus erythrorhynchos</i>	S	Utah represents a critical breeding region for this species (UDWR, 2006). These social birds nest colonially in suitable areas (UDWR, 2006). Nest sites usually occur on small islands with low gradient slopes (UDWR, 2006). Utah's only colony of breeding pelicans occurs at Gunnison Island on the north arm of the Great Salt Lake (UDWR, 2006).	High: Potentially suitable habitats for the species are present within the Project Area at Sevier Bridge Reservoir and along the Sevier River basin.	NO

Common Name	Scientific Name	Status	Habitat Association	Potential for Occurrence Within the Proposed Project Area and Cumulative Effects Area	Eliminated From Detailed Analysis (Yes/No)
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S	Breeding habitat of this species requires an adequate supply of fish and nearby nesting sites (Johnsgard, 1990). Preferentially roosts in conifers or other sheltered sites in winter in some areas; typically selects the larger, more accessible trees (Johnsgard, 1990).	Moderate: Potentially suitable habitats for the species are present within the Project Area at Sevier Bridge Reservoir and along the Sevier River basin.	NO
Bobolink	<i>Dolichonyx oryzivorus</i>	S	Inhabits mesic and irrigated meadows, riparian woodlands, and subalpine marshes at lower elevations (2,800 to 5,500 feet). Suitable breeding habitat for this ground nester includes tall grass, flooded meadows, prairies, and agricultural fields; forbs and perch sites also are required.	High: Potentially suitable habitats for the species are present within the Project Area. The Project Area includes habitat composed of agricultural fields, flooded meadows and marshes.	NO
Burrowing Owl	<i>Athene cunicularia</i>	S	Habitat includes open grassland and prairies. Species nest in underground mammal burrows that are unoccupied, and are often associated with prairie dog colonies (UDWR, 2006).	Moderate: This species is known to occur in the vicinity of the project. Ground squirrel colonies are present throughout the project and the species has the potential to occur.	NO
Ferruginous Hawk	<i>Buteo regalis</i>	S	Habitat includes Grasslands, agricultural lands, sagebrush/ saltbush/ greasewood shrub lands, and the periphery of pinyon-juniper forests (Parrish et. al., 2002). Nesting habitat includes trees, cliffs, and buttes (Parrish et. al., 2002).	Present: This species is known to nest within the Project Area.	NO
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	S	Grasshopper sparrows prefer grasslands habitats of intermediate height (~30 cm) with clumped vegetation interspersed with patchy bare ground, and sparse shrub cover (Slater, 2004). Nests are built on the ground at the base of grass clumps (UDWR, 2004).	High: Potentially suitable habitats for the species are present within the Project Area.	NO
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	S	Inhabits upland sagebrush plains, foothills, and mountain valleys (UDWR, 2006). Breeding occurs on open leks (or strutting grounds) and nesting and brooding occurs on the ground generally within a 1-mile radius of the lek. Leks are used by grouse for consecutive breeding seasons. During winter, sagebrush habitats at submontane elevations commonly are used.	Moderate: Suitable sagebrush habitats are present. No leks are known to occur within the project, however, the species has the potential to occur.	NO
Lewis's Woodpecker	<i>Melanerpes lewis</i>	S	Breeding habitat includes ponderosa pine and open riparian areas (Parrish et. al., 2002). Winter habitat includes open woodlands and lowland riparian areas. The species is a cavity nester and requires large open pine forests for foraging. Diet consists of primarily insect prey during breeding season and nuts and berries at other times of the year (Parrish et. al.,	Low: Suitable habitats for the species are not present within the Project Area.	YES

Common Name	Scientific Name	Status	Habitat Association	Potential for Occurrence Within the Proposed Project Area and Cumulative Effects Area	Eliminated From Detailed Analysis (Yes/No)
			2002).		
Long-billed Curlew	<i>Numenius americanus</i>	S	Habitat includes dry, uncultivated rangelands and pastures near water. Curlews forage in moist meadow wetlands and upland habitats (Parrish et. al., 2002).	Present: This species has been documented in the Project Area.	NO
Northern Goshawk	<i>Accipiter gentilis</i>	S	Inhabits mature mountain forest, mountain valley cottonwood, and mountain riparian zone habitats. Areas of potentially suitable nesting habitat consist of coniferous forest and mixed-aspen forest types (Johnsgard, 2002).	Low: Suitable habitats for this species are not present within the Project Area.	YES
Short-eared Owl	<i>Asio flammeus</i>	S	The short-eared owl is an open country, ground-nesting species that occupies open habitats such as old fields, pastures marshes, hay meadows, grassy plains, and tundra (Johnsgard, 2002).	Moderate: Potentially suitable habitats for the species are present within the Project Area.	NO
Three-toed Woodpecker	<i>Picoides tridactylus</i>	S	Occupies spruce, sub-alpine fir and aspen forests generally above 8,000 feet (Parrish et. al., 2002). Their food source consists of bark and wood-boring insects and their habitat must include dead trees both for foraging and nesting (Parrish et. al., 2002). In Utah, nesting occurs in aspen stands intermixed or adjacent to coniferous forests (Parrish et. al., 2002). Nests are built in excavated cavities (Parrish et. al., 2002).	Low: Suitable habitat for the species is not present within the Project Area.	YES
Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	C	Inhabits large tracts of cottonwood/willow habitats with dense sub-canopies (Parrish et. al., 2002). Nesting occurs in dense lowland riparian vegetation of regenerating canopy trees, willows, or other riparian shrubs located within 100 m of water (UDWR, 2006). They nest from late May through July (UDWR, 2006).	Low: Potentially suitable habitats for the species are not present within the Project Area.	YES
AMPHIBIANS					
Columbia Spotted Frog	<i>Rana luteiventris</i>	S	The Columbia spotted frog inhabits isolated springs and seeps with a permanent water source (UDWR, 2004). They are known to occur at Mona Springs in Juab County (Horns, 2005).	Low: This species is not known to occur within the Project Area. Potentially suitable habitats for the species are not present within the Project Area.	YES
Western Toad	<i>Bufo boreas</i>	S	This species inhabits slow moving streams, wetlands, desert springs, ponds, lakes, meadows and woodlands (UDWR, 2004).	Moderate: Potentially suitable habitats for the species are present within the Project Area.	NO

Common Name	Scientific Name	Status	Habitat Association	Potential for Occurrence Within the Proposed Project Area and Cumulative Effects Area	Eliminated From Detailed Analysis (Yes/No)
FISH					
Bonneville Cutthroat Trout	<i>Oncorhynchus clarki utah</i>	S	This species inhabits the Bonneville Basin in high elevation mountain streams, lakes and grassland streams with a well vegetated riparian zone providing cover, shade, and bank stability (UDWR, 2004). Spawning occurs during the spring in small streams over gravel substrate (UDWR, 2004).	Low: preferred habitats for this species are not present within the Project Area. The species has been documented in Chicken Creek and historically was distributed throughout the Sevier River Basin. The species is currently not known to utilize Project Area habitats.	YES
Least Chub	<i>lotichthys phlegethontis</i>	S	Least chub are found in the Bonneville Basin in slow-flowing streams and springs with dense aquatic vegetation (Wilson and Mills, 2004). The least chub has been found in Mills Valley in Juab County (Horns, 2005).	High: Potentially suitable habitats for the species are present within the Project. This species is found in tributaries of the Sevier River in Mills Valley. The Sevier River falls within the Project Area.	NO
Leatherside Chub	<i>Gila Copeova</i>	S	The leatherside chub can be found naturally in the Snake, Bear and Sevier River drainages and Utah Lake (UDWR, 2006). They inhabit low-velocity rivers with coarse substrate and a minimal presence of silt and gravel (UDWR, 2006).	High: Potentially suitable habitats for the species are present within the Project. This species is known to occupy tributaries of the Sevier River. The Sevier River falls within the Project Area.	NO
INVERTEBRATES					
California Floater	<i>Anodonata californiensis</i>	S	The California floater occupies lakes, ponds, and low-gradient streams at middle elevations in Utah (UDWR, 2006). They have been found in muddy, sandy and gravelly bottoms of creeks and ponds along with abundant <i>Myriophyllum</i> and <i>Spirogyra</i> (UDWR, 2004). They are a parasitic species that rely on the presence of host fish within their habitat (UDWR, 2006). This species is known to occur in Juab County, at Mona Springs (Horns, 2005).	Low: Potentially suitable habitats for the species are present within the Project Area; however, the species has not been documented within Yuba Lake or within the Sevier River in the Project Area.	YES
Eureka Mountainsnail	<i>Oreohelix eurekensis</i>	S	Endemic to Utah, they are found in Juab county in habitat consisting of shrublands and forests associated with limestone outcrops or soils with high calcium concentration (UDWR, 2004). They also require low-growing vegetation and a layer of plant litter on the ground for protection (UDWR, 2006).	Low: No known populations are present within the Project Area.	YES

Common Name	Scientific Name	Status	Habitat Association	Potential for Occurrence Within the Proposed Project Area and Cumulative Effects Area	Eliminated From Detailed Analysis (Yes/No)
Utah Physa	<i>Physella utahensis</i>	S	The Utah physa is found in small pools with springs. They occupy a variety of substrates including, sandy, muddy, gravelly and rocky bottoms with aquatic vegetative species present (UDWR, 2006)(UDWR, 2004).	Low: No known populations are present within the Project Area.	YES
PLANTS					
Giant four-wing salt bush	<i>(Atriplex canescens var. gigantean)</i>	S	This species occurs on sand dunes of inter-dunal valleys, on the wind-sheltered side of the dune. Only one known population occurs at the Jerico Dunes in Juab County, Utah (UNPS, 2007).	Low: Only known population occurs outside of Project Area.	YES
Ute Ladies' -Tresses	<i>Spiranthes diluvialis</i>	T	The Ute ladies'- tresses orchid is found in wet meadows, stream banks, abandoned oxbows, marshes, and sub-irrigated floodplain habitats at 4,500 to 6,800 feet (UNPS, 2007).	Low: Potentially suitable habitats for the species are present within the Project Area. The species has not been documented within Juab County and is not known to occur within the Project Area.	NO
Deep creek stickseed	<i>Hackelia ibapensis</i>	S	This species occupies granite outcrops within Douglas-fir and mountain shrub vegetative communities at about 8,200 feet elevation (URPG, 2007).	Low: Potentially suitable habitat is not present within the Project Area.	YES
Sweet penstemon	<i>Penstemon angustifolius var. dulcis</i>	S	Endemic to the Great Basin, the sweet penstemon occurs on wind-sheltered sand dunes, sagebrush and juniper vegetative communities ranging between 4,600 and 5,400 feet elevation (URPG, 2007).	Low: Suitable habitats for this species are not present within the Project Area.	YES
Cottam cinquefoil	<i>Potentilla cottamii</i>	S	The cottam cinquefoil is found in shaded areas among cracks and crevices of quartzite outcrops ranging between 7,500 and 10,400 feet elevation (URPG, 2007).	Low: Potentially suitable habitat is not present within the Project Area.	YES
Sigurd townsendia	<i>Townsendia jonesii var. lutea</i>	S	This species is found in juniper-sagebrush, salt desert shrub, and mixed desert shrub communities with a ground substrate consisting of Arapien shale and volcanic clays (URPG, 2007).	Low: Suitable habitats for this species are not present within the Project Area.	YES