



United States Department of the Interior  
Bureau of Land Management

---

August 2004



---

Environmental Assessment UT-080-2004-0380

**Environmental Assessment  
For  
Main Canyon 3D Seismic Survey Project**

T14S, R22 and 23E and T15S, R22 and 23E, Uintah County, Utah

Evergreen Resources, Inc.  
1401 17<sup>th</sup> Street, Suite 1200  
Denver, CO 80202

---

U.S. Department of the Interior  
Bureau of Land Management  
Vernal Field Office  
170 South 500 East  
Vernal, Utah 84078  
Phone: 435.781.4400  
FAX: 435.781.4410



## United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Vernal Field Office

170 South 500 East

Vernal, UT 84078

(435) 781-4400 Fax: (435) 781-4410



IN REPLY REFER TO:

1792

UT-080

August 18, 2004

**RE: Environmental Assessment for the Proposed  
3D Seismic Exploration in Main Canyon,  
Uintah County, by Evergreen Resources**

Dear Reader:

We appreciate your interest and concerns in the natural resources in the Uinta Basin and proposed projects that may affect those resources. Enclosed is the draft environmental assessment (EA) for Evergreen Resources' proposed seismic exploration in portions of the Main Canyon in Uintah County, Utah. There will be a 30-day public comment period that ends at close of business on September 21, 2004. Please refer to EA # UT-080-2004-0380 in your correspondence.

Comments, including names and street addresses of respondents, will be available for public review at the BLM Vernal Field Office and will be subject to disclosure under the *Freedom of Information Act* (FOIA). They will be considered by BLM during the decision-making phase of this project. They may be published as part of the EA and other related documents. Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review and disclosure under the FOIA, you must state this prominently at the beginning of your written comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses will be made available for public inspection in their entirety.

This EA was prepared in accordance with the *National Environmental Policy Act*. The EA provides an assessment of the potential impacts of conducting 3D seismic exploration in the Main Canyon area in Uintah County, Utah.

This EA and other EAs prepared by the BLM Vernal Field Office can also be reviewed on the Vernal Field Office's website at <http://www.blm.gov/utah/vernal>. Please address your written comments to:

Veronica Herkshan  
Bureau of Land Management  
170 South 500 East  
Vernal, Utah 84078

Sincerely,

A handwritten signature in cursive script that reads "William Stringer".

William Stringer  
Vernal Field Manager

Enclosure: EA UT-080-0380

# TABLE OF CONTENTS

Chapter 1 Purpose and Need.....	1-1
1.2 Background.....	1-1
1.3 Purpose and Need .....	1-7
1.3.1 Need for the Proposed Action.....	1-7
1.3.2 Purpose of the Proposed Action.....	1-8
1.4 Conformance with BLM’s Land Use Plan.....	1-8
1.5 Relationship to Statutes, Regulations, or Other Plans .....	1-9
1.6 Identification of Issues.....	1-10
1.6.1 Relevant Issues.....	1-11
1.7 Summary.....	1-11
Chapter 2 Description of Alternatives, Including Proposed Action .....	2-1
2.1 Introduction.....	2-1
2.2 Proposed Action.....	2-1
2.2.1 Source Generation.....	2-2
2.2.2 Data Acquisition .....	2-5
2.2.3 Demobilization.....	2-6
2.2.4 Support Operations .....	2-6
2.2.5 Surface Use Associated with the Project .....	2-7
2.2.6 Project Activities and Schedule .....	2-9
2.2.7 Workforce .....	2-9
2.2.8 Applicant-committed Environmental Protection Measures.....	2-10
2.3 No Action Alternative.....	2-14
2.4 Alternatives Considered but Eliminated from Further Analysis.....	2-15
2.4.1 Use of Vibroseis Buggies as an Energy Source.....	2-15
2.4.2 Use of 2-D Seismic Techniques.....	2-15
2.4.3 Use of Surface Shots as an Energy Source .....	2-15
2.4.4 Limit Seismic Exploration to Existing Roads and Vehicle Trails .....	2-15
2.4.5 Exclude BLM Lands within the Project Area.....	2-16
2.4.6 Use of Heliportable Drill Equipment for All Shots off Existing Roads and Trails .....	2-16
Chapter 3 Affected Environment.....	3-1
3.1 Introduction.....	3-1
3.2 General Setting.....	3-1
3.3 Resources/Issues Brought Forward for Analysis.....	3-4
3.3.1 Cultural Resources.....	3-4
3.3.2 Native American Religious Concerns.....	3-5
3.3.3 Wildlife .....	3-6
Chapter 4 Environmental Consequences .....	4-1
4.1 Introduction.....	4-1
4.2 Direct/Indirect Impacts .....	4-1
4.2.1 Alternative A – Proposed Action.....	4-1

4.2.1.1	Cultural Resources .....	4-1
4.2.1.2	Native American Religious Concerns .....	4-2
4.2.1.3	Wildlife .....	4-2
4.2.2	Alternative B – No Action .....	4-4
4.2.2.1	Cultural Resources .....	4-4
4.2.2.2	Native American Religious Concerns .....	4-4
4.2.2.3	Wildlife .....	4-4
4.3	Cumulative Impacts .....	4-4
4.3.1	Reasonably Foreseeable Action Scenario .....	4-4
4.3.2	Cumulative Impacts .....	4-5
Chapter 5	Consultation and Coordination .....	5-1
5.1	Introduction .....	5-1
5.2	Persons, Groups, and Agencies Consulted .....	5-1
U.S. Fish & Wildlife Service .....	5-1	
Utah Division of Wildlife Resources .....	5-1	
Utah State Historic Preservation Office (SHPO) .....	5-1	
Tribes .....	5-1	
5.3	Summary of Public Participation .....	5-2
5.4	List of Preparers .....	5-2
Chapter 6	References and Glossary .....	6-1
6.1	References Cited .....	6-1
6.2	Glossary of Terms .....	6-3
6.3	List of Acronyms Used in this EA .....	6-5

## LIST OF TABLES

Table 2-1	Source Generation and Associated Surface Use – Proposed Action .....	2-8
Table 5-1.	List of Preparers – BLM .....	5-2
Table 5-2	List of Preparers – O&G Environmental Consulting, LLC and SWCA .....	5-3

## LIST OF FIGURES

Figure 1-1 .....	1-3
Figure 1-2 .....	1-4
Figure 1-3 .....	1-5
Figure 1-4 .....	1-6
Figure 2-1 .....	2-3
Figure 3-1 .....	3-3
Figure 3-2 .....	3-7
Figure 3-3 .....	3-8

## **LIST OF APPENDICES**

- Appendix A Interdisciplinary Team Analysis Record
- Appendix B Material Data Safety Sheet
- Appendix C United States Fish and Wildlife Service and Partners in Flight Bird of Conservation Concern for the Colorado Plateau

# CHAPTER 1 PURPOSE AND NEED

## 1.1 INTRODUCTION

This Environmental Assessment (EA) has been prepared to analyze the potential effects of an Evergreen Resources, 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 Book Cliffs Resource Management Plan (1985). 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

PGS Onshore (PGS), under contract to Evergreen Resources, Inc. (Evergreen), 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 a 23 square mile (approximately 14,700 acres) area (Project Area). The Project Area consists of federal, state, and private lands located in southern Uintah County, Utah (Figure 1-1) within portions of townships T14S, R22E and R23E and T15S, R22E and R23E:

### T14S R22E

#### Federal Lands

All of Section 25 except NWNW; and the E $\frac{1}{2}$ , E $\frac{1}{2}$  SW, and SWSW of Section 35

#### State Lands

All of Section 36

### T14S R23E

#### Federal Lands

All of Section 29 except NE  $\frac{1}{4}$ ; All of Sections 30 and 31; S  $\frac{1}{2}$  of Sections 33 and 34; and SWSW, SESW, SWSE of Section 35

#### State Lands

All of Section 32

**T15S R22E**

Federal Lands

All of Section 1; the E ½, E ½ NW ¼, and NWNW of Section 12; and the E ½, SENW, and NWNW of Section 13

State Lands

All of Section 2

Private Lands

SWSW of Section 12 and E1/2SW1/4 of Section 12; and N ½ NW ¼ of Section 13

**T15S R23E**

Federal Lands

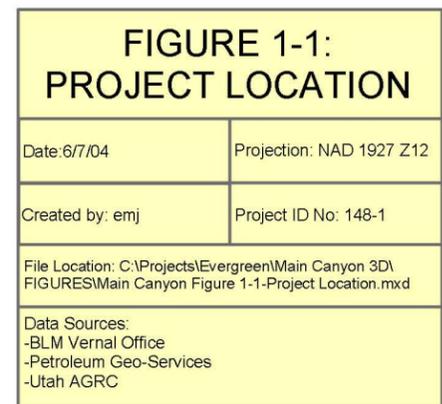
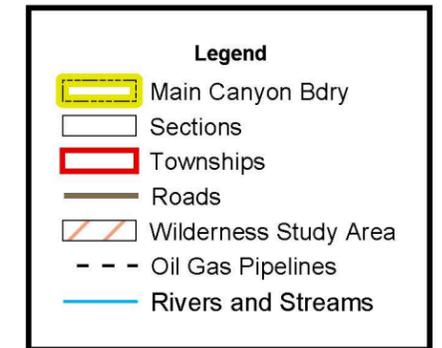
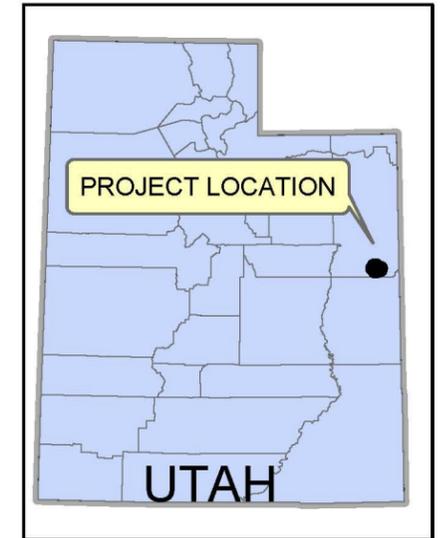
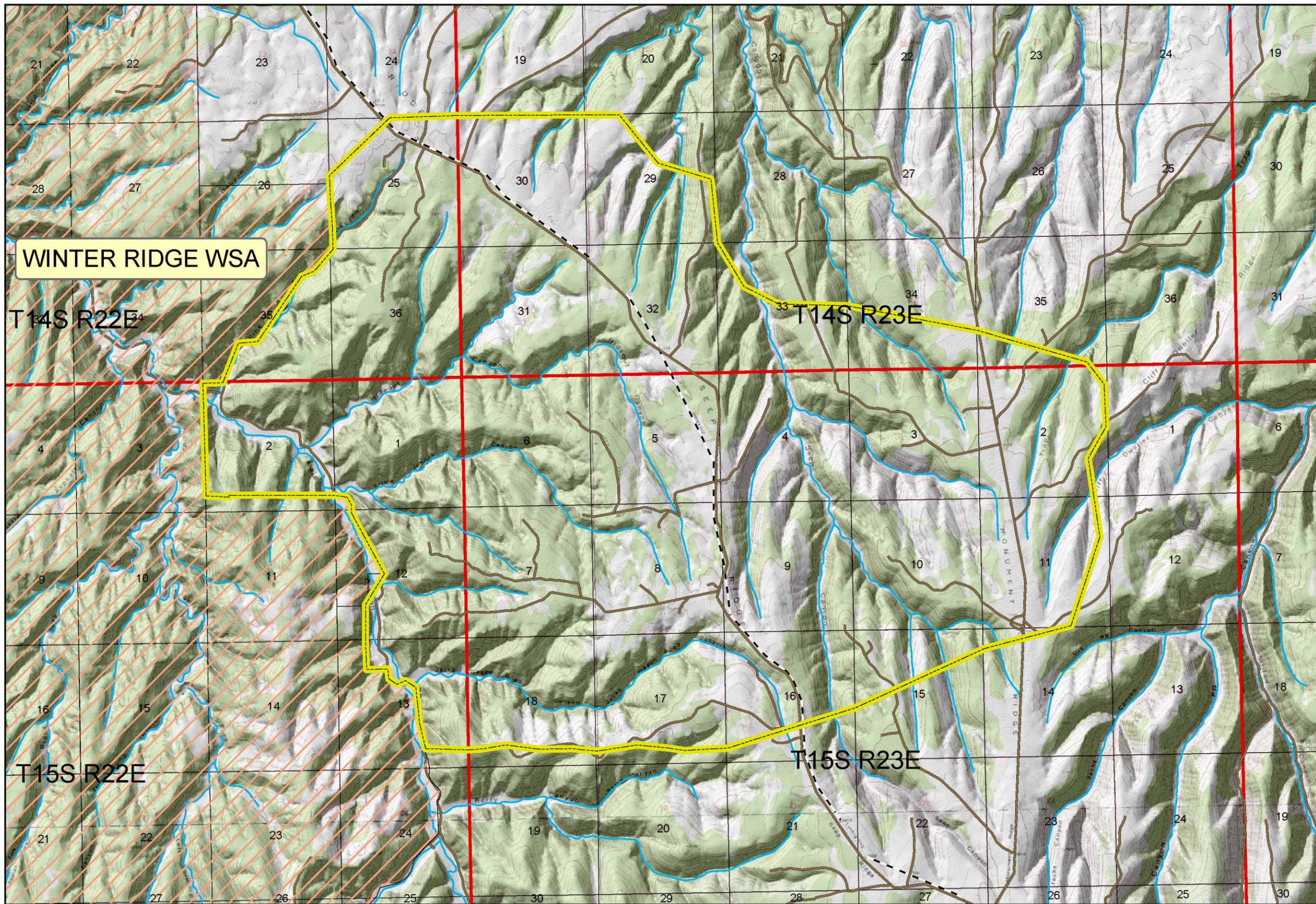
All of Sections 3-10 and 17-18; all of Section 11 except SESE; the NWNW and NENW of Section 14; and the NW ¼, N ½ NE ¼ and NWSW of Section 15.

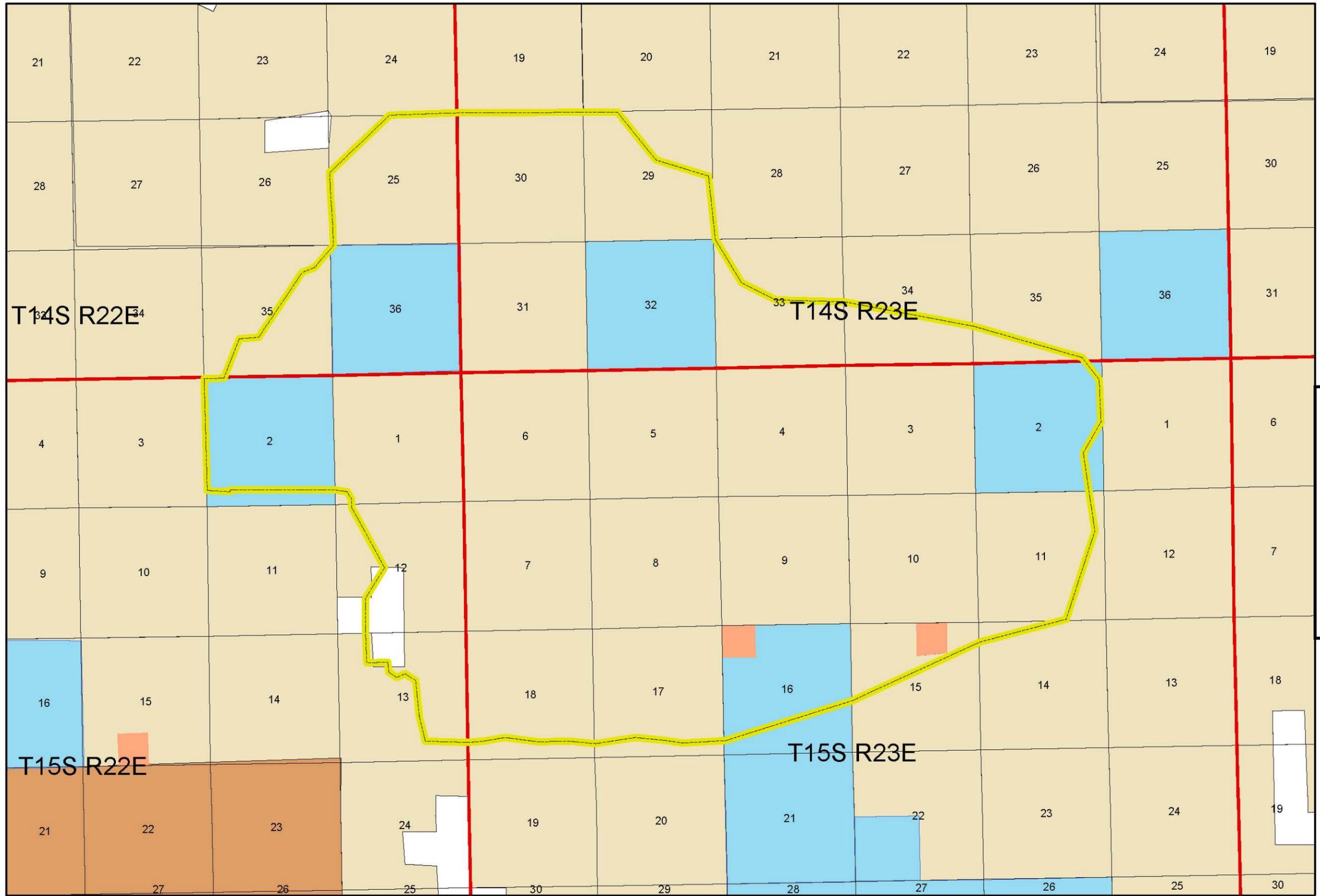
State Lands

All of Section 2; and the N ½, SW ¼, and N ½, SE of Section 16

To initiate the permitting process on federal lands in the Project Area, Evergreen submitted on February 2, 2004 a Notice of Intent (NOI) to Conduct Oil and Gas Exploration Operations to the Bureau of Land Management (BLM), Vernal Field Office. The intent of Evergreen'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 is such seismic data were unavailable. The proposed survey has been named the Main Canyon 3-D Seismic Survey Project after the canyon feature that dominates the landforms of the western part of the Project Area.

Ownership of both the surface and mineral estate is predominantly federal (79 percent) followed by state (20 percent) and private (1 percent) within the Project Area (Figure 1-2 and 1-3). Approximately 95 percent of the federal mineral estate in the Project Area is leased for oil and gas development and a majority of the leases are held or operated by Evergreen. Oil and gas development has occurred throughout the Project Area (Figure 1-4). Approximately 27 well sites have been located within the Project Area, of which nine are currently producing natural gas, three are shut in, eight are plugged and abandoned, and seven are abandoned locations.





**Legend**

- Main Canyon Bdry
- Sections
- Townships

**Landowners**

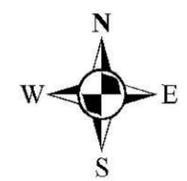
- BLM
- BLM/PROTECT WTHDRWL
- BLM/PUBLIC WTR RES
- PRIVATE
- STATE

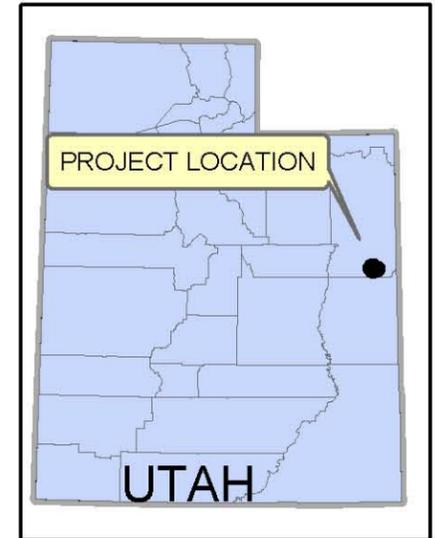
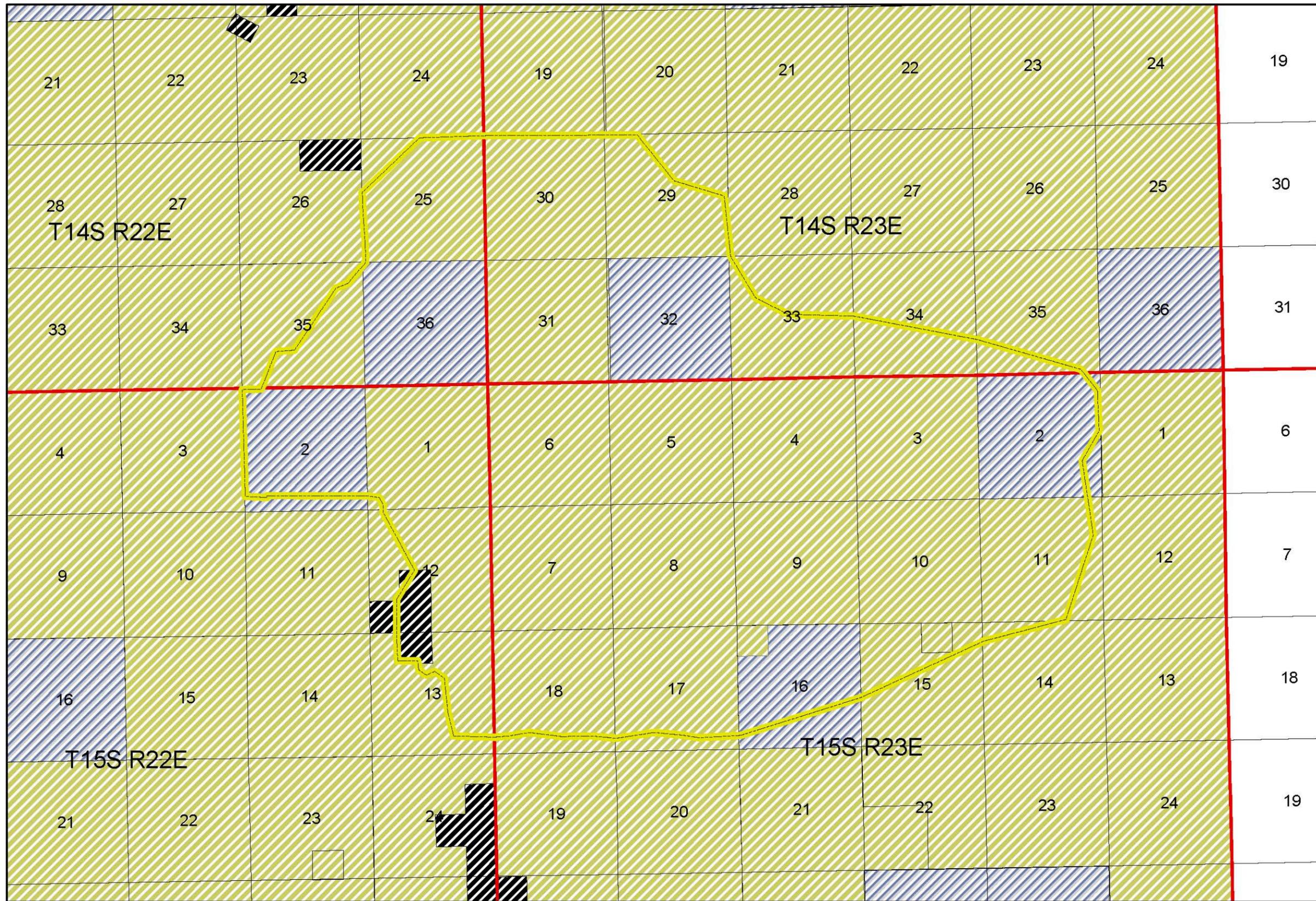
**FIGURE 1-2:  
SURFACE OWNERSHIP**

Date: 6/7/04	Projection: NAD 1927 Z12
Created by: emj	Project ID No: 148-1

File Location: C:\Projects\Evergreen\Main Canyon 3D\FIGURES\Main Canyon Figure 1-2-Surface Ownership.mxd

Data Sources:  
-BLM Vernal Office  
-Petroleum Geo-Services  
-Utah AGRC





**Legend**

- Main Canyon Bdry
- Sections
- Townships

**Mineral Ownership**

- Federal
- Private
- State

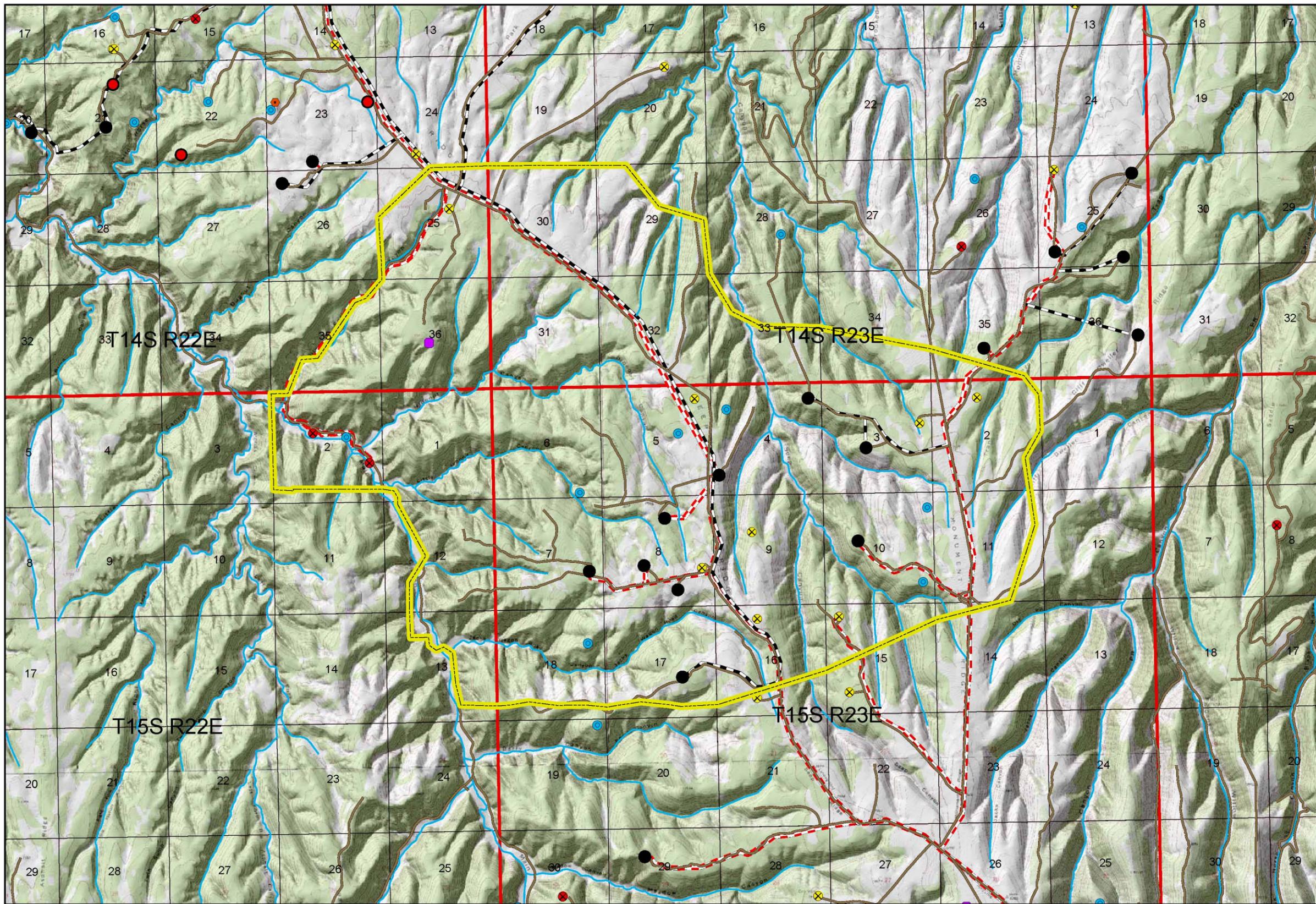
**FIGURE 1-3:  
MINERAL OWNERSHIP**

Date: 6/7/04	Projection: NAD 1927 Z12
Created by: emj	Project ID No: 148-1

File Location: C:\Projects\Evergreen\Main Canyon 3D\FIGURES\Main Canyon Figure 1-3-Mineral Ownership.mxd

Data Sources:  
 -BLM Vernal Office  
 -Petroleum Geo-Services  
 -Utah AGRC





**Legend**

- Main Canyon Bdry
- Townships
- Sections
- Rivers and Streams
- Roads
- 1-1580-Pipeline-WildHorse
- 1-1589-Pipeline-CGC\_BFC

**Oil and Gas Wells**

- Producing
- Approved APD
- Location Abandoned
- New APD; Not Approved
- Plugged and Abandoned
- Shut-in
- Temporarily Abandoned

**FIGURE 1-4: OIL AND GAS ACTIVITY MAP**

Date: 6/7/04	Projection: NAD 1927 Z12
Created by: emj	Project ID No: 148-1

File Location: C:\Projects\Evergreen\Main Canyon 3D\FIGURE-RES\Main Canyon Figure 1-4-Oil and Gas Activity Map.mxd

Data Sources:  
 -BLM Vernal Office  
 -Petroleum Geo-Services  
 -Utah AGRC  
 -Utah Div. of Oil, Gas and Mining



## 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.

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 is already occurring in the Project Area and is likely to continue. Previous two-dimensional (2D) geophysical surveys have been conducted in the canyon bottoms and along the ridgelines within the Project Area. However, the 2D data is of poor quality, thus limiting its use and, more importantly, dated 2D survey methods and resulting data is much less useful than the current technology of 3D surveys and resulting data. The proposed 3D seismic survey program for this Project Area (Proposed Action in Chapter 2) would provide about 73 times the density of data points for interpreting the subsurface conditions in comparison to the existing 2D data set (52,900 receiver groups vs. 720 receiver groups, respectively). The proposed Main Canyon 3D Seismic Survey Project would provide an effective means of obtaining seismic data to better target areas for the exploration and development of potential producing formations underlying these public lands.

The effectiveness and value of a 3D survey is its generation of a relatively continuous image of subsurface conditions in essentially all dimensions. To illustrate, contrast the information provided by a 2D survey. 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. Conditions between lines must be estimated. Three-dimensional data allows 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 below 4,000 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 of a 3D survey and is also consistent with typical industry practices for 3D seismic surveys.

Line spacing for both source points (drilled shot-holes) 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 subsurface, shot detonations. The number of individual processed signals that contribute to the final imaged point is known as the fold number. At low fold numbers, less than 12 for the geology and topography of the Project Area, data becomes unacceptably unreliable for purposes of interpreting subsurface conditions. This survey is designed to provide a fold number of 30 or greater at depths below 7,000 feet.

### **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 (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 Book Cliffs RMP (BLM, 1985).

## **1.4 CONFORMANCE WITH BLM'S LAND USE PLAN**

Federal lands in the proposed Project Area are under the jurisdiction of the BLM Vernal Field Office (VFO) and policies for development and land use decisions are contained in the Final Environmental Impact Statement on the Book Cliffs Resource Management Plan (BCRMP) (BLM, 1984) and Record of Decision (ROD) (BLM, 1985). Although a new resource management plan (RMP) for the VFO area is currently being prepared by the VFO, NEPA EIS analysis of the planning alternatives is not complete therefore a ROD and final RMP have not been prepared and approved. Alternatives developed for this project will therefore conform to the existing BCRMP, and the BCRMP provides that gas and oil resources would be developed on lands deemed suitable for that use within the BCRMP under a scenario that gives adequate environmental protection. The BCRMP ROD states "Oil and gas, tar sand, oil shale, and gilsonite would be leased while other resource values would be protected or mitigated." Because seismic exploration is a necessary part of gas and oil operations, the Proposed Action would be

in conformance with the BCRMP, and it has been determined that the Proposed Action would not conflict with other decisions throughout the plan.

## 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), U.S. Department of the Interior (USDI) requirements (Department Manual 516, Environmental Quality), and guidelines listed in BLM NEPA Handbook, H-1790-1 (BLM, 1988) and in BLM NEPA Guidebook (2004).

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 100 percent of the state lands in the Project Area for oil and gas production. Because the objectives of SITLA are to produce funding for the state school system, and because geophysical exploration on federal leases could further interest in drilling state leases in the area, it is assumed that the Proposed Action is consistent with the objectives of the State of Utah and SITLA.

The proposed seismic exploration would be consistent with the Uintah County Plan for Management of the Book Cliffs Resource Area (Uintah County Commissioners, 1998) which emphasizes multiple-use public land management practices, responsible use and optimum utilization of public land resources. The plan encompasses the location of the proposed Project Area.

PGS is 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 Main Canyon 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

**Table 1-1 Major Federal, State, and Local Permits and Approvals for the Main Canyon 3D Seismic Survey Project**

Agency	Permit, Approval, or Action
	endangered (T&E) species.
U.S. Department of Transportation	Permit for transport of high explosives.
U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives	Permit for handling and storage of explosives. Permit for use of high explosives.
Utah Division of Wildlife Resources	Coordination on impacts to wildlife and state-sensitive species.
Utah Department of Transportation	Conformance with applicable size and weight limits for trucks. Permit to transport explosives.
Utah Division of Water Rights	Change in use of water.
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.
Uintah County	County bond. Permits for use of county roads for heavy commercial purposes. Control of noxious weeds.

## 1.6 IDENTIFICATION OF ISSUES

As part of internal scoping, BLM resource specialists in the Vernal Field Office reviewed Evergreen and PGS' 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 A Interdisciplinary Team Analysis Record. The BLM has conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS) and

State Historical Preservation Office (SHPO). The BLM Vernal Field Office officially posted the proposed project on the Electronic Notification Bulletin Board (ENBB) on July 9, 2004.

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 A of this EA presents a checklist of all environmental elements considered in this analysis. Of particular importance is the consideration of the BLM's Critical Elements of the Human Environment. Critical Elements are those elements of the human environment that are subject to requirements specified in statutes, regulations, or executive orders and must be considered in all BLM EAs.

### **1.6.1 Relevant Issues**

#### Cultural Resources

- Issue 1: Potential effects of seismic survey activities on cultural resources.

#### Native American Religious Concerns

- Issue 1: Potential effects of seismic survey activities on Native American Religious Concerns

#### Wildlife

- Issue 1: Potential effects of seismic survey activities on big game species.
- Issue 2: Potential effects of seismic survey activities on raptors.

## **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. In order to meet the Purpose and Need in a way that resolves the issues, the BLM has developed 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 each alternative are then analyzed in Chapter 4 for each identified issue.

# **CHAPTER 2**

## **DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION**

### **2.1 INTRODUCTION**

This chapter of the EA presents the description of Alternative A – the Proposed Action, Alternative B – No Action, and alternatives considered but not analyzed in detail. In support of alternatives development, including the Proposed Action, planning civil and environmental surveys were completed spring of 2004 to identify and record site locations for ground vibration source points, receiver points, and staging areas. Surveys for cultural and paleontological 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 or staging area location to avoid direct impacts.

### **2.2 PROPOSED ACTION**

PGS Onshore (PGS), under contract to Evergreen Resources (Evergreen), 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 a 23 square mile (approximately 14,700 acres) area (Project Area). The seismic survey would involve (1) the generation of ground vibration by the sequential detonation of individual explosives placed underground at depth in source-point drilled boreholes (shot holes) and (2) the recording of the reflected sound waves and patterns arising from the different underground geologic strata by an array of geophones centered around and either side of a line of source points. The survey would be conducted from one side of the Project Area to the other by a crew of up to 60 personnel over an approximate six-week period.

Access to significant portions of the Project Area would be difficult due to the steep terrain associated with incised canyons in the Project Area. Within these areas, means of access to facilitate survey activities would be limited to ATVs, pedestrian traffic, and/or helicopter transport.

The proposed shot holes are arranged into lines that are positioned approximately in a southwest-northeast array oriented diagonally to the receiver lines within the accessible portions of the Project Area (Figure 2-1). The ideal configuration of continuous and parallel source lines has been modified for this proposed project due to the topographic constraints to continuous source-vehicle travel across the Project Area. The source lines would ideally run parallel, 1,980 feet apart, with drilled source points spaced approximately 311 feet apart along each source line. Based on the civil survey there would be a total of approximately 1,433 source points totaling approximately 60 miles of source lines (approximately 25 source lines).

The recording of seismic information would involve a total of approximately 43 parallel lines of receiver (geophone) stations laid out in a north-south orientation. The parallel lines would

ideally be spaced approximately 880 feet from each other. Ideal receiver locations would also be modified due to topographic constraints on access. For each shot, 14 lines of 108 individual stand-alone stations consisting of six receiver geophones per station would be in use at any one time for recording the seismic data. There would be a total of approximately 1,512 geophones in use for each shot. The survey would include approximately 142 miles of receiver lines.

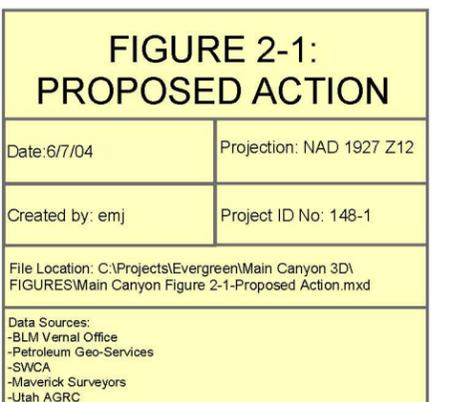
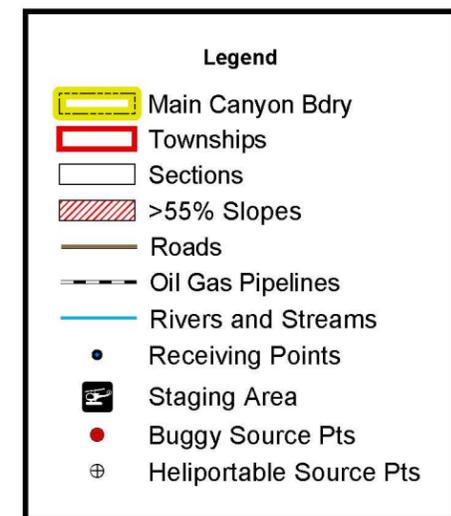
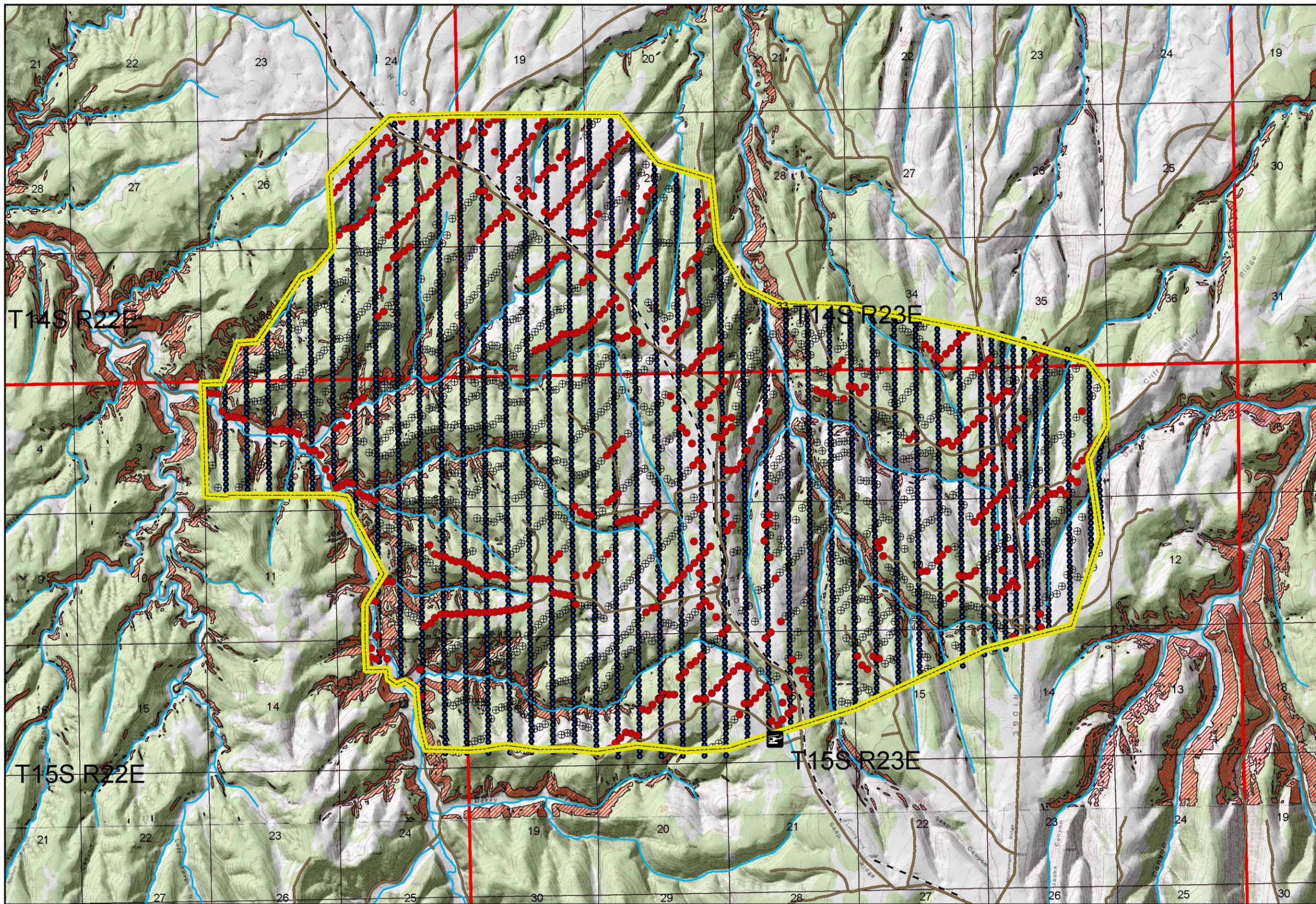
The method of accessing the source point locations where holes would be drilled and explosives placed would vary across the Project Area based on vegetation type, terrain, slope, and other conditions. Off-road, buggy-mounted drills would account for approximately 561 (39 percent) of the 1,433 source points. Heliportable drill rigs would access the remaining 872 source points (61 percent of total) on steeper and less accessible terrain.

### **2.2.1 Source Generation**

PGS would detonate explosives set in the drilled shot holes to generate ground vibrations. The two types of transportable drills that would be used to create the shot holes include buggy drills and drills transported by sling below a helicopter (heliportable drill). Both the buggy drills and the heliportable drills would create 40-foot deep holes. Each shot hole would be three inches in diameter and loaded with 10 pounds of explosive (vibrogel or similar product) made expressly for seismic point source generation (shot detonation). The Material Safety Data Sheet for vibrogel is presented in Appendix B.

PGS proposes to use up to six 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 removed to allow the passage of drill buggies and to prevent other damage to the tree. Tree removal to allow buggy passage will be limited to those cases where a practical means of avoidance is not available. 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 resources) 100-foot wide corridor to the immobilized buggy drill. Due to the density of trees (pinyon-juniper woodland) in much of the Project Area, travel to and from the 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 segments of tracks. Where possible the support vehicle will use a different path within the 100-foot wide cleared corridor to limit repeated tracking to two passes. Such break downs are infrequent; therefore, the repeated use of a set of tracks of up to four times is expected to both limit in occurrence and in distance the amount of effect on vegetation and soils.



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 28,000 pounds, and each low-pressure tire would be approximately 3-feet wide. Total buggy width is approximately eight feet with two, 3-foot wide tire treads. 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 approximately 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. Buggy tires would not be chained. The large, low-pressure tires of a buggy drill would exert a pressure of about 8 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.

For source locations located off roads/trails that cannot be safely reached by buggy drills, the heliportable drill would be used to access suitable shot hole locations within the more rugged terrain and to drill the shot holes. 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 and driller foot traffic centered on the drill hole. Following completion of the drill hole, placement of the explosive shot, and backfilling, the remaining cuttings would be raked into the existing soil. Both buggy drill and heliportable drill locations would be sited no closer than 100 feet from edges of upland escarpments.

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 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 (Federal Register UT-R649-3-26) would be followed to backfill the hole with bentonite to seal the saturated layer. Any excess bentonite would be cleaned up and removed from the location. 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 14-line groups of receiver stations. Detonation would typically produce a small plume of dust within a few feet of the shot hole. The dust is generated by the shock wave reaching the surface and causing suspension of fine soil particles. 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 jolt. The jolt would not be sufficient to cause any instability to a standing person.

In general, a person would typically be able to feel the vibration from the shot detonation at 50 feet from the shot hole, but not at 100 feet.

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.

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. Based on experience of PGS in similar geologic settings, the incidents of blowouts are less than three percent.

### **2.2.2 Data Acquisition**

Recording equipment would be transported to the field and to the six 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 6 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 4 to 6 cache bags at a time suspended from a long line. The helicopter would operate at an altitude of approximately 50-75 feet above the receiver line and deposit one bag at a time using GPS pin flag locations provided by the surveyors. 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. 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. Up to 14 lines of 108 receiver stations and cable-attached geophones would be active at any time throughout the data acquisition task.

After recording in an “active” 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.

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. Crewmembers would travel daily to the Project Area in the morning, complete data acquisition and initial decommissioning tasks, and return to the Vernal, Utah area in the evening using several pickups and three multi-passenger vehicles.

Approximately 25 vehicles would be used in total, with 15 to 20 of them used to commute to Vernal. As data acquisition efforts progress, field groups would periodically complete data acquisition tasks and would then move on to the decommissioning 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.

### **2.2.3 Demobilization**

The demobilization task would proceed concurrently with data acquisition. 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 5 days after conclusion of the data acquisition task. The same crew used in data collection of approximately 60 people would travel daily to the Project Area in the morning and return to the Vernal area in the evening using 15 to 20 vehicles.

### **2.2.4 Support Operations**

All equipment, including the drills and buggies, would be initially brought to the Project Area by 15 to 20 transport trucks/tractor trailers as part of project mobilization. Operation of most support vehicles, including pickups, would be limited to existing roads and trails. Buggy drills would be unloaded from the transport semi-trailers at an appropriate location (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 and biological resources. If and when a repair buggy would travel off road in a surveyed corridor, the buggy would create a new track as to not add passes over the same tracks created by a buggy drill. 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.

A single main staging area comprised of an existing abandoned well pad in Section 16, T15S, R23E would be used for storing equipment, refueling the helicopter (helicopter service and fuel truck), and sling-loading bundles of equipment for helicopter transport was selected to maximize use of previously disturbed areas (Figure 2-1). Several equipment trailers would be parked at this staging area location for the duration of the Project.

Other existing well locations in the Project Area may also be used to stage helicopter support activities (Figure 1-4). The specific locations and use of these additional staging areas/existing well pads would be determined in the field during seismic survey operations. To account for any unanticipated new disturbance that could occur in response to site-specific conditions and needs, a maximum of two acres of new disturbance has been estimated for the main large staging area and a maximum of one acre of new disturbance would result from use of as many as four other well pads as supporting small staging areas in the Project Area. Mobile equipment would simply utilize existing roads and drive from staging area to staging area. No mowing or clearing of vegetation or blading of soils in the staging areas would occur. Reclamation of any new disturbance associated with the staging areas would be conducted as required by the landowner, including the BLM on affected public lands.

Water needed for drilling and for possible dust suppression would be obtained from Vernal's municipal source or from another commercial or private source. An estimated 3,000 gallons of water would be needed to meet the needs for drilling and dust suppression. An 80-barrel water truck would deliver the 3,000 gallons on average daily to the Project Area. Water would be transferred to buggy drills at staging areas or at appropriate locations on existing roads. This water truck would also serve as the dust suppression vehicle, should dust control be required by the BLM AO.

The explosive shot and blasting cap magazines would be temporarily located on previously disturbed locations to minimize public access and to optimize public safety in compliance with Bureau of Alcohol, Tobacco, and Firearms and Explosives requirements. The details relative to safety procedures are addressed in the Traffic and Blasting Safety Plans submitted to and on file at the BLM Vernal Field Office.

Helicopters may land on existing road and trail intersections and existing well pads in addition to staging areas/land zones to pick up or drop off equipment or personnel.

### **2.2.5 Surface Use Associated with the Project**

Proposed surface use associated with 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			
			Surface Disturbance		Off Road Use	
	Number	Percentage	Acreage <sup>1</sup>	Percentage <sup>2</sup>	Acreage <sup>1</sup>	Percentage <sup>2</sup>
<b>Drilled Shot Holes</b>						
Buggy Drill	561	39	0.17	<0.01	49.0	0.33
Heliportable Drill	872	61	0.26	<0.01	N/A	N/A
<b>Subtotal</b>			0.43	<0.01	49.0	
<b>Staging Areas</b>						
Large	1		2	0.02		
Small	4		1	0.01		
<b>TOTAL</b>	N/A	N/A	5.43		49.0	0.33

<sup>1</sup> Basis for assessment of acreage of surface use by seismic source:

**Buggy Drill** – Surface Disturbance would occur within a 4-foot diameter circle centered on the 3-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 cuttings would be leveled by spreading.

Distance between source points (shot holes) would be 311 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 maximum possible effects from passage of buggy drill vehicle would be six feet; surface effects at a shot point would be kept within the area for buggy drill activity; 311 feet x 2.0 x six feet x number of source points / 43,560 square feet per acre = number of acres. Surface effects from passage of floatation-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 spread.

**Staging Areas** – Two larger 2-acre (approximately 300 feet x 300 feet) sites and four smaller 0.25 acre (100 feet x 100 feet) sites would be used for staging seismic survey activities. Although a majority of the land at each staging area is previously disturbed ground, two 300 feet x 300 feet areas and four 100 feet x 100 feet areas would be staked as potential surface disturbance and cultural resources clearance surveys would be completed for the six proposed staging areas.

<sup>2</sup> Percentage of 14,700-acre Project Area (acreage of sub-area within the Project Area/14,700 acres x 100)

Temporary (one growing season) to short-term (one to three years) surface use proposed for seismic survey operations, including buggy drill passage to source locations, buggy drilling, heliportable drilling, and establishment of staging areas would total approximately 54.4 acres (0.4 percent) of the estimated 14,700-acre Project Area (Table 1). Surface use would be limited to two, 3-foot wide tracks (total effects of six feet) from the floatation tire-equipped, 8-foot wide buggy drills.

Of the approximately 54.4 acres of anticipated surface use, approximately 43 acres would be located on BLM-administered lands. The five proposed staging areas (assume location of all five staging areas on federal lands) in the Project Area would total approximately three acres or less, because of use of previously disturbed areas (existing well sites, roads/trails, or other disturbed sites). The use of 41 previously undisturbed acres on federal lands represents approximately 0.4 percent of the total of approximately 11,613 acres of federal, BLM-

administered lands in the Project Area. Surface use on State of Utah lands would total approximately 11 acres of an estimated 2,940 acres of state land in the Project Area. Surface use on private lands would total approximately one acre of an estimated 147 acres of private land in the Project Area. Actual surface that would require reclamation, other than minimal hand-shoveling and raking as part of backfilling the shot hole following explosive shot placement, would total approximately three acres should all portions of the five proposed staging areas require scarification and re-seeding.

## **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 September 15, 2004 and conclude by October 31, 2004. 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 one month. The explosive shot would be loaded into the hole immediately following drilling and then backfilled/plugged.
2. Placement of up to 7 north to south lines of geophones (up to 14 lines of geophones total) on both sides of zone of source generation (shot hole detonations) on source lines between the 7th and 8th geophone line (or two middle lines if the total number of geophone lines is less than 14). Placement of geophones would begin near the completion of the one-month drilling program.
3. Controlled detonation of explosive shots and recording would begin shortly after placement of the initial grouping of receiver stations/geophones. Time between detonations is typically a minimum of 5-10 minutes and can take longer depending on terrain and accessibility of shot points to the safety officer. Shot points on a source line situated between two receiver lines would be detonated individually. Shot detonation activities would progress north or south between receiver lines.
4. After all source generation is completed for a north-south grouping between two receiver lines, the farthest west or east receiver line would be picked up and moved ahead (“leap-frog”) and laid out to form the new edge of the receiver array prior to re-initiating source generation (detonations).

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

## **2.2.7 Workforce**

A work crew of approximately 25 personnel would be required for the duration of approximately three weeks to mobilize and complete the shot-hole drilling program. Approximately three weeks after the start of drilling, an additional work crew of approximately 60 personnel would be required for the remaining one month to mobilize and complete data acquisition and to conduct demobilization activities for the Project. The 25-person work crew responsible for the drilling program would depart. During the final three weeks of the Project, approximately 60 personnel would be on-site daily.

## 2.2.8 Applicant-committed Environmental Protection Measures

### Fire Protection

- All ATVs would be equipped with spark arresters.
- All four-wheel-drive buggies would be diesel powered.
- All vehicles would be equipped with fire extinguishers and shovels.
- Two helicopters would be on location during the majority of the project, and they would be equipped with a water bucket.
- PGS would coordinate project activities with appropriate fire personnel in the BLM Vernal Field Office.

### Disposal of Trash and Other Waste Material

- All trash, flagging, stakes, and cap leads would be picked up and disposed of at an approved site-most likely the Uintah County sanitary landfill east of Vernal.
- No potentially harmful materials or substances would be left on, or in the vicinity of, the Project Area.

### Protection of Existing Facilities and Rights-of-Way (ROWs)

- PGS would maintain a safe operating buffer between shot holes and existing facilities, including oil and gas wells and pipelines, based on accepted industry standards.
- 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 livestock movement from appropriate pastures. Upon termination of activities, the temporary opening would be permanently wired shut and the wires stretched to their original tension.

### Cultural Resources

- Evergreen/PGS have utilized the services of a qualified archaeological firm to complete all Class I and Class III cultural resource surveys along and near the source lines as staked on the ground. In addition, all off-road buggy drill access routes and the large staging area have also been inventoried. Any previously unrecorded prehistoric or historic archaeological sites and properties discovered during the new inventory have been recorded.
- Should new surface disturbance at one or more of the projected four small staging areas extend beyond the existing boundary of disturbance, a Class III survey will be completed for proposed area of new disturbance prior to activities extending on to previously undisturbed lands. No more than a total of one acre of new disturbance is anticipated for activities among the four small staging areas.

- Any prehistoric or historic archaeological sites and properties found within the Project Area have been avoided.
- 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 applicable authorized officer (AO) would be contacted. Work at that site would not resume until and unless authorized by the AO.
- Workers would be instructed to leave undisturbed and uncollected any artifacts they may discover during the proposed Project.
- PGS would use a helicopter to deliver recording equipment, which would then be laid out by personnel on foot. ATV s would be used for trouble shooting by recording crews, but ATV use would be limited to archaeologically-cleared routes. However, any geophone line segments that would be used for access by buggy-mounted drills, as well as any other cross-country access routes that may be required, would be subject to a Class III Inventory.
- Heliportable drilled shot holes have been individually inventoried for cultural resources to a minimum of a 50-foot radius around the shot hole and, if terrain allowed, corridors 100 feet wide connecting the shot holes have been inventoried.
- Where heliportable shot holes are located in areas of very steep terrain (slopes greater than 30°), the field archaeologist used discretion to either undertake or waive a Class III Inventory on connecting lines; however, any observable benches, ridge tops, or other relatively flat areas within the very steep slopes was subjected to a Class III cultural resource inventory.
- No vehicle used in geophysical operations, including ATVs, pickup trucks, service trucks, and buggy-mounted drills, would depart from any road that traverses an area where cultural resources have been identified.
- Before commencing with 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.
- Water, as a dust control measure, would be applied as required by the AO to all affected roads to reduce any impacts of dust deposition on cultural resource sites, particularly prehistoric rock art.

## **Public Safety**

- PGS 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.
- PGS 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. PGS 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.
- PGS requires their personnel and subcontractors to wear hunter orange during the hunting season as a safety precaution.

## **Soils and Vegetation**

- To reduce impacts to vegetation and soils, PGS would limit vehicular traffic to the seismic lines and designated access routes.
- Off-road buggy vehicles along seismic lines would be limited to one track to minimize damage to plants.
- In areas of pinyon, juniper, or other trees, PGS would avoid damaging trees to the extent practicable. Large trees (diameter greater than 3 inches at breast height) would be avoided.
- Off-road buggy drills and ATVs would be instructed to travel cross-country at speeds of less than 15 mile per hour to limit disturbance to soils and vegetation.
- Off-road 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 AO.

## **Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves**

- PGS would not take vehicles or drill/shoot within 300 feet of a wetland or riparian area, except on existing roads or as otherwise approved by the applicable AO.
- No drilling or shooting would occur within 500 feet of any flowing stream unless approved by the applicable AO.
- Water needed for seismic survey operations would be obtained from municipal or other sources.
- The presence of water/water table in all drill holes will be recorded and provided to the BLM field office within five business days.

## **Wildlife**

- PGS anticipates requesting from the applicable AO an exception to the stipulated dates for elk and mule deer crucial winter range from November 1 through March 31. An anticipated start date of September 15, 2004 for conducting the seismic survey project

and an anticipated two-month duration for completing the survey results in an anticipated completion date of mid-November 2004.

### **Threatened, Endangered, Candidate, Proposed and Sensitive Plant and Animal Species**

- No surface water depletions from the Upper Colorado River would occur. All water used on the project would be obtained from the Vernal municipal water supply or other source determined to be non-depleting to the Upper Colorado River. Water use would be limited to that required for the drilling of a small number of shot holes and for dust suppression when required by the applicable AO.
- No drilling would occur and no explosives would be detonated during raptor seasonal protection periods. Should seismic survey activity extend past November 1, no impacts to raptors, including bald eagle, due to absence of active raptor nesting and winter roost sites in the Project Area for bald eagle.

#### **Raptor Protection Dates (from the Diamond Mountain RMP [BLM, 1993])**

<u>Raptor</u>	<u>Seasonal Buffer</u>
golden eagle	February 1 - July 15
bald eagle	January 1 - August 15
(November 1 - March 15 for winter roost areas)	
Peregrine falcon	February 1 - August 31
great horned owl	February 1 - May 15
ferruginous hawk	March 1 - July 15
long-eared owl	March 15 - June 15
red-tailed hawk, Swainson's hawk, Northern harrier, prairie falcon, and osprey	April 1 - July 15
burrowing owl	April 1 - August 15
Mexican spotted owl	March 1 - August 31
Northern goshawk	April 15 - August 20
merlin	April 15 - June 25
short-eared owl	April 10 - June 15
American kestrel	May 1 - June 30
Cooper's Hawk	May 1 - August 15
turkey vulture	May 15 - August 15
sharp-shinned hawk	June 20 - August 15

These seasonal 1/2-mile buffers around occupied raptor nests have been developed and successfully applied for several years within input from, and in coordination with, the Utah Division of Wildlife Resources (UDWR) and the U.S. Fish and Wildlife Service (USFWS). The USFWS 2002 Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances was reviewed for consistency with the proposed Project.

### **Invasive Non-Native Species**

- PGS would power-wash all equipment prior to use in the Project Area to minimize the potential for the introduction of invasive non-native plant species.

### **Air Quality**

- Dust control measures (BLM-approved) would be applied on BLM roads as mandated by the applicable AO.
- All vehicles and construction equipment would be properly maintained to minimize exhaust emissions and would be properly muffled to minimize noise.

### **Special Management Area**

- The Project Area is contiguous to, but outside of the Winter Ridge WSA. The boundary between the Project Area and the adjacent Winter Ridge WSA would be signed to discourage access by off-highway vehicles (OHVs) to the WSA where such access would be feasible.

### **Recreation**

- At the recommendation of the State of Utah Division of Wildlife Resources (UDWR), PGS would suspend operations in the Project Area on the day before the hunting season opens and the first two days of the bull elk season (October 8-10) as well as the muzzleloader deer season (September 28-30).

### **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 permitted to be carried,
  - no harassing or shooting of wildlife,
  - no trash left in any unauthorized location,
  - no unnecessary off-road driving,
  - no collecting of plants, and
  - no collecting or disturbing cultural or historical artifacts.

## **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 approximately 95 percent 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. However, this alternative would prevent a lessee from implementing the terms of their lease/grant. 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 by 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 Vibroseis Buggies as an Energy Source**

The use of vibroseis buggies would not be appropriate for this project due to the extent (approximately 70 percent of the Project Area) of steep and heavily vegetated terrain that would limit or prevent access within the Project Area. Therefore, this source method was not considered viable for this project.

### **2.4.2 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 2-D seismic alternative is not considered further in this EA.

### **2.4.3 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.

### **2.4.4 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 unacceptable large voids in the data needed to assess the oil and gas

resource in the Project Area. The voids in the data would result in source energy generation from only the relatively few roads and trails in the Project Area (Figure 1-1). That would not allow for the sufficient 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 would likely 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.

The proponent provided fold plot analysis and other information to the BLM comparing data collected by the Proposed Action and an alternative of using only existing roads and trails. The BLM reviewed the fold plots and determined that it would be reasonable to project that no data collection would occur on 15 to 20 percent of the Project Area and another 70 to 77 percent of the Project Area would have data that would be substantially degraded using only roads and trails (internal memorandum from Assistant Field Manager, Division of Minerals, Vernal Field Office, 2004). Therefore, this alternative would not meet the applicants need for the Proposed Action and is not considered further in this EA. The fold plots are available for review in the Administrative Record at the BLM Vernal Field Office.

#### **2.4.5 Exclude BLM Lands within the Project Area**

This alternative is similar to the No Action Alternative. BLM administered lands compose 79 percent of the Project Area. Due to the geographic position of the BLM lands, between 70 to 80 percent of the Project Area would have no data recorded or substantially degraded data recorded under this alternative. The resulting data would not provide sufficient geologic or geophysical information to make informed decisions concerning existing leases in the Project Area. Therefore, this alternative is not considered further in this EA.

#### **2.4.6 Use of Heliportable Drill 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 the cost of heliportable drilling being much higher than buggy drilling; and based on a recent compliance report for another seismic exploration project in the area (BLM, 2001), the very low impacts of seismic exploration do not justify such additional costs.

## **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 23-square mile Project Area is located in portions of T14S, R22E and T23E, and T15S, R22E and R23E (Figure 1-1) in the Uinta Basin section of the Northern Colorado Plateau (Fenneman, 1931). The dominant landforms comprising the Project Area consist of north sloping ridges of the Roan Plateau that are separated by mostly north sloping drainages and canyons. From west to east, canyon features consist of Main Canyon, which comprises much of the western boundary of the Project Area, tributary side canyons to Main Canyon which dominate the western half of the Project Area, and Seep Canyon and Trap Canyon which dominate the eastern half of the Project Area. Principal north-south divides are Seep Ridge in the center of the Project Area and Monument Ridge which separates Seep Canyon and Trap Canyon in the eastern part of the Project Area. Upland elevations range from a high of approximately 7,765 feet on Seep Ridge at the southern boundary of the Project Area to approximately 7,200 feet on Seep Ridge at the northern boundary of the Project Area. The low point located in the bottom of Main Canyon at the northwest boundary of the Project Area is 6,740 feet.

The gently dipping north facing slopes of the plateau and ridges are formed by sedimentary rocks of the Eocene Green River Formation underlain by Eocene/Paleocene Wasatch Formation that is exposed in the incised canyons in the Project Area. Strata of the Green River Formation are composed mostly of siltstone and shale interbedded with layers of sandstone and thin layers of oil shale and marlstone. Wasatch Formation strata consist primarily of cross bedded sandstones interbedded with siltstone and shale. Mineral resources, including hydrocarbon resources, in the Project Area are oil and gas and tar sands (BLM, 1985). Potential geologic hazards in the Project Area consist of primarily mass wasting in the form of rock fall; slumping and land slides are possible, but none have been identified within the Project Area (Harty, 1991).

Soils forming on the uplands and Green River Formation residuum and colluvial materials are mostly shallow to moderately deep, mostly gravelly clay and silt loams to loams (NRCS, 2002). Erosion potential is mostly low to moderate on upland level to gently sloping topography and high on sloping to very steep landscapes. Soils forming in the alluvial deposits of the larger canyon bottoms are mostly deep loams that are subject to erosion during major runoff events.

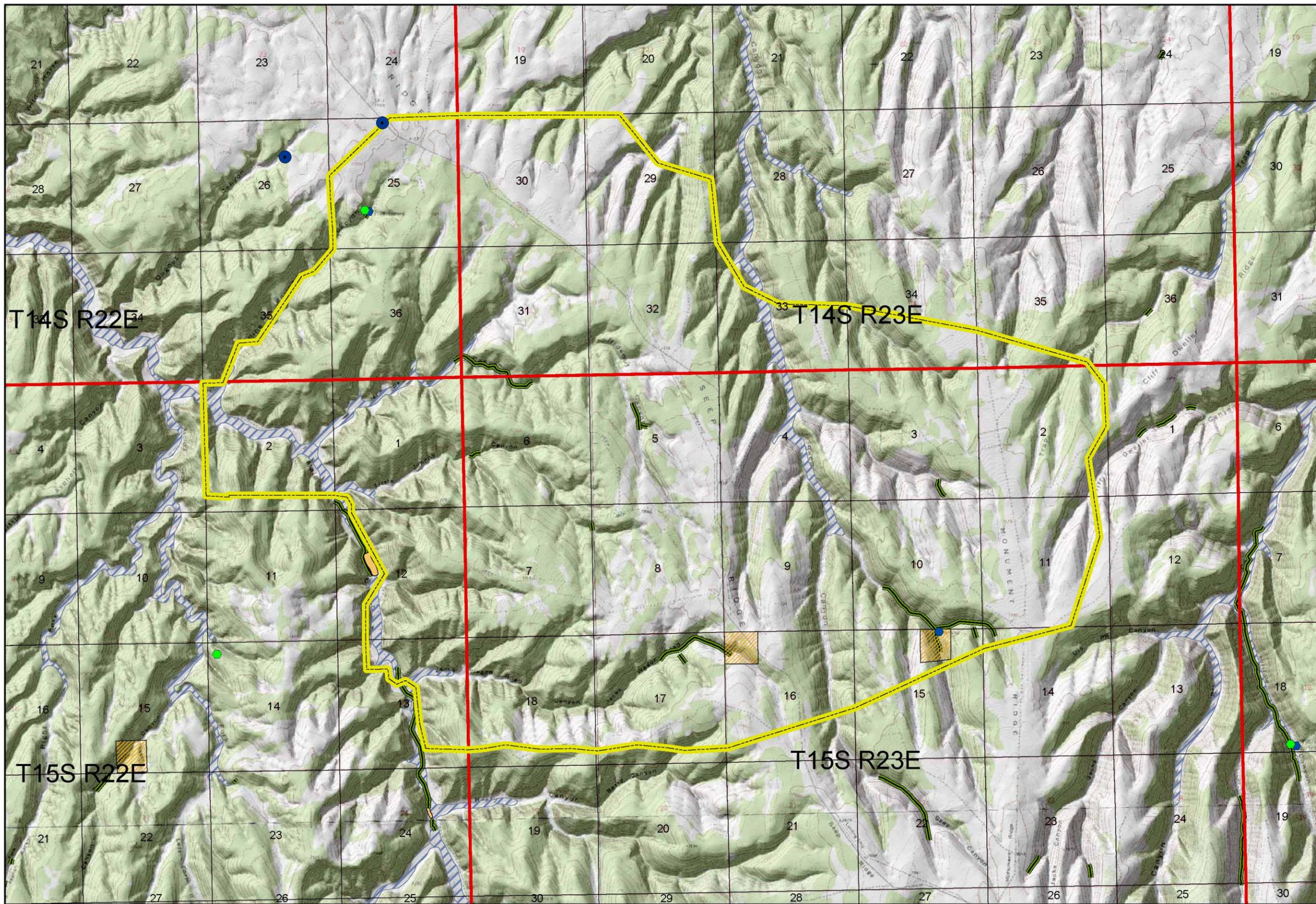
Air quality in the vicinity of the Project Area is considered good to excellent (BLM, 1984). The primary pollutant in the vicinity is expected to be particulate matter (PM), occurring as fugitive dust originating from natural sources, unpaved roads, surface disturbance associated with construction, recreation, 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 winter months as snow with scattered intense precipitation events occurring in the summer associated with strong thunderstorms. Average annual precipitation is 10 to 20 inches.

Drainages in the Project Area are ephemeral streams and 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 a zone of transition between the lower elevation mountain big sage/grassland (35 percent of the 14,700-acre Project Area) and the pinyon-juniper woodland (60 percent of the Project Area). Most of the remaining five percent supports stands of ponderosa pine and Douglas fir on north facing slopes of the steeper, lower reaches of the canyons in the Project Area. There are several scattered stands of aspen of less than one acre as well as a number of mostly narrow bands of riparian habitat along some of the drainages above the canyons and in several of the canyon bottoms (Figure 3-1) These vegetative communities support mostly dense stands and a corresponding high level of ground cover, in spite of ongoing drought conditions.

The Visual Resource Management Class for the entire Project Area is Class IV which allows changes to line, form, and color that may attract the attention of a viewer (BLM, 1984 and BLM, 1985).

Current land uses in the Project Area include oil and gas development, livestock grazing, dispersed recreation (mostly hunting), and wildlife habitat. The Project Area contains large amounts of pinyon-juniper woodlands essentially bisected by the frequently traveled north-south road known as the Seep Ridge Road, which connects the Uintah Basin to the north with the Book Cliff area and Interstate-70 to the south. Numerous 2-track roads branch out from the Seep Ridge Road to allow access into much of the Project Area. Some of the 2-track roads provide access to oil and gas facilities while others provide access to camp sites. Campers using OHVs for access frequent the Project Area. The camp sites, many of which display fire rings, may be used by hunters. Apparatus used for skinning game and remnant skins remain in the Project Area. Slash piles and cleared areas are evident in the Project Area. Litter, including discarded bar and chain oil containers, appears near some slash piles (Gayer, 2004). The Project Area includes portions of two cattle grazing allotments. Mule deer crucial winter habitat is located in four sections in the northern part of the Project Area. Elk crucial winter and summer ranges cover all of the Project Area. There are approximately nine producing oil and gas wells, eight plugged and abandoned wells, three shut-in wells, and seven abandoned locations in the Project Area (Figure 1-4).



**Legend**

- Main Canyon Bdry
- Townships
- Sections
- Floodplains
- BLM/Public Water Resource
- Riparian\_p
- Riparian\_l
- USGS Water Wells
- USGS Springs
- UT Div. Wat. Rts Sprgs

**FIGURE 3-1: SPRINGS AND WATER WELLS**

Date: 6/7/04	Projection: NAD 1927 Z12
Created by: emj	Project ID No: 148-1
File Location: C:\Projects\Evergreen\Main Canyon 3D\FIGURE-RES\Main Canyon Figure 3-1-Springs and Water Wells.mxd	
Data Sources: -BLM Vernal Office -Petroleum Geo-Services -Utah AGRC -Utah Div. of Water Rights -USGS	



In addition to cleared areas associated with oil and gas well locations, there are linearly cleared areas associated with pipelines that traverse the Project Area (BLM GIS database, 2004).

### **3.3 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 which one or more issues were identified include:

1. Cultural Resources – Critical Element
2. Native American Religious Concerns – Critical Element
5. Wildlife – Other Element/Resource of Concern

#### **3.3.1 Cultural Resources**

Based on the completion of both a Class I file search for previously recorded cultural resource sites and a Class III field survey and inventory of an area of potential effect (APE) within the Project Area, a wide range of historical and archaeological resources (sites or isolated finds) are located within or adjacent to the Project Area (Figure 1-1). Class I file searches for western and eastern portions of the Project Area revealed that 61 archaeological surveys have been conducted in or near the Project Area. These surveys consist primarily of linear inventories for roads, seismic projects, and oil and gas wells and pipelines. A total of 36 sites were recorded during the previous archaeological surveys. Twenty-three previously recorded sites are located within the Project Area, and an additional 13 sites are found within 1 mile of the Project boundary.

Of the 36 previously recorded sites, 17 sites were re-recorded, four were re-visited (no rerecording), three were recorded in the Project Area but could not be relocated, and 12 sites were located outside of the Project boundary. Most of the 36 previously recorded sites were recorded during the late 1960s and early 1980s, and they include rock art, rock shelters, lithic scatters, and historic trash scatters, corrals, peeled trees, and temporary logging camps. No evidence of substantial prehistoric remains, such as cliff dwellings, masonry granaries, slab storage cists, semi-subterranean pithouses, and retaining walls was previously recorded in the area.

A Class III cultural inventory of the proposed project's seismic source lines/locations and staging areas within the Project Area was completed in April-May 2004. Previously recorded sites within the proposed receiver line locations were re-visited as noted above. Slessman et. al 2004 provides detailed descriptions of the Class III inventories and findings. The area of potential effect (APE) for this project was a 100-foot wide corridor centered on and encompassing each source point and associated cross-country (off-road) access route for the buggy drills. In order to ensure that all seismic activity would be kept a minimum of 300 feet from culturally significant sites such as rock art (BLM standard, H-3150, Illustration 10), the APE was expanded to up to 300 feet from the APE center line in several areas that had high potential for rock art, rockshelters, or masonry structures such as canyon walls and bottoms. The expanded APE areas were delineated based on the geological formations in the canyons and the occurrence of previously recorded rock art within the same canyons (Slessman et. al., 2004).

The APE also included a single 300- x 300-foot area for staging and equipment storage, including a helicopter-landing zone. Most existing bladed roads, project receiver points, and the pedestrian/walked access routes between receiver points were not part of the defined APE. However, in most instances existing roads and trails or travel routes between some source lines were surveyed for cultural sites. These surveyed travel routes are shown on the Main Canyon 3D Seismic Project maps contained in the separate cultural resources inventory report for the Project (Slessman et al. 2004).

Cultural resources recorded during the April-May 2004 Class III field survey of the APE within the overall Project Area included 13 isolated finds (Ifs) and 10 newly-recorded cultural resource sites (Slessman et al., 2004). Four of the sites are recommended as eligible for the National Register of Historic Places (NRHP) and the remaining six sites are recommended as not eligible. Of the 10 new sites, 4 are historic, 2 contain both historic and protohistoric features (peeled trees most likely associated with Ute occupations), and the remaining 4 sites are prehistoric. The total acreage of completed Class III cultural resources field inventory for the Project's APE is 909 acres.

### **3.3.2 Native American Religious Concerns**

Federal regulations require that federal agencies must consult with Native Americans concerning cultural and religious values, beliefs, practices, and properties that may be affected by federal actions. These regulations stem from the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), Executive Orders 13007 (Indian Sacred Sites) and 13175 (Consultation and Coordination with Indian Tribal Governments). Specific traditional or religious use areas and site types that are often identified by Native Americans during this consultation process may include, but are not limited to, archaeological sites, rock art, traditional resource gathering areas, water sources, burial sites, and natural features such as mountains and plateaus.

BLM, Vernal Field Office, identified 14 federally-recognized Native American tribes and affiliate tribal historic preservation and chapter offices that have traditional ties to lands within or in the vicinity of the proposed Project Area. Initial consultation letters, Project maps, and a Project Overview have been sent to the following organizations requesting information about traditional use areas and places of cultural significance that may be affected by the project:

- Hopi Tribal Council
- Navajo Nation
- Navajo Nation Historic Preservation Office
- Duck Valley Indian Reservation
- Goshute Indian Tribe
- Northwestern Band of the Shoshone Nation
- Duckwater Shoshone - Duckwater
- Eastern Shoshone - Eastern
- Ely Shoshone Tribe
- Shoshone-Bannock Tribes
- Northern Ute Indian Tribe

Southern Ute Tribal Council  
Ute Mountain Ute Indian Tribe  
Paiute Indian Tribe

A final Native American consultation report documenting all tribal responses and requests will be produced and incorporated into the BLM Decision Record. To date, the BLM has not received responses from the tribal organizations contacted for this Project. As of the date of release of this EA for public review, no traditional cultural places have been identified by the Native American organizations contacted for this proposed Project.

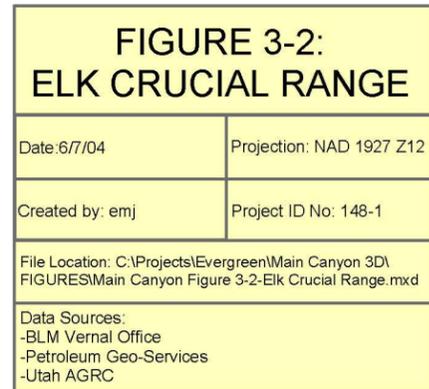
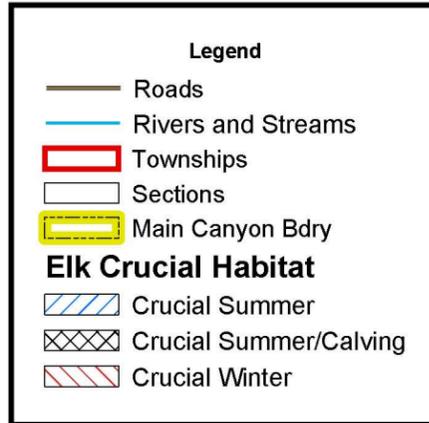
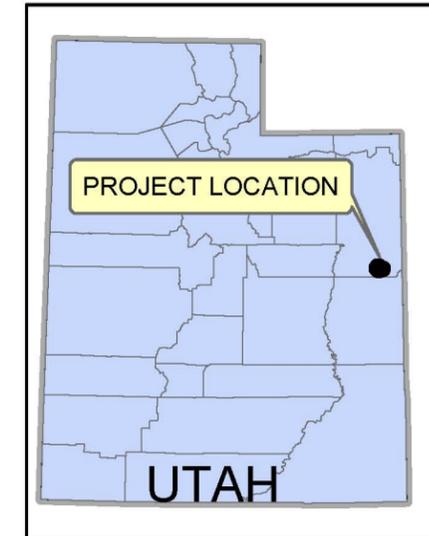
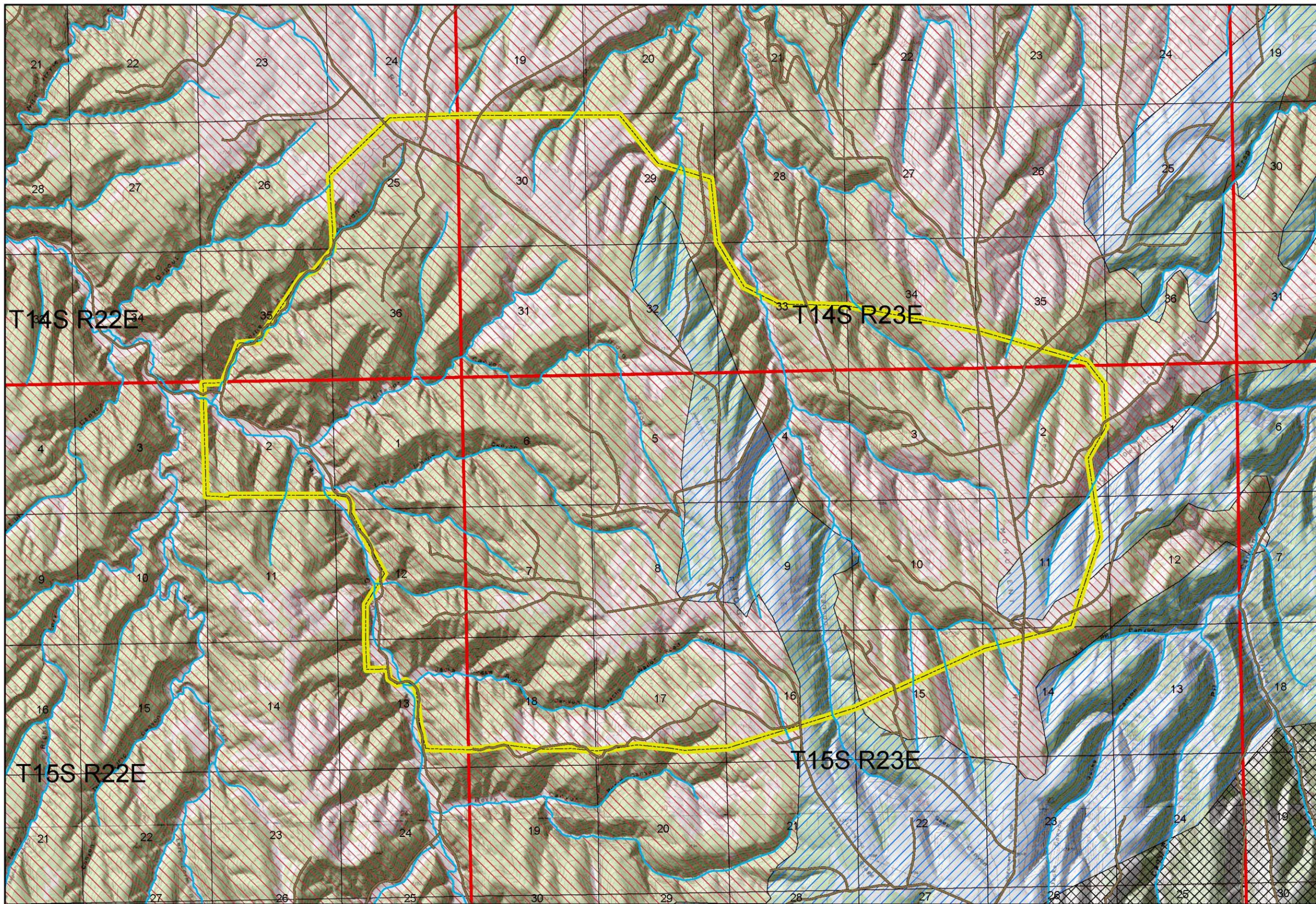
### **3.3.3 Wildlife**

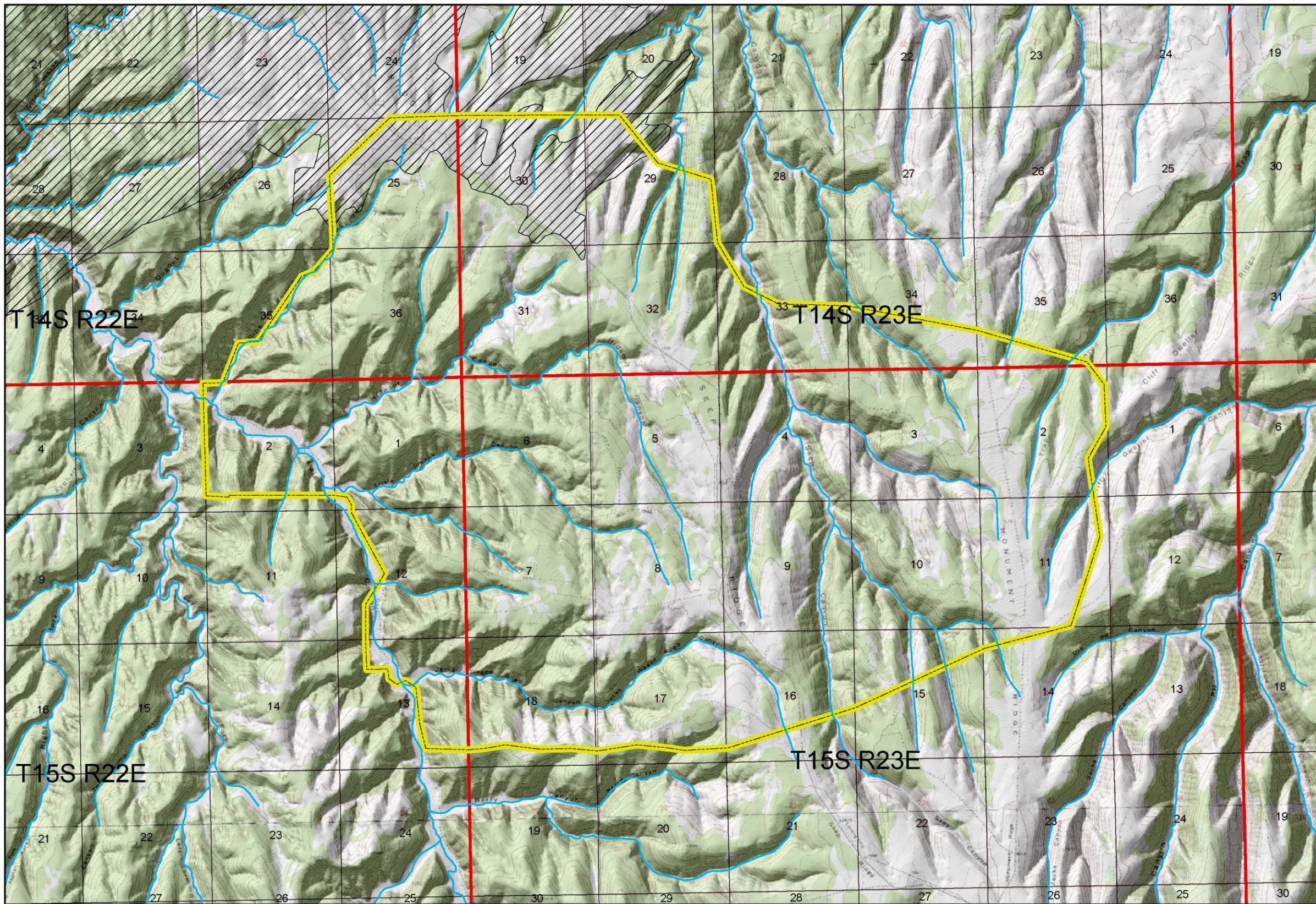
#### **Big Game**

Big game species that inhabit the Project Area include elk and mule deer (Figures 3-2 and 3-3). Crucial ranges (winter, summer, and fawning/calving) for both deer and elk occupy significant portions of the Project Area. According to UDWR, the recent drought has resulted in an unusual number of elk remaining on summer range during the time they would normally have moved to winter range at lower elevations (BLM, 2003). This results in additional pressure on forage on summer range, which may be limiting to deer and elk populations in the Book Cliffs. In addition to providing crucial winter habitat for mule deer in a portion of the Project Area (Figure 3-3), the rest of the Project Area is considered transitional range, being used primarily during fall and spring migrations. Within the proposed time frame for the Project of September 15 through November 15, mule deer would be moving through the Project Area beginning in early October as they move northward to their traditional winter habitat, north of the Project Area.

#### **Black Bear**

Black bear habitat and populations in the proposed Project Area have been under investigation for 12 plus years by Dr. Hal Black, Brigham Young University (BYU), in cooperation with the UDWR and BLM, and the results of these studies indicate that the pinyon-juniper woodland and otherwise forested portion of the proposed Project Area supports black bears and provides potential habitat for denning and foraging (BLM, 2003). Black bears forage in these wooded areas from spring to fall. The drought of 2000-2002 has resulted in poor food production for bears, which has resulted in poor cub production. Radio-collared bears have been and will continue to be monitored by Dr. Black in conjunction with on-going UDWR and BYU funded research programs.



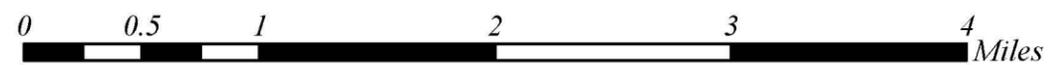


**Legend**

- Rivers and Streams
- Main Canyon Bdry
- Townships
- Sections
- Mule Deer Crit. Wint. Hab.

**FIGURE 3-3: MULE DEER CRITICAL WINTER HABITAT**

Date: 6/7/04	Projection: NAD 1927 Z12
Created by: emj	Project ID No: 148-1
File Location: C:\Projects\Evergreen\Main Canyon 3D\FIGURE-RES\Main Canyon Figure 3-3-Mule Deer Critical Habitat.mxd	
Data Sources: -BLM Vernal Office -Petroleum Geo-Services -Utah AGRC	



## **Raptors**

A number of species of raptors may be present within the Project Area including golden eagle, American kestrel, red-tailed hawk, northern goshawk, sharp-shinned hawk, prairie falcon, great horned owl, flammulated owl, and turkey vulture. While these species may be present, the Project Area is generally not characterized as preferred raptor habitat (Call, 1978). Species densities within the Project Area are suspected to be low (Faircloth, 2004). The proposed Project is scheduled to be conducted outside the raptor mating/nesting season; however, many of these raptors may still be present as they forage within, and migrate through, the Project Area. However, should the Project schedule change so that it occurs within the raptor mating/nesting season, all proposed lines would be surveyed by a qualified wildlife biologist prior to commencement of seismic survey activities and active raptor nests would be located and avoided by appropriate distances during critical seasons of use (see Section 2.2.8). Therefore, raptors would not be affected by the proposed project and are not discussed further in this EA.

## **Migratory Birds**

Bird species, including migratory birds, are common in the area. A listing of migratory birds of conservation concern to the FWS and Partners in Flight that may occur in the Colorado Plateau Physiographic Region, which includes the Project Area, is presented in Appendix C (FWS, 2004 and Partners in Flight, 2004).

## **Other Wildlife**

Other wildlife species that likely occur in the project area include Nuttall's cottontail, black-tailed and white-tailed jackrabbit, bobcat, coyote, gray fox, badger, striped and spotted skunk, mountain lion, and various species of rodents and bats. Reptiles and amphibians include short-horned lizard, sagebrush lizard, western whiptail, Great Basin gopher snake, and wandering garter snake.

# **CHAPTER 4**

## **ENVIRONMENTAL CONSEQUENCES**

### **4.1 INTRODUCTION**

This chapter presents an analysis of the environmental consequences or impacts from implementation of the Proposed Action and the No Action alternative. Issues addressed in this analysis include anticipated impacts on:

- Historic and archaic cultural resources,
- Native American religious concerns, and
- Wildlife.

Applicant-committed environmental protection measures (ACEPMs) that would avoid or reduce impacts on the existing conditions for the above resources described in Chapter 3 are presented in Chapter 2 of this EA as part of the Proposed Action. The analysis presented in this chapter assumes the integral implementation of the ACEPMs as part of project implementation.

### **4.2 DIRECT/INDIRECT IMPACTS**

#### **4.2.1 Alternative A – Proposed Action**

##### **4.2.1.1 Cultural Resources**

To minimize impacts from implementing the Proposed Action, the known cultural resource sites identified in the Class I and III inventories were avoided during the planning and design phase for the Proposed Action by relocating source points in the field within or near the sites' boundaries and by realigning and flagging access routes away from cultural resource sites. An exception to this procedure was used at several sites where the proposed access route utilized an existing disturbed road where traversing a cultural resources site. In these instances, the existing road would be used, and lathes indicating restricted off-road access were set adjacent to road to clearly indicate the restriction.

Off-road travel of floatation-tired buggy drill vehicles could result in some undiscovered cultural resources inadvertently being damaged or moved to the extent that their context would be altered. If the source lines were subsequently used for OHV use, opportunities for damage to and vandalism of cultural resources could be increased. However, BLM monitoring of previously completed seismic survey project areas in the region found that the passage of buggy- and truck-mounted drills resulted in minimal, faint to non-existent impacts to soils, limited damage/crushing of woody species and compression of non-woody species. Minimal effects on soils and the temporary effects of compressing non-woody species would make it unlikely that seismic lines would be used subsequently by OHVs (BLM, 2003). In areas of more woody vegetative cover, crushed woody vegetation from vehicle passage appeared to have made vehicle travel difficult and has likely discouraged OHV use (BLM, 2003).

To ensure that rock art would not be damaged by seismic survey activity, the width of the APE was expanded in areas with high potential for these cultural resources to up to 600 feet (300 feet on either side of the source point location). This set-back distance is more than sufficient to ensure that rock art would not be affected and was determined by using procedures described in BLM H-3150, Illustration 10.

Seismic survey source lines and associated source points have been moved to at least 300 feet from all seven of the culturally sensitive sites. The remaining seven NRHP eligible, but less sensitive sites are located above the canyon bottoms on ridges or along existing access roads. For all the seven sites, source points are a minimum of 100 feet from the site boundary, and the sites would not be impacted by drilling or detonation as they consist of less sensitive lithic scatters and camps. Two sites (42UN3713 and 42UN3718) that consist of peeled trees are located along an existing access road. Seismic survey vehicle traffic along the road would be allowed as it would not impact the peeled trees.

Protective measures that would be taken by Evergreen/PGS, as detailed in Section 2.2.8, would ensure the integrity of cultural resources.

#### **4.2.1.2 Native American Religious Concerns**

As of the date of release of this EA for public review, no traditional cultural places have been identified by the Native American organizations contacted for this proposed Project.

#### **4.2.1.3 Wildlife**

##### **Big Game**

Potential effects on big game of displacement and stress from seismic survey activities would be minimized by completing the seismic survey between September 1, 2004 and October 31, 2004 (Section 2.2.8). Survey activity limited to this two month time period would avoid impacts to mule deer and elk during the following crucial seasonal closure periods of susceptibility to human disturbance other than hunting:

May 15 – June 30	crucial elk calving and deer fawning habitat
November 1 – March 31	crucial elk and critical deer winter habitat

During the September 15, 2004 to October 31, 2004 proposed seismic survey period, both deer and elk would likely be in transition between summer and winter ranges, depending upon weather conditions. Mule deer would be found throughout the Project Area during October, as they move northward to traditional winter ranges; however, Project activities would be unlikely to adversely affect movement patterns. Both elk and mule deer hunting seasons would occur during the September through October timeframe for the proposed Project as well. The Uinta Basin and Book Cliffs have experienced a drought for several years and it is likely that elk will remain on higher elevation summer range outside the Project Area during the completion of the Project unless weather patterns change.

## **Black Bear**

Based on ongoing studies by Dr. Hal Black, Brigham Young University, discussed in the Moon Ridge 3-D Seismic Exploration Project EA (BLM, 2003), the ongoing drought resulting in poor cub production and increased competition has had the greatest effect on the black bear population in an area inclusive of the Project Area. In addition, the BLM (2003) reported increased oil and gas activity in the area may be displacing some bears to other locations. While the September-October seismic survey period would likely avoid the impact to bear denning, other impacts to bears would be similar to elk and deer, primarily temporary to short-term displacement due to seismic survey activities. Again, studies reported in BLM (2003) for lands including the proposed Project Area, bears would be temporarily displaced to adjacent, potentially less suitable habitat for forage, resulting in increased competition with other bears for resources. Should bears be denning at the time seismic survey operations are underway, they could be temporarily displaced to return to the den site, they could remain in their dens, or they could be displaced to other den sites. However, due to the temporary to short-term duration of the seismic survey, especially at any one location, it is likely that impacts to bears would be minimal and would not affect overall bear populations and distribution. Impacts to black bears from the nearby Horse Point 3-D Seismic Exploration Project, which occurred in an area of high bear populations, were negligible according to BLM (2003), who reported "Monitoring by the Division of Wildlife (DWR), of the only bear known to be denned the project area, showed the collared female remained in her den during the entire project, including when layout crews walked within a few feet, and during shooting within 70 yards." There is no reason to believe that impacts to black bears would be different as a result of the Main Canyon project.

The anticipated minimal use of OHVs of off-road, buggy drill tracks would likely not increase negative impacts from increased off-road OHV activity on black bears above existing conditions based on recent BLM post-seismic survey compliance reports for previous projects near to the Project Area (BLM, 2003).

## **Raptors and Other Neotropical Migratory Birds**

Executive Order 13186 requires the BLM to identify and either avoid, minimize, reduce or mitigate impacts to migratory birds including raptors from projects authorized by the agency. Some small animals and birds, including migratory birds, would be temporarily displaced to adjacent habitats during Project activities. Completion of the Project between September 1 and October 31 would avoid periods of sensitive nesting and fledging of young. Most migratory birds will likely have left or be ready to leave the Project Area for winter habitats.

## **Other Wildlife**

Some small, less-mobile animals such as mice and voles may be killed by vehicular traffic; however, traffic would be limited to a relatively small area and these species have high reproductive rates. Impacts to amphibians would be negligible because wetlands and riparian areas would be avoided (see Section 2.3.8- Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves). Impacts to reptiles would also be negligible due to their mobility and the low population numbers in the area. Due to the low levels and temporary nature of habitat

disturbances, no habitat fragmentation for any wildlife species is anticipated. OHV use of buggy-drill off-road trails is expected to be minimal due to the existence of an accessible road network in the Project Area and due to the rapid recovery of vegetative cover on most buggy drill trails. At current low levels of OHV use in the vicinity of the Project Area and the anticipated lack of increase of use by OHVs of seismic source lines to be traveled by off-road buggy drills, these impacts would be expected to be negligible.

## **4.2.2 Alternative B – No Action**

### **4.2.2.1 Cultural Resources**

Under the No Action Alternative, project-related impacts to cultural resources would not occur on BLM-administered lands. Cultural resources would continue to be exposed to natural weathering and erosion processes and impacted by oil and gas exploration and development activities, by foot and vehicular traffic associated with recreation use, and by livestock grazing.

### **4.2.2.2 Native American Religious Concerns**

Under the No Action Alternative, project-related impacts to cultural resources would not occur on BLM-administered lands. Any possible sites of religious concern in the Project Area would continue to be exposed to natural weathering and erosion processes and impacted by ongoing oil and gas exploration and development activities, by foot and vehicular traffic associated with recreation use, and by livestock grazing.

### **4.2.2.3 Wildlife**

Under the No Action Alternative project-related impacts to wildlife would not occur on BLM lands. Impacts to wildlife on BLM lands would continue at approximately present levels and would include additional disturbance from oil and gas exploration and development, livestock grazing, hunting, recreational use, and weather related factors such as the current drought.

## **4.3 CUMULATIVE IMPACTS**

This section describes the impacts resulting from the proposed action when added to the other past or reasonable foreseeable actions regardless of what agency or person undertakes such other actions.

### **4.3.1 Reasonably Foreseeable Action Scenario**

Reasonably foreseeable actions in the Book Cliffs area include numerous exploratory wells and development of two large oil and gas fields for which the BLM is currently preparing NEPA documents (Resource Development Group Natural Gas Project and Inland Resources). An EA was recently completed for the Wolf Point Pipeline Project (construction is to start in early June) which would transport gas from west of Main Canyon Project Area to an existing pipeline to the south. The BLM is planning to conduct prescribed burns on four parcels in the upper Book Cliffs, one of which will burn much of the Moon Ridge project area in the fall of 2004. Some timbering has occurred on SITLA lands in the vicinity of the project area, and additional

timbering is likely to occur in the future. Should the Proposed Action identify areas with a high probability of oil and gas resources, it is likely that proposals would be made to recover those resources; however, although such future proposals could utilize the data from the proposed geophysical study, such proposals are speculative at this time and cannot be considered reasonable foreseeable developments or connected actions (previous decisions from the Interior Board of Land Appeals [IBLA] indicate that geophysical exploration and the drilling of a well would not be considered connected actions [see Southern Utah Wilderness Alliance 122 IBLA 165]).

### **4.3.2 Cumulative Impacts**

Road development, oil and gas development, recreation, timber harvest, and livestock grazing have previously affected the project area. There are 27 oil and gas well locations in the project area and approximately 3,300 active wells in Uintah and Grand Counties. Assuming five acres of disturbance per well, at least 16,500 acres have been disturbed by oil and gas development. Livestock have grazed the general area for approximately 100 years. Recreationists, especially big game hunters, hikers, and wilderness enthusiasts, utilize the Book Cliffs, some using OHVs, in pursuit of their interests. The entire Main Canyon Project Area is open to OHV use. Some timbering has occurred on SITLA lands in the vicinity of the Project Area, and additional timbering is likely to occur in the future. All of these activities have had, and continue to have, environmental impacts. Many of the impacts are related to surface disturbance and its impacts to various resources. Such disturbance can disturb and potentially damage cultural resources and wildlife and their habitat. Mitigation measures are included in federally-permitted development plans to minimize impacts to the environment. Such mitigation is generally effective in protecting cultural resources, but less effective in protecting wildlife because some habitat disturbance and displacement is inevitable with oil and gas development. However, appropriate mitigation does minimize impacts to wildlife.

Oil and gas development in the Book Cliffs occurs primarily north of the Main Canyon Project Area, and cumulative impacts and scenarios for anticipated oil and gas exploration and development in the Book Cliffs are described in EA UT-080-1997-51, Wexpro Co. Island Unit (BLM, 1997); EA UT-080-1998-01, Costilla Energy, Inc. Hill Creek Unit (BLM, 1998); and EA UT-080-1999-32, EOG Resources, Inc. Chapita Wells Unit Infill Development (BLM, 1999). These documents are on file and may be reviewed at the BLM Vernal Field Office. All future projects on public lands would require approval including preparation of site-specific NEPA documents with consideration of cumulative impacts.

The higher elevations of the Book Cliffs have not yet been developed to the same extent as the lower elevation areas along the Green and White Rivers. Although there are 19 wells in the Main Canyon Project Area, the area retains a relatively natural and unaltered appearance. Crucial summer range for elk and mule deer occurs at these higher elevations and, unlike many other areas in the west, is less abundant than winter range. The Book Cliffs, as well as much of Utah, is currently experiencing a drought that has lasted several years, reducing vegetative production and forage for livestock and wildlife. Elk in the Book Cliffs have remained on summer range for the last several winters, and black bears are in poor condition and have produced few cubs during that time. However, seismic exploration has minimal impact on these crucial summer

ranges because of the short duration and the limited effects of such projects on habitat (BLM, 2003).

In September 2001, Veritas DGC Land, Inc. conducted seismic exploration along a 2-mile line in Sections 8 and 9, T12S, R22E. The project was analyzed in the Environmental Assessment for a 2-Mile Seismic Line, Sections 8 and 9, Township 12 South, Range 22 East, Uintah County, Utah, by Veritas DGC Land, Inc. EA No. UT-080-2001-475 (Veritas 2-Mile EA)(BLM, 2001). The BLM Vernal Field Office issued a Decision of Record and Finding of No Significant Impact on August 21, 2001. Veritas DGC Land, Inc. also conducted seismic exploration along numerous lines traversing a major portion of the Book Cliffs in a project that was analyzed in the Environmental Assessment for 2-D Seismic Exploration by Veritas DGC Land, Inc., Uintah County, Utah, UT-080-2002-21 (Veritas EA)(BLM, 2002). A Decision Record and Finding of No Significant Impact for that project were issued on October 4, 2002.

WesternGeco conducted seismic exploration in late 2002 in a 30.9 square mile area, located approximately 1 miles south of the proposed Main Canyon 3D Seismic Survey Project Area, which was analyzed in the Decision Record, Finding of No Significant Impact, and Environmental Assessment for the WesternGeco Horse Point 3-D Seismic Exploration, Uintah and Grand Counties, Utah, EA No. UT-080-2002-219 (Horse Point EA), issued November 9, 2002 (BLM, 2002a).

Trace Energy Services, Inc. (Trace) conducted seismic exploration in late 2003 in a 23.3 square mile area, located approximately 10 miles southwest of the proposed Main Canyon 3D Seismic Survey Project Area, that was analyzed in the Decision Record, Finding of No Significant Impact, and Environmental Assessment for the Trace Energy Service, Inc.'s Moon Ridge 3-D Seismic Exploration Project, Uintah and Grand Counties, Utah, EA No. UT-080-2003-0256 (Moon Ridge EA), issued September 3, 2003 (BLM, 2003).

These four projects took place within a similar environmental setting and generally used the same techniques (shot-holes and recording lines) as proposed by PGS in this document. The two Veritas projects were 2D projects, whereas the WesternGeco, Trace, and this Evergreen/PGS projects are 3D projects. The primary difference between 2D and 3D projects is that in 3-D projects the source lines and receiver lines are separate lines, whereas in 2D projects, both the source and recording lines occur along a common line. The issues of this EA are similar to those in the four aforementioned EAs that are incorporated by reference. Complete copies of these four reference documents are available at the BLM Vernal Field Office.

All of the recent seismic projects incorporated similar applicant-committed environmental protection measures as well as additional mitigation (incorporated into BLM Conditions of Approval) to mitigate environmental impacts to cultural and wildlife resources. Impacts to cultural and wildlife resources were short-term and minimal due to the application of environmental protective measures, as is corroborated in the compliance monitoring reports for these recent projects (BLM, 2003).

The BLM is tentatively planning to conduct prescribed burns on four parcels in the upper Book Cliffs, one of which would burn much of the nearby Moon Ridge Project Area in the fall of

2004. The purpose of the burn is "to provide increased wildlife forage, and to improve overall wildlife habitat for deer and elk in the area by altering the present late seral stages communities of sagebrush bottoms, mountain browse, and pinyon-juniper to an earlier seral stage where the forbs, grasses, and desirable browse species would be more productive". The burn would result in a short-term reduction in forage, cover, and nesting habitat for some wildlife species; the risk of a short-term increase in soil erosion; a short-term decline in opportunities for primitive and unconfined recreation; and a short-term reduction in the opportunity to hunt, photograph, or observe big game in the treated area. The burn would also result in a long-term increase in forage production, diversification of seral stages of vegetation, infiltration rates and ground water recharge, and opportunities to hunt, photograph, and observe big game species. Many of even the short-term impacts from the Moon Ridge Project (such as breaking/crushing of vegetation) would be incinerated if the burn occurs.

The low, short-term impacts generated by the Proposed Action would add little to cumulative impacts from larger and more permanent developments such as roads and oil and gas fields in the Book Cliffs. Compliance monitoring reports on the 2D seismic lines drilled and recorded by Veritas in 2001 and 2002 and the 3D project on Horse Point in 2002 observed that impacts to soils and vegetation make it unlikely that indirect impacts would result from use of off-road buggy drill tracks by OHVs. The anticipated cumulative impacts of 49 acres from the Proposed Action, together with the approximately 766 acres of surface disturbance from the recent Veritas, Western Geco, and Trace seismic projects in the Book Cliffs area, would involve an estimated total disturbance of approximately 815 acres. The cumulative impacts from these three exploration seismic projects would represent approximately 1 percent of the combined project areas of almost 115 square miles. The contribution to cumulative impacts from the Proposed Action when added to other recent seismic projects would be minimal and short-term.

## **CHAPTER 5 CONSULTATION AND COORDINATION**

### **5.1 INTRODUCTION**

The public involvement process for this proposed project involved the BLM Vernal Field Office officially posting the proposed project on the Electronic Notification Bulletin Board (ENBB) on July 9, 2004. The scoping process has continued through the development of this analysis and to date, no comments have been received from the public. Internal scoping and the identification of issues by BLM staff are discussed and the issues are listed in Section 1.6 of this EA. The issues analyzed in Chapter 4 were identified through public and agency involvement.

### **5.2 PERSONS, GROUPS, AND AGENCIES CONSULTED**

#### **U.S. Fish & Wildlife Service**

The proposed project has been discussed verbally with USFWS on several occasions prior to the release of this EA. Several discussions were held between her and the BLM VFO wildlife specialist. The BLM provided the USFWS with a shape file map of the Project Area. Most recently, O&G Environmental Consulting spoke with the USFWS and the USFWS provided an updated list of sensitive species for inclusion in the EA analysis and indicated the USFWS will review and comment on the EA when released for public review.

#### **Utah Division of Wildlife Resources**

The status of Mexican spotted owl habitat potentially occurring in the Project Area was discussed with the Utah Division of Wildlife Resources.

#### **Utah State Historic Preservation Office (SHPO)**

#### **Tribes**

The BLM Vernal Field Office identified 14 federally-recognized Native American tribes and affiliate tribal historic preservation and chapter offices that have traditional ties to lands within or in the vicinity of the proposed Project Area. Initial consultation letters, project maps, and a project overview have been sent to the following organizations requesting information about traditional use areas and places of cultural significance that may be affected by the project:

Hopi Tribal Council  
Navajo Nation  
Navajo Nation Historic Preservation Office  
Duck Valley Indian Reservation

Goshute Indian Tribe  
 Northwestern Band of the Shoshone Nation  
 Duckwater Shoshone - Duckwater  
 Eastern Shoshone - Eastern  
 Ely Shoshone Tribe  
 Shoshone-Bannock Tribes  
 Northern Ute Indian Tribe  
 Southern Ute Tribal Council  
 Ute Mountain Ute Indian Tribe  
 Paiute Indian Tribe

A final Native American consultation report documenting all tribal responses and requests will be produced and incorporated into the BLM Decision Record. To date, the BLM has received no responses from the tribal organizations contacted for this Project. As of the date of release of this EA for public review, no traditional cultural places have been identified by the Native American organizations contacted for this proposed Project.

### 5.3 SUMMARY OF PUBLIC PARTICIPATION

Public notification of the proposed action was initiated with the posting of the Notice of Intent to Conduct Oil and Gas Geophysical Exploration Operations received on February 2, 2004 by the BLM VFO, in accordance with 43 CFR 3162.3-1(g). During the preparation of the EA, the public was also notified of the proposed action by posting a notification of the Project on the Utah BLM Internet Homepage (Environmental Notification Bulletin Board) on July 9, 2003. A 30-day public comment period will be offered from August 18, 2004 to September 17, 2004.

### 5.4 LIST OF PREPARERS

List of BLM staff and supporting consultants are presented in Tables 5-1 and 5-2, respectively.

**Table 5-1 List of Preparers – BLM**

Name	Title	Responsibilities
Veronica Herkshan	Team Leader, Planning Specialist	Technical coordination and quality control
Steve Knox	Wilderness Coordinator	Evaluation of potential effects on lands with wilderness characteristics
Duane DePaepe	Wilderness Specialist	Evaluation of potential effects on lands with wilderness characteristics
Kim Bartel	Recreation Planner	Evaluation of lands with characteristics meeting criteria for potential ACEC status
Tim Faircloth	Wildlife Biologist	Impact analysis for wildlife and special status animal species
Robert Specht	Natural Resource Specialist	Impact analysis for special status plant species

Name	Title	Responsibilities
Blain Phillips	Archaeologist	Impact analysis for cultural resources and Native American religious concerns
John Mayers	Geologist	Evaluation of potential effects on paleontological resources
Dylan Tucker	Natural Resource Specialist	Evaluation of potential effects for soils, wetlands, and riparian zones
Karl Wright	Natural Resource Specialist	Evaluation of potential effects on floodplains

**Table 5-2 List of Preparers – O&G Environmental Consulting, LLC and SWCA**

Name	Title	Responsibilities
Richard Bell – O&G	Project Manager	Technical coordination and document preparation/quality control
Bonnie Carson – O&G	Environmental Engineer/Resource Specialist	Evaluation of potential effects for lands with wilderness characteristics and characteristics meeting criteria for ACEC designation
Scott Slessman - SWCA	Archaeologist	Impact analysis for cultural resources
Chris Gayer – O&G	Biologist	Impact analysis for wildlife and special status plant and animal species

## **CHAPTER 6 REFERENCES AND GLOSSARY**

### **6.1 REFERENCES CITED**

- Bureau of Land Management. 1984. Final Environmental Impact Statement on the Book Cliffs Resource Management Plan. Bureau of Land Management, Vernal District Office. Vernal, Utah.
- Bureau of Land Management. 1985. Record of Decision and Rangeland Program Summary for the Book Cliffs Resource Management Plan. Bureau of Land Management, Vernal District Office. Vernal, Utah.
- Bureau of Land Management. 1997. Wexpro Co. Island Unity Environmental Assessment. EA No. UT-080-1997-51. Bureau of Land Management, Vernal Field Office, Vernal, Utah.
- Bureau of Land Management. 1998. Costilla Energy, Inc. Hill Creek Unit Environmental Assessment. EA No. UT-080-1998-01. Bureau of Land Management, Vernal Field Office, Vernal, Utah.
- Bureau of Land Management. 1999. EOG Resources, Inc. Chapita Wells Unit Infill Development Environmental Assessment. EA UT-080-1999-32. Bureau of Land Management, Vernal Field Office, Vernal, Utah.
- Bureau of Land Management. 2001. Environmental Assessment for a 2-Mile Seismic Line, Sections 8 and 9, Township 12 South, Range 22 East, Uintah County, Utah. EA No. UT-080-2001-475. Bureau of Land Management, Vernal Field Office. Vernal, Utah.
- Bureau of Land Management. 2001a. Inspection of completed Veritas seismic operations (Section 8 and 9, T21S, R22E). Memorandum from Stan Olmstead, Environmental Scientist, to Howard Cleavinger, Assistant Field Office Manager, dated September 19, 2001. Bureau of Land Management, Vernal Field Office. Vernal, Utah.
- Bureau of Land Management. 2002. Environmental Assessment for 2-D Seismic Exploration by Veritas DGC Land, Inc., Uintah County, Utah. EA No. UT-080-2002-21. Bureau of Land Management, Vernal Field Office. Vernal, Utah.
- Bureau of Land Management. 2002a. November 2002. Environmental Assessment for WesternGeco's Horse Point 3-D Seismic Exploration Project, Uintah and Grand Counties, Utah. EA No. UT-080-2002-219. Bureau of Land Management, Vernal Field Office, Vernal, Utah.
- Bureau of Land Management. 2003. September 2003. Decision Record, Finding of No Significant Impact Decision, and Environmental Assessment for Trace Energy Service, Inc.'s Moon Ridge 3-D Seismic Exploration Project, Uintah and Grand Counties, Utah.

- EA No. UT-080-2003-0256. Bureau of Land Management, Vernal Field Office, Vernal, Utah.
- Bureau of Land Management. 2004. GIS Database. 2004. Vernal Field Office. Vernal Utah.
- Call, M.W. 1978. *Nesting Habitats and Surveying Techniques for Common Western Raptors*. U.S. Department of the Interior, Bureau of Land Management, Technical Note No. 316. 115 pp.
- Faircloth, Tim. 2004. Main Canyon 3-D Seismic Project Raptor Potential. Personal communication with Chris Gayer on 4-20-04 regarding potential for raptors in the Project Area. Bureau of Land Management, Vernal Field Office.
- Fenneman, N.E. 1931. *Physiography of Western United States*. McGraw-Hill Book Company. New York, New York.
- Gayer, Chris. May 24, 2004. O&G Environmental Consulting. Personal communication with respect to field observations made during site visit in May 2004.
- Harty, K.M. 1991. *Landslide Map of Utah*. 1:500,000. Utah Department of Natural Resources, Utah Geological and Mineral Survey. <http://geology.utah.gov/maps/geohazmap/pdf/m-133.pdf>
- Maxfield, B. 2004. Main Canyon 3D Seismic Project Mexican Spotted Owl Habitat Assessment. Utah Division of Wildlife Resources. 1 page.
- Natural Resources Conservation Service. 2002. Soil Survey Geographic (SSURGO) database for Uintah Area, Utah - Parts of Daggett, Grand and Uintah Counties. <http://soildatamart.nrcs.usda.gov/Report.aspx?Survey=UT047&UseState=UT>
- Partners in Flight. 2004. Colorado Plateau [Priority Bird populations and Habitats]. Retrieved from [http://www.blm.gov/wildlife/pl\\_87sum.htm](http://www.blm.gov/wildlife/pl_87sum.htm). Accessed July 15, 2004.
- Slessman, Scott A., Todd Kohler, Sarah Baer, and Matthew Seddon. 2004 Class III Cultural Resource Inventory Report for Evergreen Resource's Proposed Main Canyon 3D Seismic Project, Uintah County, Utah. Prepared for the BLM, Vernal Field Office, Vernal, Utah by SWCA Environmental Consultants, Broomfield, Colorado.
- Slessman, Scott. May 25, 2004. SWCA. Personal communication via telephone with respect to field observations made during site visits in May 2004.
- Uintah County Commissioners. 1998. *Uintah County Plan for Management of the Book Cliffs Resource Area*. 56 pages.
- U.S. Fish and Wildlife Service. 2004. Personal communication [July 15 email from Diana Whittington to Chris Gayer, O&G Environmental Consulting, LLC. Englewood, Colorado. RE: Migratory Birds of Conservation Concern]. Fish and Wildlife Biologist, Energy, USFWS, Ecological Services, West Valley City, UT.

## 6.2 GLOSSARY OF TERMS

Bentonite	A sedimentary rock formed from the alteration in place of volcanic ash. Largely composed of the clay mineral montmorillonite. The rock commonly has great ability to absorb water and swell.
Buggy Drill	Drill-mounted center-articulated, 4-wheel tractor for off-road accessing shot-hole locations
Cultural Resources	The archaeological and historical remains of human occupation or use. Includes any manufactured objects, such as tools or buildings. May also include objects, sites, or geological and geographical locations that are significant to Native Americans.
Ephemeral Stream	A stream or portion of a stream which flows only in direct response to precipitation. Dictionary of Geologic Terms, 1976.
Escarpment	A steep face terminating high lands abruptly typically as a steep slope.
Floodplain	That portion of a river valley, adjacent to the river channel, which is built of sediments during the present regimen of the stream and which is covered with water when the river overflows its banks at flood stages. Dictionary of Geologic Terms, 1976.
Forage	Vegetation used for food by wildlife, particularly big game species, and livestock
Geophysical Seismic Survey	The gathering of artificially-generated earth vibration data from an area.
Gravelly Clay	Clayey soils containing rounded or angular rock fragments up to 3 inches in diameter.
Habitat	The place or type of site where a plant or animal naturally or normally lives and grows. Includes all biotic, climatic, and soil conditions, or other environmental influences that affect living conditions.
Habitat Fragmentation	The process that increasingly subdivides habitats into smaller units, resulting in their increased isolation as well as loss of total habitat area.
Heliportable Drill Rigs	Shot-hole drill rig made for transport by being slung beneath a helicopter.
Hydrocarbons	Compounds containing only the two elements carbon and hydrogen – typically use as an overall reference to oil, natural gas, tar sand, and oil shale energy resources.

## Glossary of Terms (continued)

Lithic Scatter	A surface scatter of cultural artifacts and debris that consists of lithic or stone tools and chipped stone debris.
Mitigate	To lessen the severity.
Mitigation	Actions to avoid, minimize, reduce, eliminate, or rectify the impact of a management practice.
Receiver Geophones	A detector placed on or in the ground in seismic work, which responds to the ground motion at the point of its location. Dictionary of Geologic Terms, 1976.
Reclamation	The process of restoring disturbed areas using any of several methods: recontouring, spreading topsoil or growth medium, soil loosening, seeding, and planting among others.
Riparian	Land areas that are directly influenced by water. They usually have visible vegetative or physical characteristics showing this influence. Stream-sides, lake-borders, or marshes are typical riparian areas.
Seismograph	Instrument which records seismic waves.
Shot	Explosive charge used in geophysical seismic exploration.
Shot Hole	Drilled borehole in which the explosive charge or shot is placed for subsequent detonation and ground vibration generation.
Silt Loam	Soil material that contains 50 percent of more silt and 12 to 27 percent clay (or) 50 to 80 percent silt and less than 12 percent clay.
Topography	The physical features of a district or region, such as are presented on maps taken collectively; especially, the relief and contour of the land.
Vibroseis Buggy	A vibrator-mounted articulated, 4-wheel tractor for traveling from source point to source point to generate ground vibrations as part of a geophysical seismic survey.
Wetlands	Areas that are inundated by surface water or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

### 6.3 List of Acronyms Used in this EA

ACEC	Areas of Critical Environmental Concern
ACEPMS	Applicant-committed Environmental Protection Measures
AIRFA	American Indian Religious Freedom Act
AO	Authorized Officer
APE	Area of Potential Effect
ATV	All Terrain Vehicles
BCRMP	Book Cliffs Resource Management Plan
BLM	Bureau of Land Management
BYU	Brigham Young University
CEQ	Council of Environmental Quality
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
ENBB	Electronic Notification Bulletin Board
EPA	Environmental Protection Agency
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
GPS	Global Positioning System
IBLA	Interior Board of Land Appeals
Ifs	Isolated Finds
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NRHP	National Register of Historic Places
OHV	Off-Highway Vehicle
ORV	Off-Road Vehicle
OSHA	Occupational Safety and Health Administration
RFAS	Reasonably Foreseeable Action Scenario
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-Way
SHPO	State Historical Preservation Office
UDWR	Utah Division of Wildlife Resources
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VFO	Vernal Field Office - BLM
WSA	Wilderness Study Area

**APPENDIX A**  
**INTERDISCIPLINARY TEAM ANALYSIS RECORD**

# Appendix A – Interdisciplinary Team Analysis Record

Project Title: Main Canyon 3D Seismic Survey Project

NEPA Log Number: UT-080-2004-0380

File/Serial Number: NA

Project Leader: Veronica Hershman

Date Proposal Received: February 2, 2004

**FOR EAs:** NP- not present; NI- resource/use present but not impacted; PI- potentially impacted  
**FOR DNAs ONLY:** NC-no change (anticipated resource impacts not changed from those analyzed in the NEPA document on which the DNA is based)

## STAFF REVIEW OF PROPOSAL:

NP/NI/ PI	Resource	Date Rev	Sign.	Review Comments
<b>CRITICAL ELEMENTS</b>				
NI	Air Quality	8/14/04	<i>[Signature]</i>	Air quality in Uintah County is in compliance with federal and state ambient air quality standards. The alternatives would not affect air quality because activities would be short-term in any given location, no construction/earth-moving would occur, vehicles and construction equipment would be kept properly tuned to minimize emissions, and BLM-stipulated dust control measures would be applied as required (Section 2.3.8 of the EA). No permits or authorizations from the State of Utah, Division of Air Quality, would be required.
NP	Areas of Critical Environmental Concern			No lands designated as ACEC are present in the Project Area.
PI	Cultural Resources	8/11/04	<i>[Signature]</i>	Class I and III cultural resource surveys have been completed for the proposed seismic survey project, including source lines, off-road travel routes for buggy drills, and a main staging area. Any previously unrecorded prehistoric or historic archaeological sites and properties discovered during the inventories have been recorded. Although sites or properties found in the Project Area are to be avoided by the proposed seismic survey, potential impacts are analyzed in this EA with the application of applicant-committed environmental protection measures listed in Section 2.3.8 – Cultural Resources. If sites and/or properties would be found during the seismic survey, all activities at such a site

NP/NI/ PI	Resource	Date Rev	Sign.	Review Comments
NI	Environmental Justice	9/14/04	<i>[Signature]</i>	would cease immediately and the applicable AO would be contacted and notified of the find. Any further work at the reported site would not resume until and unless authorized by the AO.
NP	Farmlands (Prime or Unique)		<i>[Signature]</i>	Utah County has a minority population of 14% and a poverty population of 18%, and Grand County has a minority population of 7% and a poverty population of 14.4% (BLM, 2003). The Proposed Action and alternatives would not cause disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or Indian tribes due to the absence of these groups in the Project Area.
NI	Floodplains	8-11	<i>[Signature]</i>	No prime or unique farmlands are present within the Project Area. The temporary effects of off-road vehicle passage and the drilling of shot holes followed by subsurface detonation of charges would not impact current conditions of affected floodplains in the Project Area. This determination of no impact is consistent with the current BCRMP (BLM, 1985) and Executive Order No. 11988.
NI	Invasive, Non-native Species	8/17	<i>[Signature]</i>	The Proposed Action would not affect the introduction of invasive non-native species because PGS would power wash all equipment prior to use in the Project Area to minimize the potential for introduction of invasive non-native species seeds (Section 2.3.8-Invasive Non-native Species). Surface effects would be limited, thus minimizing the possible spread of any non-native species already in the Project Area.
PI	Native American Religious Concerns	9/17	<i>[Signature]</i>	To date, there are no Native American religious concerns within the Project Area as identified by the respondents that have replied to the BLM's letter requesting consultation coordination and consultation continues).
NP	Threatened, Endangered or Candidate Species - Plants	8-17	<i>[Signature]</i>	Suitable habitat in the Project Area for the special status plant species listed for the Vernal Field Office is absent based on vegetation types and species composition, soils, geological formations, precipitation, elevations, and past surveys in the area (Special Status Plant Species Report prepared by Robert Specht for the Main Canyon 3D Seismic Survey Project dated May 6, 2004).
NP/NI	Threatened, Endangered or Candidate Species - Animal/Fish	8-17	<i>[Signature]</i>	Nine species have been identified by the FWS that may occur in the Project Area: 1-4. Four endangered fish (Bony tail, <i>Gila elegans</i> ; Colorado pikeminnow, <i>Ptychocheilus lucius</i> ; humpback chub, <i>Gila cypha</i> ; and razorback sucker, <i>Xyrauchen texanus</i> ) may be affected by activities in Uintah and Grand Counties; however, the absence of perennial flows in streams in the Project Area, the absence of the need for water use and depletion of the Upper Colorado River system (see Section 2.3.8 - Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves), the absence of proposed Project-related disturbance of wetlands and riparian areas, and the minimization of soil disturbance and potential for accelerated erosion and sedimentation of streams precludes any impact to these four species. 5. No impacts to bald eagle ( <i>Haliaeetus leucocephalus</i> ) are anticipated due to the absence

NP/NI/ PI	Resource	Date Rev	Sign.	Review Comments
				<p>of nesting habitat, wintering habitat, and winter roost areas and the 30-mile distance to the nearest suitable habitat along the Green River. No bald eagles were observed in a spring raptor survey of the Project Area by O&amp;G Environmental Consulting, LLC.</p> <p>6. No impacts to the Mexican spotted owl (<i>MSO</i>)(<i>Strix occidentalis lucinda</i>) are anticipated due to the absence of suitable habitat in the Project Area. Although two recent habitat prediction models for MSO present conflicting information, recent field verification by Utah Division of Wildlife personnel confirmed that suitable habitat for the species is not present in the Project Area. No owls were observed in a spring raptor survey of the Project Area by O&amp;G Environmental Consultants.</p> <p>7. The western yellow-billed cuckoo (<i>Coccyzus americanus occidentalis</i>) may occur and nest in riparian areas in Uintah County during spring and summer months. However, no impacts to this species is anticipated due to the absence of sitings within or near the Project Area and seismic survey activities will not disturb riparian areas within the Project Area (Section 2.3.8-Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves).</p> <p>8. The absence of prairie dog towns and the prey base necessary for the black-footed ferret (<i>Mustela nigripes</i>) in the Project Area precludes any impacts to this species.</p> <p>9. The absence of critical value habitat for the lynx (<i>Lynx canadensis</i>) (i.e., Uinta Mountains deep forest) in the Project Area and no record of sightings of the species in the Book Cliffs precludes any impact to this species.</p>
NP	Wastes (hazardous or solid)			<p>No chemicals subject to SARA Title III in amounts greater than 10,000 pounds would be used. No extremely hazardous substances as defined in 40 C.F.R. 355 in threshold planning quantities would be used.</p>
NI	Water Quality (drinking/ground)	8-16-04	Floodplains (parties)	<p>The Proposed Action would not affect water resources because of setback distances that would be imposed between shot-holes and water resources (see Section 2.3.8- Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves). In addition, subsurface detonation of explosives would leave a benign residual of gases and solids – water/steam, carbon dioxide gas, nitrogen gas, calcium carbonate solid, and sodium carbonate gas. No surface water depletions from the Upper Colorado River would occur due to use of other non-depleting sources (Section 2.3.8)</p>
NI	Wetlands/Riparian Zones	8-16-04	Floodplains (green)	<p>All wetlands and riparian areas are to be avoided by all survey activities by a minimum distance of 300 feet (see Section 2.3.8-Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves).</p>
NP	Wild and Scenic Rivers			<p>No wild or scenic rivers occur in the Project Area, and none would be affected by the proposed Project.</p>
NP	Wilderness			<p>The Winter Ridge WSA is adjacent to, but totally outside the proposed project area.</p>

NP/NI/ PI	Resource	Date Rev.	Sign.	Review Comments
<b>OTHER RESOURCES/CONCERNS</b>				
NI	Rangeland Health Standards and Guidelines	8/11	<i>[Signature]</i>	The Proposed Action would not measurably affect water, nutrients, or energy system flows because of the very small disturbance area and because of applicant-committed environmental practices designed to minimize disturbance to soils and vegetation (see Section 2.3.8-Soils and Vegetation), water resources (see Section 2.3.8-Floodplains, Streams, Wetlands/Riparian Areas, and Public Water Reserves), and existing facilities (see Section 2.3.8-Protection of Existing Facilities and Rights-of-way (ROWs)) and to minimize the potential for the introduction of invasive non-native species (see Section 2.3.8-Invasive Non-native Species). No animal unit months of grazing would be lost.
NI	Livestock Grazing	8/11	<i>[Signature]</i>	No animal unit months would be lost from implementation of the alternatives and all stock control features such as fences, gates, and cattleguards would be maintained and repaired to pre-Project conditions following completion of the seismic survey (Section 2.3.8-Protection of Existing Facilities and Rights-of-Way (ROWs)).
NI	Woodland/Forestry		<i>[Signature]</i>	Timber resources would not be affected by the proposed alternatives.
NI	Vegetation	8/11	<i>[Signature]</i>	To minimize impacts to vegetation and supporting soils, 1) vehicular traffic would be limited to the seismic source lines and designated access routes; 2) vehicle use along seismic source lines would be limited to two tracks where possible to minimize damage to plants; 3) in areas of pinyon, juniper, and other trees, damage to trees would be avoided by routing around trees; 4) all vehicles would be instructed to travel at slow speeds to minimize affects on vegetation and soils; and 5) no vehicles would be operated during periods of saturated soil conditions when surface ruts deeper than 4 inches would occur along off-road travel routes (Section 2.3.8).
PI	Wildlife	8/11	<i>[Signature]</i>	The alternatives may affect big game, bears, raptors, migratory birds, and other species and impacts are analyzed in this EA. Application of applicant-committed environmental protection measures in Section 2.3.8 would minimize impacts to wildlife species.
NP	Utah State Sensitive Species	8/11	<i>[Signature]</i>	No Utah State sensitive species have been identified as occurring in the Project Area. Based on consultation with UDW, no impacts to sensitive species are anticipated (Maxfield, 2004)
NI	Soils	8/11	<i>[Signature]</i>	To minimize impacts to protective vegetation and soils, 1) vehicular traffic would be limited to the seismic source lines and designated access routes; 2) vehicle use along seismic source lines would be limited to two tracks where possible to minimize damage to plants; 3) in areas of pinyon, juniper, and other trees, damage to trees would be avoided by routing around trees; 4) all vehicles would be instructed to travel at slow speeds to

NI	Recreation			minimize affects on vegetation and soils; and 5) no vehicles would be operated during periods of saturated soil conditions when surface ruts deeper than 4 inches would occur along off-road travel routes (Section 2.3.8).
NI	Visual Resources	8/17/04	Kenneth Bantz	The absence of developed recreation sites in the Project Area would minimize impacts to recreation opportunities; however, dispersed recreation including hunting and some camping opportunities may be affected during the 2 month seismic survey program. To minimize impacts to hunting, the seismic survey activities would be suspended for several days associated with the start of several big game hunting seasons (Section 2.3.8 - Recreation).
NI	Geology/Minerals	8/17/04	Kenneth Bantz	The alternatives would not violate existing VRM classifications because the level of change to the existing landscape would be minimal and short-term.
NI	Paleontology	8/17/04	John Morgan	Impacts to paleontological resources are not expected based on the lack of surface disturbance associated with the alternatives and the lack of paleontological localities recorded in the Project Area a recent field survey (Paleontological Survey for the Main Canyon 3D Seismic Project prepared by SWCA Environmental Consultants dated July 2004). If any paleontological resources would be discovered during the seismic survey, the discovery would be reported to the appropriate AO.
NP	Lands/Access			No BLM ROW would be required.
NI	Fuels/Fire Management	8/17/04	John Morgan	PGS and contractors would coordinate project activities with appropriate fire personnel in the BLM VFO and are committed to the applicant-committed environmental protection measures listed for Fire Protection in Section 2.3.8 of the EA.
NI	Socioeconomics	8/17/04	John Morgan	The local economy would not be affected by the alternatives.
NI	Wild Horses and Burros	8/17/04	John Morgan	Wild horses and burros are not present in the Project Area.
NP	Wilderness Characteristics			Some lands in the Project Area were proposed for wilderness by Utah Wilderness Coalition (UWC). New information provided by UWC regarding these lands was reviewed by a BLM interdisciplinary team in conjunction with other existing information. BLM's resulting determination was that the lands do not possess wilderness characteristics.

FINAL REVIEW:

Reviewer Title	Date	Signature	Comments
Environmental Coordinator	8-17-04	<i>[Signature]</i>	
Manager Review	8/17/04	<i>[Signature]</i>	

NOTE: Review Comments should include information explaining how the specialist came to their conclusion - how does he/she know the element/resource is not present (site visit and date of visit, familiarity with location, etc.). For all 'NIs' give a brief explanation as to why that element/resource would not be impacted.

\* The list of Other Resources / Concerns to be considered may vary by individual field office. Note: Native American Trust Responsibilities should be considered for FO's with Indian Mineral interests.

*\* Reviewers not present at time of signature; however, included during review, providing input & review.*

## INTERDISCIPLINARY TEAM ANALYSIS RECORD

**Project Title:** Dawson Geophysical Company's Coyote Basin 3-D Geophysical Project

**NEPA Log Number:** UT-080-2004-0294

**File/Serial Number:**

**Project Leader:** Veronica Herksahn

**FOR EAs:** NP: not present; NI: resource/use present but not impacted; PI: potentially impacts

**FOR DNAs only:** NC: no change (anticipated resource impacts not changed from those analyzed in the NEPA document on which the DNA is based)

### STAFF REVIEW OF PROPOSAL:

NP/NI/PI NC	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
<b>CRITICAL ELEMENTS</b>				
<del>NI</del>	Air Quality			Low short-term impacts to air quality from fugitive dust and vehicle emissions.
<del>NI</del>	Areas of Critical Environmental Concern			1. Impacts to proposed ACEC along White River. ✓
PI	Cultural Resources / Native American Religious Concerns			1. Direct impacts to cultural sites. 2. Impacts to Native American religious concerns.
<del>NI</del>	Environmental Justice			No minority or low-income population would be disproportionately affected by the Proposed Action.
NP	Farmlands (Prime or Unique)			<i>None Present.</i>
PI	Floodplains			1. Impacts to floodplain functions. 2. Impacts to banks of Coyote Wash.
<del>NI</del>	Invasive, Non-native Species			With any disturbance, the possibility exists for the establishment of invasive and non-native species. However, the risk for a site specific problem with such species would be low because of standard measures incorporated into the Proposed Action, such as washing vehicles and control efforts following drilling that would prevent the spread of invasive weeds.
PI	Native American Religious Concerns			Included under Cultural Resources discussions.
PI	Threatened, Endangered, Proposed, and Candidate Species and Sensitive Species			1. Impacts to TESS plants and their habitat. 2. Impacts to TESS animals and their habitat.
NI	Wastes (hazardous or solid)			Safe handling and spill control measures would prevent release of hazardous and solid materials. Portable chemical toilets would be used for human waste. As appropriate, these toilets would be removed and the contents disposed of in an approved sewage disposal facility.

*ok  
UTSD*

NP/NI/PI NC	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
PI	Paleontology			1. Disturbance/destruction of significant paleontological materials.
NP	Wild Horses and Burros			No horses present in Wild Horse Herd Management Unit
PI	Non-WSA Lands Having, or Likely to Have, Wilderness Characteristics			1. Impacts to wilderness characteristics.

**FINAL REVIEW:**

Reviewer Title	Date	Signature	Comments
Environmental Coordinator			
Manager			

**NOTE:** Review Comments should include information explaining how the specialist came to their conclusion - how does he/she know the element/resource is not present (site visit and date of visit, familiarity with location, etc.). For all 'NIs' give a brief explanation as to why that element/resource would not be impacted.

\* This list of Other Resources / Concerns to be considered may vary by individual field office. Note: Native American Trust Responsibilities should be considered for FO's with Indian Mineral interests.

NP/NI/PI NC	Resource	Date Reviewed	Signature	Review Comments (required for all NIs and PIs. PIs require further analysis.)
NI	Water Quality			1. Increased sediments in streams due to project-related soil erosion. 2. Introduction of toxic substances into surface or ground water.
NI	Wetlands/Riparian Zones			1. Impacts from sedimentation. 2. Direct impacts to riparian vegetation.
NI	Wild and Scenic Rivers			1. Impacts to free flowing condition and outstanding remarkable values, which make Nine Mile Creek eligible for designation.
(NP)	Wilderness			
<b>OTHER RESOURCES / CONCERNS*</b>				
NI	Rangeland Health Standards and Guidelines			Rangeland Health Standards apply to all public lands. Surface-disturbing activities do not contribute to achievement of Rangeland Health Standards, and disturbed areas would not meet Rangeland Health Standards until successfully reclaimed. However, only a small portion of the project area would be directly or cumulatively disturbed by the proposed and reasonably foreseeable activities. Rangeland Health Standards address soils, riparian areas, vegetation, threatened and endangered species, and water resources. The impact of the proposal on all of the components of the Rangeland Health Standards is analyzed in this EA. Conditions and stipulations applied to the proposal would assure that achievement of these standards would not be affected in the watershed as a whole.
NI	Livestock Grazing			The project area lies within the Dry Canyon (34038) and Stone Cabin (04109) Allotments. Disturbance of vegetation would amount to less than two Animal Unit Months (AUMs) within the entire project area. Reclamation standards would mitigate this temporary loss of forage.
(NP)	Woodland / Forestry			
PI	Vegetation			1. Direct impacts to native vegetation.
PI	Wildlife Resources			1. Impacts to pronghorn, prairie dogs, raptors, and migratory birds.
PI	Soils			1. Increased wind and water erosion. 2. Lack of reclamation success. 3. Impacts to biological soil crusts.
PI	Recreation			1. Reductions in recreation opportunity and experience. 2. Impacts to Fantasy Canyon.
NI	Visual Resources			No changes that would not conform with existing VRM standards.
NI	Geology / Mineral Resources			No mineral resource recovery and no impacts to geology.
NI	Lands / Assets			Increased access to area due to project-related roads analyzed under cultural resources and recreation. No change in landownership.
NI	Fuels/Fire Management			Proponent would take all reasonable measures to avoid wildfires.

**APPENDIX B**  
**MATERIAL DATA SAFETY SHEET**



MATERIAL SAFETY DATA SHEET  
DYNNO NOBEL INC.  
11<sup>TH</sup> FLOOR CROSSROADS TOWER  
SALT LAKE CITY, UTAH 84144  
PHONE: 801-364-4800 FAX: 801-328-6452  
E-MAIL: DNNA.HSE@AM.DYNONOBEL.COM  
FOR 24 HOUR EMERGENCY CALL 800-424-9300

MSDS# 1019

DATE: 05/09/03

Supersedes MSDS  
1019 03/01/02

### SECTION I - PRODUCT IDENTIFICATION

**Trade Name(s):** D-GEL™ 1000  
DYNOSPLIT® : D1, D3/4, D 7/8  
EXTRA GELATIN: 40%, 75%  
GELAPRIME® F  
UNIGEL®  
UNIMAX®  
VIBROGEL®: 1,3  
Z POWDER™

Oil Well Explosive 80%  
Oil Well Explosive 100%  
STONECUTTER™

RED H® A  
RED H® B  
IRECOGEL® B  
IRESPLIT® D  
IRESPLIT® D-1  
IP: 724, 738

**Product Class:** Packaged Dynamites and Blasting Gelatins

**Product Appearance & Odor:** Powdery to gelatinous solid, light tan to dark brown color. Faint, waxy odor.

**DOT Hazard Shipping Description:** Explosive, blasting, type A 1.1D UN0081 II

**NFPA Hazard Classification:** Not Available (See Section IV - Special Fire Fighting Procedures)

### SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	TLV-ACGIH
Nitroglycerin (NG)	55-63-0	1-20	0.05 ppm
Ethylene Glycol Dinitrate (EGDN)	628-96-6	8-76	0.05 ppm
Nitrocellulose	9004-70-0	0-6	No Value Established
Ammonium Nitrate	6484-52-2	0-75	No Value Established
Sodium Nitrate	7631-99-4	0-50	No Value Established
Sulfur*	7704-34-9	0-4	No Value Established

\*This ingredient is not found in most of the products listed above.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations.

### SECTION III - PHYSICAL DATA

**Boiling Point:** Not Applicable

**Vapor Pressure:** Not Applicable

**Vapor Density:** Not Applicable

**Density:** 0.8-1.48 g/cc

**Percent Volatile by Volume:** Not Applicable

**Solubility in Water:** Ammonium and sodium nitrates are completely soluble. NG and EGDN are very slightly soluble.

**Evaporation Rate (Butyl Acetate = 1):** Not Applicable

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

**Flash Point:** Not Applicable

**Flammable Limits:** Not Applicable

**Extinguishing Media:** (See Special Fire Fighting Procedures section.)

**Special Fire Fighting Procedures:** Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

**Unusual Fire and Explosion Hazards:** Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

#### SECTION V - HEALTH HAZARD DATA

##### Effects of Overexposure

**Eyes:** May cause irritation, redness and tearing.

**Skin:** Contact may result in headache, nausea and blood vessel dilation.

**Ingestion:** May result in headache, nausea, intestinal upset and blood vessel dilation.

**Inhalation:** May result in headache, nausea and blood vessel dilation.

**Systemic or Other Effects:** None known.

##### Emergency and First Aid Procedures

**Eyes:** Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

**Skin:** Remove contaminated clothing. Wash with soap and water.

**Ingestion:** Seek medical attention.

**Inhalation:** Remove to fresh air. If irritation persists, seek medical attention.

**Special Considerations:** None.

#### SECTION VI - REACTIVITY DATA

**Stability:** Stable under normal conditions. May explode when subjected to fire, supersonic shock, or high-energy projectile impact, especially when confined or in large quantities.

**Conditions to Avoid:** Keep away from heat, flame, ignition sources and strong shock.

**Materials to Avoid (Incompatibility):** Corrosives (mineral acids, bases, strong acids).

**Hazardous Decomposition Products:** Carbon Monoxide (CO), Hydrogen Sulfide (H<sub>2</sub>S), Nitrous Oxides (NO<sub>x</sub>), and Sulfur Oxides (SO<sub>x</sub>).

**Hazardous Polymerization:** Will not occur.

## **SECTION VII - SPILL OR LEAK PROCEDURES**

**Steps to be taken in Case Material is Released or Spilled:** Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repack product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements. Contact of this product with water may result in a reportable release.

**Waste Disposal Method:** Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

## **SECTION VIII - SPECIAL PROTECTION INFORMATION**

**Ventilation:** Forced ventilation may be necessary where natural ventilation is limited. Magazines containing NG and/or EGDN based explosives must be ventilated before entry.

**Respiratory Protection:** None normally required.

**Protective Clothing:** Chemical resistant (nitrile) gloves are suggested.

**Eye Protection:** Safety glasses are recommended.

**Other Precautions Required:** Inhalation and skin contact should be minimized to avoid headaches, nausea, and blood vessel dilation. Protective clothing should be changed daily, more often if contaminated.

## **SECTION IX - SPECIAL PRECAUTIONS**

**Precautions to be taken in handling and storage:** Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources, and strong shock.

**Precautions to be taken during use:** Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

**Other Precautions:** It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

## **SECTION X - SPECIAL INFORMATION**

<b><u>Chemical Name</u></b>	<b><u>CAS Number</u></b>	<b><u>% By Weight</u></b>
Nitroglycerin	55-63-0	1-20

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

### **DYN0 NOBEL INC. Disclaimer**

The information contained herein is provided for reference purposes only and is intended only for persons having relevant technical skills. Because conditions and manner of use are outside of our control, the user is responsible for determining the conditions of safe use of the product. While the information is believed to be correct, DYN0 NOBEL INC. shall in no event be responsible for any damages whatsoever, directly or indirectly, resulting from the publication or use of or reliance upon the information contained herein. **(No warranty, either expressed or implied, of merchantability or fitness for a particular purpose, or of any nature with respect to the product, or to the information, is made herein.)**

**APPENDIX C**  
**UNITED STATES FISH AND WILDLIFE SERVICE AND**  
**PARTNERS IN FLIGHT OF BIRD OF CONSERVATION**  
**CONCERN FOR THE COLORADO PLATEAU**

**United States Fish and Wildlife Service and Partners in Flight Birds of Conservation Concern for the Colorado Plateau**

	<b>Colorado Plateau</b>	<b>Primary Breeding</b>	<b>Secondary Breeding</b>	<b>Winter Habitat</b>
<b>FWS BCC and PIF Priority Species (Bolded only on PIF list)</b>				
American avocet	x	Wetland	Playa	Migrant
Bendire's thrasher *	x	Low Desert Scrub	Low Desert Scrub	Migrant
Black-chinned sparrow	x	Low Desert Scrub	High Desert Scrub	Migrant
Black-throated gray warbler *	x	Pinyon-Juniper	Mountain Shrub	Migrant
Brewer's sparrow *	x	Shrubsteppe	High Desert Scrub	Migrant
<b>Broad-tailed hummingbird</b>	x	Lowland riparian	Mountain Riparian	Migrant
Ferruginous hawk *	x	Pinyon-Juniper	Shrubsteppe	Grassland
Flammulated owl	x	Pondersosa Pine	Sub-Alpine Conifer	Migrant
<b>Gambel's quail</b>	x	Low Desert Scrub	Lowland riparian	Low Desert Scrub
Golden eagle	x	Cliff	High Desert Scrub	High Desert Scrub
Grace's warbler	x	Pondersosa Pine	Mixed Conifer	Migrant
Gray vireo *	x	Pinyon-Juniper	Northern Oak	Migrant
Greater Sage-grouse *	x	Shrubsteppe	Shrubsteppe	Shrubsteppe
Gunnison Sage-grouse	x	Shrubsteppe	Shrubsteppe	
Lewis's woodpecker *	x	Pondersosa Pine	Lowland riparian	Northern Oak
Loggerhead shrike	x	High Desert Scrub	Pinyon-Juniper	High Desert Scrub
Long-billed curlew *	x	Grassland	Agriculture	Migrant
<b>Lucy's warbler</b>	x	Lowland riparian	Low Desert Scrub	Migrant
Mountain plover *	x	High Desert Scrub	High Desert Scrub	Migrant
Northern Harrier	x	Wet Meadow	High Desert Scrub	Agriculture
Peregrine Falcon	x	Cliff	Lowland riparian	Wetland
Pinyon jay	x	Pinyon-Juniper	Ponderosa Pine	Pinyon-Juniper
Prairie falcon	x	Cliff	High Desert Scrub	Agriculture
Pygmy nuthatch	x	Pondersosa Pine	Aspen	Ponderosa Pine
Red-naped sapsucker	x	Aspen	Mixed Conifer	Mountain Riparian
Sage sparrow *	x	Shrubsteppe	High Desert Scrub	Low Desert Scrub
Snowy plover	x	Playa	Playa	Migrant
Swainson's hawk	x	Agriculture	Aspen	Migrant
Virginia's warbler *	x	Northern Oak	Pinyon-Juniper	Migrant
Williamson sapsucker	x	Sub-Alpine Conifer	Aspen	Migrant
Yellow-billed cuckoo *	x	Lowland riparian	Agriculture	Migrant
* on both lists				