

ENVIRONMENTAL ASSESSMENT for the Cherokee West 3D Seismic Survey Project

BLM

Wyoming State Office — Rawlins Field Office



July 2005

MISSION STATEMENT

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BLM/WY/PL-05/015+1990

WY-030-05-EA-173



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
Rawlins Field Office
P.O. Box 2407 (1300 North Third Street)
Rawlins, Wyoming 82301-2407

In Reply Refer To:
1790

July 12, 2005

Re: Cherokee West 3D
Seismic Survey Project
Environmental Assessment

Dear Reader:

The Cherokee West 3D Seismic Survey Project is a proposed geophysical exploration project located within the boundaries of the Rawlins, Rock Springs, and Little Snake Field Offices on public, fee, and state lands within Sweetwater County, Wyoming, and Moffat County, Colorado. The proposed project is located within Townships 12 and 13 North, Ranges 96, 97, 98, and 99 West, 6th Principal Meridian in Wyoming and Colorado. Part of the proposal entails laying geophones (recording devices) in the Adobe Town Wilderness Study Area.

In order to satisfy the requirements of the National Environmental Policy Act, this EA was prepared to analyze impacts associated with the proposed seismic survey activities. No decision has been made with regard to this proposal.

It is expected that this EA can be viewed at our website beginning July 12, 2005. This will begin the 30-day public review/comment period for the document. We will review all comments and will address substantive comments in the Decision Record. A substantive comment is one that would alter conclusions drawn from the analysis based on: 1) new information, 2) why or how the analysis is flawed, 3) evidence of flawed assumptions, 4) evidence of error in data presented, and 5) requests for clarification that bear on conclusions presented in the analysis.

Your comments should be as specific as possible. Comments on the alternatives presented and on the adequacy of the impact analysis will be accepted by the BLM until August 12, 2005.

Comments may be submitted via regular mail to:

Tom Foertsch, Physical Scientist
Bureau of Land Management
Rawlins Field Office
P.O. Box 2407
Rawlins, Wyoming 82301

or may be submitted electronically at the address shown below (please refer to the Cherokee West 3D Seismic Survey Project):

e-mail: rawlins_wymail@blm.gov

Please note that comments, including names, e-mail addresses, and street addresses of respondents, will be available for public review and disclosure at the above address during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Individual respondents may request confidentiality. If you wish to withhold your name, e-mail address, or street address from public review or from disclosure under the Freedom of Information Act, you must state this plainly at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

The EA may also be reviewed at the following locations:

Bureau of Land Management
Rawlins Field Office
1300 N. Third Street
Rawlins, Wyoming 82301

Bureau of Land Management
Little Snake Field Office
455 Emerson Street
Craig, Colorado 81625

Bureau of Land Management
Rock Springs Field Office
280 Highway 191 North
Rock Springs, Wyoming 82901

If you require additional information regarding this project, please contact Tom Foertsch, Physical Scientist, at the Rawlins address or phone (307) 328-4368.

Sincerely,


Field Manager

Enclosure

**ENVIRONMENTAL ASSESSMENT
CHEROKEE WEST 3D GEOPHYSICAL PROJECT
SWEETWATER COUNTY, WYOMING
AND MOFFAT COUNTY, COLORADO**

**Prepared for:
Bureau of Land Management
Rawlins Field Office
Little Snake Field Office
Rock Springs Field Office**

**Prepared by:
Dixie Environmental Services Co. (DESCO)
650 Magnolia Blvd.
Magnolia, TX 77355
281-259-8668**

**Under the Guidance of:
Tom Foertsch**

**EA No: WY-030-05-EA-173
BLM Case No.: WYW-162237**

JUNE 2005

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 ABOUT THIS DOCUMENT	1
1.2 PROPOSED ACTION HISTORY, TYPE, LOCATION	2
1.3 CONFORMANCE WITH LAND USE PLAN	5
1.3.1 Relationship to Statutes and Regulations.....	5
1.4 NEED FOR PROPOSED ACTION.....	6
1.5 SCOPING AND PUBLIC INVOLVEMENT	6
1.6 KEY ISSUES.....	7
1.7 OTHER ISSUES AND CONCERNS	10
2.0 DESCRIPTION OF THE ALTERNATIVES.....	12
2.1 THE PROPOSED ACTION	12
2.2 NO OFF-ROAD VEHICLE USE IN ADOBE TOWN FRINGE AREAS WITH WILDERNESS CHARACTERISTICS	16
2.3 NO ACTION.....	17
2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS	17
3.0 AFFECTED ENVIRONMENT, IMPACTS & MITIGATION MEASURES PERTAINING TO CRITICAL RESOURCES	20
3.1 AIR QUALITY	21
3.1.1 Affected Environment.....	21
3.1.2 Environmental Consequences.....	21
3.1.2.1 Proposed Action.....	21
3.1.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	21
3.1.3 Mitigative Measures.....	21
3.2 AREA OF CRITICAL ENVIRONMENTAL CONCERN	21
3.2.1 Affected Environment.....	21
3.2.2 Environmental Consequences.....	22
3.2.2.1 Proposed Action.....	22
3.2.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	22
3.2.3 Mitigative Measures.....	22
3.3 CULTURAL RESOURCES	22
3.3.1 Affected Environment.....	22
3.3.2 Environmental Consequences.....	24
3.3.2.1 Proposed Action.....	24
3.3.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	24
3.3.3 Mitigative Measures.....	25
3.4 ENVIRONMENTAL JUSTICE	28
3.4.1 Affected Environment.....	28

- 3.4.2 Environmental Consequences..... 28
 - 3.4.2.1 Proposed Action..... 28
 - 3.4.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 28
- 3.4.3 Mitigative Measures..... 28
- 3.5 FLOODPLAINS 28
 - 3.5.1 Affected Environment..... 28
 - 3.5.2 Environmental Consequences..... 29
 - 3.5.2.1 Proposed Action..... 29
 - 3.5.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 29
 - 3.5.3 Mitigative Measures..... 29
- 3.6 INVASIVE, NONNATIVE SPECIES..... 29
 - 3.6.1 Affected Environment..... 29
 - 3.6.2 Environmental Consequences..... 30
 - 3.6.2.1 Proposed Action..... 30
 - 3.6.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 30
 - 3.6.3 Mitigative Measures..... 30
- 3.7 MIGRATORY BIRDS 31
 - 3.7.1 Affected Environment..... 31
 - 3.7.2 Environmental Consequences..... 33
 - 3.7.2.1 Proposed Action..... 33
 - 3.7.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 34
 - 3.7.3 Mitigative Measures..... 34
- 3.8 NATIVE AMERICAN RELIGIOUS CONCERNS..... 35
 - 3.8.1 Affected Environment..... 35
 - 3.8.2 Environmental Consequences..... 35
 - 3.8.2.1 Proposed Action..... 35
 - 3.8.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 35
 - 3.8.3 Mitigative Measures..... 35
- 3.9 PRIME AND UNIQUE FARMLANDS..... 36
 - 3.9.1 Affected Environment..... 36
 - 3.9.2 Environmental Consequences..... 36
 - 3.9.2.1 Proposed Action..... 36
 - 3.9.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 36
 - 3.9.3 Mitigative Measures..... 36
- 3.10 THREATENED AND ENDANGERED SPECIES – SENSITIVE PLANTS 36
 - 3.10.1 Affected Environment..... 36
 - 3.10.2 Environmental Consequences..... 39
 - 3.10.2.1 Proposed Action..... 39
 - 3.10.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas
with Wilderness Characteristics..... 40

3.10.3 Mitigative Measures.....	40
3.11 THREATENED AND ENDANGERED SPECIES - PLANTS	40
3.11.1 Affected Environment.....	40
3.11.2 Environmental Consequences.....	41
3.11.2.1 Proposed Action.....	41
3.11.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	41
3.11.3 Mitigative Measures to be Applied.....	41
3.12 THREATENED AND ENDANGERED SPECIES - SENSITIVE ANIMALS....	41
3.12.1 Affected Environment.....	41
3.12.2 Environmental Consequences.....	44
3.12.2.1 Proposed Action.....	44
3.12.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	45
3.12.3 Mitigative Measures.....	45
3.13 THREATENED AND ENDANGERED SPECIES - ANIMALS	46
3.13.1 Affected Environment.....	46
3.13.2 Environmental Consequences.....	47
3.13.2.1 Proposed Action.....	47
3.13.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	48
3.13.3 Mitigative Measures.....	48
3.14 WASTES, HAZARDOUS OR SOLID.....	48
3.14.1 Affected Environment.....	48
3.14.2 Environmental Consequences.....	48
3.14.2.1 Proposed Action.....	48
3.14.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	49
3.14.3 Mitigative Measures.....	49
3.15 WATER QUALITY - SURFACE	50
3.15.1 Affected Environment.....	50
3.15.2 Environmental Consequences.....	50
3.15.2.1 Proposed Action.....	50
3.15.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	50
3.15.3 Mitigative Measures.....	50
3.16 WATER QUALITY - GROUND	51
3.16.1 Affected Environment.....	51
3.16.2 Environmental Consequences.....	52
3.16.2.1 Proposed Action.....	52
3.16.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	52
3.16.3 Mitigative Measures.....	52
3.17 WETLANDS/RIPARIAN ZONES.....	53
3.17.1 Affected Environment.....	53

3.17.2	Environmental Consequences.....	53
3.17.2.1	Proposed Action.....	53
3.17.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	53
3.17.3	Mitigative Measures.....	53
3.18	WILD AND SCENIC RIVERS.....	54
3.18.1	Affected Environment.....	54
3.18.2	Environmental Consequences.....	54
3.18.2.1	Proposed Action.....	54
3.18.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	54
3.18.3	Mitigative Measures.....	54
3.19	WILDERNESS/WSAs.....	54
3.19.1	Affected Environment.....	54
3.19.2	Environmental Consequences.....	55
3.19.2.1	Proposed Action.....	55
3.19.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	55
3.19.3	Mitigative Measures.....	55
4.0	AFFECTED ENVIRONMENT, IMPACTS & MITIGATION MEASURES PERTAINING TO NON-CRITICAL RESOURCES.....	55
4.1	ACCESS.....	56
4.1.1	Affected Environment.....	56
4.1.2	Environmental Consequences.....	56
4.1.2.1	Proposed Action.....	56
4.1.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	57
4.1.3	Mitigative Measures.....	57
4.2	FLUID MINERALS.....	57
4.2.1	Affected Environment.....	57
4.2.2	Environmental Consequences.....	58
4.2.2.1	Proposed Action.....	58
4.2.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	58
4.2.3	Mitigative Measures.....	59
	HYDROLOGY-GROUND.....	59
4.3.1	Affected Environment.....	59
4.3.2	Environmental Consequences.....	59
4.3.2.1	Proposed Action.....	59
4.3.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	59
4.3.3	Mitigative Measures.....	60
4.4	HYDROLOGY-SURFACE.....	60
4.4.1	Affected Environment.....	60

4.4.2	Environmental Consequences.....	60
4.4.2.1	Proposed Action.....	60
4.4.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	61
4.4.3	Mitigative Measures.....	61
4.5	PALEONTOLOGY	61
4.5.1	Affected Environment.....	61
4.5.2	Environmental Consequences.....	62
4.5.2.1	Proposed Action.....	62
4.5.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	62
4.5.3	Mitigative Measures.....	62
4.6	RANGE ALLOTMENT(S)/RANGE IMPROVEMENT PROJECTS.....	63
4.6.1	Affected Environment.....	63
4.6.2	Environmental Consequences.....	64
4.6.2.1	Proposed Action.....	64
4.6.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	64
4.6.3	Mitigative Measures.....	65
4.7	REALTY AUTHORIZATIONS	65
4.7.1	Affected Environment.....	65
4.7.2	Environmental Consequences.....	67
4.7.2.1	Proposed Action.....	67
4.7.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	67
4.7.3	Mitigative Measures.....	67
4.8	RECREATION.....	68
4.8.1	Affected Environment.....	68
4.8.2	Environmental Consequences.....	68
4.8.2.1	Proposed Action.....	68
4.8.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	68
4.8.3	Mitigative Measures.....	69
4.9	SOCIO-ECONOMIC CONSIDERATIONS.....	69
4.9.1	Affected Environment.....	69
4.9.2	Environmental Consequences.....	69
4.9.2.1	Proposed Action.....	69
4.9.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	70
4.9.3	Mitigative Measures.....	70
4.10	SOILS.....	70
4.10.1	Affected Environment.....	70
4.10.2	Environmental Consequences.....	71
4.10.2.1	Proposed Action.....	71
4.10.2.2	No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	72

4.10.3 Mitigative Measures.....	72
4.11 SOLID MINERALS/GEOLOGY	72
4.11.1 Affected Environment.....	72
4.11.2 Environmental Consequences.....	73
4.11.2.1 Proposed Action.....	73
4.11.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	73
4.11.3 Mitigative Measures.....	73
4.12 VEGETATION	73
4.12.1 Affected Environment.....	73
4.12.2 Environmental Consequences.....	74
4.12.2.1 Proposed Action.....	74
4.12.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	75
4.12.3 Mitigative Measures.....	76
4.13 VISUAL RESOURCES.....	76
4.13.1 Affected Environment.....	76
4.13.2 Environmental Consequences.....	76
4.13.2.1 Proposed Action.....	76
4.13.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	77
4.13.3 Mitigative Measures.....	77
4.14 WILDLIFE, AQUATIC	77
4.14.1 Affected Environment.....	77
4.14.2 Environmental Consequences.....	78
4.14.2.1 Proposed Action.....	78
4.14.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	78
4.14.3 Mitigative Measures.....	78
4.15 WILDLIFE, TERRESTRIAL	78
4.15.1 Affected Environment.....	78
4.15.2 Environmental Consequences.....	80
4.15.2.1 Proposed Action.....	80
4.15.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	80
4.15.3 Mitigative Measures.....	80
4.16 WILD HORSE AND BURRO AREAS	81
4.16.1 Affected Environment.....	81
4.16.2 Environmental Consequences.....	81
4.16.2.1 Proposed Action.....	81
4.16.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics.....	81
4.16.3 Mitigative Measures.....	83
5.0 CUMULATIVE IMPACTS OF THE PROPOSED ACTION	83
6.0 RESIDUAL IMPACTS OF THE PROPOSED ACTION.....	84
7.0 CUMULATIVE IMPACTS OF ALTERNATIVE 2.....	84

8.0 RESIDUAL IMPACTS OF ALTERNATIVE 2.....	85
9.0 CUMULATIVE IMPACTS OF NO ACTION.....	85
10.0 RESIDUAL IMPACTS OF NO ACTION	86
11.0 PERSONS/AGENCIES CONSULTED	86
12.0 REFERENCES CITED.....	87

MAPS AND FIGURES

Map 1. Cherokee West 3D Prospect.....	3
Map 2. Adobe Town Fringe Wilderness Areas	18
Map 3. Big Game Crucial Winter Range.....	79
Map 4. Adobe Town Herd Management Area.....	82
Chart 1. Well Status Within the Cherokee West 3D Project Area.....	58

TABLES

Table 1. Lands Affected by the Proposed Project.....	4
Table 2. Known Cultural/Historical Sites Within the Wyoming Portion of the Project Area	23
Table 3. Avian Species with Potential for Occurrence within Cherokee West 3D Project Area: 2002 Birds of Conservation Concern List.....	31
Table 4. Sensitive Plants With Potential To Occur in Sweetwater County, Wyoming-(BLM Rawlins Field Office) and Moffat County, Colorado-(BLM Little Snake Field Office).....	37
Table 5. Sensitive Animals with Potential for Occurrence in Moffat County, Colorado-(BLM Little Snake Field Office), and Sweetwater County, Wyoming-(BLM Rawlins Field Office).....	41
Table 6. Seasonal Restrictions for Sensitive Species by State.....	43
Table 7. Non-Critical Elements of the Human Environment	55
Table 8. Summary of Grazing Uses Permitted Within Project Area	63
Table 9. Land & Realty Authorizations within the Proposed Project Area.....	64
Table 10. 1:100,000 Scale Soil Descriptions	70
Table 11. Plant Communities Found within the Cherokee West 3D.....	73
Table 12. Individuals Involved in the Preparation of this EA	86

APPENDICES

APPENDIX A - NOTICE OF INTENT

APPENDIX B – SCOPING CONTENT ANALYSIS

APPENDIX C – NOTICE OF INTENT STANDARDS FOR THE STATE OF COLORADO

ENVIRONMENTAL ASSESSMENT CHEROKEE WEST 3D MOFFAT COUNTY, COLORADO & SWEETWATER COUNTY, WYOMING

1.0 INTRODUCTION

1.1 ABOUT THIS DOCUMENT

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA is tiered to the Bureau of Land Management's (BLM) Great Divide Resource Area Resource Management Plan (GDRMP), Little Snake Resource Management Plan (LSRMP); and Green River Resource Management Plan (GRRMP) and their associated environmental analyses and decision documents.

As geophysical exploration operations on BLM-administered lands are being proposed, this EA is being prepared to evaluate effects on all federal and nonfederal lands in the potentially affected area.

This EA is not a decision document. The purpose of this document is to disclose the effects and consequences of the proposed action and alternatives to it. This EA will be used for evaluation of the alternatives and to make a determination of the need to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). The responsible line officer will make a decision based on consideration of the purpose and need for the project, the significance of the effects of alternatives, and public concerns. After a 30-day scoping period is completed and the EA is prepared, the EA will be released to the public for review and comment prior to a decision regarding authorization by the Rawlins Field Office. The decision will be prepared and distributed, along with publication of a press release in the local newspapers. If impacts are not significant as defined in 40 CFR 1508.27, a decision document will be prepared by the appropriate agency official (a Decision Record/FONSI). If impacts are determined to be significant, the Environmental Impact Statement process will be initiated. For this project, the responsible official is:

- BLM Field Manager, Mark Storzer of the Rawlins Field Office

Tiering is in accordance with CEQ regulations (40 CFR 1502.20 and 1508.28), which allow the responsible official to focus on site-specific issues that are within the scope of a broader plan, program, or analysis that is already approved. All BLM documents that are incorporated by reference in this document can be reviewed upon request at the Rawlins BLM Office in Rawlins, Wyoming. This Environmental Assessment discloses the direct, indirect, and cumulative environmental effects that would result from the proposed action and alternatives. The document is organized into seven main parts:

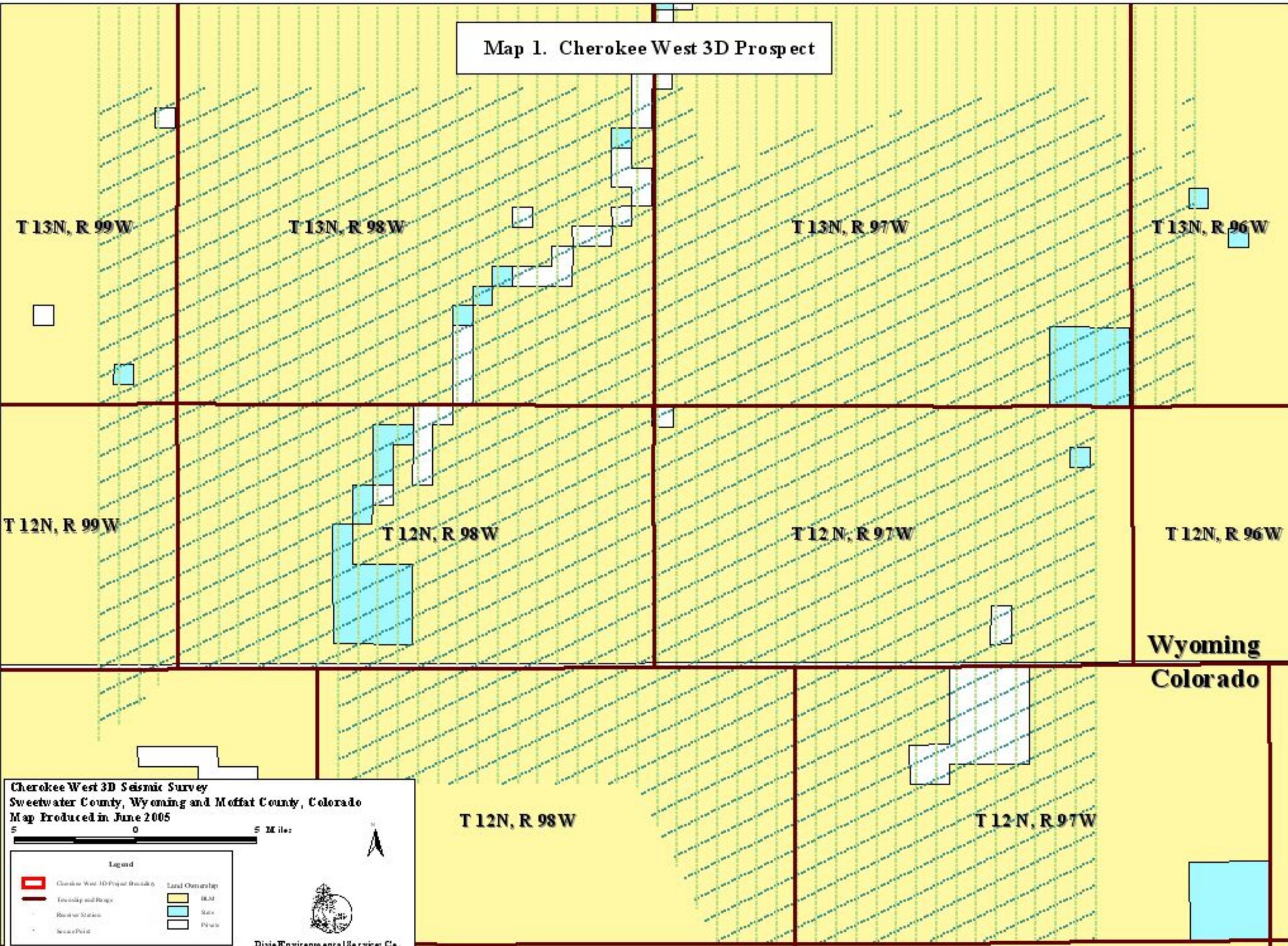
- *Chapter 1 - Introduction:* This chapter includes a brief description of the applicant's proposal, scope of the analysis, information on the history of the project proposal and the purpose of and need for the project. This section also details how the federal agencies informed the public of the proposal and how the public responded. Key issues that focus the analysis are identified in this chapter.
- *Chapter 2 – Description of the Alternatives:* This chapter provides a more detailed description of the applicant's proposal and the Agencies' proposed action, as well as alternatives. These alternatives were developed based on issues raised by the public and other agencies.
- *Chapter 3 - Affected Environment, Impacts, and Mitigation Measures Pertaining to Critical Resources:* This chapter describes the environmental effects of implementing the proposed action and other alternatives on critical elements of the human environment (identified by the BLM NEPA Handbook H-1790-1). This analysis is organized by resource, e.g., vegetation, wildlife, recreation, etc. Within each section, the affected environment is described first to provide a baseline for evaluation and comparison of the other alternatives that follow. This section of the EA also presents mitigation measures developed in response to the anticipated impacts, which would be applied to the project, if approved.
- *Chapter 4 – Affected Environment, Impacts, and Mitigation Measures Pertaining to Non-Critical Resources:* This chapter includes the same information as Chapter 3, but addresses non-critical resources within the project area.
- *Chapters 5 through 10– Cumulative and Residual Impacts:* These chapters include cumulative and residual impacts of the Proposed Action and the No Action Alternative.
- *Chapters 11 and 12 Consultation and Coordination:* These chapters contain a list of agencies or persons consulted during the preparation of the EA, followed by the sources cited in the EA.
- *Appendices:* The appendices contain a Notice of Intent (Appendix A), a Scoping Content Analysis (Appendix B) and Notice of Intent, Standards for the State of Colorado (Appendix C).

Additional information that supports the analysis presented in this document is contained in the project file located at the Rawlins BLM Office, 1300 N. Third, Rawlins, Wyoming 82301.

1.2 PROPOSED ACTION HISTORY, TYPE, AND LOCATION

On January 26, 2005, Veritas DGC (Veritas) filed a Notice of Intent (NOI) with the Bureau of Land Management (BLM) Rawlins Field Office (RFO) to conduct the Cherokee West 3D geophysical project (**Appendix A**). The proposed project would utilize a combination of Vibroseis and shot-hole charges as energy sources, and would encompass 135.6 square miles in Sweetwater County, Wyoming and Moffat County, Colorado. Of the total acreage in the project boundary, some 86,784 acres (97.4%) are BLM-administered land, 240 acres (1.2%) are State lands, and 280 acres (1.4%) are privately owned, as reflected on **MAP 1**.

Map 1. Cherokee West 3D Prospect



Cherokee West 3D Seismic Survey
Sweetwater County, Wyoming and Moffat County, Colorado
Map Produced in June 2005

0 5 Miles

Legend

Cherokee West 3D Prospect Boundary	BLM
Township and Range	State
Boundary Status	Private
Survey Point	

Dixie Environmental Services Co.

The Cherokee West 3D project area is approximately 16 miles wide by 8.48 miles long and covers 135.6 square miles. A total of 357 linear miles of vibrator or drill travel routes along source lines, and an additional 554 linear miles of ATV travel along receiver lines are planned in this area. Actual surface use by the proposed project would be restricted to 100-foot corridors along the seismic lines and small staging and survey base station areas, only a small percentage of the total project area.

This Environmental Assessment addresses potential effects to the project area, regardless of surface ownership or federal administrative unit.

The majority of subject BLM-administered land within this project is located in the state of Wyoming and falls under RFO jurisdiction; however, approximately 320 acres (0.37% of the project area) fall within Rock Springs Field Office (RSFO) jurisdiction and 2,490 acres (2.9% of the project area) are located in the state of Colorado, within the jurisdiction of the BLM Little Snake Field Office (LSFO). RFO will lead project-planning efforts; however, representatives will coordinate closely with LSFO and RSFO to ensure that all concerns associated with proposed activities are addressed. Please note that portions of the project occurring on private and State lands are not subject to BLM authorization. Legal descriptions of lands affected by the proposed project regardless of surface ownership are included in **Table 1**:

Table 1. Lands Affected by the Proposed Project	
Township & Range	Sections
Colorado	
T12N, R97W	10-23, 26-35
T12N, R98W	13-26, 35-36
T12N, R99W	13-16, 22-24
Wyoming^a	
T12N, R96W	5-7, 18-19
T12N, R97W	1-24
T12N, R98W	1-24
T12N, R99W	1-3, 1-15, 22-24
T13N, R96W	7-8, 17-20, 29-32
T13N, R97W	7-36
T13N, R98W	7-36
T13N, R99W	11-15, 22-27, 34-36

^aThe Wyoming Township and Range grid system does not appear to be in perfect alignment with a two mile offset to the west from Colorado and therefore section numbers for each state are included to better depict the project area in both states.

1.3 CONFORMANCE WITH LAND USE PLANS

The portion of the proposed action located in Wyoming is subject to two separate resource management plans. The majority of the project area lies within RFO jurisdiction, and is subject to the Great Divide Resource Management Plan (GDRMP), approved on November 8, 1990. A small portion (0.5 square miles) of the project area is located within RSFO jurisdiction and is subject to the Green River Resource Management Plan (GRRMP), approved on August 8, 1997. The remainder of the proposed action located in Colorado, within LSFO jurisdiction, is subject to the Little Snake Resource Management Plan (LSRMP), approved on April 26, 1989. The plans and decisions were reviewed, and a determination was made that this proposal conforms to land use plan decisions, guidelines, terms, and conditions as required by Federal Land Policy and Management Act (FLPMA) 43 CFR 1600.

The project lies within two BLM-designated Resource Management Units (MUs) in the state of Colorado: MU 2, “Northern Central Resource Management Area,” and MU 3, “Little Snake River Resource Management Area.” The majority of the Colorado portion of the project area lies within MU 2, which has the highest or high intermediate favorability for the occurrence of oil and gas. MU 2 management objectives include provisions for the development of oil and gas resources. MU 3 occupies a smaller portion in the south central section of the project area, where the management objectives are to improve soil and watershed values, increase forage production, and enhance livestock grazing.

The proposed project is located in an area identified by the LSRMP, the GRRMP, and the GDRMP for high oil and gas potential. Each of the RMPs provide that BLM administered lands in the project area will remain open to oil and gas exploration, subject to mitigative provisions. The mitigative measures developed via this environmental assessment are in compliance with the referenced RMPs.

The development of this project would not affect the achievement of the Colorado Standards for Public Health and Guidelines for Livestock Grazing Management (November 1996) or the Wyoming Standards for Healthy Rangelands (August 1997).

A portion of the proposed project would occur in the Adobe Town Wilderness Study Area (WSA). This project would not affect the wilderness characteristics of the WSA.

1.3.1 Relationship to Statutes and Regulations

This environmental assessment was prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) and other statutes and regulations applicable to the project. Impacts to the entire proposed area, including state and private lands, have been considered; however, BLM's authority for imposing mitigation standards, including Conditions of Approval of the NOI for geophysical activity, pertain only to the public lands.

Federally owned oil and gas resources are managed by the U.S. Department of the Interior under the authority of the Mineral Leasing Act of 1920, as amended. Other congressional actions amplify and extend this base authority.

The Federal Land Policy and Management Act of 1976 specifies that public lands are to be managed in a manner that recognizes the need for a domestic source of minerals and declares congressional policy that federal lands be managed recognizing the need for implementation of the Mining and Minerals Policy Act of 1970.

Authority for geophysical prospecting on BLM-administered public lands is contained in the Mineral Leasing Act of February 25, 1920, Title 30 Chapter 3A, as amended, and the Code of Federal Regulations 43 CFR 3150. Other relevant guidance includes BLM Management Manual Handbook H-3150-1.

1.4 NEED FOR PROPOSED ACTION

The proposed action, the Cherokee West 3D geophysical project, is needed to effectively evaluate hydrocarbon reserves underlying the project area for further development of oil and gas resources. The 3D survey will provide a high-resolution image of subsurface geological features underlying the project area.

The prospect overlies an area of high oil and gas potential as identified by the GDRMP, LSRMP, and GRRMP. This proposed 3D seismic project is designed to accurately map structure, stratigraphy, rock, and fluid properties in the subsurface, which should enable wells to be drilled with a much greater probability of tapping producible hydrocarbons than is attainable without 3D geophysical exploration. Within the Wyoming portion of the analysis area itself, 19 oil and gas wells exist, only one of which is known to be currently flowing. Within the Colorado portion of the analysis area itself, 80 oil and gas wells exist, 34 of which are known to be currently flowing. Status of wells within the project boundary is listed in **Chart 1**. Completion of the project should result in the drilling of fewer 'dry holes' in the future, minimizing the occurrence of abandoned well pads, as well as reducing the need for drilling and associated environmental disturbance.

1.5 SCOPING AND PUBLIC INVOLVEMENT

Scoping is an important part of the National Environmental Policy Act (NEPA) process and is used to determine the scope of issues to be addressed and for identifying the key issues related to a proposed action (40 CFR 1500.7). The scoping process can involve federal, state, and local government agencies, tribal governments, resource specialists, industry representatives, local interest groups, and members of the public. Scoping is an interdisciplinary process.

The following participated in the scoping process: Bureau of Land Management (BLM); Wyoming Game and Fish Department (WGFD), Colorado Division of Wildlife (CDOW), Dixie Environmental Services Co. (DESCO); geophysical contractor (Veritas); mineral interest holders; geologists; geophysicists; members of the public; and others. Scoping

was conducted primarily through meetings, phone conversations, written comments, and field observations and assessments.

Public notification and education were also integrated with scoping. A scoping notice was sent out to local residents and interest groups in and around the Cherokee West 3D project area, briefly describing the proposed action.

A total of 31 comments and responses were received from the public as a result of the scoping process. All correspondence is retained in the project file.

1.6 KEY ISSUES

Issues are points of dispute or contention, and areas of concern or uncertainty. In the NEPA process, they are further defined as cause and effect relationships based on the proposed action. Using comments from the public, other agencies, and tribes, the ID Team developed a list of key issues. All comments received through scoping and the public involvement processes were considered in developing the key issues and alternatives, which directed the analysis process. The key issues represent those issues that the decision maker needs to consider in selecting an alternative, and drive the NEPA analysis. The key issues include important issues, as defined in NEPA regulations (40 CFR 1500.4(1)), that are used in the development of alternatives to the proposed action. The key issues received the most public and internal specialist concern. Guided by the appropriate management plans, the ID Team developed alternatives and project design features to address the key issues identified during scoping. The following issues constitute the main subjects or questions of widespread public discussion and interest regarding geophysical investigation. These key issues provided the focus of this EA. A brief description of the key issues identified for this project is as follows:

ISSUE 1 THE PROPOSED SEISMIC ACTIVITY COULD NEGATIVELY AFFECT WILDLIFE RESOURCES OF THE AREA

A few individuals/organizations suggested that the BLM prepare a biological assessment, as well as consult with the Game and Fish Department with regards to impacts on wildlife as a result of proposed operations. Other members of the public said that the BLM should conduct formal endangered species consultation for any listed species that may occur in the area and must comply with its affirmative duty under Section 7(a)(1) to proactively implement programs for the conservation of listed species.

Individuals/organizations wanted to be sure that sensitive species (raptors, sage grouse, etc.) and the habitat that they depend on, are protected during operations in accordance with BLM Manual MS-6840.06.E (Special Status Species Management). It was recommended that greater sage-grouse leks and primary nesting habitat should be evaluated, and that a thorough analysis of raptor nest sites in the area is needed.

Some members of the public thought that the project would impact crucial winter range for elk, mule deer, and pronghorn antelope. These individuals said that no work should

be conducted in crucial winter range areas from November 15 through April 30. Other members of the public believed that impacts to elk herds found within the project area should be studied and that impacts on migration and movement corridors should be disclosed.

ISSUE 2 DRILLING, OFF-ROAD VEHICLE USE, AND OTHER SEISMIC-RELATED ACTIVITY COULD AFFECT CULTURAL AND/OR PALEONTOLOGICAL RESOURCES.

Individuals/organizations suggested that cultural and paleontological resources should be inventoried and protected in the area of the proposed action. Some were concerned that project operations might impact the Cherokee and/or Outlaw Trails, which are documented in the project area, and others were concerned that pictograph sites in the Powder Rim or other rock art would be impacted.

It was suggested that outcroppings of the Wasatch and Washakie formations be mapped within the project area, as these formations are listed as “Class 5” under the Probable Fossil Yield Classification System, meaning they are typified as highly productive of vertebrate fossils with easy access to outcrops. One individual requested that the BLM conduct full-scale paleontological surveys along the proposed source and receiver lines prior to issuing an EA or EIS.

A few individuals/organizations stressed that the BLM should consult actively with affected Native American Tribes to insure the protection of Native American Cultural Sites.

ISSUE 3 OFF-ROAD VEHICLE USE ASSOCIATED WITH THE PROPOSED SEISMIC ACTIVITY COULD AFFECT VEGETATION RESOURCES

Some members of the public were concerned that the project would impact one of Wyoming’s largest woodlands of ancient juniper. One individual/organization stated that Vibroseis and shothole buggies should not be allowed to travel through juniper woodlands or riparian areas of the Powder Rim in order to protect unique and limited habitat.

Individuals/organizations were also concerned with potential impacts to sagebrush habitat within the project area as a result of off-road vehicle travel. It was stated that recovery of vegetation that is killed by compaction or other mechanical disturbance in arid desert environments is an extremely long-term proposition, and that off-road travel in sagebrush steppe could further break up sagebrush patches into smaller fragments.

Concern was also expressed regarding the protection of rare species. It was suggested that rare plant species be mapped within the project area and operations should be offset around them. In addition, individuals/organizations expressed concern over the introduction and/or spreading of invasive species as a result of operations. It was stated that allowing user-made roads and large equipment to move back and forth across the

landscape increases the chances of introducing or spreading invasive plant species, and that steps need to be taken to deny these plants the opportunity to establish themselves.

ISSUE 4 OFF-ROAD VEHICLE USE ASSOCIATED WITH THE PROPOSED SEISMIC ACTIVITY COULD AFFECT SOILS WITHIN THE PROJECT AREA

One member of the public was concerned that project operations would impact fragile soil crusts and lead to increased runoff, decreased water infiltration into the soil, and long-term decreases in productivity of surrounding vegetation. Another individual/organization stated that fragile soils and steep slopes prone to erosion must be avoided by off-road vehicles of all kinds.

ISSUE 5 OFF-ROAD VEHICLE USE ASSOCIATED WITH THE PROPOSED SEISMIC ACTIVITY COULD AFFECT VISUAL RESOURCES OF THE PROJECT AREA.

Some individuals/organizations expressed concern that project operations, specifically Vibroseis operations, would leave visual scars on the landscape. One individual believed that mechanical destruction of sagebrush and other shrubs resulting from off-road vehicle use would create long-term scars on a landscape already riddled with human intrusions. This individual believed that important visual resources should be mapped according to viewsheds that are seen from areas of highest recreational and aesthetic interest.

ISSUE 6 PROPOSED OPERATIONS COULD AFFECT SURFACE AND/OR SUBSURFACE WATER QUALITY.

A few individuals/organizations were concerned that proposed operations could degrade surface water quality. It was stated that operations should not be allowed in or very near to streams, wetlands, or riparian areas; equipment should be serviced and fueled away from these areas; and equipment staging areas should be at least 150 feet from riparian areas in order to protect surface water resources.

Some members of the public were concerned that proposed operations could impact ground water resources of the area. One individual pointed out that past seismic exploration in the Shirley Basin disrupted water tables and aquifers. It was suggested that near-surface ground water flows be mapped and an in-depth analysis of potential impacts be provided in the EA.

ISSUE 7 NOISE DISTURBANCE CREATED BY PROJECT OPERATIONS COULD AFFECT WILDLIFE, HUNTERS, AND RECREATIONISTS

One individual suggested that the EA should address issues related to noise created by helicopter flights, the drilling of shot holes, blasting in shot holes, and noise from Vibroseis buggies.

One member of the public said that noise from operations would disturb hunters in the area, and another inquired about what efforts would be made to alert hunters that their hunting experience and activities may be disrupted.

A suggestion that was made to help reduce disturbance to hunters was to begin operations in the Powder Rim area first and work west towards Kinney Rim.

ISSUE 8 PROJECT OPERATIONS COULD IMPAIR THE ADOBE TOWN WILDERNESS STUDY AREA

Individuals/organizations expressed that the BLM should insure that project operations do not impair the Adobe Town WSA and “fringe” areas for designation as wilderness.

1.7 OTHER ISSUES AND CONCERNS

A number of issues and concerns, other than those determined to be key issues, surfaced relative to this proposal. These issues, while valid and important, were determined to be not significant within the context of the NEPA process. They were either outside the scope of analysis; cannot be adequately addressed at the project level and therefore are not relevant to reasonably foreseeable significant adverse impacts in this project area, nor are they essential to a reasoned choice among alternatives for this project. Other issues are already decided or related to non-discretionary standards, or they are conjectural and not supported by scientific evidence. Some issues were already addressed in that they were a part of the purpose and need for action and the reason for which the proposal was made, or they were determined to be outside the scope of this analysis. Other issues will be addressed by required disclosure of effects. All comments, issues, and concerns were given in-depth review and consideration, however only key issues were addressed in detail. A scoping content analysis can be found in **Appendix B**, and all comments received are on file at the Rawlins BLM office.

The following subjects were concerns that were brought up by a number of individuals during scoping, but were outside of the scope of analysis or determined not to be key issues, as they do not drive formulation of alternatives nor do they need to be analyzed in depth.

ISSUE 1: THE PROJECT SHOULD NOT PROCEED UNTIL THE GREAT DIVIDE RESOURCE MANAGEMENT PLAN IS REVISED.

Some individuals shared the opinion that the project should not be allowed to proceed until the Great Divide Resource Management Plan (GDRMP) is revised, so areas that may potentially be slated for protection under the new plan would not be damaged before final decisions are reached on their management. These opinions were noted; however, this issue is outside the scope of this analysis.

Although the GDRMP was implemented in 1990, it was designed to protect the resources, including those in the Cherokee West 3D project area. The resources within

the project area have changed very little since the approval of the RMP. Extensive planning went into the development of the GDRMP to help insure the protection of area resources and to determine allowed land uses.

At present, the GDRMP is undergoing revision. The draft document is still in the initial public scoping stage of development. There is no anticipated completion date at this point, as development of a new RMP requires a multitude of research and planning. It is a lengthy process, deserving of much consideration. Until the new RMP is finalized and approved, activities on federal lands are managed under the existing GDRMP.

ISSUE 2: NO VIBROSEIS OPERATIONS SHOULD BE ALLOWED WITHIN THE KINNEY RIM CITIZENS PROPOSED WILDERNESS AREA OR THE POWDER RIM CITIZENS PROPOSED AREA OF CRITICAL ENVIRONMENTAL CONCERN.

Some members of the public believed that Vibroseis activity should not be conducted within the Kinney Rim citizens proposed wilderness area or the Powder Rim citizens proposed Area of Critical Environmental Concern (ACEC) so that the unique characteristics of these areas would not be negatively affected by operations, potentially affecting future designation as wilderness areas/ACECs.

The Kinney Rim was a citizens proposed wilderness area; however, it has already been surveyed by the BLM and determined not to have wilderness characteristics; therefore, there is no potential for designation of the area as a wilderness area.

The project area encompasses only two square miles of the Powder Rim citizens proposed ACEC. The Powder Rim is proposed as an ACEC because it contains large and important juniper scrub woodlands, which support a multitude of bird species, a desert elk herd, seven species of rare native plants, and cottonwood riparian communities, as well as xeric upland shrub and desert shrub communities. The proposed project would not negatively affect any of the characteristics for which the area is considered important. All trees would be avoided by off-road vehicles and equipment; therefore, juniper habitat and the species that rely on this habitat would not be negatively impacted. Off-road vehicle activity would not occur within 500 feet of surface water or riparian areas, so cottonwood riparian communities would not be impacted. Operations would be offset accordingly to protect rare plant species. Elk could experience short-term, temporary displacement from the immediate area of work into adjacent suitable habitat during the duration of operations. There would be no operations conducted in areas designated as crucial winter range or parturition habitat for the species during seasonally restricted periods; therefore, there should be minimal impact to elk within the proposed ACEC.

2.0 DESCRIPTION OF THE ALTERNATIVES

This chapter describes and compares the alternatives considered for the Cherokee West 3D Seismic Project. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options.

2.1 THE PROPOSED ACTION (ALTERNATIVE 1)

The general technique of the type of geophysical exploration proposed is referred to as the seismic reflection method. This method utilizes an energy source, which sends acoustic energy into the earth. This energy is reflected from subsurface layers and recorded at the surface with an instrument used to transform seismic energy into electrical impulses (geophones or receivers). The data collected is then processed by computer to create an image of the subsurface geology. The Vibroseis method that Veritas proposes for the majority of the project area generates seismic waves created by specialized buggies equipped with large metal pads that vibrate the ground. At each energy source location, four vibrating buggies lower their pads to the ground to create seismic waves that are recorded by surface recording equipment. The buggy and heliportable drilling methods proposed for areas of the project generate seismic waves created by the detonation of an explosive below the ground. The waves are recorded in the same manner as those of Vibroseis origin.

The Terms and Conditions applied to the Notice of Intent to Conduct Geophysical Operations are considered an integral part of the proposed action, and are incorporated herein by reference.

Separate operational and scheduling phases of the proposed project are described below:

Offset Areas: No off-road vehicle travel would be conducted within the Adobe Town Wilderness Study Area (WSA). No source points would be placed within the WSA, and surveying, cable layout/pickup, and troubleshooting operations in this area would be accomplished by crews on foot with helicopter support.

Survey/Staking: Survey operations are scheduled to begin on May 9, 2005, and are estimated to continue over a duration of 25 days. During the survey/staking phase, Veritas proposes to utilize eight crews, each consisting of one surveyor and one helper. The crews would utilize modified stakeless survey technology within the project area, which incorporates both GPS and navigation technology. Survey crews would utilize GPS technology to record locations of hazards, equipment access routes, cultural/historical sites, and other sensitive environmental resources. This data would be digitized and reflected on the project map, along with applicable avoidance/buffer zones. The project map, complete with all access routes and avoidance/buffer zones, would be loaded into navigation systems on each of the Vibroseis buggies. The navigation systems guide the Vibroseis buggies to and from source point locations and allow them to stay within approved access corridors. If the navigation system detects that a Vibroseis buggy

is getting outside of an approved corridor, an audio warning system is activated both within the Vibroseis buggy and in the Central Recording Unit. This technology helps to minimize impacts by minimizing error. Stakeless surveying also eliminates the need for the majority of the flagging that would normally be associated with a seismic operation; however, “line of sight” staking would still be done. Some locations may still be marked with stakes or flagging, as necessary, to assist in avoidance of sensitive resources. No staking or flagging would be done in the Adobe Town WSA.

Access equipment for survey crews includes ATVs and ½ to ¾ ton pickup trucks. Trucks would be restricted to existing roads and trails within the project area. ATVs would be used to carry crews and equipment off-road; however, equipment would be carried by hand in those areas restricted to or not accessible to ATV travel. ATVs would be permitted only on previously approved routes, and would be limited to speeds of 15 mph or less. The ATVs proposed for use are typical one-passenger four-wheelers with 9-inch (0.75 foot) wide tires. Terrain permitting, a single ATV pass would be made along source and receiver lines to accomplish project staking. Some receiver lines would be used as part of the transportation plan. Several survey base stations for GPS radio towers would be required. Base stations located on BLM-administered land would be subjected to archaeological inventory and specifically permitted.

A total of 65 receiver lines would be aligned north/south across the project area, with a spacing of 1,320 feet between lines. Receiver points would be located every 220 feet along each of the lines, with a total of 13,307 receiver points located over 554 linear miles.

Source lines would be placed in a diagonal pattern, with a general northeast/southwest orientation, between each pair of receiver lines over 64 swaths. Source line spacing would be 1,760 feet, and source points would be located at intervals of 220 feet along each of the source lines, with a total of 8,568 points over 357 linear miles. Source points would be placed in offset positions as necessary to avoid rough terrain, existing facilities, wetland areas, sand dunes, archeological sites, sensitive species, and other areas of concern.

Cable Layout: A helicopter would be used to transport receiver equipment along receiver lines. Caches of cables, data collectors, batteries, and geophones would be placed along receiver lines, normally at intervals of six geophones per station (every 1,320 feet). Equipment unpacking and layout, geophone placement and cable connection work, and equipment bundling for helicopter pick-up would be accomplished by several four or five-man crews of workers, who would alternately layout and pick-up as needed. Traffic along receiver lines crossing BLM-administered land would be restricted to personnel on foot or using ATV's. No truck or buggy vibe traffic is planned along receiver lines. The same method (reversed) would be used to pick up the equipment. Cable deployment field operations would be performed during daylight hours.

Vibroseis Operations: Veritas proposes to utilize two sets of buggy mounted vibrators (each set being comprised of four buggy vibes) to create an energy source at each source point in which this method will be used. Veritas proposes to utilize vibroseis buggies for approximately 70% of the survey, in areas with gentle slopes. Veritas also intends to run the vibroseis buggies at night. The buggy vibes are 10 feet 7 inches high, 31 feet long, and 10 feet wide. They weigh approximately 60,000 pounds each and are equipped with 34-inch (2.8 feet) wide low-pressure tires, which give them a ground pressure of 10-14 pounds per square inch (PSI). This configuration provides for optimum traction (minimal spinning) while minimizing soil compaction, resulting in reduced potential for two-track roads being formed. A vibrator pad measuring 7.7 feet x 3.9 feet is centered under each vehicle.

A single pass by one set of four vibrators would be made along each source and access route, conditions permitting. The vibrators would offset their tracks in order to minimize impacts and vibroseis operations would proceed from west to east, two swaths at a time. The vibrators would begin at the north-westernmost point of the project area, and would shake points from north to south in the first two swaths. Wyoming Game & Fish recommend that operations start at Powder Rim and proceed west towards Kinney Rim. When they reach the southern end of the swaths, the vibrators would then vibrate north up the remainder of the next swaths, and the project would proceed as such through completion. Eighteen receiver lines (equipment along receiver lines) have to be laid out and active prior to recording.

Refueling of vibrators would be conducted at existing roads and trails. If the number of vibrators needed for operations change, Veritas would notify the BLM in advance so that impacts could be assessed accordingly.

Buggy and Heliportable Drilling Operations: Some source points within the project will require drilling, as vibroseis operations are not feasible due to rough or steep terrain. Veritas proposes to utilize buggy drills for approximately 20% and heliportable drills for approximately 10% of the project area in order to minimize and/or avoid negative impacts to sensitive areas.

Buggy drills would be standard Ardco drills with accompanying water buggies. Ardco units typically have a length of 24 feet 11 inches, a width of 8 feet, and a height of 10 feet 10 inches to 20 feet 3 inches (depending on whether the mast is up or down). This type of buggy drill weighs approximately 18,000 pounds and typically exhibits a ground pressure of approximately 4-5 pounds per square inch (PSI). With the larger combine balloon tires fitted as proposed, ground pressure would be further minimized.

In areas where heliportable drilling is necessary, a helicopter would transport small, portable drills to source point locations, limiting the need for cross-country vehicle travel. One helicopter is capable of supporting four drills.

Buggy drill holes would be drilled to a depth of 60 feet and loaded with an 11-pound charge of *Pentolite*. Heliportable drill holes would be drilled to a depth of 40 feet and loaded with a 5.5-pound charge of *Pentolite*. Holes would be plugged in accordance with

Wyoming Oil and Gas Conservation Commission (WOGCC) and Colorado Oil and Gas Conservation Commission (COGCC) rules regarding seismic hole plugging.

Veritas proposes to begin shothole drilling on between July 1st and July 15th and should be completed within 45 days. Raptor and plover timing stipulations are in effect during this period.

Data collection/recording: Veritas would begin recording (with an I/O System Two MRX recording system) for the project around August 1st, and anticipates completion of this phase within approximately 60 days. Data would be acquired 24 hours per day. During the data acquisition portion of the project, 3D geophysical data would be recorded using the following specialized equipment:

- 1) 9 I/O AHV-IV Buggy Vibrators
- 2) 5 ArdcO Buggy Drills (equipped with combine balloon tires for low ground pressure)
- 3) 6 Heliportable Drills
- 4) 1 Vibrator Service / Fuel Truck Ford F-800
- 5) 2 One Ton Crew Cab Trucks (Vibe Support/Personnel Transfer)
- 6) 1 F800 Recording Truck
- 7) 2 7 Passenger Suburbans
- 8) 3 ¾ ton pickup trucks
- 9) 5-One ton stake bed trucks to transport personnel and recording equipment
- 10) 1 One ton service truck
- 11) 8 Honda ATV'S
- 12) 5 48' Van Trailer (Equipment Transport / Battery Charging)
- 13) 1 48' Flat Deck Trailer (Equipment Transport)
- 14) 2 20' ATV Trailers
- 15) 2 5-ton equipment trucks
- 16) 1 B2 A-Star Helicopter
- 17) 1 Wash Trailer
- 18) 1 Support Vehicle for Helicopter
- 19) 6000 Channel MRX Recording System (Boxes, Batteries, Cables, Geophones)
- 20) 2 Semi fuel tankers: 1 for vibes, 1 for helicopter

Trouble-shooting of equipment during recording operations would be accomplished primarily through the use of helicopters, and occasionally ATVs. Veritas would minimize ATV passes along receiver lines to the maximum extent possible; however, passes along receiver lines may become necessary in areas to correct or replace recording equipment. ATVs along receiver lines will be equipped with GPS to avoid surveyed cultural sites. If multiple passes become necessary, ATV paths would be offset to minimize impacts.

Staging Areas: Veritas would set up a staging area for the deployment of equipment from a helicopter loading zone (LZ). Facilities at this staging area would consist of equipment trailers, helicopter fuel storage, vibrator fuel storage and parking for crew transport vehicles. All of the fuel storage tankers would have double wall containment.

A typical staging area is 200 x 200 feet in size. Archaeological inventory of all staging area locations on BLM-administered lands would be conducted. All applicable approvals and/or permits would be obtained from the appropriate BLM Field Office (RFO, RSFO, or LSFO, depending on location within the project area).

Clean-up: The project clean-up phase would proceed concurrently with the recording phase. Equipment, pin flags, lathe, ribbon flagging, trash, and any other materials brought in by the seismic crews would be removed as the recording crew works through the project area. Trash would be disposed of properly at either a Colorado or Wyoming Department of Environmental Quality (DEQ) approved disposal site.

Compliance: Veritas' project managers and Quality Control/Quality Assurance (QAQC) representatives would ensure that operations are conducted in compliance with all applicable local, state, and federal regulations, as well as all conditions of approval contained within the BLM's Finding of No Significant Impact and seismic permit.

2.2 NO OFF-ROAD VEHICLE USE IN ADOBE TOWN FRINGE AREAS WITH WILDERNESS CHARACTERISTICS (ALTERNATIVE 2)

Alternative 2 is largely the same as the proposed action; however, in addition to prohibiting off-road vehicle travel in the Adobe Town WSA, there would be no off-road vehicle travel in the fringe areas surrounding the WSA, which were identified by the BLM as having wilderness characteristics.

These areas exist along the south and southeastern boundaries of the WSA, within the northeastern portion of the project area (**Map 2**). They are identified by the BLM as fringe areas D and E (BLM RFO), and are defined by the following parameters: size, naturalness, opportunity for solitude or unconfined recreation, and supplemental values. These areas are large enough as to allow for practical use, are generally not imprinted by man, allow for primitive recreation, and contain various other resource features. There are currently no restrictions in place for the protection of these areas by the BLM.

There is an alternative in the Rawlins Field Office RMP revision to manage these areas to preserve their wilderness characteristics.

Surveying, cable layout/pickup, troubleshooting, and recording in the fringe areas would be accomplished on foot with helicopter support.

Drilling operations in the fringe areas would be accomplished with heliportable drills. The prohibition of off-road vehicle traffic in the fringe areas would create the need for over 1500 additional holes to be drilled in areas that would have been completed using vibrators. The time necessary to complete drilling operations would greatly increase, as heliportable drills are only capable of completing four to six holes per day. Six heliportable drills would be utilized for drilling. Assuming that each drill completes an average of four holes per day, and that only 1500 holes would be drilled, approximately 63 days would be required for drilling in the fringe areas. Under the proposed action, all

areas planned for drilling would have been completed in approximately 45 days. With the addition of 1500 holes in the fringe areas under this alternative, time necessary for drilling would be more than doubled (total of 108 days).

As a consequence of increased time necessary for drilling, recording operations would not begin until October 1, 2005. Recording operations would take approximately 60 days to complete. This would push the project even further into the fall hunting season and into the restricted period (November 15th – April 30th) for big game crucial winter range in Wyoming.

All aspects of project operations outside of the fringe areas would be identical to those described in the Proposed Action.

2.3 NO ACTION (ALTERNATIVE 3)

Under the No Action alternative, the seismic project would not be authorized on BLM-administered lands, which comprise 97% of the Cherokee West 3D project area. Operations could only occur on state and private lands comprising less than 3% of the total project area. Existing land and resource use activities within the project area would continue generally as is. The Affected Environment descriptions presented in this EA, thus, also constitute the effects of the No Action alternative, unless otherwise noted.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

A number of alternatives to the proposed action were considered. The following are brief descriptions of alternatives eliminated from detailed study and the reasons for eliminating them.

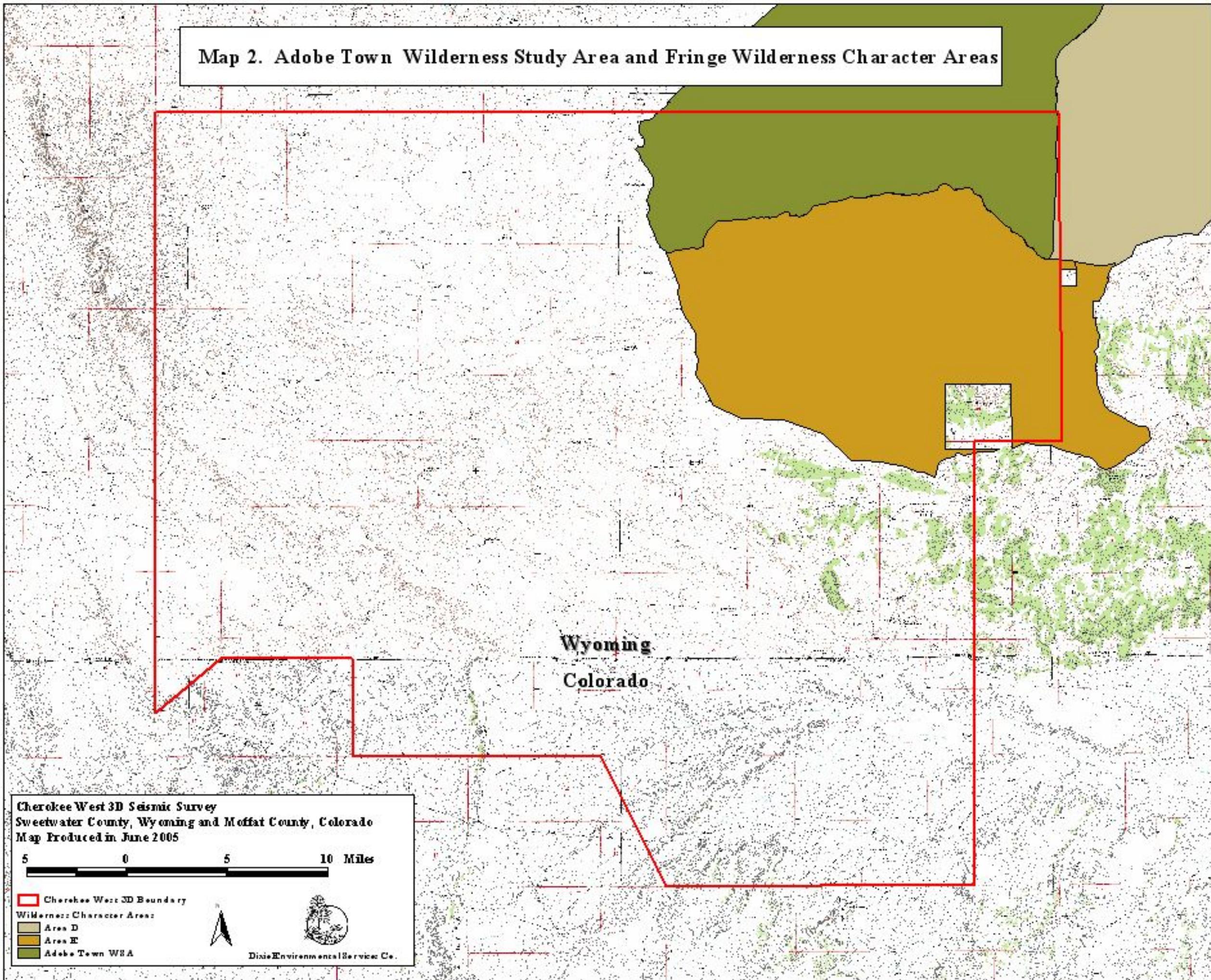
Exploratory Drilling

Exploratory drilling is an alternative to collecting and analyzing seismic data. Exploratory drilling was the only available method of locating oil and gas reserves prior to development of 2-D and 3-D seismic technologies used to image the subsurface geology of an area and pinpoint locations of potential reservoirs. Exploratory wells are typically less successful, more costly, and have greater environmental impacts (i.e., more wells are required) than wells based on high quality seismic data, therefore, it was not considered to be a viable alternative for accomplishing project objectives.

Utilize Helicopter Operations For The Entire Project

Under this alternative, a helicopter would transport portable drills to each source point location, and all layout, pickup and troubleshooting would be accomplished on foot with helicopter support, limiting the need for off-road vehicle travel. Heliportable drill units are small and lightweight, and have a lot less torque than larger, heavier drills. It is

Map 2. Adobe Town Wilderness Study Area and Fringe Wilderness Character Areas



Cherokee West 3D Seismic Survey
Sweetwater County, Wyoming and Moffat County, Colorado
Map Produced in June 2005

5 0 5 10 Miles

Cherokee West 3D Boundary
Wilderness Character Areas:
Area A
Area B
Adobe Town WSA

Dixie Environmental Services Co.

estimated that each heliportable unit would be capable of drilling approximately four to six holes per day based on the substrate present within the project area. The applicant would have access to only six heliportable drills in total for the project's duration. Assuming that each drill can accomplish four holes a day, and the number of source points would remain the same, heliportable drilling would require approximately ten and a half months for completion. With seasonal wildlife and hunting period restrictions applicable to the project area, this method would not allow for continuous operations, and would therefore not be feasible, strictly from a time-frame standpoint.

In addition to time constraints, the entire project area would be subject to constant helicopter traffic along seismic lines throughout the duration of the project, creating increased noise disturbance to wildlife and people in the area for an extensive period of time.

The above-mentioned factors, combined with increased operating costs that would be many times that of the proposed action, make this option economically unfeasible and environmentally undesirable. It was eliminated from future analysis.

Utilize Buggy Drilling for the Entire Project

Under this alternative, buggies would be utilized for drilling in the entire project area. A total of approximately 7560 holes would be required to accomplish project objectives.

Buggy drills would be standard Ardco drills with accompanying water buggies. As explained in the proposed action, Ardco units typically have a length of 24 feet 11 inches, a width of 8 feet, and a height of 10 feet 10 inches to 20 feet 3 inches (depending on whether the mast is up or down). This type of buggy drill weighs approximately 18,000 pounds and typically exhibits a ground pressure of approximately 4-5 pounds per square inch (PSI). With the larger combine balloon tires fitted as proposed, ground pressure would be further minimized.

Buggy drills could complete approximately 10 to 15 holes per day and five buggy drills would be utilized during project operations. Assuming that 10 holes would be drilled per buggy per day, drilling operations would take approximately five months to complete. With seasonal wildlife and hunting period restrictions applicable to the project area, this method would not allow for continuous operations, and would therefore not be feasible, strictly from a time-frame standpoint.

Use Passive Seismic for Survey

Passive seismic is a relatively new and unproven methodology for characterizing the subsurface with respect to oil and gas reservoir potential. This technique utilizes seismic receivers placed in the field in an array similar to conventional 3-D seismic technology, which record the naturally occurring seismic activity. This methodology does not require the need for man-made energy sources (i.e. dynamite, vibrators, or air guns). Receivers

pick up energy released from micro-seismic events occurring deep within the earth's crust.

There are three significant reasons why this methodology was eliminated from analysis. First, the amount of time necessary to collect data with passive seismic technology is highly variable and dependent on the natural seismic processes within the earth's crust. These natural seismic events are also highly unpredictable in time and space. In some test examples using this method, it took up to a year to collect enough data to provide a high-resolution image necessary to map and pinpoint the location of hydrocarbon reservoirs. In areas with a low occurrence of natural seismic activity the process could take many years. In the oil and gas exploration industry today, there are time constraints set by regulatory and surface permits, as well as mineral lease agreements. In addition, increases in the amount of time necessary to conduct the survey intensify the longevity of impacts and disturbances to wildlife, recreationists, local residents, and natural resources.

Second, the equipment needed is relatively new and expensive, and few geophysical data collection companies are equipped with this new and unproven technology. The amount of time required to collect data can increase project costs through maintaining field crews for longer periods of time.

A third reason is there are still problems with the reliability of the data. Passive seismic technology has not undergone the testing necessary for users to have confidence in the data. It is difficult to spend large amounts of money on technology that has not been proven to work equally or better than conventional methods. For these reasons, the alternative was eliminated from analysis.

3.0 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES PERTAINING TO CRITICAL RESOURCES

This section provides an analysis of potential impacts (environmental consequences), which would result from project implementation under each alternative. Note that the anticipated environmental consequences of the No Action alternative are largely the same as the Affected Environment description; therefore, they are addressed under the same heading unless otherwise noted.

This section of the EA also presents mitigation measures developed in response to the anticipated impacts, which would be applied to the project, if approved.

Critical elements of the human environment (identified by the BLM NEPA Handbook H-1790-1), their status in the project area, and whether or not they would be affected by the proposed project are discussed in the sections below:

3.1 AIR QUALITY

3.1.1 Affected Environment

There are no special designation air sheds or non-attainment areas nearby that would be affected by the proposed action.

3.2.2 Environmental Consequences

3.2.2.2 Proposed Action (Alternative 1)

Anticipated impact to air quality would occur from exhaust fumes emitted by vibroseis buggies, ATVs, a helicopter, drills and miscellaneous support vehicles. Emissions would be present throughout the duration of proposed field recording operations and be similar to that of 8 semi-trucks and 10 cars. Impacts resulting from exhaust emissions are expected to be negligible.

Air quality would also be slightly altered by fugitive dust resulting from vehicle travel on existing roads and trails, and to a much lesser extent, dust from cross-country vehicular travel. Helicopters and ATVs, rather than jug trucks, would be used to transport cable and geophone equipment off road, thus minimizing dust creation. Off road vehicles would be restricted to speeds less than 15 mph. Overall, fugitive dust contributions are expected to be minimal, short term, and localized.

3.3.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, there would be less fugitive dust in the fringe areas, as there would be no off-road vehicle travel in these areas.

3.1.3 Mitigative Measures

None.

3.2 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

3.2.1 Affected Environment

The entire project area is clear of any BLM existing or proposed areas of critical environmental concern (ACECs).

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

There would be no affect to ACECs, as there are none present in the project area.

3.4.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.2.3 Mitigative Measures

None.

3.3 CULTURAL/HISTORICAL RESOURCES

3.3.1 Affected Environment

Cultural resources in this region range from late Paleo-Indian to Historic. For a general understanding of the cultural resources in this area of Colorado, see *An Overview of Prehistoric Cultural Resources, Little Snake Resource Area, Northwestern Colorado*, Bureau of Land Management Colorado, Cultural Resources Series, Number 20, and *An Isolated Empire, A History of Northwestern Colorado*, Bureau of Land Management Colorado, Cultural Resource Series, Number 2. For a general overview of the cultural resources in the southwestern portion of Wyoming, see *People of the Sage: 10,000 Years of Occupation in Southwest Wyoming*. Cultural Resource Management Report No.67, Archaeological Services of Western Wyoming College, Rock Springs.

A review of the State Historic Preservation Office (SHPO) database for the project sections located in Colorado indicates that 27 sites have been recorded and 42 cultural resource inventories have occurred within the project area extent in Colorado. The cultural resource inventories were conducted for proposed well pad, pipeline, seismic, evaporation ponds, sewer improvement, and livestock projects. Eight of the previously

recorded resources were recorded as prehistoric open lithic scatter sites and 19 were recorded as prehistoric open camp sites. Of the open lithic scatter sites, 3 were officially determined as “need data”, 2 were determined field eligible, 2 were field not eligible, and 1 was officially eligible for the NRHP. The NRHP eligibility status of the open camps are as follows: 4 were officially “need data”, 4 were field “need data”, 8 were field eligible, 1 was officially not eligible, and 2 were officially eligible (Table 1).

Four of the previously recorded sites were associated with the Archaic stage and one site with the Late Prehistoric stage, as determined through temporally diagnostic artifacts. The remaining sites were unspecified as to their associated temporal and cultural periods. Although a few of the sites were multicomponent, containing historic debris, no solely historic sites were recorded within the proposed project area. The preliminary file search demonstrates a moderate to high occurrence of prehistoric open camp and open lithic scatter sites. It is likely that the project areas’ site potential will be similar based on varied topography and natural material availability. These matters may be considered the preliminary indicators directing research questions.

Forty-three previous Class III cultural resource inventories are on record for the 122 sections encompassing the Wyoming portion of the proposed project area, according to the records of the Wyoming State Historic Preservation Office. Twenty-three of the inventories were for linear projects, five were for block areas, and 15 were for combinations of block and linear projects.

Of the 23 linear projects, 11 were seismic prospects, six were pipelines, four were roads, and two were fences. The length and number of acres inventoried for these linear projects are unknown. The five block inventories encompassed a total of 1617 acres and included two miscellaneous projects, one Class II sampling survey, one borrow pit, and one facility associated with a pipeline. The 15 combination block and linear inventories included blocks encompassing 120 acres. They were 14 well pads with access roads, and one miscellaneous project. The length and number of acres inventoried for the linear portions of these projects are unknown.

A total of 192 sites have been recorded in the 122 sections encompassing the Wyoming portion of the prospect, according to the records of the Wyoming State Historic Preservation Office. These are tabulated by site type and eligibility below:

Table 2: Known Cultural/Historical Sites Within the Wyoming Portion of the Project Area			
Site Type	Eligible	Not Eligible	Unknown
Prehistoric lithic scatters	26	34	30
Prehistoric campsites	30	8	23
Prehistoric rock art	7		
Prehistoric hunting blinds			3
Prehistoric stone circles	1		1
Prehistoric wickiups	2		
Prehistoric rock shelters	2		

Table 2: Known Cultural/Historical Sites Within the Wyoming Portion of the Project Area			
Site Type	Eligible	Not Eligible	Unknown
Historic Cherokee Trail	1		
Historic trash scatters		4	1
Historic trash dumps		1	
Historic stock herding camps		2	1
Historic corrals/fences		1	1
Historic corrals/fences with trash			1
Historic inscriptions		2	
Historic cairns			1
Historic sites of unknown type			1
Prehistoric lithic scatter with historic trash			4
Prehistoric campsites with historic trash	1		2
Prehistoric campsite with historic trail			1
Total	70	52	70

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

The proposed seismic exploration project has the potential to cause effects to unidentified sites eligible for the NRHP. An effect is defined as an alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register of Historic Places (36 CFR 800.16 (i and l)). These effects could be in the form of direct, indirect or cumulative impacts. Direct impacts are physical, and can adversely affect the site or its setting. Direct impacts could occur from vehicle traffic through sites during geophysical field operations, creating two-tracks, surface soil displacement and/or soil compaction, and rutting in wet weather. The new trails themselves, a direct impact, could affect the setting of sites for which setting is a component of site significance. Direct impacts can also include artifact displacement. Indirect effects to sites could occur through the creation of trails which subsequently might be used by wild and domestic animals, recreationists, and/or stimulate erosion. Further, new trails will provide access into areas containing cultural resources. The new trails will be used by the public and facilitate illicit artifact collection which could radically change site interpretations and result in the loss of important scientific information. Cumulative effects would consist of a gradual degradation of the cultural landscape through erosion and illicit artifact collection, as well as the aggregate effects of any kinds of development and use in an area which affect the surface.

With the implementation of the spread out vehicle pattern (see visual resources section 4.9), the saturated soil operations prohibition (see soils section 4.6), and the standard cultural resource procedures prescribed below (pursuant to the Wyoming BLM-SHPO and Colorado BLM-SHPO State Protocols regarding implementation of the NHPA Sec. 106 and BLM 8100 series manuals), no effect to significant cultural resources is

anticipated. All cultural resources will be avoided by seismic project activities on source and receiver lines, staging areas, and heliportable activities.

3.6.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, the Adobe Town Fringe Areas with wilderness characteristics would not be subjected to tire impacts from off-road vehicle travel. This being the case, there is less likelihood that any unidentified cultural/historical resources in this area would be impacted.

3.3.3 Mitigative Measures

Veritas shall provide a Class III cultural resource inventory report and site forms to the established Standards of Bureau of Land Management Wyoming and Colorado Cultural Resource Use Permit. All cultural resources, unless previously determined not eligible to the National Register of Historic Places, will be avoided by all project activities, source and receiver lines, staging areas and heliportable activities. The Class III cultural survey will be guided by the following requirements:

Travel Route/Activity Plan: A map will be provided that has all the travel routes, staging areas, drive around ways, and support areas designated on it. This map will cover all transportation aspects of the project. This map will be at 1:24,000 foot scale. Smaller scale maps may be used for field compliance work. A copy of this map will be in the possession of all Veritas Field Crew Leaders during operation on the project.

Receiver Lines: A Class III cultural survey does not have to be done on receiver lines unless they are part of the travel route/activity plan. Cultural resources identified during the records review will be avoided by project design. Receiver lines will only have foot traffic allowed during the project in those areas that are not part of the travel route/activity plan. Flagging and other designation methods will be maintained during the life of the project and removed when the project is over. Exceptions are when the geophone lines are tested. One ATV only will be present on the receiver line to fix problems as they are identified. Driving of the ATV will be limited in scope and confined to designated areas of the receiver lines geophone spreads. ATV traffic will not be allowed through identified sites, even for geophone testing.

There will be no other vehicle traffic allowed on receiver lines unless they have been designated as part of the travel route/activity plan for moving equipment around. The receiver lines that are designated travel routes will have a Class III cultural resource survey completed (see Source Lines). No cross-country operation of ATV's is authorized.

Source Lines: Source lines are those lines on which all vehicle and vibroseis truck traffic will occur. These lines will have a Class III survey completed during the design phase of the travel route/activity plan development. The travel route/activity plan map

will show all of the drive around ways. All drive around routes, for cultural resources or for other environmental reasons, will be adequately marked. Flagging and other designation methods will be maintained during the life of the project and removed when the project is over. Source lines and travel routes will have a Class III survey conducted that is 100 feet wide, 50 feet either side of the center line. Where vibroseis trucks must turn around, a sufficient area will be surveyed at a Class III. Turn around areas will be shown on the map as well. No cross-country operation of vehicles is authorized outside the approved travel route/activity plan.

Drive Around Routes and Barriers: The archaeological consulting firm, in conjunction with Veritas, will provide adequate visual protection for cultural resources. Standard site avoidance (by all vehicles including ATVs) entails, at a minimum, a 32.8-meter (100 foot) or more buffer zone around all eligible and unevaluated sites. Sites of potential Native American concern are subject to special measures, as specified below. Sites previously determined to be not eligible for nomination to the NRHP require no further action if the field reexamination confirms that the previous recordation is still accurate.

Barriers will be flagged on both sides of the source/receiver line that bisect a cultural resource.

Drive-around routes will be adequately marked and will be surveyed at a Class III level. Flagging and other designation methods will be maintained during the life of the project and removed when the project is over.

Support Areas: Staging, base stations, and equipment areas, as well as any other areas containing concentrations of people and equipment, will be surveyed at a Class III level with a suitable buffer, Area of Potential Effect. These areas will be identified on the travel route/activity plan map.

Heliportable Drill Holes: A Class III survey will be conducted at each heliportable drill point. This will include a 50-foot area around the drill location. Larger areas will be used when needed for site-specific operational reasons.

Standard Stipulations:

1. The operator is responsible for informing all persons who are associated with the operations that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are encountered or uncovered during any project activities, the operator is to immediately stop activities in the immediate vicinity of the find and immediately contact the authorized officer (AO) at (307) 328-4200 (Rawlins Field Office) or (970) 826-5000 (Little Snake Field Office). Within five working days, the AO will inform the operator as to:
 - Whether the materials appear eligible for the National Register of Historic Places;

- The mitigation measures the operator will likely have to undertake before the identified area can be used for project activities again; and
 - Pursuant to 43 CFR 10.4(g) (Federal Register Notice, Monday, December 4, 1995, Vol. 60, No. 232) the holder of this authorization must notify the AO, by telephone at (970) 826-5000, and with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), you must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer.
2. Veritas will provide a cultural resource inventory report(s) addressing that portion of the project located within the area of potential effect of historic transportation routes/site for which setting might be an issue. The report, including recommendations, will be submitted to BLM who, in consultation with the Wyoming SHPO, will determine effects of the proposed project. Geophysical activities will not be permitted to create visual intrusions or adverse effects to the Cherokee Trail and other historic transportation routes/site for which setting might be an issue. Based on determination of effect, BLM-RFO will issue project authorization for operations in this area with appropriate conditions.
 3. Vibroseis (source) points must be at further than ¼ mile or the visual horizon (whichever is closer) of the Cherokee trail. Geophone receiver cable within one quarter mile of the trail will be placed by helicopter-assisted pedestrians.
 4. No project-related vehicle traffic (industrial access) is permitted on the Historic trails. The Historic trails may be crossed at existing disturbances or in areas previously determined to be noncontributing. Single pass crossings on poorly established roads will be permitted when the route is approved by the Bureau archaeologist and will not result in resource damage.
 5. Veritas's archeological consultant will obtain a cultural resource files search printout from the SHPO Cultural Records Office shortly before commencing fieldwork. Based on this, the consultant will identify previously recorded cultural resource sites on federal and non-federal lands in the project area. Using site form copies obtained from SHPO, the consultant will plot these sites onto the project map for Veritas, who will design avoidance for these properties prior to the survey. Previously determined not eligible properties will be revisited to assure that they are adequately recorded.
 6. Veritas is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archeological sites, or for collecting artifacts. Also, should previously unrecorded cultural materials be encountered during the project, work shall be stopped until the BLM's Authorized Officer can be notified and then material properly evaluated by a qualified archaeologist.

7. All off-road vehicular traffic on BLM land will be confined to a corridor 100 feet wide (50 feet either side of the flagged centerline) along lines that have been inventoried for cultural resources.
8. Maps indicating the drive-around routes shall be carried by personnel in the field. If the situation arises where project personnel cannot determine the appropriate drive-around routes, Veritas must request assistance from the contract archaeologist or contact a BLM archaeologist.
9. Should there be any unanticipated damages to any cultural resources (including historic trails) the applicant will be responsible for necessary remediation measures as determined by the Authorized Officer.

3.4 ENVIRONMENTAL JUSTICE

3.4.1 Affected Environment

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities.

The proposed project area is largely unpopulated. No minorities and/or low-income populations or communities are known to be of issue with regards to the proposed action.

3.4.2 Environmental Consequences

3.7.2.1 Proposed Action

The proposed action would have no health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency’s Environmental Justice Guidance (1998).

3.7.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.4.3 Mitigative Measures

None.

3.5 FLOOD PLAINS

3.5.1 Affected Environment

Shell and Skull Creeks flow through the project area and have associated flood plains. Shell Creek flows across the Colorado-Wyoming state line and through the western portion of the project. Skull Creek lies in the northeast corner of project area and flows through the Adobe Town WSA. Several smaller waterways are present within the project area, along with their associated floodplains. They include Beaver Slide Draw, Beaver Wash, Crooked Wash, North Fork Powder Wash, Espitallier Spring, West Dripping Rock Spring, and Eagle Rock Draw.

The floodplains of both Shell Creek and Skull Creek are confined to dry benches formed in the drainage bottoms and along creek channels. Floodplain zones in the project area were identified using aerial photography.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

The proposed action should have no negative effects on floodplains within the project area. There would be no floodplain alteration and/or increased erosion rates associated with the proposed action, as off-road vehicle travel would be prohibited on saturated soils within floodplain areas in order to prevent rutting or trenching and to minimize impacts to vegetation in the area.

With implementation of mitigative measures to protect surface water resources (incorporating a 500-foot offset from surface water), activity within floodplain areas would be minimal. All operations conducted within these sensitive areas would be conducted on foot with helicopter support.

3.5.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.5.3 Mitigative Measures

Veritas shall not utilize off-road vehicles within 500 feet of surface water or riparian areas.

Vibroseis and shot hole source points shall not be placed within 500 feet of surface water.

Recording equipment shall be deployed in the area by crew members on foot.

3.6 INVASIVE, NONNATIVE SPECIES

3.6.1 Affected Environment

Invasive weeds, which include noxious species and weeds of concern in Colorado and Wyoming, have a much higher probability of occurrence in areas of soil disturbance. The spread of invasive, non-native plant species contributes to the loss of rangeland productivity, increased soil erosion, reduced water quantity and quality, reduced structural and species diversity, and loss of wildlife habitat. Because invasive and noxious weeds are very aggressive, special management is required to prevent the introduction of weed propagules from outside sources. Noxious and invasive species which have the potential for occurrence within the project area include, but are not limited to the following: diffuse knapweed (*Centaurea diffusa* Lam.), Russian knapweed (*Acroptilon repens* (L.) DC.), spotted knapweed (*Centaurea maculosa*), leafy spurge (*Euphorba esula*), black henbane (*Hyoscyamus niger*), salt cedar (*Tamarix spp.*), and Halogeton (*Halogeton glomeratus*).

Halogeton is of particular concern with regards to project activities within Wyoming and Colorado. This invasive species is known to occur along many roadsides and in other disturbed areas within project boundaries, and is primarily associated with the saltbush vegetation type found within the project area. Invasive weeds must be managed in accordance with the Colorado Weed Management Act, as well as any other applicable regulations or guidelines established by the States of Wyoming and Colorado.

3.6.2 Environmental Consequences

3.8.2.1 Proposed Action

Invasive and/or noxious weeds could be introduced to the area by infested equipment or spread into new areas as a result of travel through existing populations of invasive species. With implementation of the crew education and vehicle washing stipulations below, no such introduction or spread of existing populations is expected.

Weeds could also invade, spread, and take hold in areas of surface disturbance caused by project operations. Provided reclamation and reseeding is undertaken promptly in any areas of (unanticipated) surface disturbance as prescribed below, no increase in weed occurrence is foreseen.

3.8.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, the likelihood of introducing or spreading invasive weeds in the fringe areas would be reduced as a result of the prohibition of off-road vehicle travel in these areas. Equipment would not be moving through areas already infested with weeds, and the fringe areas would not be subject to as much surface disturbance, which

could promote the propagation of weeds.

3.6.3 Mitigative Measures

To prevent the introduction of new weeds, Veritas shall thoroughly power-wash all field vehicles (buggy vibes, pick-ups, ATVs, etc) before transporting them to the project area.

Veritas shall establish a vehicle washing station at the staging area to wash equipment on site in the event of exposure to invasive and/or noxious weeds. The washing station shall be mobile and able to be transported to other areas, as necessary. Washing stations shall be located on state or private lands.

To help prevent the spread of existing populations of invasive and/or noxious weeds, information on the more common species with potential for occurrence in the project area shall be distributed to crew members. The crew members shall be instructed to avoid any populations of these species that they encounter, and asked to report the locations of the populations to the BLM.

Should Veritas be required to re-vegetate any areas upon completion of project activities, an appropriate seed mixture shall be coordinated with the appropriate BLM representatives.

3.7 MIGRATORY BIRDS

3.7.1 Affected Environment

Habitat within the project area is suitable for a variety of species of migratory birds listed on the 2002 Birds of Conservation Concern List. **Table 2** indicates species that have the potential to be found within the proposed project area based on habitat requirements:

Table 3. Avian Species with Potential for Occurrence within Cherokee West 3D Project Area: 2002 Birds of Conservation Concern List		
Species Common Name	Scientific Name	Habitat
Northern harrier	<i>Circus cyaneus</i>	Grasslands, agriculture lands, shrublands and marshes
Swainson's hawk	<i>Buteo swainsoni</i>	Arid grasslands, agriculture lands, or deserts with scattered trees or shrubs
Ferruginous hawk	<i>Buteo regalis</i>	Basin-prairie shrub, grassland, rock outcrops
Golden eagle	<i>Aquila chrysaetos</i>	Open habitats, including shrublands, grasslands, and agriculture lands
Peregrine falcon	<i>Falco peregrinus</i>	Forage in open areas and shrublands. Nest on cliffs near pinyon/juniper or ponderosa woodlands

Table 3. Avian Species with Potential for Occurrence within Cherokee West 3D Project Area: 2002 Birds of Conservation Concern List		
Species Common Name	Scientific Name	Habitat
Prairie falcon	<i>Falco mexicanus</i>	Dry open country and prairies. Nest on cliffs below 10,000 feet.
Mountain plover	<i>Charadrius montanus</i>	Plains, grasslands, shrublands- grassy or dirt fields
Burrowing owl	<i>Athene cunicularia</i>	Grasslands, basin-prairie shrublands, deserts, usually associated with prairie dogs or other burrowing rodents
Short-eared owl	<i>Asio flammeus</i>	Open habitats, grasslands, marshes, shrub-steppe, agriculture lands. Nest on ground.
Virginia's warbler	<i>Vermivora virginiae</i>	Mountain shrublands and oakbrush, pinyon-juniper woodlands
Wilson's phalarope	<i>Phalaropus tricolor</i>	Shorebirds, nest in sedge and rush meadows
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Riparian (cottonwood) woodlands
Black swift	<i>Cypseloides niger</i>	Nest in colonies on vertical rock faces, near waterfalls or dripping caves
Flammulated owl	<i>Otus flammeolus</i>	Ponderosa pine, Douglas fir, lodgepole pine, spruce, old growth pinyon-juniper and/or aspen stands (cavity nesting). Open forest for foraging,
Lewis's woodpecker	<i>Melanerpes lewis</i>	Open pine forest, riparian cottonwoods, pinyon/juniper woodlands
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>	Coniferous forest open with mixed aspen
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	Pinyon/juniper woodlands and adjacent open shrublands
Black-throated gray warbler	<i>Dendroica nigrescens</i>	Mature pinyon/juniper woodlands
Sage sparrow	<i>Amphispiza belli</i>	Sagebrush, chaparral, dry foothills
Brewer's sparrow	<i>Spizella breweri</i>	Sagebrush and alpine meadows

*Information compiled from the 2002 Birds of Conservation Concern List-Southern Rockies/Colorado Plateau Region

Each of the above-listed species is highly mobile throughout the year, with the exception of nesting females, who tend to and defend their nests, and their offspring (prior to fledging). The nesting season within the project area varies for each species; however, nesting generally occurs between the months of March and August.

Data from the RFO BLM indicates the presence of 26 raptor nests in the portion of the project area under RFO jurisdiction, including one burrowing owl, one Cooper's hawk, six ferruginous hawks, seven golden eagles, one American kestrel, and ten unknown

Accipiter, *Buteo*, or raptor species. Data from the Colorado Division of Wildlife does not indicate any raptor nests located within the project area; however, it does indicate the presence of three golden eagle nests in close proximity to the project area. Portions of the one-mile buffers surrounding each of these nests extend into the project area. Locations of raptor nests and buffer zones located within the project area are contained in the project file at the Rawlins Field Office.

Activities are not permitted within a one-mile buffer of each golden eagle and ferruginous hawk nest during the nesting season (February 1 through July 31 in Wyoming and February 1 through August 15 in Colorado), while ¾ mile buffers safeguard the other species during this time period. A “controlled use area,” designated for avoidance by the BLM, directly surrounds each nest. Casual use is permitted within this area; however, no construction activities are allowed at any time.

The majority of migratory birds with potential for occurrence within the project area can be found in shrublands, grasslands, and open areas; most of the project area is composed of Wyoming big sagebrush habitat. Wilson’s phalarope, yellow-billed cuckoo, and black swift are shorebirds/riparian species. Due to the very limited occurrence of riparian habitat within the Cherokee West 3D project area, species that prefer this habitat are not anticipated to be present. The flammulated owl, Lewis’s woodpecker, Williamson’s sapsucker, Pinyon jay, and black-throated gray warbler are found in Pinyon/Juniper or other coniferous forests. A portion of the eastern project area is composed of Juniper woodland habitat.

3.7.2 Environmental Consequences

3.9.2.2 Proposed Action

Proposed project operations would result in an extremely minimal likelihood of “take,” as defined by the Migratory Bird Treaty Act of 1918 (available online at <http://laws.fws.gov/lawsdigest/migtrea.html>), of migratory bird species occurring in the area. There is always a slight chance that individuals of any species could be wounded or killed as a result of the passage of equipment; however, proposed operations are for slow moving equipment travel and would not pose a significant threat.

Only foot traffic would occur within 500 feet of surface water and riparian areas. This being the case, there would be no impact to shorebirds/riparian species. In addition, there is limited forested habitat within the project area, and impacts to forested habitat would be negligible; therefore, migratory species found in this type of habitat would not be affected by proposed operations.

Temporary displacement of migratory bird species from immediate work areas into adjacent areas of suitable habitat is expected; however, impacts would be short-term, localized, and negligible.

The burrowing owl is a migratory species that deserves to be addressed separately, as it is

the only species that spends time underground. This owl is often found in association with prairie dogs or other burrowing rodents. It feeds on insects, small rodents, and occasionally small songbirds. There has been one documented burrowing owl in the Wyoming portion of the project area and one in the Colorado portion of the project area. As prairie dog colonies in the area increase in activity, the likelihood of burrowing owl occupancy increases.

Studies have shown that Vibroseis operations do not damage small mammal burrows (See **Section 3.12** for more explanation); therefore, they are not expected to damage burrows occupied by the owl species. Drilling holes directly into a burrow would potentially impact this species; however, with implementation of the burrow avoidance measure listed below, there would be no effect to burrowing owls as a result of the proposed action.

3.9.2.3 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, there would be a slight increase in the likelihood of take of bird species in the fringe areas as a result of the increased amount of helicopter travel in the area necessitated by the use of only heliportable drilling equipment.

Helicopters create more noise disturbance than other types of equipment, so the potential for displacement of birds into adjacent suitable habitat is increased under this alternative. The duration of the disturbance would also be increased as a result of the use of heliportable drilling equipment in the fringe areas. Heliportable drills are much slower than Vibroseis buggies and ArdcO drills. Each heliportable unit is capable of drilling approximately four to six holes per day in the type of substrate present within the project area. This being the case, the time necessary for drilling in the fringe areas would be approximately double that of the proposed action.

3.7.3 Mitigative Measures

Off road vehicle travel shall be restricted to speeds of less than 15 miles per hour.

No off-road vehicle travel shall be permitted within 500 feet of surface water or riparian areas.

Veritas shall not vibrate directly on top of known burrow locations, and no source holes shall be placed within 100 feet of active prairie dog burrow entrances throughout the project area.

Applicable offsets shall be observed to protect nesting raptors if operations are conducted around nest areas during restricted periods (February 1 through July 31 in Wyoming and February 1 through August 15 in Colorado). Seismic personnel shall move quickly

through the “controlled use areas” near nests during casual use so as not to disturb nesting raptors.

If project field activities are proposed during the period between February 1 and July 31, a raptor nest survey shall be conducted to find nests occupied in spring 2005. From February 1 through May 31 (nest selection period), geophysical operations shall not be allowed on BLM-administered lands within 0.5-mile radius of occupied raptor nests, except ferruginous hawk nests, for which the seasonal buffer is a 1.0-mile radius, unless exception is granted.

3.8 NATIVE AMERICAN RELIGIOUS CONCERNS

3.8.1 Affected Environment

Colorado:

A letter was sent to the Uinta and Ouray Tribal Council, Southern Ute Tribal Council, Ute Mountain Ute Tribal Council, and the Colorado Commission of Indian Affairs on January 21, 1999. The letter listed the projects that the BLM will notify them on and projects that would not require notification. No comments were received (Letter on file at the Little Snake Field Office). This project requires no additional notification.

Wyoming:

Several cultural sites potentially sensitive to Native American Tribes were identified during the records search and the Class III inventory (See Table 2, Section 3.3.1). On April 1, 2005, letters were sent to the Ute, the Eastern Shoshone, the Northern Arapaho, and the Shoshone-Bannock Tribes describing the proposed project and the sites that had been identified. The Ute Tribe responded and a field trip was conducted on June 13, 2005 with Betsy Chapoose and Clifford Duncan. During the field visit, specific sites were visited and possible impacts were discussed. Mr. Duncan was comfortable with the project as long as the sites are physically protected and their locations kept confidential.

3.8.2 Environmental Consequences

3.10.2.2 Proposed Action

Unidentified sites of Native American concern could suffer impacts if the proposed project adversely affected their physical integrity or interfered with their ceremonial use. With implementation of the following mitigation measures, however, the project should create no adverse impact in this regard.

3.10.2.3 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.8.3 Mitigative Measures

Regardless of surface ownership, all known sites containing prehistoric cairns, stone alignments, or wickiups shall be avoided by all vehicles by a distance of 300 feet or more. Regardless of surface ownership, all known sites containing rock art shall be avoided by all vehicles by a distance of 300 feet or more unless otherwise determined during consultation. All shot hole source points must be located at least one-quarter mile from sites containing rock art. Source points must be located at least one-quarter mile from sites containing rock art.

Standard stipulations regarding human remains and other discoveries shall apply to this project. See **Section 3.3.3** above.

If any additional sites of potential Native American religious concern (e.g. rock art, vision quest structures, human burial sites, prehistoric cairns, stone circles) are identified by Veritas personnel within 500 feet of any proposed off-road travel route regardless of surface ownership, the BLM Rawlins or Little Snake River Field Archaeologist shall be promptly notified. The need for special mitigative measures and/or additional Native American consultation shall be determined by the BLM Rawlins or Little Snake River Field Office.

3.9 PRIME AND UNIQUE FARMLANDS

3.9.1 Affected Environment

There are no prime or unique farmlands present within the project area.

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

The proposed action would have no effect on prime or unique farmlands.

3.11.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.9.3 Mitigative Measures

None.

3.10 THREATENED AND ENDANGERED SPECIES – SENSITIVE PLANTS

3.10.1 Affected Environment

Sensitive plant species potentially present within in the Cherokee West 3D project area, along with the habitat in which they are found, are listed in **Table 3**.

Table 4. Sensitive Plants With Potential To Occur In Sweetwater County, Wyoming-(BLM Rawlins Field Office) and Moffat County, Colorado (BLM Little Snake Field Office).		
Species Common Name	Scientific Name	Habitat
Laramie Columbine	<i>Aquilegia laramiensis</i>	Crevices of granite boulders and cliffs. Elev. 6,400-8,000 feet.
Nelson's Milkvetch	<i>Astragalus nelsonianus</i>	Alkaline clay flats, shale bluffs and gullies, pebbly slopes-volcanic cinders in sparsely vegetated sagebrush, juniper, and cushion plant communities. Elev. 5,200-7,600 ft.
Cushion Milkvetch	<i>Astragalus aretoides</i>	Sagebrush and cushion plant communities on sandstone, stony clay, badlands, and barren clay slopes and ridges. Elev. 6,900-7,200 ft.
Debris Milkvetch	<i>Astragalus detritalis</i>	Pinyon-juniper and mixed desert shrub communities; often rocky soils ranging from sandy clays to sandy loams. Alluvial terraces with cobbles. Elev. 5,400-7,200 ft.
Duchesne Milkvetch	<i>Astragalus duchesnensis</i>	Pinyon-juniper woodlands and desert shrub communities; around sandstone or shale outcrops. Elev. 4,600-6,400 ft.
Starvling Milkvetch	<i>Astragalus jejunus</i>	Dry barren ridges and bluffs of shale, sandstone, clay, or cobblestones. Elev. 6,000-7,100 ft.
Cedar Rim Thistle	<i>Cirsium aridum [C. sp. nov.]</i>	Barren, chalky hills, gravelly slopes, and fine textured , sandy-shaley draws. Elev. 6,700-7,200 ft
Ownbey's Thistle	<i>Cirsium ownbeyi</i>	Sparsely vegetated shaley slopes in sage and juniper communities. Elev. 6,440-8,400 ft.
Rocky Mountain Thistle	<i>Cirsium perplexans</i>	Open areas and disturbed sites in mixed shrublands and pinyon juniper woodlands. Elev. 5,000-8,000 ft.

Table 4. Sensitive Plants With Potential To Occur In Sweetwater County, Wyoming-(BLM Rawlins Field Office) and Moffat County, Colorado (BLM Little Snake Field Office).

Tufted Cryptanth	<i>Cryptantha cespitosa</i>	Sparsely vegetated shale knolls; with pinyon-juniper or sage-brush; usually with other cushion plants. Elev. 6,200-8,100 ft.
Uinta Basin Spring Parsley	<i>Cymopterus duchesnesis</i>	Cold desert shrub, sagebrush, and juniper communities; sandy clay and clay semi-barrens of Mancos and Morrison shales; Morrison, Uintah, Wasatch and Green River formations. Elev. 4,700-6,800 ft.
Single-Stemmed Wild Buckwheat	<i>Eriogonum acaule</i>	Barren hillsides in fine particle soils. Elev. 5680-6820 ft.
Woodside Buckwheat	<i>Eriogonum tumulosum</i>	Mixed desert shrub and pinyon-juniper woodlands; on rocky outcrops, sedimentary gravels or clays. Elev. 5,800-6,300 ft.
Nuttall Sandwort	<i>Minuartia nuttallii</i>	Open sagebrush hills to alpine slopes, mostly on gravelly benches or open talus.
Matted Fiddleleaf	<i>Nama densus</i> var. <i>parviflorum</i>	Open scrub in sandy soils
Ligulate Feverfew	<i>Parthenium ligulatum</i>	Barren shale knolls. Elev. 5,400-6,500 ft.
Gibben's Beardtongue	<i>Penstemon gibbensii</i>	Sparsely vegetated shale or sandy-clay slopes. Elev. 5,500-7,400 ft.
Persistent Sepal Yellowcress	<i>Rorippa calycina</i>	Riverbanks and shorelines, usually on sandy soils near high water lines
Pale Blue-Eyed Grass	<i>Sisyrinchium pallidum</i>	Wet meadows, stream banks, roadside ditches, and irrigated meadows. Elev. 7,000-7,900 ft.
Rock-Tansey	<i>Sphaeromeria capitata</i>	Cushion plant communities on rocky limestone ridges and gentle slopes. Elev. 7500-8600ft
Laramie False Sagebrush	<i>Sphaeromeria simplex</i>	Cushion plant communities on rocky limestone ridges and gentle slopes, at 7,500-8,600 ft.
Mountain clover	<i>Trifolium andinum</i>	Crevice of volcanic or carbonate rock in the pinyon/juniper zone. Elev.

Table 4. Sensitive Plants With Potential To Occur In Sweetwater County, Wyoming-(BLM Rawlins Field Office) and Moffat County, Colorado (BLM Little Snake Field Office).

		6,900-7,400 ft.
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*Compiled from the BLM State Director’s Sensitive Species Lists For the Little Snake Field Office (Colorado) and the Rawlins Field Office (Wyoming) –Species that do not occur within project habitat have been omitted.

Review of the documented habitat requirements of each of the above-listed species suggests that there is limited potential for their occurrence within the project area. Only one sensitive species has been documented within 100 miles of the project area, Gibben’s beardtongue (*Penstemon gibbensii*).

Gibben’s beardtongue is a species endemic to south-central Wyoming (Carbon and Sweetwater Counties), northeast Utah, and northwest Colorado. It occurs on sparsely vegetated shale or sandy-clay slopes at elevations of 5,500 to 7,700 feet, which are generally surrounded by pinyon-juniper woodland, sagebrush, or greasewood-saltbush. Dave Myers (RFO) mapped probable occurrence areas for Gibben’s beardtongue within the project area, based on slope and elevation characteristics. The probable mapped locations occurred at elevations between 6800 and 7400 feet.

Veritas was presented with two alternatives in order to avoid impacts to Gibben’s beardtongue (*Penstemon gibbensii*):

- 1). Avoid all penstemon (with buggies and shot-holes) in the areas where the seismic lines cross the probable habitat the BLM identified.
- 2). Survey the identified areas during the flowering season (July) to identify any populations in the area. If none are found, the BLM will not require any special procedures regarding Gibben’s beardtongue. Surveys could be done for part or all of the area depending on the schedule of the project. If this option is selected, the BLM will provide information on survey techniques and identification of the plant.

3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

Proposed project operations would potentially result in the damage or killing of undocumented sensitive species within the project area.

Overall, the proposed action would result in direct (tire) impacts to only a little over one percent (1%) of the land surface within the overall project boundary. Reflecting land status in the area, approximately 97.4% of these vegetative impacts would occur on BLM-administered land, 1.4% would occur on State land, and 1.2% would occur on private land. As the vibrators and/or drill buggies travel cross-country on the source lines, they break down brush and crush other vegetation, leaving the appearance of two-

track trails. The single pass of ATV tires, in contrast, does not kill brush, due to the light weight of these vehicles, nor does the presence of heliportable drills lowered at shot hole locations. Portions of the project area subject to vibrator and drill buggy operations would receive the most vegetative impact. In square miles to be traversed with Vibroseis or drill buggies, direct surface impacts would total approximately 1.1 percent (2.8-foot wide tires x 2 tracks x 4 vibrate trucks x 5,280 feet per mile / 43,560 square feet per acre = 2.72 acres impact per linear mile x 357 linear miles = 971.04 acres of impact / 86,784 acres total project area = 1.1%) of the total project area. This calculation is “worse-case scenario,” based on Vibroseis travel throughout the project area, as it would impact the most surface area. The buggy drills would not impact as much surface area as the four vibrate trucks would, and buggy drills would be utilized for approximately 20% of the project area. In addition, heliportable drills would be utilized for approximately 10% of the project area and there would be no direct tire impacts associated with heliportable units. Actual direct surface impacts would likely be under one percent of the total project area.

With implementation of the offset vehicle pattern along ATV and Vibrator truck travel routes, impacts to vegetation in general, as well as sensitive species are expected to be minor and localized.

3.12.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, the potential for damaging or killing undocumented sensitive species of vegetation in the fringe areas would be decreased with the prohibition of off-road vehicle travel. This area (approximately 10,500 acres in size) would not be subject to direct tire impacts, only foot traffic; therefore the total percentage of acreage directly impacted by project operations would decrease by approximately 10 percent. Undocumented sensitive species could potentially be crushed or killed under or in the immediate area of the heliportable drills; however, the likelihood of damage to sensitive species is minimal.

3.10.3 Mitigative Measures

Veritas shall offset vehicle travel paths to minimize impacts to vegetation in general, as well as sensitive species.

Crews shall receive information regarding Gibben's beardtongue in order to enable them to identify and avoid this sensitive species.

Should off road vehicle travel and/or drilling be necessary in areas identified by the RFO as potential suitable habitat for Gibben's beardtongue, surveys for presence/absence of the species shall be conducted prior to operations. If the species is present within these areas, operations shall be offset in order to prevent damaging any plants.

3.11 THREATENED AND ENDANGERED SPECIES – PLANTS

3.11.1 Affected Environment

No threatened or endangered plant species are known to occur within the Cherokee West 3D project area; however, populations of Ute Ladies'-tresses (*Spiranthes diluvialis*) have been documented in north-central Colorado and Wyoming (in Converse, Goshen, Laramie and Niobrara Counties). Ute Ladies'-tresses exist in seasonally moist to very wet meadows along streams or stream meanders that retain ample ground water in areas below 7,000 feet in elevation. It is also found to occur near springs, seeps, or lakeshores. Suitable habitat for the species, while unlikely, may be present along creek corridors within the project area.

The Colorado butterfly plant is endemic to Laramie County, Wyoming; therefore, it would not be present within the project area, and there is no suitable habitat for Blowout Penstemon.

3.11.2 Environmental Consequences

3.13.2.1 Proposed Action

No damage to undocumented populations of Ute Ladies'-tresses is anticipated, as no off-road vehicle travel would be conducted within potentially suitable habitat for the species.

3.13.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.11.3 Mitigative Measures

No off-road vehicle activity shall be conducted within 500 feet of surface water or riparian areas.

3.12 THREATENED AND ENDANGERED SPECIES – SENSITIVE ANIMALS

3.12.1 Affected Environment

Sensitive wildlife species potentially present in the Cherokee West 3D project area, along with the habitat in which they are found, are listed in **Table 4**.

Table 5. Sensitive Animals with Potential for Occurrence In Sweetwater County, Wyoming (BLM Rawlins Field Office) and Moffat County, Colorado (BLM Little Snake Field Office)

Species Common Name	Scientific Name	Habitat
MAMMALS		
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	Forests, basin-prairie shrub, caves and mines
White Tailed Prairie Dog	<i>Cynomys leucurus</i>	Basin-prairie shrub, grasslands
Spotted Bat	<i>Euderma maculatum</i>	Cliffs over perennial water, basin prairie shrub
Long-Eared Myotis	<i>Myotis evotis</i>	Conifer and deciduous forests, woodland-chaparral, caves and mines
Fringed Myotis	<i>Myotis thysanodes</i>	Conifer forests, woodland-chaparral, caves and mines
Wyoming Pocket Gopher	<i>Thomomys clusius</i>	Meadows with loose soil
Swift Fox	<i>Vulpes velox</i>	Grasslands
BIRDS		
Burrowing Owl	<i>Athene cunicularia</i>	Grasslands, basin-prairie shrub
Baird's Sparrow	<i>Ammodramus bairdii</i>	Grasslands, weedy fields
Sage Sparrow	<i>Amphispiza belli</i>	Basin-prairie shrub, mountain-foothill shrub
Ferruginous Hawk	<i>Buteo Regalis</i>	Basin-prairie shrub, grassland, rock outcrops
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	Basin-prairie shrub, mountain-foothill shrub
Mountain Plover	<i>Charadrius montanus</i>	Sparsely vegetated grasslands, Basin-prairie
Black Tern	<i>Chlidonias niger</i>	Freshwater lake, marsh, and river areas
Peregrine Falcon	<i>Falco peregrinus</i>	Tall cliffs
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Basin-prairie shrub, mountain-foothill shrub
Long-Billed Curlew	<i>Numenius americanus</i>	Grasslands, plains, foothills, wet meadows
Sage Thrasher	<i>Oreoscoptes montanus</i>	Basin-prairie shrub, mountain-foothill shrub
White Faced Ibis	<i>Plegadis chihi</i>	Marshes, wet meadows
Brewer's Sparrow	<i>Spizella breweri</i>	Basin-prairie shrub
Columbian Sharp-Tailed Grouse	<i>Tympanuchus phasianellus columbianus</i>	Grasslands
FISH		
Bluehead Sucker	<i>Catostomas discobolus</i>	Bear, Snake, and Green drainages, all

Table 5. Sensitive Animals with Potential for Occurrence In Sweetwater County, Wyoming (BLM Rawlins Field Office) and Moffat County, Colorado (BLM Little Snake Field Office)		
Species Common Name	Scientific Name	Habitat
		waters
Flannelmouth Sucker	<i>Catostomas latipinnis</i>	CO River drainage, clear mountain streams and lakes, large rivers
Mountain Sucker	<i>Catostomas platyrhynchus</i>	River drainage, mountain streams and lakes, large rivers all waters
Leatherside Chub	<i>Gila copei</i>	Bear, Snake, and Green river drainages, cool streams and ponds
Roundtail Chub	<i>Gila robusta</i>	CO River drainage, clear mountain streams and lakes, mostly large rivers
Colorado River Cutthroat Trout	<i>Oncorhynchus clarki pleuriticus</i>	CO River drainage, clear mountain streams
REPTILES AND AMPHIBIANS		
Boreal Toad	<i>Bufo boreas</i>	Pond margins, wet meadows, riparian
Midget Faded Rattlesnake	<i>Crotalus viridis concolor</i>	Mountain foothills shrub, rock outcrops
Northern Leopard Frog	<i>Rana pipiens</i>	Beaver ponds, permanent water in plains and foothills
Great Basin Spadefoot	<i>Spea intermontana</i>	Spring seeps, permanent and temporary waters

*Compiled from the BLM State Director's Sensitive Species Lists For the Little Snake Field Office (Colorado) and the Rawlins Field Office (Wyoming) –Species that do not occur within project habitat have been omitted

Some of the above-listed species are known to occur in the Cherokee West 3D project area, including greater-sage grouse, white-tailed prairie dogs, and various raptor species. The Wyoming RFO identified one burrowing owl nest, six ferruginous hawk nests, and one sage grouse lek within the Wyoming portion of the project area. Data from the Colorado Division of Wildlife did not document any sensitive species within the Colorado portion of the project area; however the BLM reported the recent discovery of one sage grouse lek in this area. Locations of each of these sensitive species are contained within the project file at the Rawlins Field Office.

The applicable RMPs contain seasonal restrictions for the protection of certain sensitive species, with restricted periods differing in Wyoming and Colorado. **Table 5** contains seasonal restrictions for each species by state:

Table 6: Seasonal Restrictions for Sensitive Species by State		
Sensitive Species	Wyoming	Colorado

Sage Grouse Nesting	March 1-June 30	March 1-June 30
Sage Grouse Wintering		December 16-March 15
Raptors	February 1-July 31	February 1-August 15
Mountain Plover	April 10-July 10	April 10-July 10

In September 2003, the mountain plover was removed from the federally proposed-threatened species list; however, it has been listed as a sensitive species by the BLM. No occupied habitat for mountain plover is identified within the Wyoming portion of the project area; however, potentially suitable habitat for the species does exist within project boundaries. There has been one documentation of a mountain plover nest in the Colorado portion of the project area. The location of this nest is contained within the project file at the Rawlins Field Office.

3.12.2 Environmental Consequences

3.14.2.2 Proposed Action

Vehicle travel associated with the proposed action could result in the injuring or killing of sensitive animal species present in the project area; however, the likelihood of injury to any of the species is extremely low due to the fact that vehicles traveling off-road would not exceed speeds of 15 mph.

No harm would occur to sensitive fish, reptile, or amphibian species due to the fact that there would be no off-road vehicle travel within 500 feet of surface water or riparian areas. Only foot traffic and receiver lines would be permitted in these areas.

Project timing is such that project operations would occur toward the end of or after the nesting seasons of the above-listed sensitive avian species; therefore, the majority of birds would be highly mobile. No harm to these birds is expected.

Project operations would occur after any swift fox kits would have matured enough to be highly mobile; therefore, no harm to this species is anticipated.

Due to project scheduling, off-road vehicular activity would not adversely affect greater sage-grouse strutting, nesting, and/or brood rearing activities, as surface disturbing activities would not occur within a two-mile radius of active grouse leks during the applicable restricted periods listed in **Table 5** for the protection of the species. In addition, no surface disturbance is permitted within 0.25 miles of lek sites.

Proposed activities would not disturb mountain plover and/or long-billed curlew nesting and brood rearing activities, as no surface disturbing activity would be conducted within one-quarter mile of any active nests during the nesting season, April 10th through July 10th. Should activities in suitable mountain plover or long-billed curlew habitat be necessary prior to July 10th, the applicant would have field surveys conducted by qualified biologists to identify active nests.

Project activities could temporarily disturb nesting raptors, if conducted during the seasonally restricted periods listed in **Table 5**, but would not typically result in the loss of nests, nesting structures, or habitat, as activities are not permitted within a one-mile buffer of each golden eagle and ferruginous hawk nest during the nesting season, while ¾ mile buffers safeguard the other species during this time period. A “controlled use area,” designated for avoidance by the BLM, directly surrounds each nest. Casual use is permitted within this area; however, no construction activities are allowed at any time. The applicant would have surveys conducted by qualified biologists to determine the status of nests present within the project area prior to conducting any ground based activities within the above-mentioned buffers of any nest location during the restricted period.

Data suggest that within approximately six months of completion of a 3D vibroseis project, surface disturbance associated with geophysical activity appears to have had positive effects on new burrow construction, as loosened soil along vehicle travel paths is attractive to some burrowing rodents (Thomas 1995). No adverse effects to burrowing mammals are expected, and, concomitantly, no adverse impacts to small mammal predators, including the sensitive raptors and swift fox, are anticipated.

Crushing of tall sagebrush could affect wintering habitat for greater sage grouse; however, vegetation changes as a result of project operations would be minimal and would occur in only a small percentage of the total project area (See **Vegetation Section**).

Temporary displacement of sensitive species from areas where operations are being conducted to adjacent suitable habitat is expected; however, impacts of this nature would be short-term, localized, and negligible.

3.14.2.3 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, noise disturbance resulting from the increased use of helicopters necessitated by heliportable drilling operations would result in a greater likelihood of temporary displacement of wildlife into adjacent suitable habitat. In addition, the duration of the disturbance would be increased, as heliportable drills are much slower than Vibroseis buggies and Arcco drills. The heliportable units are capable of drilling approximately four to six holes per day, so the duration of time required to complete drilling operations in the fringe areas would approximately twice that of the proposed action.

3.12.3 Mitigative Measures

Veritas shall observe seasonal restrictions (**Table 5**) for all sensitive species to avoid disturbance. If project field activities are proposed during the period between February 1 and July 31, a raptor nest survey shall be conducted to find nests occupied in spring 2005.

From February 1 through May 31 (nest selection period), geophysical operations shall not be allowed on BLM-administered lands within 0.5-mile radius of occupied raptor nests, except ferruginous hawk nests, for which the seasonal buffer is a 1.0-mile radius, unless exception is granted.

Veritas shall not conduct operations within 0.25 miles of lek sites, and leks will be avoided by two miles between March 1 and June 30 to protect nesting sage grouse.

Veritas shall not vibrate directly on top of known burrow locations, and no source holes shall be placed within 100 feet of active prairie dog burrows throughout the project area.

3.13 THREATENED AND ENDANGERED SPECIES – ANIMALS

3.13.1 Affected Environment

The RFO has a “No Effect” determination for threatened and endangered species within the project area. The area is block-cleared for the black-footed ferret and there is no habitat for other species.

Black-footed ferrets, listed as federally ‘endangered’, are considered obligate associates to prairie dogs, which constitute their primary food source and provide burrows for shelter. Prairie dog colonies are present in the Colorado Portion of the project area. These colonies were mapped in 1989. Prairie dog colonies within the project area have been inactive or have had limited activity since the mid 1990’s when colonies in the Little Snake Field Office area experienced an outbreak of sylvatic plague. In the past couple of years, activity in the prairie dog towns has increased and at this time, the colonies are considered active. However, the boundaries of these colonies are much smaller than the original mapping in 1989. Information obtained from the BLM suggests that colonies present would not likely be considered potential habitat for black-footed ferrets, as the size and burrow density are probably not great enough to meet the requirements of the species.

Geophysical vibroseis operations are proposed for portions of the project area, which exhibit relatively gentle terrain. This is also the most suitable terrain for prairie dog colonies. Therefore, vibroseis activity would possibly be conducted within undocumented colonies. Past BLM and BLM-commissioned research concluded that vibroseis operations caused no adverse impact to studied Utah and white-tailed prairie dogs, their ecology, or population dynamics (Young and Sawyer 1981; Menkens and Anderson 1985). Menkens and Anderson (1985) extrapolated their findings on white-tailed prairie dogs, to conclude that vibroseis was not likely to adversely affect black-footed ferrets. The USFWS currently does not require black-footed ferret habitat assessment and surveys for vibroseis activities within prairie dog towns (P. Deibert, USFWS-Cheyenne, personal com. and email, 8/01/02). The project area is within an experimental non-essential habitat designation area for the black-footed ferret. The project area was block-cleared for black-footed ferrets in 1993.

Bald eagles (*Haliaeetus leucocephalus*) are listed as federally ‘threatened’, and are found throughout Wyoming and Colorado. No Bald eagle nests or winter roost areas have been identified within or near the project area. Suitable nesting habitat, including large trees within mature and old growth forested areas adjacent to large bodies of water or rivers, is not present within the Cherokee West 3D.

The Preble’s Meadow jumping mouse, listed as federally ‘threatened’, occurs in riparian shrub/grass habitat types, marshy areas, moist-meadow grasslands near streams. It uses mixed shrublands in spring and summer and dryer uplands in winter as hibernaculum. There is no suitable habitat within or adjacent to the project area for this species.

The yellow-billed cuckoo is a candidate species proposed for listing, which is found in cottonwood/willow riparian habitat west of the Continental Divide. No suitable habitat is known to occur within the project area. Potential suitable habitat could be present; however, it would be extremely limited, and no off-road vehicle activity would occur within 500 feet of riparian habitat.

The western boreal toad is also a candidate species proposed for listing, which occurs in riparian areas >7,500 feet in elevation. There is no suitable habitat within or adjacent to the project area for this species.

There is no suitable habitat within the project area for the Wyoming toad, listed as federally ‘endangered’, as the species distribution is restricted to within 30 miles of Laramie, WY within Mortenson Lake and Hutton Lake National Wildlife Refuges.

The Canada lynx is listed as federally ‘endangered’, and can be found in early and late coniferous forests >6,500 feet in elevation and rangelands. There is no suitable habitat within the project area for the species.

3.13.2 Environmental Consequences

3.15.2.2 Proposed Action

No bald eagle nesting or suitable nesting habitat has been documented within the Cherokee West 3D; therefore, there would be no affect to bald eagles from the proposed action.

Proposed project activities would have no affect on the black-footed ferret, as there is no suitable habitat for the species present within the project area.

Proposed project activities would have no affect on the yellow-billed cuckoo, as no off road activity would occur within 500 feet of potential suitable habitat for each of the species.

No potential suitable habitat has been documented within the Cherokee West 3D for the Preble’s Meadow jumping mouse, western boreal toad, Wyoming toad or Canada lynx; therefore, there would be no affect to either of the species from the proposed action.

3.15.2.3 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.13.3 Mitigative Measures

In order to minimize potential impacts to prairie dog towns, Veritas shall not vibrate directly on top of known burrow locations, and no source holes shall be placed within 100 feet of active prairie dog burrows throughout the project area.

In order to minimize impacts to species that occur in riparian habitat, no off road vehicle activity shall be conducted within 500 feet of surface water or riparian areas.

3.14 WASTES, HAZARDOUS OR SOLID

3.14.1 Affected Environment

Diesel fuel and small amounts of substances, such as vehicle lubricating and hydraulic oil, would be used in the field during project operations for maintenance of project vehicles.

Project markers in the form of wooden lath, ribbon flagging, and pin flags would be used in some areas; however, the use of project markers would be minimized as a result of the proposed stakeless survey technology.

3.14.2 Environmental Consequences

3.14.2.1 Proposed Action

Hazardous substances such as gasoline, diesel, vehicle lubricating and hydraulic oil used in the field during project operations could contaminate natural resources, if spilled. With implementation of the waste disposal prescription below, however, no adverse impact is foreseen.

Project markers could contribute litter and/or solid waste in the project area. However, Veritas has made an operational commitment in their proposed action to remove project lath and flagging as recording operations progress, so no debris should remain behind the project, as planned. No impact in this regard is foreseen, and no mitigative measures are recommended.

Fires could be lit, causing serious safety hazards and loss of or damage to property could occur. With implementation of Veritas' plan for emergency fire response, the likelihood of fire damage is expected to be low.

3.16.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.16.3 Mitigative Measures

Veritas shall clean up all oil, fuel or other spills, including contaminated soils. All spill-related material shall be hauled to a Colorado or Wyoming DEQ approved disposal site. Spills resulting from ruptured pipelines or well casings shall be cleaned up as directed by DEQ and the facility owner/operator.

Veritas shall clean up all project lath, flagging, and incidental trash as operations proceed through an area. The collected trash shall be hauled to a DEQ approved disposal site.

Hazardous materials, other than those identified in Veritas's Plan of Operations, shall not be stored for any length of time on BLM administered land. Additionally, no hazardous waste will be disposed of on federal land. The term hazardous material means: 1) any substance, pollutant, or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, 42 U.S.C. 9601 et seq., and the regulations issued under CERCLA, 2) any hazardous waste as defined in the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, and 3) any nuclear or nuclear byproduct as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq.

Veritas shall clean up all oil, diesel or hydraulic fuel spills, including contaminated soils. All spill-related material shall be hauled to a Wyoming DEQ approved disposal site. Spills resulting from ruptured pipelines or well casings shall be cleaned up as directed by DEQ and the facility owner/operator.

Veritas shall prepare an Emergency Response Plan addressing fire and submit it to the Authorized Officer for review at least one week prior to any project field operations. Veritas shall coordinate with the nearest paramedic providers for life flight and ambulance service to establish Landing Zones across the project. These zones shall be used in case of serious injury to workers needing immediate evacuation.

Veritas shall place all tanks holding bulk liquids within lined containment areas. Capacity of the containment area shall be 110% of the largest tank. Bulk liquids contained in tanker semi-trailers may be parked in a safe location on the staging area. Fueling of

equipment or maintenance of equipment shall be done away from riparian or other open water areas.

Explosive materials shall be located out of sight and at least one-quarter mile from traveled roads. Loaded shot holes shall not be left unsecured.

3.15 WATER QUALITY – SURFACE

3.15.1 Affected Environment

Possible perennial water resources present within the project area include Shell Creek and Skull Creek. Shell Creek runs from the northeast to the southwest in the western half of the project area. The numerous ephemeral tributaries in the Shell Creek watershed drain approximately one-half of the project area. Skull Creek runs in the northeast corner of project through the Adobe Town WSA. The ephemeral headwater tributaries of the Skull Creek watershed drain the northeastern quarter of the project area. There are several other smaller surface waterways, including Beaver Slide Draw, Beaver Wash, Crooked Wash, North Fork Powder Wash, Ace in the Hole Draw, Upper Powder Spring, Espitallier Spring, West Dripping Rock Spring, and Eagle Rock Draw found in the project area. There are also approximately 26 reservoirs indicated by use of a topographic map of the project area: Adobe, Adobe Butte, Adobe Draw, Agropyron, Border, Carson, Dead End, Dome, Hawk Nest, Haystack, High Center, Humbolt, Last, Long Ridge, Muir, Miserable, Northwest Powder, Powder, Powder Wash, Pronghorn, Rocky, Sandy Fork, Washout, West Cow Creek, and Virgin reservoirs.

3.15.2 Environmental Consequences

3.15.2.1 Proposed Action

Localized increases in water turbidity and contamination due to fluid leaks or spills from equipment are potential impacts to surface water as a result of the proposed action. However, due to operational restrictions placed on perennial waterways, as well as other mitigative measures that would be employed by Veritas to protect all surface waters, effects of seismic activity on surface water quality within the project area would be negligible.

3.17.2.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.15.3 Mitigative Measures

No off-road vehicle travel shall be permitted within 500 feet of surface water or riparian areas.

No source points shall be located in drainages within the project area, and equipment shall not be permitted to travel in any area that exhibits saturated soil conditions in or adjacent to drainages.

Seismic operations shall remain at least 500 feet from all springs, stock ponds, and impoundments.

Veritas shall clean up all oil, fuel or other spills, including contaminated soils. All spill-related material shall be hauled to a Colorado or Wyoming DEQ approved disposal site.

3.16 WATER QUALITY – GROUND

3.16.1 Affected Environment

The project area is within the Little Snake and Vermillion watersheds and is supported by a sandstone aquifer of the Colorado Plateaus Aquifers (USGS, 2002). The depth to the aquifer, as well as the water quality, varies greatly in the area.

A search of scientific literature revealed a single publication documenting research on the effects of seismic operations on groundwater aquifers. This study, conducted by Ernest W. Bonds (1975), in association with the Montana Bureau of Mines and Geology, tested the possible physical and chemical effects of detonating seismic explosives in or near aquifers in Montana. Water quality within wells and seismic test holes was monitored prior to, during, and after detonation of charges to determine effect. There were only minor effects from the tests on the physical and chemical characteristics of the water. These effects included temporary changes in depth of the aquifer and slight, temporary increases in total dissolved solids and specific conductivity. However, none of these changes affected the water quality significantly enough to prevent normal uses.

In addition, un-published results documenting testing of water wells prior to and upon completion of seismic operations, conducted in association with several 3D projects, indicate that detonation of charges within 300 feet of water wells does not negatively affect water quality.

Bond (1975) recommended that all seismic shot holes, which actually penetrate more than one aquifer, should be plugged to prevent interflow between aquifers with degraded water quality and aquifers with high quality water. The probability of connecting aquifers present within the project area is very low, since source hole depth is limited to 40 to 60 feet.

In the unlikely event that a shot hole did penetrate an aquifer and the charge was detonated within the aquifer, water quality would not likely be negatively affected. Bob Belock of the Austin Powder Company reported that most of the materials in the proposed explosive, *Pentolite*, end up as carbon monoxide (CO), carbon dioxide (CO₂), nitrogen (N₂), nitrous oxides (NO_x), and water. All of the mass of the charge is converted to gasses, heat, water, and other trace chemicals that are in such small quantities that they do not measurably affect water quality.

Based on information contained in the LSRMP, there are no groundwater springs within the Colorado portion of the project area; however, USGS topographic maps indicate that there are three springs located within the Wyoming portion of the project area.

According to the Wyoming State Engineers Office Water Rights Database (April 2005), there are seven wells present within the Wyoming portion of the project area. Of the seven wells, six are in good standing and one has been abandoned. Four of the wells are used for stock water, three are recorded as miscellaneous, and the last serves both domestic and stock purposes. Information obtained from the Colorado Division of Water Resources Database (June 2005) indicates that there are no permitted water wells within the Colorado portion of the project area.

3.16.2 Environmental Consequences

3.18.2.1 Proposed Action

The proposed action includes the drilling of source points, which could potentially penetrate aquifers underlying the project area, and subsequently cause an interchange of surface and ground water, or affect water levels within aquifers. The probability of penetrating aquifers within the project area and contaminating ground water is very low due to depths at which the aquifers occur and shallow (40 to 60 foot) hole depths proposed for the project.

If artesian flow (water rising above the depth at which encountered) is encountered in the drilling of any seismic hole, cement or high grade coarse ground bentonite would be used immediately to seal off the water flow, with the selected material placed from the bottom of the hole to the surface, or at least fifty (50) feet above the top of the water-bearing material. This would prevent cross-flow between aquifers, erosion, or contamination of fresh water supplies; therefore, the proposed action is not likely to have an adverse affect on groundwater quality or quantity within the project area.

Water quality in wells and springs located within the project area would not be negatively affected, operations would be offset around these features in accordance with RMP guidelines in order to protect both the integrity of wells and springs, as well as water quality.

3.18.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, there would be a greater possibility of drilled holes penetrating groundwater aquifers, as there would be over fifteen hundred more holes drilled under this alternative than the proposed action.

3.16.3 Mitigative Measures

Veritas shall offset all source points a distance of at least 300 feet from all water developments and groundwater wells, in accordance with BLM requirements.

Veritas shall plug all shot holes in accordance with COGCC and WOGCC requirements to prevent the commingling of surface and ground water.

3.17 WETLANDS / RIPARIAN ZONES

3.17.1 Affected Environment

Shell and Skull Creeks flow through the project area and have associated wetlands/riparian zones. Shell Creek flows across the Colorado-Wyoming state line and through the southwestern portion of the project. Skull Creek runs in the northeast corner of the project through the Adobe Town WSA.

Wetlands/riparian zones were identified using aerial photography and the National Wetlands Inventory (NWI) data. The photography shows some wetland/riparian habitat along Shell Creek. In addition, there are some smaller sections of the North Fork Powder Wash and other smaller washes branching off to the west that appear to be riparian on the aerial photography and are identified as such in the NWI data. Wetland/riparian habitat contains “fragile” soils, as defined by the LSRA RMP (see **Section 4.6** for definition).

3.17.2 Environmental Consequences

3.19.2.1 Proposed Action

The potential for wetland/riparian zone alteration and/or increased erosion rates exists in association with the proposed action. The passage of off-road vehicles through wetlands/riparian zones containing fragile soils could create ruts and/or trenches. Water retention, drainage, or flow could be facilitated by the ruts/trenches, altering the hydrology of the area and possibly increasing erosion rates. In addition, passage of equipment could kill or uproot vegetation in the area, reducing root material, which acts as an anchor to hold sediment in place. This could also increase erosion potential. With implementation of the mitigative measures below, the proposed project would have no negative affect to wetlands/riparian areas.

3.19.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.17.3 Mitigative Measures

No off-road vehicle activity or placement of shot points shall be conducted within 500 feet of riparian areas. Receiver lines shall be allowed within this distance, but equipment shall be walked in with helicopter assistance.

Vehicular traffic across/through drainage channels is limited to sloping drainage sides or to vertical banks of less than 2 feet. Channel crossings shall be aligned perpendicular to the stream channel, to the extent practicable.

3.18 WILD AND SCENIC RIVERS

3.18.1 Affected Environment

There are no wild and scenic rivers present within the project area.

3.18.2 Environmental Consequences

4.2.2.2 Proposed Action

The proposed action would have no affect on wild and scenic rivers.

4.2.2.3 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.18.3 Mitigative Measures to be Applied

None.

3.19 WILDERNESS / WSAs

3.19.1 Affected Environment

The northeastern project area includes a portion of the RFO's Adobe Town Wilderness Study Area (WSA). The 1976 Federal Land Policy and Management Act (FLPMA) requires that WSAs be managed "as to not impair the suitability of such areas for preservation as wilderness" until they can be evaluated for inclusion under the National Wilderness Preservation System. In keeping with the (FLPMA), the Adobe Town WSA is managed under interim wilderness guidelines that do not allow for off road (ATV) travel. Only receiver lines would be placed in the WSA, and the area would be limited to foot traffic only.

Two areas that exhibit wilderness characteristics exist adjacent to the Adobe Town WSA (along the south and southeastern boundaries of the WSA, within the northeastern portion of the project area). They are identified by the BLM as fringe areas D and E (BLM RFO), and are defined by the following parameters: size, naturalness, opportunity for solitude or unconfined recreation, and supplemental values. These areas are large enough as to allow for practical use, are generally not imprinted by man, allow for primitive recreation, and contain various other resource features. There are currently no restrictions in place for the protection of these areas by the BLM.

3.19.2 Environmental Consequences

4.3.2.1 Proposed Action

The proposed action would have no affect on wilderness values within the Adobe Town WSA with implementation of mitigative measures. Operations in this portion of the project area would consist of receiver lines only. No off-road vehicle travel would be permitted in the WSA and operations would be supported by helicopter.

Proposed operations should not affect the size, naturalness, opportunity for solitude or unconfined recreation, or supplemental values of the fringe areas adjacent to the Adobe Town WSA; therefore, they should not affect the wilderness characteristics of these areas.

4.3.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

3.19.3 Mitigative Measures

No off-road vehicle travel shall be permitted within the Adobe Town WSA. Helicopter support shall be utilized to lower receiver line and recording equipment to field personnel through the use of a long-line. Helicopters shall not be allowed to land within the WSA unless an emergency situation was present.

No staking or flagging shall be allowed in the Adobe Town WSA.

4.0 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION MEASURES PERTAINING TO NON-CRITICAL ELEMENTS

Table 7: Non-Critical Elements of the Human Environment		
Element	Status: Shell Creek 3D	Addressed in EA
Access	Minimally Affected	Yes
Forestry	Not Affected	No
Fluid Materials	Potentially Affected	Yes
Hydrology/Ground	Potentially Affected	Yes
Hydrology/Surface	Potentially Affected	Yes
Paleontology	Potentially Affected	Yes
Range Allotment(s)/Range Improvement Projects	Potentially Affected	Yes
Realty Authorizations	Potentially Affected	Yes
Recreation	Potentially Affected	Yes
Socioeconomics	Potentially Affected	Yes
Solid Minerals/Geology	Not Affected	Yes
Soils	Potentially Affected	Yes
Vegetation	Potentially Affected	Yes
Visual Resources	Potentially Affected	Yes
Wildlife, Aquatic	Potentially Affected	Yes
Wildlife, Terrestrial	Potentially Affected	Yes
Wild Horse and Burro Areas	Potentially Affected	Yes

4.1 ACCESS

4.1.1 Affected Environment

Both MUs within the Colorado portion of the project area are clear of any access and posting boundary needs.

There are some existing right-of-ways, potential right-of-ways, and areas currently supporting a high concentration of minor linear rights-of-ways. There are few major roadways that intersect the project area, however, there are several two-track roads allowing for access into more remote areas.

Fencing is not reported in abundance by BLM personnel, although there is some fencing just off Country Road 4 West.

4.1.2 Environmental Consequences

4.1.2.1 Proposed Action

Operation of off-road vehicles associated with the proposed action would disturb the

ground surface, potentially creating the appearance of two-track roads. Impacts would be more severe in areas containing “fragile soils.” The large tires of the vehicles would leave depressions (areas lower than the surrounding area) or tracks in the ground surface as a result of compaction; however, soil compaction and/or displacement should be minimal due to the fact that weight distribution of all off-road vehicles proposed for use allows for exertion of a low bearing pressure on the substrate. Large tires distribute the weight of the vehicles equally, minimizing impacts.

With the implementation of vehicle path offsets, avoidance of “fragile” soils, and other measures, the potential for the creation of two-track roads is minimal; therefore, there should be no affect on access due to the proposed action.

Proposed operations would potentially result in the damaging, breaching or cutting of fences that exist within the project area. Veritas would repair any damaged or cut fences; therefore, there should be no affect on access as a result of impacts to fences.

4.1.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, with implementation of Alternative 2, there would be no ground disturbance as a result of off-road vehicle travel in the fringe areas, so there would be no potential for creating the appearance of two-track roads or breaching or damaging fences in these areas.

4.1.3 Mitigative Measures

Vehicle travel paths shall be offset to minimize impacts.

No off-road vehicle traffic shall be allowed within 500 feet of surface water or riparian areas.

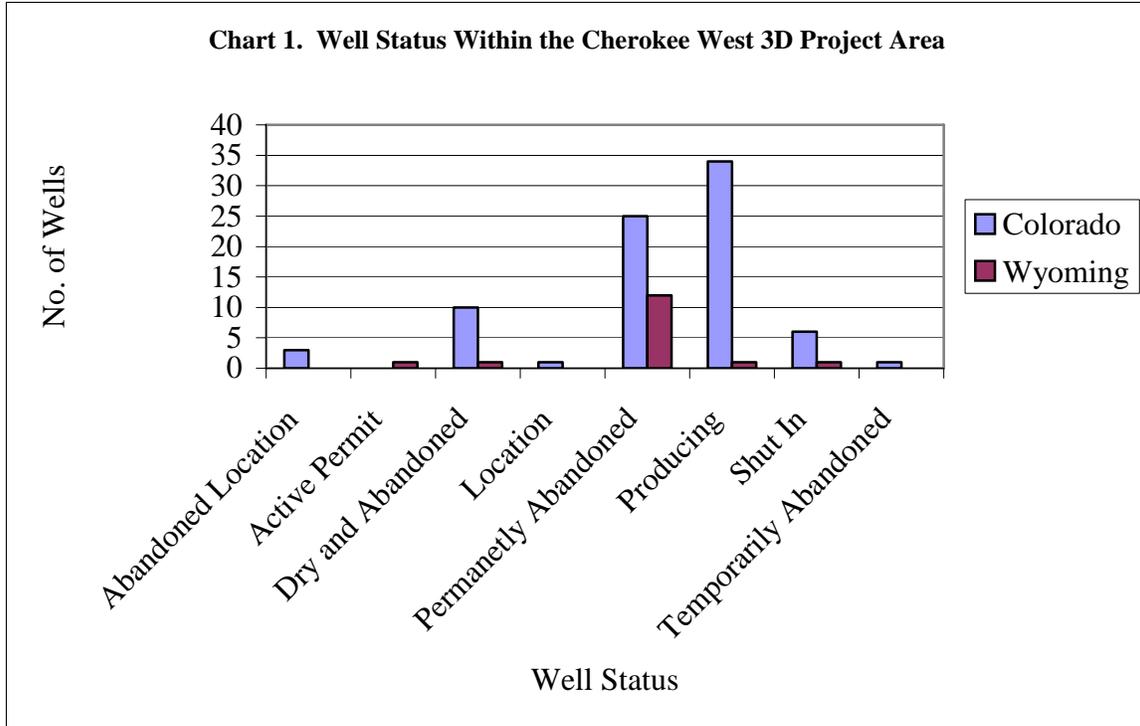
Veritas shall make every effort to avoid disturbing or altering fences. Gates shall be used when possible. Gates shall be closed immediately after passing through them. If a fence must be crossed, it shall be let down or cut (as determined by the grazing lessee or owner/operator), crossed, and immediately returned to the original condition. The wires shall be stretched to the original tension from the nearest brace or gate panel.

4.2 FLUID MATERIALS

4.2.1 Affected Environment

The proposed Cherokee West 3D project lies within the Vermillion Basin, which contains approximately 5,000 acres covered by undeveloped oil and gas leases in the State of Colorado (BLM 2004). Within the analysis area itself, 19 wells exist in Wyoming, only one of which is known to be currently flowing. One well is permitted for drilling; however, one is a dry hole, three have an expired permit, one is shut-in, and the

remainder of the wells are either plugged and/or abandoned. Eighteen of the 19 wells are gas, with only one oil well. There are 80 wells within the project boundaries in Colorado; most of the wells are producing. **Chart 1** illustrates the status and state of each well within the project boundaries.



Source: Wyoming and Colorado Oil & Gas Conservation Commissions

4.2.2 Environmental Consequences

4.2.2.1 Proposed Action

Adoption of the Proposed Action would allow project participants to obtain and utilize 3D geophysical data, resulting in the greater likelihood of drilling producing wells and attaining efficient field development.

Seismic operations near oil/gas wells and related facilities could damage them. With implementation of the safe distance prescription below, no adverse impact to oil and gas related facilities is foreseen. In the event of unanticipated damage to any existing facilities, other measures apply (see mitigation measures for **Range Allotment, section 4.6**).

4.4.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed

action.

4.4.3 Mitigative Measures

Source points shall be located a minimum of 300 ft from oil/gas wells and pipelines, unless written permission to encroach closer has been given by the owner/operator.

4.3 HYDROLOGY-GROUND

4.3.1 Affected Environment

As explained in **Section 3.16**, the project area is within the Vermillion and Little Snake watersheds with sandstone aquifers of the Colorado Plateaus Aquifers (USGS, 2002). The depth to the aquifer, as well as the water quality, varies greatly in the area.

According to the BLM, LSRA RMP ROD, there are no groundwater springs or wells within the Colorado portion of the project area. The probability of penetrating aquifers within the project area is very low due to depths at which the aquifers occur and shallow (40 to 60 foot) hole depths proposed for the project.

4.3.2 Environmental Consequences

4.5.2.2 Proposed Action

The proposed action includes the drilling of source points, which could potentially penetrate aquifers underlying the project area, and subsequently cause an interchange of surface and ground water, or affect water levels within aquifers. Due to the depths of aquifers in the area, it is not likely that drilling of source points or energy waves generated as a result of detonation of charges would disturb groundwater aquifers. In addition, source holes would be plugged in accordance with COGCC and WOGCC rules to prevent the commingling of surface and ground water.

If artesian flow (water rising above the depth at which encountered) is encountered in the drilling of any seismic hole, cement or high grade coarse ground bentonite would be used immediately to seal off the water flow, with the selected material placed from the bottom of the hole to the surface, or at least fifty (50) feet above the top of the water-bearing material. This would prevent interchange of surface and ground water, cross-flow between aquifers, erosion, or contamination of fresh water supplies; therefore, the proposed action is not likely to have an adverse affect on groundwater hydrology in the project area.

4.5.2.3 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, there would be a greater possibility of drilled holes penetrating

groundwater aquifers, as there would be over fifteen hundred more holes drilled under this alternative than the proposed action.

4.3.3 Mitigative Measures

Veritas shall offset all source points a distance of at least 300 feet from all groundwater wells, in accordance with BLM requirements.

Veritas shall plug all shot holes in accordance COGCC Rule 333, Subsection C, Item 4.

Veritas shall conduct all drilling and hole plugging operations in strict conformance with all Wyoming Oil and Gas Conservation Commission requirements

Veritas shall submit a copy of the "Hole Plugger's log" for each hole of the shotline describing: whether the holes were wet or dry; static water level if appropriate; any flowing holes; breached or caved holes; approximate volume of bentonite used per hole; any lost hole locations; etc., with the Notice of Completion.

Shot holes shall be inspected for subsidence within one field season and prior to release of the bond liability.

4.4 HYDROLOGY, SURFACE

4.4.1 Affected Environment

As explained in **Section 3.15**, possible perennial water resources present within the project area include Shell Creek and Skull Creek. Shell Creek runs from the northeast to the southwest in the northern half of the project area. The numerous ephemeral tributaries in the Shell Creek watershed drain approximately one-half of the project area. Skull Creek runs from the northeast to the southwest and is located in the northeastern corner of the project area. There are several other smaller surface waterways, including Beaver Slide Draw, Beaver Wash, Crooked Wash, North Fork Powder Wash, Ace in the Hole Draw, Upper Powder Spring, Espitallier Spring, West Dripping Rock Spring, and Eagle Rock Draw found in the project area. There are also approximately 26 reservoirs found on the topographic map of the project area: Adobe, Adobe Butte, Adobe Draw, Agropyron, Border, Carson, Dead End, Dome, Hawk Nest, Haystack, High Center, Humbolt, Last, Long Ridge, Muir, Miserable, Northwest Powder, Powder, Powder Wash, Pronghorn, Rocky, Sandy Fork, Washout, West Cow Creek, and Virgin reservoirs.

4.4.2 Environmental Consequences

4.4.2.1 Proposed Action

The passage of off-road vehicles in close proximity to surface water could create ruts and/or trenches in fragile soils present in the floodplains of drainages within the project area. Water retention, drainage, or flow could be facilitated by the ruts/trenches, altering the hydrology of the area and possibly increasing erosion rates. In addition, passage of

equipment could kill or uproot vegetation in the area, reducing root material, which acts as an anchor to hold sediment in place. This could also increase erosion potential. With implementation of mitigative measures below, project activities should have no affect on surface hydrology within the project area.

4.6.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action. No off-road vehicles would be utilized in the fringe areas; therefore, even without the implementation of mitigative measures below to protect surface water resources, there would be no affect on surface hydrology within the project area.

4.4.3 Mitigative Measures

No equipment shall be permitted to travel in areas where saturated soil conditions are present in order to prevent rutting, which could potentially result in hydrologic alteration.

Seismic operations shall remain at least 300 feet from all water developments and groundwater wells.

All seismic recording equipment shall be laid out on foot within 500 feet of surface water or riparian areas.

Pumping water out of stock ponds or other water reservoirs on BLM administered land for any project use is not allowed, unless authorized by the BLM.

4.5 PALEONTOLOGY

4.5.1 Affected Environment

Numerous geologic formations are found at the bedrock level in the broad, generalized area associated with this proposed action, such as the Washakie Formation (Twa), Green River Formation: Laney Member (Tgl), Green River Formation: Wilkins Peak Member (Tgw), and Wasatch Formation: Cathedral Bluffs tongue (Twc). The Washakie Formation dates from the upper Eocene and covers most of the northern portion of the project area. Both the Green River Formation: Laney Member (Tgl) and Green River Formation: Wilkins Peak Member occur in the southwestern portion of the project area from the middle to lower Eocene. The Wasatch Formation: Cathedral Bluffs tongue occurs between the two Green River Formations in the southwestern corner of the project area and originated in the lower Eocene.

All four named formations are listed as Class 5 according to the Probable Fossil Yield Classification System. Class 5 entails “highly fossiliferous geologic units that regularly and predictably produce vertebrate fossils and/or scientifically significant vertebrate fossils, and that are at risk of natural degradation and/or human-caused adverse impacts.”

There are Miocene Rocks (Tm) in the southeastern corner of the project area, however, no data is available on the potential fossil yield. Alluvium and colluvium is found along the Shell Creek corridor and in Crooked Wash. Dune sand and loess cover the northern half of the project area in Wyoming. However, there are no known fossil sites within the Wyoming portion of the project area.

4.5.2 Environmental Consequences

4.5.2.1 Proposed Action

If any such fossils are located here, activities could damage the fossils and the information that could have been gained from them would be lost. The significance of this impact would depend upon the significance of the fossil. Ceasing operations and notifying the Field Office Manager immediately upon discovery of a fossil during activities could effectively mitigate this impact. An assessment of the significance would be made and a plan to retrieve the fossil or the information from the fossil would be developed.

The proposed action could also constitute a beneficial impact to paleontological resources by increasing the chances for discovery of scientifically significant fossils.

4.7.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

4.5.3 Mitigative Measures

Veritas is responsible for informing all persons associated with this project that they shall be subject to prosecution for damaging, altering, excavating or removing any vertebrate fossil objects on site.

If vertebrate paleontological resources (fossils) are discovered on BLM-administered land during project operations, Veritas shall suspend operations that could disturb the materials, and immediately contact the BLM Rawlins Field Office Manager (Authorized Officer). The Authorized Officer shall arrange for evaluation of the find within 5 working days and determine the need for any mitigation actions that may be necessary. Any mitigation shall be developed in consultation with Veritas, who may be responsible for the cost of site evaluation and mitigation of project effects to the site. If the operator can avoid disturbing a discovered site, there is no need to suspend operations; however, the discovery shall be immediately brought to the attention of the Authorized Officer.

4.6 RANGE ALLOTMENT(S)/RANGE IMPROVEMENT PROJECTS

4.6.1 Affected Environment

Lessees and grazing allotments that exist within the project area are listed in **Table 7**:

Table 8. Summary of Grazing Uses Permitted Within Project Area				
Colorado				
Allotment Name and #	Permittee	Livestock Kind	Dates	AUMs^b
Powder Wash 04214	Salisbury Livestock	Cattle/Sheep	11/01-5/13	2502
State Line 04215	Morgan Creek Land And Livestock	Sheep	10/20-5/01	635
Hiawatha Tridistrict 04300	Maneotis Sheep Co.	Sheep	11/01-4/30	5865
Shell Creek 04301	Raftopoulos Brothers Livestock.	Cattle/Sheep	3/15-6/15 9/15-1/31	520
Wyoming				
Allotment Name and #	Permittee	Livestock Kind		AUMs^b
Adobe Town 10502	Raftopoulos Brothers Livestock.	Cattle/Sheep	10/1-2/28	1924
Cow Creek 10509	Raftopoulos Brothers Livestock.	Cattle/Sheep	3/1-10/31	2629
Crooked Wash 10510	Raftopoulos Brothers Livestock.	Cattle	6/1-10/31	87
Espitalier 10511	Raftopoulos Brothers Livestock.	Cattle	6/1-10/31	3061
Little Powder Mountain 10513	Raftopoulos Brothers Livestock, Smith Rancho Inc., Salisbury Livestock Co.	Cattle/Sheep	3/1-12/15	2217
Powder Mountain 10519	Salisbury Livestock Co.	Cattle/Sheep	4/1-10/31	923

^bAUMs = Animal Unit Months

Cattle and/or sheep grazing in the Cherokee West 3D could occur at any time and livestock are anticipated to be present in the area during project operations. Improvements associated with these BLM-administered allotments include water wells, stock water ponds or reservoirs, and fences. Several water wells and reservoirs exist in association with the grazing populations.

There are fences located within the Wyoming portion of the project area, specifically the Powder Allotment fence, as well as fencing along the state line.

Six range improvement projects will be carried out in the State of Colorado in association with grazing allotments. Three of these projects will involve fencing, one will involve the installation of a pipeline, and the others will involve either ponds or springs.

4.6.2 Environmental Consequences

4.6.2.1 Proposed Action

Project operations could involve fence crossings. Leaving fences down or gates open when livestock are present may result in livestock moving between pastures, from private to public land or vice versa, and herd mixing. This could lead to unauthorized grazing, overgrazing or increased livestock operator cost associated with sorting mixed herds. With implementation of the fence crossing measures prescribed below, the project should result in negligible impacts.

Seismic activities in close proximity to water wells and pipelines or water impoundments (developed water) could result in casing failure or dam fissure and a subsequent loss of livestock water. With implementation of the developed water restrictions prescribed below, the project should result in no adverse impacts. (Other natural types of surface water are addressed under Water Quality in this EA).

Heavy vehicle traffic could cause damage to existing cattle guards. With implementation of the facilities repair/replacement responsibility measures prescribed below, the project should result in no adverse impacts.

The proposed action would result in short-term vegetative changes within the project area. This disturbance would consist primarily of conversion of some mature shrubs and forbs in the tire paths to grass and also to younger, more succulent shrubs and forbs. Existing grass plants, most pertinent to summer/winter cattle use, should not be affected. Shrub species, more pertinent to winter sheep use would be only minimally affected, as younger shrubs and forbs are expected to re-vegetate areas of disturbance. While species and age make-up of plants in the tire paths would change, available palatable livestock forage would not be reduced. With side-by-side vehicle travel paths (see mitigation measures for Visual Resources), livestock forage loss is anticipated to be immeasurable.

4.8.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, the prohibition of off-road vehicle travel in the fringe areas would eliminate the potential of damaging fences and reduce the likelihood of damaging vegetation within these areas.

4.8.3 Mitigative Measures

Veritas shall be responsible for notifying grazing lessees prior to entering their allotments. Affected grazing lessees are listed above, and their addresses are available from the BLM upon request.

Veritas shall make every effort to avoid disturbing or altering fences. Gates shall be used when possible. Gates shall be closed immediately after passing through them. If a fence must be crossed, it shall be let down or cut (as determined by the grazing lessee or owner/operator), crossed, and immediately returned to the original condition. The wires shall be stretched to the original tension from the nearest brace or gate panel.

Source points shall be located a minimum of 300 feet from all BLM-managed water wells and reservoirs.

Any and all facilities damaged, destroyed or removed in connection with this geophysical exploration operation shall be immediately restored to original condition or replaced with a similar facility.

Veritas' operations shall comply with and shall not compromise the standards set for rangeland health for public lands administered by the BLM for each state, which can be found online at: www.co.blm.gov/standguide.htm (Colorado) and <http://www.blm.gov/nhp/efoia/wy/1997im/wy1997-105atch.pdf> (Wyoming).

Vibroseis source points shall be located a minimum of 300 feet from standing structures unless written permission to encroach closer has been given by the land owner or operator (BLM H-3150-1 Handbook).

Surveying paint shall not be applied to any existing structures or objects (i.e., buildings, fences, signs, rocks, etc.)

Veritas shall be required to repair any damage to facilities caused by their operations.

4.7 REALTY AUTHORIZATIONS

4.7.1 Affected Environment

Land status for Moffat County, Colorado involves 11 pipelines, five access roads, and a special land use permit. There is also withdrawal for a public water reserve located in Township 11 North, Range 99 West, Section 22. Several federal oil and gas leases exist within the project area. There are no pending or past realty actions in Sweetwater County, Wyoming.

Table 9. Land and Realty Authorizations within the Proposed Project Area

Identification Number	Location	Description
COC 64274	T12N, R97W, sec. 14 and 15	Graveled Highway (20')
COC 66443	T12N, R97W, sec. 14 and 15	Graveled Highway (15')
COC 10806	T12N, R97W, sec. 15, 22, and 27	Pipeline (25')
549204	T12N, R97W, sec. 20	D/C
968961	T12N, R97W, sec. 21	D/C All Min
COC 40639	T12N, R97W, sec. 21 and 28	Pipeline
COC 44228	T12N, R97W, sec. 21, 22, 27, 28, 29, 30, 31, 32, and 34	Pipeline (17.5')
COC 50002 WY	T12N, R97W, sec. 21, 28, and 29	Pipeline (25')
COC 0107410	T12N, R97W, sec. 25, 26, 27, and 34	Pipeline (20')
COC 64264	T12N, R97W, sec. 26, 27, 34, and 33	Graveled Highway (20')
COC 50057	T12N, R97W, sec. 28, 29, 32, 33, and 34	Graveled Highway (15')
COC 49992	T12N, R97W, sec. 29	Pipeline (15')
COC 40608	T12N, R97W, sec. 29 and 32	Pipeline (17.5')
COC 65406	T12N, R97W, sec. 29 and 32	Pipeline (5')
COC 23097	T12N, R97W, sec. 31, 32, and 33; T12N, R98W, sec. 35 and 36; T12N, R99W, and sec. 16, 22, and 24	Graveled Highway (75'), Special Land Use Permit
COC 0128058	T12N, R97W, sec. 32; T12N, R98W, sec. 35 and 36; T12N, R99W, and sec. 22 and 24	Pipeline (25')
COC 44217	T12N, R97W, sec. 32	Pipeline (15')
COC 50069	T12N, R97W, sec. 32	COMPR S
COC 44228	T12N, R97W, sec. 33	Evaporation Pond and Driveway
COC 48528	T12N, R97W, sec. 33	Pipeline (15')
COC 49993	T12N, R97W, sec. 33	Pipeline (17.5')
COC 44228	T12N, R97W, sec. 34 and 32	COMPR S
SG 9/1/1881	T12N, R97W, sec. 36	State Grant
COC 09718	T12N, R98W, sec. 16, 17, 20, and 21	Recon to US No Min
COC 60520	T12N, R99W, and sec. 16	(17.5')
COC 60521	T12N, R99W, and sec. 16	Well Pad
COC 60521	T12N, R99W, and sec. 16	Graveled Highway (20')
COC 61957	T12N, R99W, and sec. 16	(12.5')

Table 9. Land and Realty Authorizations within the Proposed Project Area

Identification Number	Location	Description
COC 61958	T12N, R99W, and sec. 16	Well Pad
COC 61958	T12N, R99W, and sec. 16	Graveled Highway
1173410	T12N, R99W, and sec. 22 and 23	D/C OG Coal
1151060	T12N, R99W, and sec. 23 and 24	D/C OG COAL
COC 051801	T12N, R99W, and sec. 24	None

4.7.2 Environmental Consequences

4.7.2.1 Proposed Action

Seismic activities in close proximity to pipelines or power lines could result in casing failure or service interruption. With implementation of the developed restrictions prescribed below, the project should result in no adverse impacts.

4.9.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

4.7.3 Mitigative Measures

Source points shall be located a minimum of 300 feet from oil/gas wells and pipelines, unless written permission to encroach closer has been given by the owner/operator. Spills resulting from ruptured pipelines or well casings shall be cleaned up as directed by DEQ and the facility owner/operator.

Veritas shall utilize the *One Call* service to obtain information in the planning for and avoidance of buried utilities.

Source points shall be offset away from powerlines, communication sites, and public water reserves, in accordance with safe operating distances.

Surveying paint shall not be applied to any existing structures or objects (i.e., buildings, fences, signs, rocks, etc.)

Veritas shall be required to repair any damage to facilities caused by their operations.

4.8 RECREATION

4.8.1 Affected Environment

The main recreation activity conducted within the proposed project area is hunting. Game present in the project area primarily consists of mule deer, elk, and pronghorn antelope. Archery hunting season begins in August in Colorado and September in Wyoming, while regular fall hunting for antelope begins in September, and deer and elk seasons open in October.

The Adobe Town Wilderness Study Area (WSA) is considered a tourist attraction due to its natural landscape and wilderness characteristics. A small portion of this WSA lies within the northeastern portion of the project area.

The Cherokee Trail, which traverses east/west through the project area, is also visited as a recreational site. In addition, some recreationists visit the area for horse viewing.

4.8.2 Environmental Consequences

4.8.2.1 Proposed Action

Project activities would temporarily displace game, which would present an inconvenience to hunters. Project operations are scheduled to conclude by the end of September, but may extend later into the fall hunting season, should unforeseen circumstances arise. Project operations could also disrupt the quality of dispersed recreation activities by visibly and audibly intruding on recreationists; however, with implementation of avoidance measures below, impacts to recreation and hunting activities or resources would be minimal and short in duration in any single area. Overall, impacts to recreation are considered negligible.

Disturbance to recreational visitors of the Adobe Town WSA and Cherokee Trail would be minimal due to operational restrictions placed on these areas. No off-road vehicle traffic would be permitted within the WSA or within ¼ mile of the Cherokee Trail. Refer to **Cultural Resources 3.3** and **WSAs 3.19 Sections** for more information regarding these resources.

4.10.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, there would be increased disturbance to wildlife and recreationists for a longer duration of time as a result of heliportable drilling in the fringe areas. Helicopter support required for heliportable drilling operations would result in increased noise disturbance in the project area, increasing the likelihood of displacement of game and disruption of recreation activities. In addition, the duration of the

disturbance would be increased, as heliportable drills are much slower than Vibroseis buggies and Ardco drills. The heliportable units are capable of drilling approximately four to six holes per day, so the duration of time required to complete drilling operations in the fringe areas would be approximately twice that of the proposed action.

With the additional time necessary for heliportable drilling operations, the project would likely extend into the fall hunting season. The noise disturbance created by the helicopters, along with the increased potential for temporary displacement of game, could affect the success of the hunters, as well as the overall hunting experience.

4.8.3 Mitigative Measures

Veritas shall avoid, to the maximum extent possible, working in the immediate vicinity of hunters and recreational visitors known to be utilizing the area.

Signs shall be posted at common recreation and gathering sites throughout the project area to inform the public of operations and make hunters aware of crews in the area at least 1 month prior to the project's start.

Veritas shall require all crew members to wear orange/yellow safety vests, making them easily visible to all hunters, and shall designate a contact person to resolve any issues that may arise during hunting season.

4.9 SOCIO-ECONOMIC CONSIDERATIONS

4.9.1 Affected Environment

The Cherokee West 3D project is located within the Washakie Basin, which is part of the large Greater Green River Basin. Oil and gas exploration and production, as well as livestock operations and hunting are the main economic staples of the area.

4.9.2 Environmental Consequences

4.9.2.1 Proposed Action

The Baggs and Craig area local economies might experience a temporary and minimal benefit from the sale of goods and services to the Veritas crew. Surface owners within the Cherokee West 3D would be paid land use fees by Veritas. Indirect benefits to the surrounding economy may occur if the interpretation of the collected data leads to the drilling of additional exploration or development wells in the project area. The local economy might have some direct but minimal, short-term benefit from support services to drilling and production crews, but only a small number of people would be affected.

The project area is already surrounded by oil and gas production and ongoing oilfield activities, so new production would cause minimal impact, either beneficial or adverse, to the present socioeconomic environment. Generated revenue from oil and gas production,

as the result of successful drilling programs resulting from the 3D seismic project, would affect only a small number of people and not necessarily people from the socioeconomic area in the vicinity of the project.

It is not likely that the proposed project activities would generate high levels of concern, opposition, or dissatisfaction among local residents. Residents of local communities are accustomed to oil and gas related activities, including seismic operations, and are unlikely to view the project as problematic.

4.11.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

4.9.3 Mitigative Measures

None.

4.10 SOILS

4.10.1 Affected Environment

Naturally, soils in the project area occur as a complex mosaic, resulting from the interaction of many factors including parent material chemistry and composition, topographic setting, and deposition type. There was no soil data available for the portion of the project area that lies in the state of Colorado; however, soil data obtained from Sweetwater County, Wyoming shows that the 3D project area falls within the soil-mapping units contained in **Table 9**. This dataset represents soils of Wyoming at 1:100,000- scale. The layer contains 350 separate soils descriptions across 23 Wyoming counties, although only Sweetwater County soils data was examined for this EA. These soil layers were compiled based on the five-factor soil forming model using digital surficial geology, bedrock geology, and elevation. Soil data obtained from Sweetwater County, Wyoming shows that the 3D project area falls within the following soil-mapping units:

Table 10. 1:100,000 Scale Soil Descriptions	
Soil Units	Soil Description
SW01	Typic Torrifluvents, fine-silty and fine, mixed (calcareous), frigid
SW02	Dune Land- Typic Torripsamments, mixed, frigid - Typic Torriorthents, coarse-loamy, mixed (calcareous), shallow
SW03	Rock Outcrop; Typic Torriorthents, loamy, mixed (calcareous), frigid, shallow; and Lithic Torriorthents, loamy-skeletal, mixed (calcareous), frigid
SW04	Typic Torriorthents, loamy, mixed (calcareous), frigid

Table 10. 1:100,000 Scale Soil Descriptions	
	shallow, Typic Torripsamments, frigid, mixed, Typic Natrargids, fine-loamy, mixed, frigid
SW10	Aquic Haplustolls, coarse-loamy, mixed, frigid; and Ustic Torriorthents, fine-loamy, mixed (calcareous), frigid; and Typic Fluvaquents, fine-loamy, mixed (calcareous), frigid.
SW12	Ustic Haplargids, fine-loamy and coarse-loamy, mixed, frigid- Ustic Haplocambids, sandy, mixed, frigid.
SW14	Typic Argicryolls, fine-loamy and loamy-skeletal, mixed- Typic Haplocryalfs, fine, smectitic- Alfic Haplocryolls, fine-loamy and loamy-skeletal, mixed.

The dominant soils in the southern portion of the project area in Wyoming are SW12 and SW04, and the dominant soil in the northern portion of the project area is SW 02. SW10 and SW03 soils appear to be present around waterways.

4.10.2 Environmental Consequences

4.10.2.1 Proposed Action

The primary potential impacts of the proposed action would be 1) soil compaction on heavier soils, 2) vegetation removal which would cause soil destabilization, 3) damage to soils on slopes which are especially susceptible to gully erosion, 4) increased wind erosion induced by off-road vehicle travel on sandier soils, and 5) damage to unstable or “fragile” soils.

Moderate compaction of soils could be created by the proposed off-road heavy vehicle traffic in areas containing heavier soils, which are dominant in the project area, as well as in riparian areas. Compaction reduces capacity for soils to absorb moisture, and results in reduced root growth and plant vigor. Soil compaction can also result in reduction of soil productivity due to the loss of soil structure, increased erosion risk and decreased infiltration of precipitation. By offsetting individual vehicle drive paths (see visual resources section) and prohibiting off-road vehicle travel in riparian areas, soil compaction would be minimized.

The spread-out vehicle pattern prescription (see **Visual Resources** Section) would also serve to minimize vegetation damage and removal and subsequent soil destabilization leading to gully erosion.

Risk of erosion and vegetation removal would generally be higher on slopes, particularly areas of steep terrain within the Cherokee West 3D. With the implementation of slope restrictions described below, damage to these sensitive areas that are more susceptible to erosion would be minimized.

Compaction and soil mixing may occur as a result of surface rutting caused by vehicle operations on wet soils. Existing BLM standards call for closure during such conditions and/or avoidance of areas containing wet soils. With implementation of the saturated soil restriction prescribed below, no rutting is expected.

4.12.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, there would be less likelihood of surface rutting and/or compaction of soils within the fringe areas. Foot traffic and the placement of heliportable drills in the fringe areas would result in only minimal impacts to soils.

4.10.3 Mitigative Measures

Veritas shall conduct no vehicle operations during periods of saturated ground conditions when surface rutting could occur. If vibroseis operations result in ruts of 3 inches deep or more, operations shall cease until conditions dry out sufficiently enough to prevent rutting. Shot points rather than vibroseis points shall be placed along rims in the southwest corner of project area and on the east end of the project area in areas with steep topographic grade in order to minimize compaction and/or rutting.

Up hill and down hill buggy (vibe or drill) operations shall be allowed only on slopes of 25 percent (14 degrees) or less. Other vehicle operations (e.g. ATVs, jug trucks, pickups, transcriber trucks, radio repeater trucks) are limited to slopes of 25 percent (14 degrees) or less. All vehicle travel is restricted to the travel/route activity plan map. No cross-country travel is allowed.

Veritas shall avoid constant use of the same access routes in order to reduce soil compaction. Highly erodible soils locations, particularly steep slopes, sand dune areas, or drainages, shall be avoided.

Any ruts created shall be repaired in a way that shall produce the least disturbance (i.e., hand shovel).

Veritas shall reclaim and reseed any areas where their operations have caused surface rutting or have otherwise removed all of the surface vegetation as directed by the Authorized Officer.

4.11 SOLID MINERALS/GEOLOGY

4.11.1 Affected Environment

No saleable, locatable, or coal leasable permits are present. An unknown number of open lode and/or placer mining claims may be present.

As mentioned in Section 4.5, the project area overlies several formations, namely the Green River Laney and Wilkins Peak members, the Washakie, and the Wasatch: Cathedral Bluffs tongue. Most of these formations date back to the Eocene, which was approximately between 36 and 57 million years ago. An area of Miocene rocks occupies the southeastern corner of the project area in Wyoming, which would have been laid down sometime between 5 and 24 million years ago.

4.11.2 Environmental Consequences

4.11.2.1 Proposed Action

The proposed action would have no environmental impact on the solid minerals or mining claim resources of this area.

4.13.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

4.11.3 Mitigative Measures

None.

4.12 VEGETATION

4.12.1 Affected Environment

Plant community types identified by the BLM within the Cherokee West 3D project area are Juniper Woodland, Wyoming Big Sagebrush, Black Sagebrush, Wyoming Big Sagebrush & Desert Shrub, Desert Shrub & Greasewood, and Saltbush. **Table 11** lists the species present in each of the plant communities.

Table 11: Plant Communities Found within the Cherokee West 3D			
Juniper Woodland Community			
Grasses	Forbs	Shrubs	Trees
Bluebunch wheatgrass	Lupine	Big sagebrush	Utah juniper
Needle and thread	Indian paintbrush	Rabbitbrush	Common juniper
Slender wheatgrass	Phlox	Snowberry	
Idaho fescue	Prickly pear cactus	Bitterbrush	
Wyoming Big Sagebrush Community			
Grasses	Forbs	Shrubs	
Bluebunch wheatgrass	Phlox	Wyoming big sagebrush	
Thickspike wheatgrass	Sandwort	Gardner saltbush	
Sandberg bluegrass	Buckwheat	Black sagebrush	
Indian ricegrass	Penstamon	Green rabbitbrush	
Needle and thread	Indian paintbrush		

Threadleaf sedge	Globemallow		
Squirreltail	Prickly pear cactus		
	Mustard		
Black Sagebrush Community			
Grasses	Forbs	Shrubs	
Bluebunch wheatgrass	Phlox	Black sagebrush	
Squirreltail	Woody aster	Wyoming big sagebrush	
Indian ricegrass	Prickly pear cactus	Shadscale	
	Mustard	Green rabbitbrush	
		Winterfat	
Wyoming Big Sagebrush & Desert Shrub Community			
Grasses	Forbs	Shrubs	
Bluebunch wheatgrass	Phlox	Wyoming big sagebrush	
Thickspike wheatgrass	Sandwort	Gardner saltbush	
Sandberg bluegrass	Buckwheat	Black sagebrush	
Indian ricegrass	Penstamon	Green rabbitbrush	
Slender wheatgrass	Indian paintbrush	Shadscale	
Needle and thread	Globemallow	Greasewood	
Threadleaf sedge	Prickly pear cactus	Horsebrush	
Squirreltail	Mustard	Snakeweed	
		Winterfat	
Desert Shrub & Greasewood Community			
Grasses	Forbs	Shrubs	
Thickspike wheatgrass	Phlox	Shadscale	
Slender wheatgrass	Sandwort	Gardner saltbush	
Bluebunch wheatgrass	Sand sagewort	Greasewood	
Indian ricegrass	Prickly pear cactus	Horsebrush	
Needle and thread	Mustard	Snakeweed	
Inland saltgrass	Biscuit root	Alkali sagebrush	
Western wheatgrass		Basin big sagebrush	
Squirreltail		Rabbitbrush	
Alkali sacaton		Winterfat	
Saltbush Community			
Grasses	Forbs	Shrubs	
Indian ricegrass	Wild onion	Gardner saltbush	
Squirreltail	Biscuit root	Birdsfoot sage	
Sandberg bluegrass	Woody aster	Bud sage	
Western wheatgrass	Globemallow	Spiny hopsage	
	Mustard	Greasewood	
	Prickly pear cactus	Snakeweed	
		Shadscale	

Vegetation information is summarized in the Wyoming and Colorado GAP Analyses as follows. The dominant plant community types indicated by the analyses within the Cherokee West 3D are Wyoming big sagebrush (approximately 70%) and desert shrub. Some of the more common species present in the project area include Wyoming big sagebrush (*Artemisia tridentata* ssp. *Wyomingensis*), shadscale saltbush (*Atriplex confertifolia*), Gardner's saltbush (*Atriplex gardneri*), and rayless aster (*Aster brachyactis*) (Wyoming Gap Analysis 1996).

Juniper woodlands cover areas in the eastern portion of the survey, with Utah juniper being the dominant species. Additionally, a small part of the project area is described as

greasewood fans and flats as it is dominated by greasewood (*Sarcobatus vermiculatus*). For additional information and detail, please refer to the Wyoming and Colorado GAP Analyses.

4.12.2 Environmental Consequences

4.12.2.1 Proposed Action

Overall, the proposed action would result in direct (tire) impacts to a little over one percent of the land surface within the overall project boundary (See **Section 3.10.2** for a more detailed explanation of impacts).

It has been observed on previous geophysical projects using the spread-out vehicle pattern that the woody brush plants are sometimes severely affected, but that the more herbaceous and resilient grasses and forbs survive and continue to vegetate the vehicle paths. Brush kill is a function of multiple factors including brush type, amount of traffic, time of year, and moisture conditions. Based on observation of past 3D projects in environments elsewhere in Wyoming where relatively low-growing Wyoming Big Sage, Low Sage (*Artemisia arbuscula* ssp. *longicaulis*), or Black Sage (*Artemisia nova*) predominates, up to 30% of the sagebrush plants driven over might be killed, and up to another 20% of plants directly driven on might be partially killed and/or damaged (Bill Lanning, BLM Pinedale F.O. Natural Resource Specialist, personal communication). The remaining 50% of plants driven on would remain visibly unaffected.

A portion of the project area is dominated by grasses, which tend to recover more quickly from vehicle disturbance. Vehicle impacts to grasses and forbs are anticipated over the same surfaces as the brush impacts (with the affected area constituting a little over one percent of the overall project area). Impacts to these species, however, would be very short-term in effect, as grasses and forbs are not likely to be killed by vehicle traffic, and would re-sprout from their established root systems in the spring.

Areas located within the eastern portion of the survey contain juniper woodlands, which provide habitat for several avian and wildlife species. With implementation of mitigative measures to protect trees, soils, and vegetation, there would be no harm to juniper habitat within the project area.

4.14.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, vegetation in the fringe areas would not be crushed or killed as a result of the off-road vehicle travel. Vegetation could be crushed or killed as a result of foot traffic and/or the placement of heliportable drilling equipment; however, this would occur over a very small percentage of the total area.

4.14.3 Mitigative Measures

Source points and vehicle traffic shall be offset around individual trees and, where possible, entire stands, as these can sometimes occur in tight clusters. No trees shall be cut.

No off road vehicle traffic is permitted within 500 feet of riparian vegetation. This stipulation measure applies to federal and non-federal lands (per Endangered Species Act).

The geophysical operations shall be conducted whereby the vibroseis buggies shall stagger their paths of travel, so that no vehicle is treading over the path of another vehicle, except when using existing roads and trails. Optimally, this shall occur such that the total disturbance width shall be as narrow as possible.

Disturbance of vegetation shall be kept to a minimum by limiting the number of times the vehicles travel over their designated access routes. If required, damaged areas shall be seeded with native plant species recommended by the BLM authorized officer.

Source points and vehicle traffic shall be offset around individual trees and, where possible, entire stands, as these can sometimes occur in tight clusters. No trees may be cut.

4.13 VISUAL RESOURCES

4.13.1 Affected Environment

Unmodified, natural scenes are common in the area, with human modifications including gas wells, bladed and two-track roads, power lines, water impoundments, fences, and grazing cattle and sheep comprising relatively minor components of the overall project area landscape. Wells and associated upgraded access roads exist in the project area. The project area is visible from County Road 4, a crowned and ditched road that crosses the southern end of the project area; however, the project is not visible from any other major viewing points such as cities, or recreation use centers.

4.13.2 Environmental Consequences

4.13.2.1 Proposed Action

In areas where the drills, vibrators, and support vehicles are working or traveling, visual quality could be impacted for the duration of operations in the area. Off-road vehicle traffic by buggy vibes and by repetitive passes of ATVs could cause long linear obtrusions (i.e., two-track roads) across the landscape, as they have in the past. To avoid linear visual obtrusions, to reduce soil compaction, and to reduce the degree of vegetation loss, BLM Wyoming has for the past decade required that geophysical projects off-set

their vehicle operations such that the tires of one vehicle do not follow in the path of another. The approach has been successful and long linear-two-tracks are not being created. With this vehicle off-setting system (see mitigation measure below), visual scarring is anticipated to be minimal.

Shot hole locations could be visible in the landscape as a result of drill cuttings deposited around the surface of the hole; however, only 30 percent of the total project area would contain source holes, and the holes would likely not be noticeable after a short period of time, as wind and rain eventually either distribute or settle cuttings in the area around the hole.

4.15.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, visual quality of the project area would be impaired with the presence of equipment for a longer period of time under Alternative 2. The use of only heliportable drilling units in the fringe areas would increase the duration of project activities, as well as necessitate the use of additional helicopters in the area.

There would be no off-road vehicle travel in the fringe areas; therefore, there would be no potential for creating visual scars on the landscape in these areas as a result of the passage of equipment.

More shot holes would be drilled as a result of the prohibition of off-road vehicle use in the fringe areas; therefore there would be more potential for creating visual scars on the landscape as a result of deposition of drill cuttings around shot hole locations. Over fifteen hundred additional holes would be drilled under this alternative than the proposed action.

4.13.3 Mitigative Measures

To the maximum extent feasible, Veritas shall offset side-by-side all off-road vehicle (including ATV) traffic over a 50-foot wide swath on either side of the seismic line, so that one vehicle does NOT drive the same path as another vehicle. Where travel is on two track ways or road surfaces, vehicles shall travel one behind another.

4.14 WILDLIFE, AQUATIC

4.14.1 Affected Environment

Shell and Skull Creeks flow through the project area and have associated wetlands/riparian zones. The BLM has not conducted surveys for fish or amphibian species in either of these creeks. Shell and Skull Creeks do provide potential habitat for the northern leopard frog (*Rana pipiens*) and the great basin spadefoot (*Spea intermontana*).

4.14.2 Environmental Consequences

4.14.2.1 Proposed Action

The proposed seismic project is not likely to have a negative impact on any amphibian or fish species. No off-road vehicle traffic would occur within 500 feet of riparian areas (including the Skull and Shell Creek drainages), which would be the occupied habitat of any fish or amphibian species; therefore, no impact to aquatic wildlife would occur.

4.16.2.2 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be the same as those discussed under the proposed action.

4.14.3 Mitigative Measures to be Applied

See Wetlands/Riparian mitigation in **Section 3.17**.

4.15 WILDLIFE, TERRESTRIAL

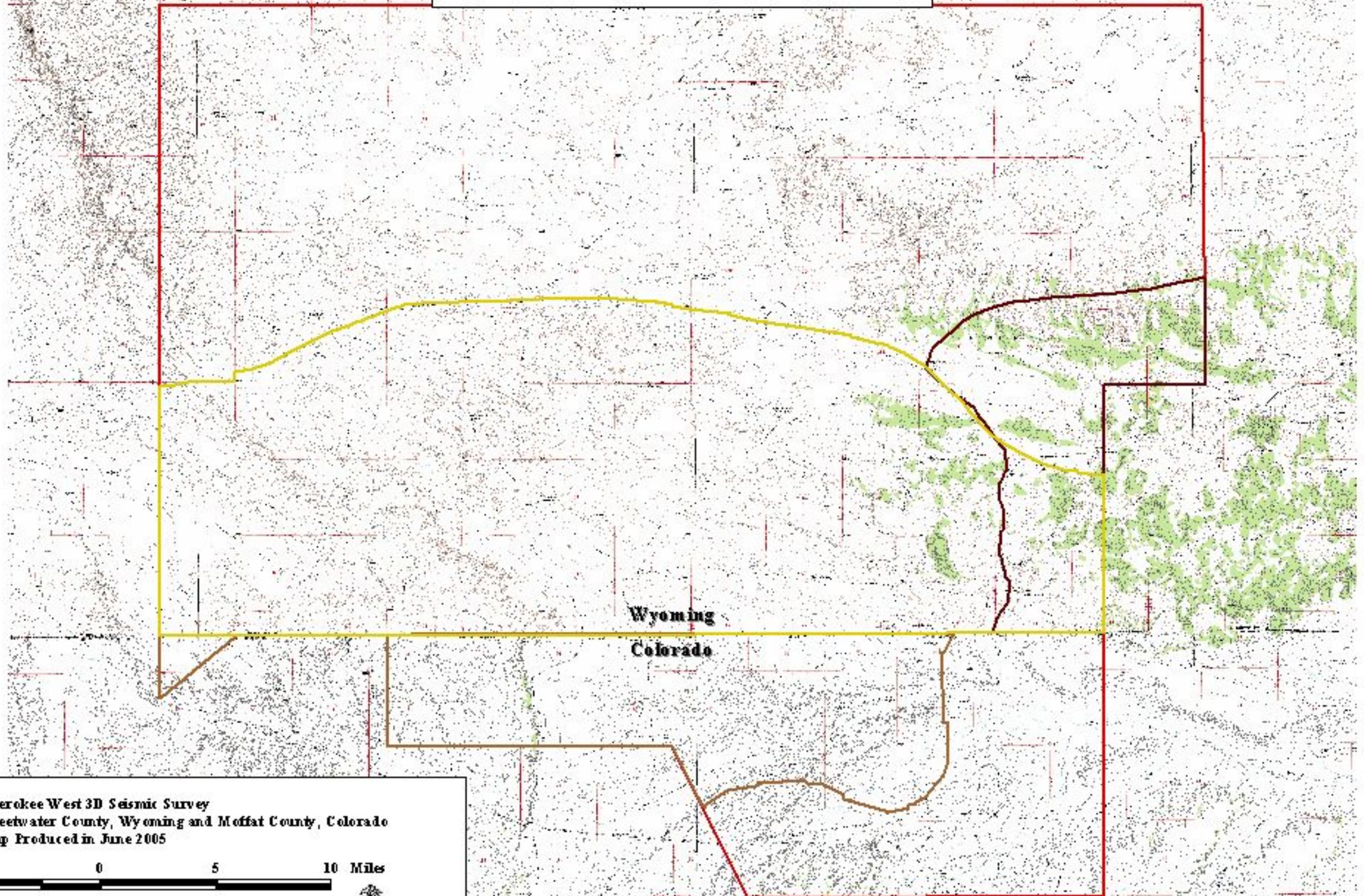
4.15.1 Affected Environment

The project area does fall within habitat designated as crucial winter range for mule deer, elk, and pronghorn antelope under 1989 LSRA RMP or by the Wyoming Department of Game and Fish, which is restricted from November to April. Areas designated as elk crucial winter range overlap the larger project boundary on the eastern side. Pronghorn antelope crucial winter range crosses the entire width of the project area, just north of the Wyoming state line, and extends halfway into the Wyoming portion of the project. Mule deer crucial winter range occurs in the east central part of the project. No crucial winter range exists within the Colorado portion of the project area; however, data from the Colorado Division of Wildlife indicates that much of the project area within Colorado is classified as an “Elk Limited Use Area.” This classification means that the area is within the overall range which is occasionally inhabited by elk and/or contains a small scattered population of elk. No restrictions apply to areas given this designation (See **Map 3**).

In addition to big game crucial winter range, the project area contains yearlong habitat for the Petition Elk Herd. This herd can be found within the following approximate boundaries: 1-80 on the north, Hwy 430 on the west, Hwy 789 on the east, and the Wyoming/Colorado border on the south.

According to information obtained from the Wyoming Department of Game and Fish (Tim Woolley, personal communication) elk migration through the area generally occurs in April (Spring Migration) and again in late October to November (Fall Migration).

Map 3. Big Game Crucial Winter Range



Cherokee West 3D Seismic Survey
Sweetwater County, Wyoming and Moffat County, Colorado
Map Produced in June 2005

5 0 5 10 Miles



- Antelope Crucial Winter Range
- EHL In Use Area
- Muledeer Crucial Winter Range
- Cherokee West 3D Boundary



Dixie Environmental Service

Environmental Consequences

4.15.2.1 Proposed Action

Disruption to wintering mule deer, elk, and pronghorn antelope populations in the area would potentially result from project operations if they occurred during the late fall and winter months (November-April). The species could be displaced from crucial protective habitat in harsh winter conditions. Since project timing is such that activities would be completed prior to the end of September, proposed project operations would have no effect on wintering mule deer, elk, or pronghorn antelope.

Pronghorn antelope, mule deer, elk, and other terrestrial wildlife species may be temporarily disturbed and/or displaced from immediate areas in which crews are working during the proposed project period. They may move into adjacent suitable habitat; however, impacts would be short term, localized, and negligible, and the animals are expected to return to their original habitat once crews vacate the area.

The proposed action should not interfere with elk migration, as project scheduling is such that it does not occur during migration periods characteristic of the general area (April and October-November).

Terrestrial wildlife could be injured or killed as a result of off-road vehicle operations; however, the potential for occurrence is very minimal. The majority of the wildlife species in the area are highly mobile. In addition, vehicles would be moving at slow paces. Off road vehicle travel is limited to a maximum of 15mph; therefore, wildlife should be able to move out of harm's way.

1.1.1.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, heliportable drilling operations in the fringe areas would increase the potential for displacement of wildlife, as well as increase the project's duration, potentially extending it into restricted periods for crucial winter range. Should operations be conducted in areas designated as elk, mule deer, or pronghorn antelope crucial winter range during restricted periods, it may displace these species from habitat that offers them vital protection in the cold winter months. It is not likely that proposed operations would affect population dynamics of any of the species; however, individuals of any of the species could potentially suffer from the lack of protection.

4.15.3 Mitigative Measures to be Applied

Operations shall be restricted in areas designated as crucial winter range during the period of November 15th to April 30th within the Wyoming portion of the project area, to protect wintering pronghorn antelope, elk, and mule deer.

4.16 WILD HORSE AND BURRO AREAS

4.16.1 Affected Environment

In Colorado, wild horses are present in the general area of the project; however, no burros are present within the project area. The main herd management area is located south of the project area in Sand Wash Basin, Colorado.

In Wyoming, the project area overlaps with the Adobe Town Herd Management Area (HMA), as indicated in **Map 4**. Wild horse gathers are planned within this HMA throughout the project period. Each gather would take one to two days, covering many portions of the proposed project area; however, the individual gather areas are not large in scale with respect to the project area.

4.16.2 Environmental Consequences

4.16.2.1 Proposed Action

In Colorado and Wyoming, wild horse populations could potentially be displaced while seismic crews are working in the area as a result of noise and/or human presence; however, the displacement would be short-term and localized in nature.

Veritas' helicopter operations associated with the proposed project could interfere or create an added safety risk in conjunction with helicopter operations conducted by the BLM for the purpose of horse gathers; however, with close coordination and implementation of mitigative measures, no impact is anticipated.

1.1.1.1 No Off-Road Vehicle Use in Adobe Town Fringe Areas with Wilderness Characteristics (Alternative 2)

Environmental consequences would be largely the same as those discussed under the proposed action; however, the potential for interference with, and safety risk during, BLM helicopter operations associated with horse gathers would be increased. Additional helicopters and increased flight times necessitated by heliportable drilling operations would increase the chances of project helicopters flying in the same vicinity of helicopters associated with horse gathers. In addition, the duration of operations in the area would be increased under this alternative due to the added time necessary to complete heliportable drilling operations; therefore, the potential for conflict would exist over a longer period of time.

Map 4. Herd Management Area

Wyoming
Colorado

Cherokee West 3D Seismic Survey
Sweetwater County, Wyoming and Moffat County, Colorado
Map Produced in June 2005



- Cherokee West 3D Boundary
- Herd Management Area



Dixie Environmental Services Co.

4.16.3 Mitigative Measures

To aid in avoiding interference with herd management operations, Veritas shall communicate with the BLM prior to and throughout the project period regarding wild horse gathers, the areas and times at which they will occur, and flight plans associated with these operations, as to minimize potential safety and disturbance risks. Veritas' preliminary flight plans shall be available to the BLM following the survey phase of the project.

Off-road vehicle travel shall be limited to speeds of 15 mph.

Crews shall be instructed to not harass wild horses or domestic livestock, and pilots shall be instructed to be aware of their presence within the herd management area in efforts to avoid disturbance.

To protect wild horses, helicopter activity shall take special care to avoid frightening or running wild horses.

The operator shall make every effort to minimize disruption and displacement of the wild horses in the area by seismic related ground and aerial activity.

Veritas shall be in close communication with the BLM in order to coordinate helicopter activities during the planned wildhorse gather.

Helicopter operations for this project shall be restricted to the project area (excepting ingress and egress in a direct manner to and from the project area).

5.0 CUMULATIVE IMPACTS OF THE PROPOSED ACTION

Pursuant to NEPA, the BLM must consider the cumulative effects of the proposed action in conjunction with other activities. Cumulative impact is the impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Effects include: (a) Direct effects, which are caused by the action and occur at the same time and place, and (b) indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8).

Veritas' proposed project overlaps the Shell Creek 3D project (August 2004) in Colorado and Wyoming, the Cherokee East 3D project (1999), and early 2D seismic projects conducted in the mid 20th century. In proposed areas of overlap, the potential of cumulative effects on vegetation and soils exists due to additional passes by equipment along source and receiver lines during each effort.

Inspection of past projects has indicated that 3D seismic projects do not result in major vegetative changes. The amount or percentage of sagebrush actually killed in vehicle paths is minimal, and vegetation begins to regenerate after short periods of time. Cumulative impacts are expected to be minimal and should not differ much from those outlined in environmental consequences sections above pertaining to the two resources.

No positively attributable indirect effects (caused by the action and later in time or farther removed in distance, but still reasonably foreseeable) are foreseen as a result of approval of the proposed action. Some level of oil and gas well drilling (and associated impact) in the analysis area is anticipated in the foreseeable future, but energy exploration activity is anticipated with or without completion of the proposed geophysical survey. Well drilling, if, when, and where it occurs, is the function of multiple factors, principally whether the oil and gas rights are under lease, and whether economically-producible oil and gas resources are present. Nearby on-going drilling and exploration does attest to some level of hydrocarbon presence. While the geophysical project proponent is hopeful that data gathered via the project would be very positive, there is no guarantee of this. It is concluded that the proposed geophysical data gathering project would not in and of itself cause important direct or indirect change. Analysis of impacts related to future well drilling must be addressed when drilling plans, including at least the general number and general location of wells, are more firm.

Other than on-going ranching, hunting, and oilfield maintenance activities described in the Affected Environment, no pending or on-going development activities are known for the analysis area.

Cumulative impacts of the proposed project, together with past, on-going, and foreseeable actions, are concluded to be extremely low level and short term.

6.0 RESIDUAL IMPACTS OF THE PROPOSED ACTION

Mitigation measures developed through this EA addressing potential environmental impacts under this alternative would be included as terms and conditions of approval of the NOI. As the mitigation measures would avoid or minimize impacts, no residual effects are foreseen.

7.0 CUMULATIVE IMPACTS OF ALTERNATIVE 2

Cumulative impacts of Alternative 2 would be the same as those discussed under the Proposed Action.

8.0 RESIDUAL IMPACTS OF ALTERNATIVE 2

Residual impacts of Alternative 2 would be the same as those discussed under the Proposed Action.

9.0 CUMULATIVE IMPACTS OF NO ACTION

The environmental consequences of adoption of the No Action alternative would result in the general continuance of existing land and resource use in the analysis area. The description of the Affected Environment, therefore, effectively describes consequences of selection of this alternative, with the following items of note.

Adoption of this alternative would not mean that oil and gas development (well drilling) would cease. The great majority of private, state and federal minerals in the project area have been leased, with mineral lessees granted the right to produce oil and gas reserves

contained within those leases. Therefore, with or without the geophysical data, well drilling is anticipated in the project area.

The adoption of this alternative, assuming the entire project would be canceled, would mean that the impacts quantified in the analysis of the proposed action would not take place; the surface area in the project would not be subjected to tire impacts; ATVs, pedestrians and the helicopter would not be present in the project area; and project-driven archeological and biological inventories would not be conducted.

While adoption of this alternative would cause no direct environmental impacts, it would result in the following indirect environmental impacts and direct socio-economic impacts:

Without the 3D data, lessees are more likely to drill 'dry holes'; resulting in greater environmental impact than if they had the 3D data. Well pad and access road construction, for dry holes or otherwise, involves complete removal of vegetation cover and contributes to landscape and/or habitat fragmentation. Seismic exploration is one of

the less surface-disturbing means available to a leaseholder for exploration.

To fully develop the field and/or extract all economically producible hydrocarbons, more producing wells may be needed than would be required with efficient well placement based on 3D geologic subsurface information. Additional inefficiently placed producing wells would also result in greater environmental impacts.

With knowledge of the subsurface strata/structure, the lease holder/operator would have more flexibility to move proposed well locations away from sensitive areas, and still direct the drilling to hit spots most likely to contain producible hydrocarbons. This should result in an indirect benefit to sensitive environmental settings within the project area. Without 3D data, lessee willingness to directional drill to preserve sensitive areas would likely be less.

Project-driven (and financed) archeological and potential biological inventories in the area of project potential effect would not take place under this alternative. The lack of studies would not adversely affect these resources, but also would not contribute to the existing database concerning resources in the area.

The proposed action would generate an undisclosed amount of revenue for the local economy through private landowner access fee payments, as well as via food, fuel, and incidental purchases for the seismic crews. Under the No Action alternative this economic opportunity would be lost.

Also, the proposed action increases the probability of pinpointing subsurface hydrocarbon pockets where successful wells could be drilled. Each new producing well would have positive economic benefits. Without the 3D information those hydrocarbon pockets may go untapped and the associated economic benefits would potentially be lost.

It is not possible to accurately project the relative indirect socio-economic benefits/impacts between the proposed action and the no-action alternatives, because future developments resulting from both alternatives are unknown. In both cases, some level of economic benefit to the local community, lessees, and the public is anticipated to occur as a result of exploration and development of oil and gas resources in the project area.

No direct cumulative or residual effects are foreseen as a result of adoption of the No Action Alternative. Indirect cumulative and/or residual effects associated with application of the No Action alternative cannot be quantified or assessed, as is not possible to accurately project oil and gas development in the area. Proposal-specific environmental analysis would continue to be undertaken, incrementally addressing these issues until such time as patterns are discernable or broader-scale actions are proposed.

10.0 RESIDUAL IMPACTS OF NO ACTION

None anticipated.

11.0 PERSONS / AGENCIES CONSULTED

This report was prepared by Dixie Environmental Services Co. (DESCO) under the direction of Mr. Tom Foertsch, BLM Rawlins Field Office, Physical Scientist.

Table 12. Individuals Involved in the Preparation of this EA	
Name	Title
Tanya Matherne	DESCO, President and Primary Report Author
Tom Foertsch	BLM Rawlins Field Office, Physical Scientist
Barb Blackstun	BLM Little Snake Field Office, Natural Resource Specialist
Louise McMinn	BLM Little Snake Field Office, Realty Specialist
Duane Johnson	BLM Little Snake Field Office, NEPA Coordinator
Desa Ausmus	BLM Little Snake Field Office, Wildlife Biologist
Henry S. Keesling	BLM Little Snake River Office, Archaeologist
Frank Blomquist	BLM Rawlins Field Office, Wildlife Biologist
Susan Foley	BLM Rawlins Field Office, Soils Scientist
Bob Lange	BLM Rawlins Field Office, Hydrologist
Beth Holden	BLM ___ Field Office, Legal/Right of Way Specialist
David Myers	BLM Rawlins Field Office, Biologist
Chuck Reed	BLM Rawlins Field Office, Horse Specialist
Mary Read	BLM Rawlins Field Office, Wildlife Biologist
Janelle Wrigley	BLM Rawlins Field Office, Land and Realty Specialist
Tim Woolley	Wyoming Game and Fish
Krystal Clair	BLM Rawlins Field Office, Recreation Planner
Chris Otto	BLM Rawlins Field Office, Rangeland Management Specialist
Mark Newman	BLM Rawlins Field Office, Geologist
Patrick Walker	BLM Rawlins Field Office, Archaeologist
Bill Lanning	BLM Pinedale Field Office, Natural Resource Specialist
Shelly Devoss	BLM Rock Springs Field Office, Natural Resource Specialist
Carrie Dobey	Wyoming Game and Fish Department, Wildlife Biologist
Dwight Melancon	GeoTir
Aaron Bateman	Veritas
Arthur Perkins	DESCO, Senior Biologist/Ecologist and Report Author
Jacqueline Smith	DESCO, Biologist/Ecologist and Report Author
Justin Rowland	DESCO, Biologist/Ecologist and Report Author
Gary Kowalski	DESCO, Operations Manager and Report Contributor

In addition to the above listed persons, the Uintah and Ouray Tribal Council; Colorado Native American Commission; Eastern Shoshone, Northern Arapaho, and Shoshone-Bannock Tribes; and Colorado and Wyoming State Historic Preservation Office were also consulted with.

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APPENDIX A

NOTICE OF INTENT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DEPARTMENT OF AGRICULTURE
FOREST SERVICE

FORM APPROVED
OMB NO. 1004-0162
Expires: December 31, 2005

NOTICE OF INTENT AND AUTHORIZATION TO CONDUCT
OIL AND GAS GEOPHYSICAL EXPLORATION OPERATIONS

NOI Case File No.

Lessee or Operator <u>Kerr Mc Gee</u>		Project Name <u>Cherokee West</u>	
Address <u>1999 Broadway Suite 3600</u>		Do you have a bond on file with the Agency? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
City <u>Denver</u>	State <u>CO</u>	Which Agency? <input checked="" type="checkbox"/> BLM <input type="checkbox"/> Forest Service	
Zip Code <u>80202</u>	Phone No. (include area code)	Bond No.	Bond Amount: <u>\$50,000</u>
E-Mail Address <u>kgenaud@kmg.com</u>			

Geophysical Co. <u>Velitas DGC</u>		Geophysical Co. Representative <u>Scott Hochman</u>	
Address <u>1200 17th Street, Suite 1000</u>		Address <u>1200 17th Street, Suite 1000</u>	
City <u>Denver</u>	State <u>CO</u>	City <u>Denver</u>	State <u>CO</u>
Zip Code <u>80202</u>	Phone No. (include area code) <u>720-956-3295</u>	Zip Code <u>80202</u>	Phone No. (include area code) <u>720-956-3295</u>
E-Mail Address <u>scott_hochman@velitasdgc.com</u>		Cellular Phone No. (include area code) <u>303-956-5013</u>	

Local Rep./Party Chief Dwight McLenahan 303-892-5612 (office) 720-273-9650 (cell)

1. Legal Description: Give the legal and land description of the lands involved using Meridian, Township, Range, and Section(s), or metes and bounds as appropriate:

<u>WYOMING</u>		<u>COLORADO</u>	
<u>T13N-R96W</u>	<u>Sec 7-8, 17-20, 29-32</u>	<u>T12N-R97W</u>	<u>Sec 10-23, 26-35</u>
<u>T13N-R97W</u>	<u>Sec 7-36</u>	<u>T12N-R98W</u>	<u>Sec 13-26, 35-36</u>
<u>T13N-R98W</u>	<u>Sec 7-36</u>	<u>T12N-R99W</u>	<u>Sec 13-16, 22-24</u>
<u>T13N-R99W</u>	<u>Sec 11-15, 22-27, 34-36</u>		
<u>T12N-R96W</u>	<u>Sec 5-7, 18-19</u>		
<u>T12N-R97W</u>	<u>Sec 1-24</u>		
<u>T12N-R98W</u>	<u>Sec 1-24</u>		
<u>T12N-R99W</u>	<u>Sec 1-3, 10-15, 22-24</u>		

You must also submit a map with a minimum scale of one-half inch per mile showing the general area and project location. We recommend a 7 1/2-minute USGS quadrangle or the scale commonly used in the area. For seismic operations, your maps should include source and receiver lines, surface ownership, and any Federal lands under lease. When survey lines are along property boundaries between Federal and private lands, indicate which side of the line you will use.

2. Do you hold any Federal leases within the project area? Yes No (If yes, indicate location and lease numbers on an attached map.) Note: There is no fee for operations on your Federal lease.

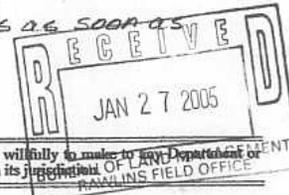
3. If you are proposing seismic exploration, how many miles of source line (2-D), or acres (3-D) (to the nearest 10 acres) of survey are on:

a. Your Federal Lease 50,014 b. Other Federal lands 25,307

4. When do you expect to start exploration? Aug. 1, 2005 How long will the project last? 60 days.

Describe any of your critical time frames associated with the proposed project, such as equipment or contractor availability.

Begin Surveying, Cultural and Natural Resource studies as soon as weather and surface conditions permit.



Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on reverse)

Description and Type of Operations (check all that apply):

a. Survey Type: 2-D 3-D Gravity/Magnetic Other (explain): _____

Describe the survey type:

Approx. 164 Sq. Mi. Survey
Receiver Line Spacing - 1320 ft. Receiver Station Spacing - 220 ft. Receiver Direction - N/E
Source Line Spacing - 1760 ft. Source Station Spacing - 220 ft. Source Direction - S/W
Source Method - Vibroseis with Shot Hole Infill - Buggy & Heliportable

b. Survey Method: Surface charge Shothole Vibroseis Other (explain): _____

What type and amount of explosives per source point will you use? Pentolite 5.5 lbs @ 40 ft. & 11.0 lbs @ 60 ft.

What shotpoint pattern and spacing will you use? Single Hole @ 220 ft. What will be the shothole depth? 40 ft (Heli) & 60 ft (Buggy)

Did you attach or display a diagram of the shotpoint pattern on the project map? Yes No

Describe the survey method: Source energy will be generated by both shot hole & vibroseis methods. Vibroseis is primary with buggy drilled shot holes & heliportable shot holes as infill. (4) buggy mounted vibrators per source station is required. Terrain will dictate vibrators, buggy drills & heliportable drills.

c. Transport Method: Vibrator Trucks Pick-up Truck Buggy/ATV Backpack Helicopter

Describe your transportation plans, including types and numbers of vehicles and how you will access the project area:

Access within the project area will utilize existing roads and trails where possible; however, there will be required cross country travel to access source locations. ATV's will be utilized for access to source & receiver stations.

Note: No source points will be positioned within the Adobe Town WSA; however, ATV's will be required to access receiver stations in this area.

d. Operating Procedures: Describe your operating procedures, including how you will minimize surface impacts. Describe support facilities you need, such as helispots, camps, or powder magazines; construction of roads or trails; proposed plugging procedures for shotholes; and general clean-up procedures.

A helicopter will be utilized to deploy & pick up recording equipment to minimize off road vehicular traffic. No permanent facilities will be constructed on the project. Staging areas will be located on private land if possible. Cultural and natural resource sites will be avoided.

Hole plugging will be conducted in accordance with WY 05-CC & COO 05-CC stipulations. All flagging, stakes, etc. will be removed as the project proceeds in addition to a final cleanup upon completion of the project.

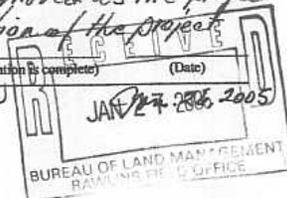
(Printed name of authorized company representative)

(Authorized company representative signs here to indicate this application is complete)

(Date)

Continued on next page J. DWIGHT MELANCON

J. Dwight Melancon



APPENDIX B

Scoping Content Analysis

Scoping Content Analysis

Cherokee West 3D Project

Comments were received from a total of 31 individuals and/or organizations. These comments were reviewed and organized by resource concern. Those that did not fall into a particular resource category were listed under general issues and concerns. The number of occurrences listed by each issue indicates the number of individuals/organizations that commented on the issue. Some individuals/organizations brought up multiple points under the same issue topic; therefore the number of bulleted items will not necessarily coincide with the number of occurrences.

General issues and concerns

Expresses general support/no opposition for the proposed action. (3 occurrences)

- The detailed image of the subsurface that 3D seismic provides allows the operator to target the most promising areas, while avoiding areas that would otherwise require exploratory drilling.
- The use of seismic interpretation can greatly reduce the environmental impacts of oil and gas development and operator costs, as fewer dry holes are drilled.
- Geophysical activity is consistent with the President's National Energy Policy and the Secretary of Interior's "4C's" philosophy to promote conservation practices with energy development and should be encouraged by the BLM.
- The proposed activity creates minimal short-term surface disturbance and the mandatory mitigation in effect through the applicable RMPs is adequate to protect the resources of the project area.
- The EA should be expedited and the project should be approved without delay.

Expresses general opposition to the proposed action. (3 occurrences)

Information should be obtained from previous surveys believed to be completed in the area.

The Red Desert area and its sensitive environment should be protected for future generations to inherit and to enjoy in a natural state, which preserves the awesome beauty and isolation.

There should be no oil and gas exploration in the Adobe Badlands.

The BLM should not issue any other permits for oil and gas exploration in the Badlands until already permitted BLM lands are finished.

There are plenty of other places in Wyoming for oil and gas development, not in sensitive natural areas like the Powder Rim and Adobe Town.

The cumulative impacts of this project, as well as concurrent, previous, and future foreseeable oil and gas activities should be analyzed. (5 occurrences)

Since the project likely overlaps the Desolation Flats Natural Gas project, as well as existing drilling activities in the Washakie Basin, Powder Rim, and Powder Wash areas, the cumulative effects of these activities must be studied together.

The EA must analyze the cumulative impacts of this project and other projects in the area on wildlife, water quality, air quality, visual resources, and wilderness resources.

Because elk from the Baggs herd migrate out to the Powder rim. The impacts of other projects that impact the Baggs Elk Herd must be considered together with the Cherokee West project.

Actions that should be addressed in a cumulative fashion include, but are not limited to, road construction activities, activities leading to soil and vegetation disturbance, activities leading to changed habitat structure, activities leading to habitat fragmentation, and activities causing air or water pollution.

BLM should require that lessees in the area go on the record as to what they anticipate will be future

seismic exploration needs in the general vicinity of the project area and analyze the potential impacts of such projects.

Vibroseis Operations should not be allowed in certain areas. (20 individuals/ organizations commented on this issue. Some commented on more than one area, so occurrences are listed below)

No Vibroseis operations should be allowed in the Adobe Town and Kinney Rim Citizens Proposed Wilderness Areas or the Powder Rim proposed Area of Critical Environmental Concern. (16 occurrences)

No Vibroseis operations should be allowed in the Red Desert. (5 occurrences)

No Vibroseis should be used in the fragile environment present within the project area. (4 occurrence)

No Vibroseis should be used in the “Adobe Town Fringe” (2 occurrences)

Only hand laid receiver line operations and heliportable drilling operations should be allowed in these areas.

The BLM should recognize the Western Heritage Alternative for the Rawlins RMP.

The Vibroseis method of geophysical exploration results in unnecessary and undue degradation to public lands and resources. Shot hole methods should be used throughout the project area.

Hunting Concerns. (2 occurrences)

- Noise from operations would disturb hunters in the area.
- Operations should start in the Powder Rim area first and work west towards Kinney Rim so that work does not interfere with most hunting seasons during September (archery: 1-30 September) and October through November (rifle deer/elk: 1-31 October, 1-30 November).
- Field personnel should wear blaze orange during rifle big game seasons (September 20-November 30).
- Workers with firearms or dogs should be prohibited during exploration.
- What efforts will be made to alert hunters that their hunting experience and activities may be disrupted?

The BLM must consider a reasonable range of alternatives. (2 occurrences)

- The BLM must consider a reasonable range of alternatives, including the No Action alternative, where there are unresolved conflicts over resource use.
- The BLM should consider an alternative that would only allow exploration to occur with no surface disturbance within the Adobe Town WSA and citizens’ proposed wilderness surrounding the Adobe Town.
- The BLM should consider an alternative incorporating suggestions from Game and Fish and conservation groups.
- The BLM should consider passive seismic technology as an alternative.

An EIS should be prepared for the project. (3 occurrences)

- An EIS should be completed for operations within the WSA to more thoroughly consider and avoid undue or unnecessary degradation of this world-class badlands, juniper, and high desert wilderness.
- An EIS must be prepared if impacts may be significant. In making a significance determination, the BLM must carefully consider and weigh the significance criteria specified at 40 C.F.R. § 1508.27.
- The Cherokee West project would create potentially major impacts to lands, which are undeveloped, roadless under BLM definitions, and of wilderness quality.
- If an EIS is not required, the BLM must provide a “convincing statement of reasons” why the project’s impacts are insignificant and issue a FONSI

Ensure all holes are plugged. (1 occurrence)

Clarify compatibility of shot-hole and Vibroseis-generated data in the EA. (1 occurrence)

Concerns related to cultural and paleontological resources

Activities could impact cultural resources. (4 occurrences)

- The EA must ensure that there is a sufficient inventory of cultural resources and their values prior to authorizing ground-disturbing activities.
- Because of the known presence of cultural resources on these lands, the BLM must conduct a Section 106 review prior to approval of this project.
- The EA should identify areas where cultural sites are at risk, and the decision document should employ measures to protect these resources.
- BLM must fully comply with the need to consult with the SHPO prior to authorizing activities that may harm resources eligible for the National Register of Historic Places, and insure compliance with the National Historic Preservation Act.
- There are numerous remains of cabins (built of various materials including native stone) and corrals. Some are easily historically documented and some remain complete mysteries. Potential damage to these sites is great.
- The Cherokee Trail is documented through a good deal of the eastern part of the project area. This trail should remain unchanged to allow eventual inclusion in the Historic Trails System, should that come to pass.
- The Outlaw Trail likely runs through the project area, so potential impacts to artifacts associated with the Outlaw Trail should certainly be analyzed as part of this project.
- There are known pictograph sites in the Powder Rim area dating from prehistoric times, and may be other rock art in the badlands of southern Adobe Town. A complete survey of these areas is needed prior to the issuance of the EA.
- Once harmed, cultural and paleontological resources are lost for future generations.
- The 3D analysis should reflect the sensitive nature of these resources and reflect the wishes of all tribes.
- All cultural/historic sites should be avoided by a distance of ¼ mile.
- All proposed source and receiver lines for which vehicle travel will be allowed must be completely surveyed and cleared in advance for archeological and cultural resources, and significant sites must be allowed to be fully excavated and catalogued before the vehicles can be allowed to roll.

Activities could impact Native American Cultural Sites. (4 occurrences)

- Avoiding all Native American cultural sites would be impossible without intense archaeological survey.
- The BLM must consult, actively with 2-way communication with affected tribes (Shoshone, Arapaho, Bannock, Comanche, Crow, Cheyenne, Sioux, Ute, etc.) to identify respected sites and Traditional Cultural Properties and to provide mitigation measures, which offer the maximum level of protection for these areas.
- The BLM must specifically request the views of tribal officials, and must solicit the views of traditional leaders or religious leaders. BLM must be diligent in the pursuit of this information.
- Petroglyph sites in the project area are almost certainly a TCP, and it is imperative that the BLM bring tribal representatives to these sites in a field visit to assure that adequate mitigation measures are put in place.

Activities could impact paleontological resources. (2 occurrences)

- The Washakie and Wasatch formations contained within the project area are listed as “Class 5” under the Probable Fossil Yield Classification System. These are typified as highly productive of

vertebrate fossils with easy access to outcrops.

The Washakie Basin contains world-class fossil resources in the Eocene Washakie Formation, containing unique fossils of uinatheres and taeniodonts. Six excellent specimens of rare taeniodont were recovered from the lower part of the Adobe Town member of the Washakie formation.

The BLM must map outcroppings of the Wasatch and Washakie formations in its NEPA document and fully analyze the impacts of various alternatives on fossil resources contained therein.

The BLM should conduct full-scale paleontological surveys along the proposed source and receiver lines prior to issuing an EA or EIS.

Concerns related to water resources/hydrology

The proposed geophysical operations could degrade surface water quality.

(4 occurrences)

- To minimize impacts to aquatic resources, it was recommended that equipment be serviced and fueled away from streams, springs, and riparian and ephemeral drainages with defined channels.
- Equipment staging areas should be at least 150 feet from riparian areas.
- Wetlands and riparian areas should not be subject to the direct impacts of exploration.
- Riparian areas should be given special consideration in the EA and protection in the decision document.
- Seismic activities, including blasting, cannot be allowed in or very near to streams, wetlands or riparian areas.
- The decision document should ensure that all components of State water quality standards are met and should ensure compliance with Sections 401 and 404 of the Clean Water Act.

The proposed geophysical operations could impact ground water. (1 occurrence)

- In the past, seismic exploration in the Shirley Basin has disrupted water tables and aquifers.
- There are a number of permanent springs along the Powder Rim, and as free-flowing, good quality surface water is such a rarity in the Red Desert, it is imperative that seismic exploration projects do nothing to impair or reduce the flow of springs.
- The EA should map the near-surface ground water flows that could potentially be impacted by Vibroseis and/or shot-hole seismic, provide an in-depth analysis of potential impacts, and require mitigation measures that guarantee that aquifer and spring flows will not be disrupted by this project.

Concerns related to noise

3D seismic operations create noise disturbance to wildlife and recreationists. (2 occurrences)

- Every effort should be made to decrease the intrusive noise associated with seismic exploration.
- The EA should address issues related to noise created by helicopter flights, the drilling of shot holes, blasting in shot holes, and noise from Vibroseis “buggies.”

Concerns related to land use planning

The Great Divide Resource Management Plan. (18 occurrences)

- The project should not be allowed to proceed until the Great Divide Resource Management Plan is revised.

The Heart of the West Conservation Plan (1 occurrence)

- The project area lies astraddle the Adobe-Vermillion Core Area and the Powder Rim Linkage, which are integral parts of the Heart of the West Conservation Plan.
- The BLM should ensure that the core and corridor areas under this plan receive the maximum protection from degradation under the Cherokee West project.

Concerns related to the Adobe Town WSA

The Cherokee West 3D should not impair the Adobe Town WSA. (3 occurrences)

- BLM should insure that the project does not impair the Adobe Town WSA and “fringe” areas for designation as wilderness.
- Under the principles of multiple use and sustained yield, and because part of the area is a wilderness study area, the environmental analysis must identify areas within the Cherokee West 3D where drilling, shot holes, and the use of Vibroseis techniques are inappropriate.
- The BLM must ensure that it meets the statutory requirement to prevent non-impairment of the Adobe Town Wilderness Study Area.

Concerns related to socioeconomics

The project, and possible resulting development, will have a beneficial effect on the local economy. (1 occurrence)

The project will have positive socio-economic effects on the surrounding communities as a result of crew expenditures in the area, permit fees, taxes and other benefits that are derived from increased oil and gas activity in the area.

Concerns related to vegetation and soils

The proposed 3D could impact vegetation in the area. (7 occurrences)

Damage to both vegetation and soils from Vibroseis vehicles has been documented in the past.

Using existing roads, helicopters, or personnel on foot, and avoiding off-road travel during wet and muddy conditions should minimize vegetation disturbance.

The project will impact one of Wyoming’s largest woodlands of ancient juniper.

Sagebrush habitats are sensitive to fragmentation, which has a detrimental effect on many sagebrush obligate species.

Off-road travel in sagebrush steppe will have the effect of further breaking up sagebrush patches into smaller fragments.

Recovery of vegetation that is killed by compaction or other mechanical disturbance in arid desert environments is an extremely long-term proposition.

Rare plant species should be mapped and protected from any disturbance.

Vibroseis and shothole buggies should not be allowed to travel through juniper woodlands or riparian areas of the Powder Rim in order to protect unique and limited habitat.

The proposed 3D could impact soils in the area. (2 occurrences)

Biological soil crusts are quite fragile and succumb quickly to trampling and compaction of the type associated with off-road vehicle use. These crusts play an important role in fixing nitrogen, improving rainfall infiltration, and reducing soil erosion.

Destruction of biological soil crusts and the mechanical compaction of soils (with or without biological crusts) leads to increased runoff, decreased water infiltration into the soil, and long-term decreases in productivity of surrounding vegetation.

Fragile soils and steep slopes prone to erosion must be avoided by off-road vehicles of all kinds.

Invasive plant species could be introduced into and/or spread in the project area as a result of operations. (3 occurrences)

Allowing more user-made roads and large equipment to move back and forth across the landscape increases the chances of introducing or spreading invasive plant species. Steps need to be taken to deny these plants the opportunity to establish themselves.

BLM should require strict regulations to prevent the spread of invasive weeds and more adequately protect natural plant diversity and rare plants.

The EA should fully analyze the extent of the invasive species problem in this area, the causes, and options for both restoration and prevention in the future.

The BLM should conduct surveys to determine the location and characteristics of native plant communities and rare or special status species.

Concerns related to wildlife/T&E

The 3D seismic operation could cause impacts to wildlife. (9 occurrences)

The BLM should do a biological assessment for the Cherokee West 3D project and consult with the Game and Fish Department about impacts.

The BLM must conduct formal Endangered Species consultation for any listed species that may occur in the area and must comply with its affirmative duty under Section 7(a)(1) to proactively implement programs for the conservation of listed species.

The BLM must ensure full compliance with BLM Manual MS-6840.06.E (Special Status Species Management).

All Sage Grouse leks within the project area should be identified and no activities should be undertaken within 2 miles of each lek during nesting and breeding season (March 1 – May 15).

Sage grouse leks and primary nesting habitat should be evaluated for the entire project area, and determinations should be made whether sage grouse in this area are migratory or non-migratory, which would influence the degree of protection needed for habitats.

Vibroiseis traffic through sagebrush may create pathways for predators in sage grouse nesting habitat, increasing predation and reducing nest success.

Lek sites should be protected from mechanical damage from off-road vehicle traffic at all times.

Dense stands of sagebrush, which provide critical winter habitat for the sage grouse, should be protected.

The EA should determine whether raptors are or could be using the Cherokee West 3D area and ensure that BLM meets its duties to provide management protection for the species.

A thorough analysis of raptor nest site locations is needed, and the project should be designed to avoid all lands within two miles of active raptor nests during the nesting season.

There are sage grouse, elk, antelope, some deer and various non-game species that will experience deleterious effects from the simple introduction of more people, not to mention traffic, noise, and potential for accidental and deliberate kills.

The BLM should analyze the issue of habitat fragmentation on migration corridors and ecological linkages.

The project area includes primary winter-yearlong habitat for the Petition Elk Herd. Impacts of disturbance on this herd must be studied in depth.

The project will impact crucial winter range for elk, deer, and pronghorn antelope.

The BLM must ensure full consideration of impacts on mule deer, pronghorn antelope, elk, and any other big game species that occupy the area.

Work should be avoided during the winter big game stipulation period (November 15-April 30).

The BLM should protect more than “critical” big game winter ranges; they should protect all winter range within the project area.

Wintering areas, colonial or other concentrated avian nesting areas, spawning beds, and traditional birthing areas are examples of the special habitats the environmental analysis should consider.

The EA should identify “keystone” species and resources, which can literally be key to preventing undesirable, cascading ecological effects, such as widespread extinctions (EX. prairie dogs).

The EA should identify migration and other movement corridors, and establish precautionary measures to ensure that the project will not alter or impair the traditional migratory routes of these animals.

The Powder Rim contains cottonwood riparian woodlands that provide potential nesting habitat for the yellow-billed cuckoo, a threatened species. Surveys should be undertaken during the nesting season in these areas to determine presence or absence. Activities should not be allowed to occur in or near yellow-billed cuckoo habitat during the nesting season.

Prairie dog colonies within the project area must be mapped and seismograph lines must be designed to avoid colonies entirely.

There are particularly large colonies just north of the man camp of Powder Wash on the Colorado side of the project area, which may ultimately be suitable for black-footed ferret reintroduction.

The NEPA process should be expedited to minimize impacts on wildlife (1 occurrence)

If the NEPA process is expedited, the project can be completed prior to big game wintering season so as to minimize impacts to wildlife.

Concerns related to visual resources

The project will leave visual scars on the landscape (1 occurrence)

Both soil compaction and mechanical destruction of sagebrush and other shrubs resulting from off-road vehicle activity will create long-term scars on a landscape already riddled with human intrusions.

Important visual resources should be mapped according to viewsheds that are seen from areas of highest recreational and aesthetic interest, including the Adobe Town WSA, the Adobe Town Fringe areas and associated citizens’ proposed wilderness, and the Kinney Rim citizens’ proposed wilderness. Other areas of importance from a visual resource perspective include the Powder Rim and the Prehistoric Rim and Cherokee Rim.

APPENDIX C

Notice of Intent Standards for the State of Colorado

NOTICE OF INTENT STANDARDS FOR THE STATE OF COLORADO

PLANT AND ANIMAL COMMUNITY (animal) STANDARD: The proposed project area supports diverse habitats for a variety of wildlife species. The proposed seismic project is likely to displace wildlife using the area during the activity period. All wildlife that is displaced is likely to return to the area after seismic activity is completed. No long term negative impacts to vegetation or other critical wildlife habitat features are anticipated from this project. This standard is currently being met and will continue to be met in the future.

Name of specialist and date: Desa Ausmus 05/24/05

SPECIAL STATUS, THREATENED AND ENDANGERED SPECIES (animal) STANDARD: Black-footed ferret and bald eagles are the only federally listed threatened or endangered species that have potential to be found within the project area. It is highly unlikely that any black-footed ferrets occur in the project area. White-tailed prairie dog colonies, the black-footed ferrets habitat, do occur within the project area but are unlikely to be affected by seismic activities. The project area does not contain any nesting or roosting habitat for bald eagles. It is possible that bald eagles would use the upland habitats of the project area to feed on winter killed big game species during the winter months. However, the proposed action is scheduled to be completed before wintering eagles arrive in the project area and therefore, would not impact bald eagles.

Several BLM sensitive species occur in the project area. White-tailed prairie dogs, greater sage grouse and ferruginous hawks are three BLM sensitive species known to occur in the project area. Mitigative measures would protect these species, and minimal impacts are expect to their habitat. The proposed action is not expected to have significant impacts to any BLM sensitive species. This standard is currently being met and will continue to be met in the future.

Name of specialist and date: Desa Ausmus 05/24/05

PLANT AND ANIMAL COMMUNITY (plant) STANDARD: The Proposed Action would result in mechanical crushing and compression of plants throughout the project area. While some direct plant mortality may occur, it would occur sporadically and not cause any appreciable impacts to the diversity, vigor, or abundance to the plant community at large. The potential for weed introduction would be reduced by regular washing of equipment. Although the potential for the Proposed Action to introduce weeds into areas where they are not currently present cannot be completely eliminated, it would not present a great enough vector, due to mitigation, for further weed invasion to be detrimental to the overall health of the plant communities. The Proposed Action would meet this standard. Under the No Action Alternative the project would not occur and, therefore, meet this standard.

Name of specialist and date: Hunter Seim 05/17/05

SPECIAL STATUS, THREATENED AND ENDANGERED SPECIES (plant) STANDARD: There are no federally-listed threatened or endangered or BLM sensitive plant species within the area affected by the Proposed Action in Colorado. The potential for the Proposed Action to result in direct mortality of BLM sensitive plants in Colorado is remote. The use of an offset pattern for vehicle movement would reduce this potential further. The Proposed Action would not create impacts to the soils or vegetative community that would preclude the presence of BLM sensitive or federally threatened or endangered plant species in the future. The Proposed Action would meet this standard. Under the No Action Alternative the project would not occur and, therefore, meet this standard.

Name of specialist and date: Hunter Seim 05/17/05

RIPARIAN SYSTEMS STANDARD: Mitigative measures limiting activities to foot and helicopter traffic along riparian areas will insure that riparian resources are not degraded as a result of this activity. This standard is being met and will continue to be met in the future.

Name of specialist and date: Desa Ausmus 05/24/05

WATER QUALITY STANDARD: The water quality standard for healthy rangelands is currently met and the proposed geophysical operations would not affect the water quality of Shell Creek, Powder Wash, the Little Snake River, or the Green River. Mitigation incorporated into the proposed action or developed in this Environmental Assessment, as well as the Standard Terms and Conditions of a geophysical permit contain several Best Management Practices that would maintain the water quality of the affected stream segments.

Name of specialist and date: Barb Blackstun 05/17/05

UPLAND SOILS STANDARD: The proposed action with mitigation provided in this Environmental Assessment would meet the upland soils standard for healthy rangelands. Steep slopes with fragile soil resources would be avoided. Activities conducted within fragile soil areas would be accomplished on foot or by helicopter. Decreased soil cover resulting from disturbances to biological soil crusts and vegetation is expected to be short term.

Name of specialist and date: Barb Blackstun 05/17/05