ENVIRONMENTAL ASSESSMENT

FOR THE PROPOSED

ANADARKO / VERITAS

SALT CREEK 3D

VIBROSEIS PROJECT

DOE EA No. EA-1544

BLM Case No. WYW-163071

BLM EA No. WY- 060-EA05-95

WOGCC Permit No. 025-05-015G

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1.0 PURPOSE AND NEED

1.1 INTRODUCTION

Veritas DGC Land has notified the Bureau of Land Management (BLM) Casper Field Office (CFO) of its intent to conduct a 3D seismic project in Natrona County, Wyoming.

The proposed project, called the **Salt Creek 3D,** lies roughly 30 miles north of the city of Casper and will overlie a 53 square mile, or roughly 34,000 acre area. Actual surface use of this area would be restricted to corridors and activities comprising a small proportion of the total acreage. Within the project area, approximately 23,800 acres (70%) are public surface land managed by the BLM, 1600 acres (5%) are federal lands managed by the Department of Energy, another 1600 acres (5%) are State of Wyoming land, and 7000 acres (21%) are private land, as depicted on **Figure 1**. A total of 585 linear miles of source line and 580 linear miles of receiver line are planned within this area.

This EA addresses potential effects to the 34,000 ac. project area, regardless of surface ownership. Lands included in the proposed Salt Creek 3D Project are:

T39N - R78W Sec. 3-10, 15-22, 28-30
T39N - R79W Sec. 1-4, 9-15, 23-25

T40N - R78W Sec. 6-8, 17-21, 28-33
T40N - R79W Sec. 1-3, 9-16, 21-28, 33-36

The project lies on the Midwest, Edgerton, Salt Creek, and Gillam Draw West USGS 7.5' Quads.

1.2 PURPOSE AND NEED FOR ACTION

The proposed action, the Salt Creek 3D Seismic Project, is needed in order to acquire and evaluate data for further development of oil and gas reserves. Geophysical exploration utilizing 3D techniques is an intensive data acquisition and computer synthesis system used to analyze and three dimensionally depict subsurface geologic structures/stratigraphy. The technique is capable of locating and displaying unknown subsurface pools or pockets which potentially contain producible hydrocarbons. Data obtained through this 3D geophysical data acquisition project should enable wells to be drilled with a much greater probability of locating producible hydrocarbons than is attainable via previous methods, such as 2D seismic data and wildcat wells. The project, thus, should result in fewer “dry holes” in the future, minimizing the need for drilling and associated environmental disturbance. Additionally, the acquired subsurface 3D data may be used to improve current CO2 injection operations to more efficiently recover hydrocarbons in the Salt Creek Field.

1.3 CONFORMANCE WITH LAND USE PLAN

Within the Casper Field Office (CFO) jurisdictional area, the proposed action is subject to the Platte River Resource Area (PRRA) Resource Management Plan (RMP) Record of Decision (ROD), approved in July 1985. The Plan and Decisions have been reviewed to determine if this proposal conforms with the land use plans terms and conditions as required by 43 CFR 1610.5.

The proposed project lies within BLM-designated Resource Management Unit (RMU) 5, the Salt Creek RMU. It also lies within the expansive Salt Creek Area of Critical Environmental Concern (ACEC).

Regarding energy and minerals, RMU 5 management prescriptions indicate that “oil and gas development and production have been intensive in this area since the 1890s. Drilling and production will continue. A major part of the continued management of oil and gas production in this area will be continued emphasis on implementation of the Salt Creek ACEC plan.” (PRRA RMP ROD p. 58).

The PRRA RMP ROD provides that BLM administered lands in the project area will remain open to oil and gas exploration, subject to mitigative provisions (Decision M.1). The mitigative measures developed via this environmental assessment are in compliance with the referenced RMP ROD.

The Salt Creek ACEC management area includes Salt Creek to its confluence with the South Fork of the Powder River and portions of Teapot Creek and Castle that have been identified as sensitive drainages. The area is considered to have major natural hazards, which without special management attention afforded by designation as an ACEC would result in irreparable damage to the environment and the community (BLM, 1980a). The Salt Creek drainage has been designated an ACEC for the following reasons:

- Natural hazards
- Long history or intensive oilfield development and associated impacts (oil spills, oilfield debris, exposed pipelines, waste oil dumped on well locations and roads and in drainages)
- Produced water quality discharged into Salt Creek
- Severe erosion in portions of the watershed
- H2S air quality

Short-term, intermediate, and long-term stream monitoring surveys (Level II) will be continued in the ACEC. Prescribed management of the ACEC also calls for inventory and evaluation of historic oil and gas sites, structures, and townsites that may be eligible for nomination to the National Register. In no case will any future historic district designation interfere with oil and gas development or production in producing fields within this area. (PRRA RMP ROD p. 47)

Within the Salt Creek region, the BLM has included erosive soils as one of the sensitive resources for management within the Salt Creek ACEC. Specific issues pertinent to the proposed geophysical operations are addressed in accordance with the ACEC management plan and discussed in detail in the Soils, Water, and Vegetation sections of this EA.

1.4 RELATIONSHIP TO STATUTES, REGULATIONS AND OTHER PLANS

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 project area, including state and private lands, have been considered; however, BLM' and DOE's authority for imposing mitigation standards, including terms and conditions for approval of the NOI for geophysical activity, pertain only to the respective federal lands, except on issues relating to 1) sites listed on, or eligible, or potentially eligible for the National Register of Historic Places and 2) Threatened and Endangered Species.

Authority for the proposed action and alternatives is contained in the Mineral Leasing Act of 1920, as amended, and in the regulations at 43 CFR 3100. Other relevant guidance includes the BLM 3100 series Manual and Handbook and the NEPA Handbook (H-1790-1).

INSERT FIGURE 1

Project boundary & land status map

2.0 DESCRIPTION OF THE ALTERNATIVES

2.1 ALTERNATIVE 1 – THE PROPOSED ACTION

During the survey phase of the project, Veritas DGC Land will employ a crew of 2-6 surveyors utilizing one ATV per surveyor to make a single pass along surveyed routes. Source points and all travel routes to them will be mapped as surveying proceeds using state of the art GPS technology for the accurate placement of each point. Mapping of points and travel routes will be executed solely with the use of GPS technology without the physical demarcation of points in the field (no flagging tape, lath, or paint). Sub-centimeter accuracy is essential for the placement of both receiver and source point locations. In order to accomplish this, base stations are required to provide differential corrections in real-time to the roving survey teams. These stations remain static, but different locations will be required depending on radio communications within the area. To the maximum extent possible, base stations will be placed on existing disturbances. If base stations are necessary in undisturbed locations on federal lands, these locations will be permitted separately. Base stations will be active throughout the duration of the project.

One hundred and twelve parallel receiver lines spaced 495 feet apart will be aligned E - W with each in-line point at 165 foot intervals. A total of 18,600 receiver points are proposed. Receiver lines vary in length from 2.3 to 7.0 miles. A geophone group of individual ground motion sensors are placed at each pre-planed receiver station. A single traverse cable serves as the communication link between geophone groups, adjacent receiver lines, and eventually tied into a recording truck. All recording (receiver related) equipment will be deployed via helicopter transport in cache bags. Actual placement of geophones and cable layout is accomplished by pedestrians assisted by hand held GPS units. In order to minimize helicopter flight time, one-ton cable trucks transport recording equipment to predetermined points along major roads. Receiver point locations will correspond to pre-plot positions with very few exceptions. Trouble-shooting and maintenance of recording equipment will be performed using ATVs.

Seventy five parallel source routes (also spaced 495 feet apart) will be aligned N - S (perpendicular to the receiver lines) with each point ideally in-line at 165 foot intervals. A total of 18,711 source points are planned. Source routes range from 2.0 to 10.5 miles in length. Whereas receiver point locations are fixed, considerable latitude exists in the placement of source point location. Thus, of the 18,710 source points and the travel routes to them proposed in the project, approximately 70% (13,100) are projected to be placed on existing disturbances such as roads, pipeline scars, well pads, etc. Locations of the 5,610 points that are unable to be placed on existing disturbance will be positioned by surveyors utilizing GPS. Access to these points will mapped using GPS as well.

Veritas will set up staging areas for the deployment of equipment, including a helicopter loading zone. Facilities at this staging area consist of as many as three highboy equipment trailers, fuel storage for both helicopter and vehicles, and a parking lot for crew transport vehicles. All of the fuel storage tankers have double wall containment. A typical staging area is 200 x 200 feet in size. The location of staging areas has not yet been selected, but will likely be placed on previous surface disturbance. If staging areas are necessary in undisturbed areas on federal surface, they will be permitted separately.

Veritas proposes to utilize two buggy mounted vibrators working in tandem to create an energy source at each vibroseis source point. The buggy vibes are 12' 6" high, 35' 6" long, and 11' 6" wide. A vibrator pad measuring 4.5’ x 7.5’ is centered under each vehicle. Each vehicle weighs 62,000 pounds and is equipped with 43-in (3.6 feet) wide low-pressure tires, which give them a ground pressure of less than 16 PSI. This configuration provides for optimum traction (minimal spinning) while minimizing soil compaction, resulting in reduced potential for two-track roads being formed. Refueling of buggy vibes will be at existing roads and trails. Veritas may utilize two pairs of buggy mounted vibrators in order to accelerate project completion. If this occurs, the pairs would work separately in adjoining but not overlapping portions of the project.

Cleanup: All lathe, pin-flags, ribbon flagging used for project operations will be removed immediately upon job completion. These materials will be deposited at a Wyoming DEQ approved disposal site.

Schedule:

Surveying:	Begin June 8, 05 – Complete July 20, 05
Recording:	Begin June 20, 05 – Complete August 1, 05

2.2 ALTERNATIVE 2 - NO ACTION

Under the no action alternative, geophysical data acquisition operations would not be authorized on Federally administered lands which comprise 75% of the project area. Operations could still occur on private and State lands comprising 25% of the total area. A decision to not authorize operations on the Federal portions of the project would result in disruption of the data acquired in the overall prospect, and would preclude data gathering under federal surface where leaseholdings occur. Adoption of the No Action alternative would therefore very likely result in the cancellation of the entire project. Under this alternative, 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.

2.3 ALTERNATIVES CONSIDERED BUT NOT INCLUDED IN THE DETAILED ANALYSIS

Change of Season: The proposed project is planned for late-spring / mid-summer operations. Conducting the proposed project in another season of the year was considered. Carrying out field operations in the winter under snow and frozen ground conditions would likely somewhat lessen vehicular traffic impacts to the land surface (i.e., soils and vegetation). Weather in the Casper area, however, cannot be counted on to remain snowy and significantly below freezing for several months at a time. Scheduling project operations to the winter months, therefore, cannot be projected to appreciably alter environmental impacts of the undertaking. Conducting project operations earlier in the spring months would generally conflict with the sensitive birthing / rearing season of wildlife species inhabiting the area, and so is not advantageous from a natural resources standpoint. In sum, various permutations of the Change of Season alternative yield equal or worse environmental results. For these reasons, detailed analysis of the Change of Season alternative is not further pursued.

All-Heliportable / Dynamite Operations: Under this alternative, only relatively small drills transportable by helicopter would be used to drill the proposed source points, and no off-road vehicle operations would occur in connection with this method of operations. Cable placement and other facets of the project would be the same as under the Proposed Action. Per source point, heliportable drilling is approximately six times more expensive than vibroseis. As selection of this alternative would most likely result in cancellation of the project, environmental consequences of this alternative would be the same as for the No Action alternative, which is analyzed in detail. Full analysis of this alternative was deemed unwarranted.

3.0 AFFECTED ENVIRONMENT

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT

Element	***Status on EA Area***	***Addressed in EA ?***
Air Quality	Minimally Affected	Yes
ACECs	Potentially Affected	Yes
Cultural Resources	Potentially Affected	Yes
Farmlands (Prime or Unique)	None Present	No
Floodplains	Not Affected	No
Native American Religious Concerns	Potentially Affected	Yes
Threatened and Endangered Species	Potentially Affected	Yes
Wastes (Hazardous or Solid)	Potentially Affected	Yes
Water Quality	Potentially Affected	Yes
Wetlands/Riparian Habitat	Potentially Affected	Yes
Wild and Scenic Rivers	None Present	No
Wilderness	None Present	No
Environmental Justice	Not Affected	No
Invasive Plants	Potentially Affected	Yes

3.1 PHYSICAL RESOURCES

3.1.1 Climate

The proposed project lies in an area typical of a high semi-arid desert regime. Average annual precipitation ranges between 10 and 14 inches. Most precipitation occurs during late spring and summer thundershowers. The remainder comes in the form of snowfall, primarily from November through April, with heaviest snowfall in spring.

The National Weather Service Office in Midwest (located within the current project area boundary), reports the following average temperatures and precipitation for the relevant months during the period between 1949 and 1991 (as presented in the Soil Survey of Natrona County Area, Wyoming, USDA NRCS 1997). Wind is often a significant factor in this area.

Month	**Avg Low Temp**	**Avg High Temp**	**Avg Precipitation (inches)**
June	48	81	1.94
July	54	90	1.3
August	52	89	0.74

For a more detailed overview of climatic conditions in the project area, please refer to *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment ,* (AATA 2003).

Impacts: None anticipated.
Mitigation: None needed.

3.1.2 Topography

Terrain of the project area is heavily dominated by gently rolling sagebrush /grassland steppe. Along the eastern portion of the project area, however, the divide between the Castle and Salt Creek drainages is a rocky ridge associated with broken and steep terrain. Elevation in the project area varies from approximately 4790 to 5295 feet AMSL, a difference of 505 feet.

Impacts: Off-road vehicle activities, particularly in areas of steep slopes, could cause surface scarring and subsequent gully erosion. The PRRA RMP ROD indicates that surface disturbance will be prohibited on slopes in excess of 25%, unless written modification, including supporting analysis documentation, is approved in writing by the Authorized Officer (Decisions M.1 and SWA 4).

More lenient slope restrictions specifically for 3D seismic projects were developed by the BLM Pinedale Resource Area (PRA) in the early-1990s. These slope restrictions have been subsequently successfully used in Pinedale and elsewhere, including the Casper Field Office (e.g., Boone Dome 3D). The following slope restriction provisions, thus, constitute written exception to the 25% slope restriction prescribed by the PRRA RMP ROD. With implementation of this slope restriction, no significant impact to topography is foreseen.

Mitigation:

- Except for areas of highly erodable soil where off road vehicle traffic will be limited to slopes of 25% or less (see EA figure 2) and sparsely vegetated slopes, up-hill buggy vibe operations are permitted on slopes of 35 percent (19 degrees) or less, and down-hill buggy vibe operations are permitted on slopes of 45 percent (22 degrees) or less. Conventional vehicle operations (e.g., pick-up trucks) are limited to slopes of 25 percent (14 degrees) or less. ATVs may be used on steeper slopes which can be safely negotiated, providing no undue environmental damage is caused. Should the Authorized Officer determine that any vehicle operations on slopes between 25 and 45 percent is causing undue vegetative or soil disturbance, such operations will be immediately suspended.

3.1.3 Paleontology

Review of BLM paleontological sensitivity maps based on surface geology indicates that the project area falls within sensitivity zone 4, and to a lesser extent, zone 3 classifications. Potential exists for surface exposure of paleontological resources in these zones, but is considered relatively low. No paleontological localities have been recorded in the current project area, (personal communication Christopher Arthur, Archaeologist, BLM-CFO).

Impacts: BLM has previously determined that vibroseis projects do not pose a significant hazard to paleontological materials, owing to the low level of disturbance associated with this operation type. The standard BLM paleontological material discovery stipulation applies to all projects. With implementation of the discovery measure prescribed below, no significant impact to important paleontological resources is foreseen.

Mitigation:

< If vertebrate paleontological resources (fossils) are discovered on land administered by the BLM-CFO during project operations, the operator will suspend operations that could disturb the materials, and immediately contact the BLM Casper Field Office. The BLM Authorized Officer will arrange for evaluation of the find and determine the need for any additional actions which may be necessary.

3.1.4 Soils

A detailed summary of soils in the current project area is presented in the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment* , (AATA 2003). Comprehensive information is available in the Soil Survey of Natrona County, Wyoming (USDA NRCS 1997) and at http://www.sdvc.uwyo.edu/clearinghouse and http://www.gap.uidaho.edu.gap. Please refer to these documents for a description of soils in the project area.

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. Two limiting general characteristics of soils are particularly sensitive to surface-disturbing activities, and so are relevant to surface management considerations: 1) soils on steep (>25%) slopes and 2) soils that are inherently fragile, being sandy, unstable and/or highly erosive. Soils in the project area highly susceptible to water erosion are identified in the Salt Creek ACEC Management Plan and are subject to special protection measures. The location of highly erosive soils is depicted on **figure 2**.

Impacts: Surface disturbance to highly erodable, fragile soils could result in appreciable soil loss and subsequent wind or water erosion. With implementation of the rapid reclamation prescriptions (see mitigative measures for vegetation), minimization of travel in these sensitive areas, and the slope restrictions prescribed in this EA (see mitigation measures for topography and vegetation), however, no adverse impacts to highly erodable soils are expected.

Surface rutting could be caused by vehicle operations on wet soils. With implementation of the saturated soil restriction prescribed below, the project should cause no significant impact in this regard.

Soil compaction could be created by the proposed off-road heavy vehicle traffic. Compaction reduces capacity for soils to absorb moisture, and results in reduced root growth and plant vigor. With implementation of the off-set individual vehicle drive paths prescription (see mitigation measures for visual resources), soil compaction will be minimized. No appreciable project impact is foreseen in this regard.

General soil erosion could be instigated by the proposed off-road heavy vehicle traffic. With implementation of the off-set individual vehicle drive paths prescription (see mitigation measures for visual resources) and the slope restrictions referenced above, however, vegetation damage will be minimized. Although off-road vehicle operations would crush and break off much of the above-ground vegetation in the tire paths, root masses would remain alive and / or intact and continue to hold soil in place, thus reducing or avoiding soil erosion. No appreciable project impact is foreseen in this regard.

Mitigation:

- The operator shall conduct no vehicle operations during periods of saturated ground conditions when surface rutting could occur.

Insert Figure 2

Highly erodable soils

3.1.5 Water

Principal drainages within the project area consist of Salt Creek, Castle Creek, Coal Draw and Bothwell Draw. All are ephemeral streams except Salt Creek, which historically was also ephemeral, but which now flows year-round as it receives produced water discharges from the Salt Creek and Teapot Dome Oilfields. Various other unnamed minor intermittent drainages and tributaries traverse the project area.

Two large (ca. 2.5 and 8 ac.) ponds lie in the central project area within a half mile of the town of Midwest as reflected on **figure 1**. No other permanent water sources are recorded on the USGS topo map or on BLM GIS files (Bruce Parker, BLM-CFO, personal communication). Potential exists for unrecorded water sources. Water wells are addressed in the Livestock Grazing section of this EA.

Project operations do not require use of any water.

For more information please refer to the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment ,* (AATA 2003), which contains a detailed summary of local hydrologic resource conditions including gauging station and surface water quality records.

Impacts: Seismic (vibroseis) operations near any springs, seeps, or riparian areas in the project area could disrupt the subsurface fissure or stream channel morphology, thus restricting or eliminating water flow. If safe operating distances are observed, however, no significant impact is expected.

Vehicular traffic through riparian and wetland areas could result in a temporary increase in turbidity (water quality deterioration). If, however, these areas are avoided, actual impacts are expected to be negligible.

Discussion: The PRRA RMP ROD prohibits surface disturbance within 500 ft of surface water and riparian areas (Decision M.1) and also prohibits surface development within 500 feet of springs, live streams, lakes and associated riparian habitat (Decision SWA.2). Both of these referenced decisions allow for waiver or modification of the 500 foot restriction by the BLM Authorized Officer.

Less restrictive 'recommended safe distances' from seismic source points to resources including springs are presented in Illustration 10 of the H-3150-1 Handbook for Onshore Oil and Gas Geophysical Exploration (BLM 1994). The recommended safe distance for vibroseis operations is 300 feet. The H-3150-1 Handbook specifies that if the BLM or any interested party wishes to modify the buffer distance presented in the Handbook, the burden of proof to justify the necessity of an increased distance or the safety of a decreased distance is the responsibility of the party wishing to make the change (ibid.). The U.S. Forest Service utilizes the same safe shot-hole distance and burden of proof standards (USDA-USFS 1996).

In consideration of the activity-specific (geophysical) guidelines and policy promulgated by BLM via the H-3150-1 Handbook, the less restrictive Handbook buffer prescription (300 ft) will be applied regarding source creation for the proposed project. The following avoidance provision, thus, constitutes written exception to the 500 feet water avoidance buffer prescribed by the PRRA RMP ROD.

Mitigation:

- To protect riparian dependent special status species of wildlife and plants, riparian habitat, and water quality, vehicle travel will not be allowed within 300 feet of surface water, flowing streams, or riparian areas, except at existing crossings, unless on established roads. This stipulation applies to **the entire project area** regardless of surface ownership

- To protect subsurface water flow, source points on federal lands shall be located a minimum of 300 feet from surface water, flowing streams, seeps, springs, or riparian areas.

3.2.1 Wildlife

Wildlife of the Salt Creek 3D project area is discussed in detail in the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment* (AATA 2003).

Although big game (mule deer and pronghorn) inhabit the area, the project area contains no big game crucial winter range or parturition areas.

Special Status Animal Species – Federally Listed Species

A list of **federally threatened, endangered, proposed and candidate** species potentially present within the project area or potentially affected by the project was obtained from the U.S. Fish & Wildlife Service (USFWS 2005). Listed species are discussed below.

SPECIES	STATUS	HABITAT	STATUS IN EA/COMMENTS
Bald Eagle	T	Uncommon, found throughout state. Nests and perches in large trees, along rivers and lakes. Foraging along rivers/lakes and on carrion.	No documented nests in or near project. No documented winter roosts in project.
Black-footed ferret	E	Prairie dog towns. In Wyoming, only known from reintroduction population in NE Carbon County.	Project area falls under USFWS-BFF block clearance.
Platte River Species (Whooping crane, Interior least tern, Piping plover, Pallid sturgeon, Eskimo curlew, Western prairie fringed orchid)	E	Platte River (downstream)	The project is not in the Platte River drainage. No water will be used for project vibroseis operations.

Bald Eagles typically nest in large trees, within mature and old growth forested areas adjacent to large bodies of water or rivers, and tend to avoid human development or disturbance (Buehler 2000). In Wyoming, the bird is a rare breeder outside of the greater Yellowstone ecosystem. Winter range is typically associated with aquatic habitats with some open water for foraging. Winter roost-site characteristics include: large deciduous or coniferous trees that are open and accessible for roosting; forested areas that offer protection from prevailing winds; and sites located away from houses or roads (Buehler 2000). The nearest documented bald eagle winter roost lies within Pine Ridge, roughly 6 miles east of the project boundary. Nesting and roost habitat is not known to occur for this species within the proposed project area. The proposed project will have '**no effect'** on bald eagles or their habitat.

Insert Figure 3

Known wildlife sites

Black-footed ferrets are considered obligate associates to prairie dogs, which constitute their primary food source and provide burrows for shelter. Historically, black-footed ferrets ranged throughout the non-mountainous portions of Wyoming, in areas that supported prairie dogs. They are currently restricted to a single reintroduced population in NE Carbon County. Potential habitat in the form of black-tailed prairie dogs *(Cynomys ludovicianus)* occur in scattered colonies throughout the project area (Appendix D in this EA). The USFWS developed a new set of guidelines for black-footed ferret surveys and compliance with the Endangered Species Act (ESA) (USFWS 2004b). Black–footed ferret surveys are no longer necessary in black-tailed prairie dog colonies statewide, or in white-tailed prairie dog towns, except those areas noted in the new guidance. The USFWS developed an initial list of habitat blocks that are not likely to be inhabited by black-footed ferrets. In these areas, take of individual ferrets and effects to a wild population are not considered an issue and survey for ferrets are no longer recommended. The project area falls within the block clearance area for black-footed ferrets. The proposed project will have **'no effect"** on black-footed ferrets or their habitat.

The project lies within the Missouri River drainage and will not affect endangered downstream **Platte River listed species**. In addition, the proposed Salt Creek 3D is entirely a vibroseis operation which does not require the use of water for project activities. The proposed seismic project will have '**no effect**' to these Platte River species.

Special Status Animal Species - Sensitive Species

Suitable habitat may be present in the project area for 16 of the 21 animals in the BLM Casper Field Office accorded **'sensitive species'** status by BLM Wyoming State Office, Sensitive Species Policy and List (September 2002). These species are greater sage grouse, ferruginous hawk, peregrine falcon (low probability), burrowing owl, sage thrasher, Brewer's sparrow, loggerhead shrike, sage sparrow, mountain plover, long-eared myotis, Fringed Myotis, Townsend's big-eared bat, swift fox, black-tailed prairie dog, white-tailed prairie dog, and the northern leopard frog. Each of these is addressed below. Among these sensitive species, sage grouse and raptors are notable in that they are routinely protected via BLM seasonal restrictions.

Upland Birds: Sage grouse are known to inhabit the project area and one sage grouse strutting ground/lek has been documented north of the project boundary. Sage grouse strutting areas and the surrounding nesting habitat are protected via various seasonal inventory and avoidance restrictions from March 15 through July 15 (personal comm. James Wright, BLM-CFO). The 2 mile nesting habitat buffer surrounding this lek extends just to the northern edge of the vibroseis project area (**Figure 3**). The proposed operations could adversely affect sage grouse strutting, nesting, and rearing activities if conducted during this period within this habitat buffer zone. However, according to the current proposed project boundaries, geophysical operations will take place entirely outside of this 2 mile zone. Additionally, the project area will be accessed from the south via established roads and highways. No adverse impact to sage grouse nesting activities is anticipated.

Raptors: The project contains suitable habitat for BLM-designated sensitive raptor species (**ferruginous hawk, peregrine falcon** (low probability)**, and burrowing owl)**. Other raptors which could be present within the project area include: red-tailed hawk, golden eagle, prairie falcon, Swainson's hawk and great-horned owl. Raptors are protected via seasonal inventory and avoidance restrictions from February 1 through July 31 (PRRA RMP ROD Decision WL.7). BLM GIS data for the proposed project area indicates that six raptor nests have been recorded within the central to southeastern portions of the proposed project area (**figure 3**). Because project activities are scheduled to occur during the seasonal restriction period, the proposed operations could adversely affect nesting raptors. Therefore, a raptor nest inventory and subsequent avoidance measures would be required to avoid disturbance to nesting raptors. A nesting raptor inventory was conducted between 27 May and 7 June 2005 (Appendix D in this EA).

Other sensitive avian species: Habitat for the sensitive **mountain plover** includes short grass prairie, and shrub-steppe type landscapes, with nest sites often located in areas of sparse vegetation and in association with prairie dog towns. Mountain plover migrate from Wyoming in late July and August to wintering areas in California, and then return to Wyoming in March. In September 2003, the USFWS determined that the proposed mountain plover was not warranted for listing. However, the mountain plover remains a BLM species of concern and the species is protected via seasonal restrictions from April 10 to July 10. Suitable habitat for the mountain plover may exist within the project area. Because project operations are scheduled to occur during the seasonal restriction period, inventory and avoidance of any mountain plover nests is required. An inventory of suitable mountain plover habitat on BLM lands within the project area was conducted between 27 May and 16 June 2005 (Appendix D in this EA).

The **Sage Thrasher**, a BLM designated sensitive species, relies on sagebrush communities in level to gently sloping terrain for feeding and nesting activities. It is almost entirely dependent upon sagebrush habitats during the breeding season where nests are formed in low sage usually less than one foot above ground surface. The majority of nesting/rearing activities for this species occur in mid-June. Occasionally, the sage thrasher may have more than one brood per season (Hoppes 1978, Campbell et. al., 1997). Sage thrasher activity and a suspected breeding area for the sage thrasher have been documented within the project boundaries in Sec. 29 of T39N R78W (WYNDD files). The recent wildlife inventory conducted for the current project has also documented this species (see Appendix D).

The **Brewer's sparrow**, also accorded BLM sensitive species status, is closely associated with sagebrush communities for forage and nesting activities, preferring dense stands of sagebrush interspersed with grassy areas. They can also be found in habitats such as sub-alpine fir, dwarf birch, or montane-pinyon juniper woodlands. A suspected breeding area for this species has also been documented in the same area of the project as the aforementioned sage thrasher. The recent wildlife inventory conducted for the current project has also documented this species (see Appendix D).

The **sage sparrow** is also considered a key sagebrush obligate species, preferring to nest on the ground or in low shrub. Similar to both the sage thrasher and Brewer's sparrow, a suspected breeding area for the sage sparrow has been documented within the project boundaries in Sec. 29 of T39N R78W (WYNDD files). These observations were made in 1987 and 1989.

The **Loggerhead shrike** is commonly found in open grass and sagebrush covered steppe with scattered shrubs or small trees. Unlike the other sensitive avian species potentially present within the project area, however, it is not a ground nesting bird. Typically, a pair builds its nest 3-12 feet above the ground in a tall shrub or the crotch of a low tree branch. One observation of a Loggerhead shrike is of record roughly 10 miles west of the project area (WYNDD files), and the recent wildlife inventory conducted for the current project has documented this species throughout the 3D area, often associated with greasewood habitats (see Appendix D).

Mammals: Bats typically use a wide variety of ecological settings – from desert shrub to coniferous forest, woodlands, rocky canyons and cliffsides, or large riverine/riparian areas. **Townsend's big-eared bat, fringed myotis,** and **long-eared myotis** have not been documented within the Salt Creek 3D area, although suitable habitat may exist within this part of Natrona County and the adjacent Converse County. **Bats** normally use steep rocky cliffs, caves, or trees (as opposed to ground cover vegetation), for roosting and breeding, making them less vulnerable to potential impacts from seismic activities. Bats are highly mobile while foraging, the temporal nature of seismic activity is not likely to disrupt feeding activity. No cutting of trees, which may serve as roosts or maternity sites, has been proposed. Project operations are not likely to significantly disrupt bat habitat or normal activity patterns. No mitigative measures are proposed for these three sensitive species of bats, and no adverse impacts are expected.

The **swift fox** is native to the grassland prairies of the Great Plains region of North America. Wyoming is on the western periphery of its historical range and comprises a relatively small portion of its total range. This species prefers open and flat prairies and arid plains with flat to rolling terrain and sparse vegetation. Current and historic swift fox range is dominated by short-grass prairie. Prairie dog colonies are considered high quality habitats for the swift fox. Female swift foxes bear one annual litter and young emerge from burrows by the first of June and are 80% of adult size by late June. Both adults stay with the litter through early July (Clark and Stromberg 1987). Swift fox have been documented in Natrona County, and adjacent Carbon and Converse Counties (WYNDD, available at *uwadmnweb.uwyo.edu/wyndd*). The Wyoming Game and Fish Department has documented swift fox in the lat/long degree block that contains the project area, and degree blocks to the south and east of the project area (WGFD 2004). Potential (although not optimal) swift fox habitat occurs within the project area. Sagebrush/greasewood/saltbush habitats in the north and central portions of the project transition into more suitable rolling grassland in the south and southwestern portions. There are also expansive prairie dog colonies in rolling grassland on private lands in the eastern portion of the project area that may be suitable for swift fox. Any swift fox potentially present in the current study area could be adversely impacted by operations occurring during the breeding, whelping, and early rearing phases (i.e. by vehicle impacts or placement of buggy vibes on or within close proximity to individual dens possibly resulting in collapse or entrapment). The proposed vibroseis project would begin in mid June at the northern project boundary and proceed south, with project activities scheduled to complete on August 1. Project activities in the southern portion of the prospect would therefore occur after swift fox kits would have matured and would be highly mobile. No adverse impact to this species or its potential habitat are anticipated.

Much of the project area is considered suitable habitat for the **black tailed prairie dog.** In August 2004 the USFWS determined that this species was not warranted for listing. The black-tailed prairie dog remains a Wyoming BLM Sensitive Species. BLM GIS records indicate that one small black tailed prairie dog colony is known along the east-central periphery of the project area (**Figure 3**), but no comprehensive inventory has been done. Before seismic operations can begin on BLM lands, a comprehensive inventory of prairie dog colonies must be conducted. This inventory was conducted between 27 May and 16 June 2005 (Appendix D). Black-tailed prairie dog colonies were located scattered throughout the project area, no white-tailed prairie dogs were documented. Noise and vibrations created by the proposed seismic operations may cause prairie dogs (regardless of species) to flee to their burrows. Activity immediately on or near burrows could also result in burrow collapse and crushing or entrapment of the inhabitants. With implementation of the avoidance measures prescribed below, no adverse impact to prairie dogs are expected.

Herps: The **Northern leopard frog** is primarily found near permanent water in plains, foothills, and montane zones throughout the state. Not as aquatic as the bullfrog, this species is also found in deciduous forest riparian, shrub and grass/sedge**/**forb riparian, and wetland meadows (Wyoming Biodiversity Network species atlas). Suitable wetland/riparian habitat or the associated vegetative cover may be present within the 3D area along Salt Creek and creeks and ponds primarily associated with oil field production water. The striped chorus frog *(Pseudacris triseriata),* which requires habitat similar to the northern leopard frog, was documented at 2 locations in the project area (K. Firchow, pers. comm.). Because vehicular traffic will be restricted within 300 ft of riparian areas (see Surface Water), no adverse impact to the northern leopard frog or its habitat is expected.

Impacts: *(Potential for direct project effects to threatened and endangered species, big game, raptors, sage grouse and other special status wildlife species is addressed in the species-specific discussions above. Issues common to most or related to project effects to habitat are presented below)*

Reproductive and rearing activities of sensitive ground and near-ground nesting birds generally last from mid-April until mid-July. These activities could be adversely impacted by project off-road vehicular traffic conducted during this period. According to the project plan of operations, buggy-vibe operations would begin in mid-June at the northern project boundary and proceed south, with project activities scheduled to be completed on August 1. Because the northern portion of the project area has been more intensively developed, the majority of proposed buggy vibe traffic in the northern project area will be on existing roads. In contrast, a greater proportion of buggy vibe traffic in the southern portion of the vibroseis project will be off-road. Utilizing this north-to-south operational design, potential impacts to ground nesting birds and their young would be minimized, as off-road activities in the southern portion of the prospect will occur in late July after most songbird species are done nesting.

Off road vehicular traffic could result in the reduction of wildlife forage and qualitative habitat changes from the crushing of vegetation, with woody plants most affected, but only on a short-term basis (see Vegetation impacts section). Ground nesting sagebrush obligate species such as the sensitive sage grouse, sage sparrow, sage thrasher, Baird's sparrow, and Brewer's sparrow could be affected by the reduction in shrubby vegetation, which could reduce suitable nesting areas. Off-road vehicle traffic proposed in conjunction with the Salt Creek 3D project is estimated to drive on (directly impact) approximately 733 acres, or 2.2% of the 34,000 acre project area (see Vegetation section of this EA). Most of the brushy plants in the tire paths, however, are expected to remain intact and alive after being driven over. Thus the project is anticipated to kill less than 1% of the brush plants occurring in the overall 3D project area. Species preferring more open land cover (e.g., prairie dog, mountain plover) might be slightly benefited. Overall, impacts to vegetation in terms of wildlife forage and habitat are expected to be minimal.

Geophone cable deployment and vehicle traffic may cause animals to flee the immediate site of these human activities. This displacement of wildlife, however, will be brief and localized, as small scale transitory activities are spread over multiple small sites within the project area. Therefore, no adverse effects are expected.

Roads and other existing developments divide landscape into separated "islands" of wildlife habitat. Traffic and human activities associated with these roads and developments then forces wildlife to concentrate in the smaller roadless islands to avoid or to minimize contact with humans. The project area is heavily roaded. Project related vehicle travel will take place along these established roads as much as possible. Even though the proposed off-road vehicle traffic operations would crush brush along travel paths, mitigative measures outlined in the Soils, Visual, and Vegetation sections of this EA would prevent the creation of major breaks in

the extant vegetative continuity and, most importantly, preclude the defacto establishment of new roads. Consequently, the 3D seismic project is not expected to contribute to habitat fragmentation.

Mitigation:

- If off-road vehicle operations are to be conducted during the period between February 1 and July 31, Veritas shall have a qualified biologist provide the BLM with a current raptor nest survey. Once an active nest is identified, the size of the buffer zone for no vehicle operations will be determined on a case by case basis by the BLM Authorized Officer, who will consider topography and raptor prey habitat surrounding the nest site. Usually the buffer zone will be ¼ to ½ mile as determined by the authorized officer. This raptor inventory report will be included at Appendix D of the EA and attendant requirements will become a part of project conditions of approval.

- If off-road vehicle operations are to be conducted for the period between April 10 and July 10, Veritas shall have a qualified biologist provide BLM with a current mountain plover survey report covering potential mountain plover habitat on BLM surface to be affected during this period. Procedures outlined in BLM Instruction Memorandum No. WY-2004-035, April 16, 2004 regarding activities involving mountain plover shall be followed. Seismic exploration is considered a short-term project, which causes minimal impact to mountain plover nesting habitat. However to protect nesting birds, the guidelines require that between April 10 and July 10 plover surveys in suitable habitat need to be completed 1 – 3 days prior to project activity to avoid direct take of mountain plovers. This plover inventory report will be included at **Appendix D** of this EA and attendant requirements will become a part of project conditions of approval.

- Veritas shall have a qualified biologist provide BLM with a current prairie dog survey report covering all BLM surface to be affected. This inventory report will be included at **Appendix D** of this EA and attendant requirements will become a part of project conditions of approval. To the maximum extent practical, prairie dog colonies should be avoided by vibroseis activities. No vibroseis source points will be located on active burrows. If colonies cannot be avoided source points placed within a colony shall be located in an area of low burrow density.

See also mitigation measures for riparian areas under Water.

3.2.2 Vegetation

The predominant vegetative cover in the Salt Creek 3D project area is 'Mixed Grass Prairie', as classified by the GAP system. Grassy patches must occupy more than 50% of the landscape for the primary vegetation type to be classified as 'Mixed Grass'. The vegetation in 'Mixed Grass Prairie' communities are composed of short grass prairie and tall grass prairie species and may contain or even be dominated by silver sagebrush. With the exception of silver sagebrush, trees or shrubs cannot occupy more than 25% of the total vegetative cover in this type. Common plants in this community include Indian ricegrass, needle-and-threadgrass, prairie sandreed, Douglas rabbitbrush, broom snakeweed, fringed sage, and blue grama grass. Grasses in this cover type often occur in patches intermixed with shrub species such as big sagebrush (Artemisia tridentata). (www.gap.uidaho.edu).

More detailed vegetative mapping of the current project area and environs based on Landsat 7 imagery and a 'supervised vegetation classification' system is included in the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment* (AATA 2003). Nineteen vegetative field sampling transects were recorded for that EA, with characteristic species and associations for Riparian, Lowland and Upland vegetative communities in the Salt Creek Oil Field area described. For more information, please refer to that Environmental Assessment. Additional information concerning local vegetation, listing predominant species by range site / soil mapping unit, can also be found in the Soil Survey of the Natrona County Area, Wyoming (USDA-NRCS 1997).

Special Status Plants – Federally Listed Species

Federally designated threatened and endangered plant species potentially present in the BLM-CFO are summarized in the table below (USFWS 2005).

SPECIES	STATUS	HABITAT	COMMENTS	PROJECT EFFECT
Ute Ladies' Tresses	T	Seasonally moist soils and wet meadows, riparian edges, gravel bars, old ox-bows in UT,NB,CO,MT, WA and WY (Goshen, Niobrara, Converse & Laramie Counties) Historically in NV. Riparian areas within the project area are characterized by heavy clay soils and relatively high soil ph, both of these are negative indicators for ULT habitat, No occurrences of this species have been documented in Natrona or Johnson Counties.	Riparian areas will be avoided by 300 ft (see mitigation measures for Surface Water).	No effect

With the Implementation of the 300' riparian avoidance buffer, the proposed project will have **"no effect"** on Ute's ladies-tresses.

Special Status Plants - Sensitive Species

Six plants accorded **'sensitive species'** status per BLM Wyoming State Office Instruction Memo, (September 2002) are considered potentially present in the overall Casper Field Office: Porter's Sagebrush, Nelson's Milkvetch, Many-stemmed Spider-flower, Williams' Wafer Parsnip, Laramie Columbine, and Laramie False Sagebrush. Based on the documented environmental settings of the occurrence of these species, potential habitat for only one of these species, Nelson's Milkvetch, may exist within the Salt Creek 3D project area.

Nelson's Milkvetch *(Astragalus nelsonianus)* is a regional endemic of Wyoming, Colorado, and Utah with over half of its range falling within Wyoming. Abundance of this species is estimated in the range of 4,000 to 40,000 individuals. Several populations have been documented in Natrona County both east and west of Casper, however none of the known populations occur in the northeastern part of the county in the vicinity of Midwest and Edgerton, and the species is not known to occur in Johnson County. Nelson's milkvetch is usually found in sparsely vegetated sagebrush, juniper, cushion plant and/or grassland communities and on disturbed or eroded soils, alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders at elevations between 5200 - 7600 feet. Appropriate habitat for this species also includes shadscale communities developed on marine shales. Although this type of habitat occurs within the current project area, the maximum elevation of the prospect falls slightly below the optimal range for the species occurrence. Moreover, the species was not observed during vegetative sampling transects conducted in support of the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment* (AATA 2003). Potential habitat for the Nelson's milkvetch may exist within the project area, but it is considered marginal.

Refer to the Wyoming Rare Plant Field Guide (Fertig 1994) for more detailed plant descriptions and other information.

Weeds

The *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment ,* (AATA 2003) indicates that 5 species of noxious weeds have been observed within the project area; these are Russian knapweed, Canada thistle, Scotch thistle, bull thistle, and halogeton. Other problematic weedy species observed include Russian thistle and kochia. It is considered probable that additional weeds, noxious and otherwise, are present in the project area. For more information, please refer to the above referenced Environmental Assessment.

Impacts: The proposed action is not expected to result in any long term or permanent loss of vegetation. The undertaking would result in short-term vegetative disturbance on approximately 733 acres, or 2.2% of the 34,000 acre project area. This impact quantification estimate was arrived at as follows.

Calculation: 2 vibrators x 4 tires x average 3.6 ft wide tires = 29 ft wide impact x 585 miles of source line x 5280 ft / 43560 sq ft/ac x 30% off road = 617 ac vibe tire impact **plus** vibe pads 4.5 ft x 7.5 ft x 2 vibes x 6 sweeps x 18711 source points / 43560 sq ft / ac x 30 % off road = 52 acres **plus 1** ATV passes x 2 tires x 0.75 ft wide tires = 1.5 ft wide impact x 1165 miles of combined source and receiver lines x 5280 / 43560 sq ft x 30% off road = 64 acres for a total direct off-road surface impact of (617+52+64=) 733 acres.

Reflecting land status in the area, approximately 75% of these vegetative impacts would occur on federal surface (70% BLM and 5% DOE), 5% would occur on State land, and 20% would occur on private land.

Vehicle impacts to the grass and forb component of vegetation which heavily dominates the project area would be minimal and short term in effect, as these plants are not killed by vehicle traffic and will re-sprout from their established root systems. Shrubs in the tire paths will be more substantially affected, but the majority of these too will not be killed. It has been observed on previous geophysical projects conducted during summer / early fall in areas of relatively low-growing sagebrush that such projects kill up to approximately 30% of woody brush in the drive paths, with another 20% partially killed or damaged, and the remaining 50% of driven-on brush persisting visibly unaffected. This would equate to a <1% reduction in brush within the overall project area (2.2% direct impact area x 30% brush kill = 0.66). The above-estimated brush kill and damage ratios, however, do not take into account the fact that silver sage constitutes the majority of the brush in the project area. As opposed to the majority of other sagebrush species, silver sage has been shown to have the ability to sprout when broken off. Where woody brush plants are killed by vehicular traffic, grass remains, with near-term regrowth containing a greater percentage of grasses and young succulent forbs. In all, project impacts to general vegetation are anticipated to be minimal.

Undocumented colonies of the sensitive Nelson's milkvetch could be crushed or damage to their fragile habitat and associated plant communities could occur as a direct result of vehicle tire impacts. Because the lack of stabilizing vegetation on slopes results in increased tire spinning, off-road vehicle traffic damage would be highest on sparsely vegetated (<30% ground cover) steep slopes (in excess of 25%). Nelson's milkvetch could occur here. With application of the slope/vegetative cover restrictions outlined below, no adverse impact is foreseen.

New noxious weeds could be introduced to the area by infested equipment. With implementation of the vehicle washing stipulation below, no project is foreseen in this regard.

Weeds could also invade and take hold in areas of surface disturbance caused by project operations. Provided reclamation and re-seeding is undertaken promptly in any areas of (unanticipated) surface disturbance as prescribed below, no adverse impact to vegetation or weed occurrence is foreseen.

The following mitigation measures were developed in consideration of the Standards for Healthy Rangelands (BLM, 1997).

Mitigation:

- To protect potential sensitive plant habitat, off-road vehicle operations shall be limited to slopes of 25% or less in areas where vegetative cover is sparse – less than 30% ground cover.

- Particular attention should be paid to the prevention of the introduction of new weeds to the area. The operator shall thoroughly power-wash all field vehicles (helicopter, buggy vibes, pick-ups, ATVs, etc) Should crew members encounter existing noxious weeds within the project area, equipment and vehicles exposed to the weed shall be washed before moving to another area.

- Within 30 days of disturbance, the operator 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. Only certified weed-free seed shall be used. Reclamation efforts may include disking or ripping the ground surface, reseeding and mulching.

3.3 CULTURAL RESOURCES

3.3.1 Historical and Archaeological

The Salt Creek 3D files search area (53 sections) contains 85 known cultural resource sites. A large portion of the current project area has previously been inventoried or is exempt from archeological inventory requirements due to past surface disturbance. The past block inventory and the exempt area are depicted on **figure 4** of this EA. Class III cultural resource inventory of un-inventoried public lands in the project Area of Potential Effect (APE) is needed to evaluate potential impacts of the proposed Salt Creek 3D vibroseis project. Standard BLM procedures provide that all cultural resource sites eligible or unevaluated for the National Register of Historic Places would be avoided by geophysical project re-design, regardless of surface ownership.

The 85 sites previously recorded in the project files search area may be categorized as follows: 34 (40%) prehistoric lithic scatters, one of these with historic debris and two of these accompanied by groundstone, 13 (15%) 'open camps' exhibiting both chipped stone artifacts and fire-altered rock and/or hearths including one with a possible prehistoric cairn (48.NA.1759), 2 (2%) prehistoric sites manifest as only hearths, ash stains, and/or fire-altered rock, and 36 (42%) historic sites. Previously recorded historic sites include the Salt Creek Oil Field historic district, several townsites, numerous oil field work camps and drill sites, trash dumps, historic buildings in the towns of Midwest and Edgerton, several highway bridges, and 3 linear sites. One of the linear sites is the Bozeman Trail, one is the (abandoned) North & South Railroad linking Midwest and Casper, and one is the Casper-Salt Creek Wagon Road.

Five percent of the 85 previously recorded sites are reported to have been destroyed. Another roughly 9% of sites in the files search area have been evaluated as significant and therefore are considered eligible for nomination to the National Register of Historic Places (NRHP). Approximately 40% of the sites are of unknown / undetermined eligibility status and, until a full evaluation is obtained, merit protection from disturbance as if they were eligible for nomination. The remaining 46% of previously recorded sites in the files search area have been evaluated as not eligible for the National Register.

Impacts: The proposed seismic exploration could cause impacts to sites eligible for the NRHP. 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 would occur from the vehicle traffic during geophysical field operations. These impacts would consist of formation of two-track trails, surface soil displacement or soil compaction. If exploration activities are carried out in wet weather, rutting could occur. Indirect effects would occur through creation of trails which might be used by recreationists and which could stimulate erosion. The trails themselves could affect the setting of sites for which viewshed is a component of site significance. By providing access into areas containing sites, public use could result in 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. With the implementation of the mitigative measures prescribed below, no effect to significant cultural resources is foreseen.

Insert figure 4

Previously inventoried areas

Mitigation:

- The operator shall provide a Class III cultural resource inventory for all public lands where vehicle traffic will occur. The inventory shall cover 50 feet either side of the flagged centerline of travel routes, for a total inventory coverage of 100 feet. Such inventory will not be required on upgraded roads or for areas covered by previous inventories, provided those inventories meet current standards. The inventory will be designed to locate and prescribe avoidance routes or other mitigation for all significant sites, previously recorded as well as newly discovered. Standard site avoidance entails a 32.8 meter (100 foot) or more buffer zone around all eligible and unevaluated sites. Sites of potential Native American concern discovered during inventory are subject to special measures.

- The operator's archeological consultant shall obtain a cultural resource files search from the SHPO Cultural Records Office shortly before commencing fieldwork. Based on this, the consultant will identify significant and unevaluated 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 the operator, who is requested to arrange avoidance for these properties.

- All off-road vehicular traffic on federal land shall be confined to a corridor 100 ft wide (50 ft either side of centerline) along routes which have been inventoried for cultural resources.

- No off-road vehicle traffic is permitted within 300 ft of intact segments of the Bozeman Trail or the Salt Creek-Casper Wagon Road. Existing modern roads within this 600 ft wide buffer corridor may be used.

- No off-road vehicle traffic is permitted within 50 ft of intact segments of the North-South Railroad bed. Existing modern roads within this 100 ft wide buffer corridor may be used.

3.3.2 Native American Religious Concerns

No sites are of record within the Salt Creek 3D which are potentially eligible for the National Register as a Traditional Cultural Property. Also, no Indian Sacred Sites, as defined and protected by E.O.13007, are known for the project area. Based on previous programmatic level BLM - Native American consultation and previous project-specific consultations for other undertakings in this general area, no sites of Native American religious concern have been identified within the 3D project area.

Prehistoric rock art, rock alignment, cairn, stone circle and potential funerary sites are considered highly sensitive by Native American groups historically associated with this area (Eastern Shoshone and Northern Arapaho). One possible such site (48.NA.1759) has been recorded by past inventory.

Impacts: Yet unidentified Indian Sacred Sites, as defined and protected by E.O.13007, could suffer impacts by adversely affecting their physical integrity or by interfering with their ceremonial use. Based on BLM Casper Field Office guidelines and past consultations with Eastern Shoshone and Northern Arapaho Tribal representatives following field tours of similar projects in the general CFO area, the following special site avoidance measures will be applicable. With implementation of these measures, the project should cause no significant impact in this regard.

Mitigation:

< Regardless of surface ownership, all sites containing prehistoric cairns or stone circles will be avoided by a distance of 350 feet or more.

< Regardless of surface ownership, all sites containing prehistoric rock art shall be avoided by a distance of 0.25 miles or by the distance agreed to via project specific BLM - Native American consultation.

< If any additional sites of potential Native American religious concern (e.g., vision quest structures, human burial sites, prehistoric cairns, stone circles) are identified by project personnel within 500 ft of any proposed off-road travel route regardless of surface ownership, the BLM Casper Field Archeologist shall be promptly notified. The BLM Casper Field Office shall determine the need for special mitigative

measures and / or additional Native American consultation.

3.4 LAND USE

3.4.1 Livestock Grazing

Livestock (cattle) grazing occurs within the Salt Creek 3D project area. The proposed project falls in portions of three BLM grazing allotments. Affected lessees are listed at **Appendix B** of this document. Refer to the Platte River Resource Area RMP EIS for additional information on these allotments. Also see the Vegetation section of this EA.

Range improvements on public lands within the analysis area include pasture fences and one stockwater surface pipeline. This pipeline transports oilfield discharge water to two large stockponds located in the southern portion of the project. The ponds have recently been deepened to hold more discharge water and an inter-agency project has recently been undertaken to stock the ponds with fish for recreational opportunity enhancement. The location of this pipeline, which is maintained by Anadarko, is reflected on **figure 5.**

Impacts: Seismic activities in close proximity to water wells or water impoundments could result in casing or artesian flow failure and a subsequent loss of livestock water. The BLM 3150 Handbook indicates that 300 feet is a safe operating distance for vibroseis source operations from water wells and other resources (Also see discussion in the Water section of this EA). With implementation of the water and pipeline avoidance measures indicated below, no adverse impact to livestock water is anticipated.

Project operations would involve multiple 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 and lessee notification restrictions prescribed below, the project should result in negligible impacts.

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

Off road vehicle traffic will directly impact an estimated 733 acres of the total project area (see Vegetation section of this EA). Once plants re-sprout next spring, slight and short-term changes to species and age make-up of plants in the tire paths are anticipated (principally some degree of conversion of shrub species to herbaceous plants), but available palatable livestock forage would not be appreciably affected. With side-by-side vehicle travel paths (see mitigation measures for visual resources), livestock forage impacts are anticipated to be negligible.

The following mitigation measures were developed in consideration of Standards for Healthy Rangelands (BLM 1997), in particular Standard 5 and Guidelines for Livestock Grazing Management (ibid.).

Mitigation:

- Veritas is charged with the responsibility of notifying grazing lessees prior to entering upon their allotments. Affected grazing lessees are listed at Appendix B of the EA.

- Vibroseis source points shall be located a minimum of 300' from water wells, and stockwater pipelines, unless written permission to encroach closer has been given by the owner/operator.

- The operator shall make every effort to avoid disturbing or altering fences. Gates shall be used when possible. Gates must 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 put back up. The wires shall be stretched to the original tension from the nearest brace or gate panel.

- 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.

Insert figure 5

Location of stockwater pipeline

3.4.2 Roads, Wells, Utilities & Other Development

The regional motor vehicle transportation system serving the general project area consists of an established system of interstate, state and county roads. Primary access will be via I-25 and State Highway 259, which run from Casper north to the project area. Bladed and gravel roads serving the Salt Creek Oil Field criss-cross the northern majority of the project, with unimproved (two-track) roads present throughout the prospect as well. Vehicle traffic in the project area is relatively light and is composed mainly of oil field workers and local residents (these primarily on the paved roads).

Oil and gas production is the dominant land use in the overall study area. The Salt Creek Oil & Gas Field was first drilled in 1889. Wells here produce from the Wall Creek, Lakota, Sundance, and Tensleep Formations. A total of 4297 wells have been drilled in the Salt Creek Field. Of these, 2266 are plugged and abandoned, 1181 are completed wells, 753 are injection wells, 42 are dormant wells, and 45 wells are pending abandonment (http://wogcc.state.wy.us/). Locations of these wells and the associated roads are depicted on **figure 6** and on the pre-plot project map in **Appendix A**.

Other standing structures associated with oil and gas development and production are scattered throughout the project area on federal and non-federal lands.

The Towns of Midwest and Edgerton lie within the proposed geophysical project. The Town and other residences in and near the project area are discussed in the socioeconomic section of this EA.

Associated with the oil field and the Town, many single pole and double-pole overhead power transmission lines, buried telephone cables, and several underground oil and gas transmission pipelines cross through the project area. An abandoned railroad grade is known to exist in the southwestern portion of the prospect.

Impacts: The proposed project will increase traffic considerably, particularly on the unpaved roads, as the vibrators work on the roads and cable repair vehicles, personnel carriers and incidental support vehicles travel the roads and seismic lines daily, potentially causing traffic-related safety risks. With application of the traffic measures below, no adverse traffic-related safety impacts are foreseen

Source operations near existing buried pipelines, buried telephone cables, overhead powerlines and oil / gas wells could result in transmission interference or facility breakage. With implementation of the safe distance prescription below (per the BLM H-3150-1 Handbook), no significant impact to these facilities is foreseen. (Also see discussion regarding water wells and other resources in the water and livestock/grazing sections of this EA.). Unanticipated damage to existing facilities is addressed under livestock/grazing mitigation measures.

Mitigation:

- Cable crossings will be signed by Veritas.
- Vibroseis (source) points on BLM land shall be located a minimum of 300 ft from oil/ gas wells, standing structures, pipelines, powerlines, buried cables and other sensitive built facilities, unless written permission to encroach closer has been given by the owner/operator.

Insert figure 6

Existing oil & gas wells

3.4.3 Socioeconomic

In the immediate project vicinity, services and population are concentrated in the Towns of Midwest and Edgerton and at Gas Plant Camp. The city of Casper, population approximately 50,000, is located approximately 30 miles south of the study area.

The Town of Midwest lies in the northcentral portion of the proposed project. The 2000 census reports a combined population of 408 for Midwest and Gas Plant Camp; separate figures are not available. Some 229 residential structures are present within Midwest, most of them built in 1939 or earlier during the oil production boom. Many of the housing units are unoccupied, primarily because they are uninhabitable due to age and condition. An elementary, a middle, and a high school are located within the town of Midwest. Emergency medical and ambulance service are provided by Salt Creek Emergency Services, a volunteer organization. The nearest doctors and medical facilities are in Kaycee and Casper.

Gas Plant Camp is situated on State land approximately a half mile south of Midwest, in the central portion of the proposed geophysical project. Two dispersed ranch related rural residences are also known to be present within the project boundary, on private lands.

The Town of Edgerton lies in the northeastern portion of the project. The 2000 census reported a Town population of 169 at that time. Edgerton is reported to contain 122 residences, about half of which are mobile homes. The town water tank, rodeo grounds, and cemetery fall within the proposed project area boundary.

The project area's local economy is based heavily on oil and gas production, and has been for over a century.

For more information please refer to the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment* (AATA 2003), which presents housing unit, employment, wage, and other socioeconomic statistics.

Impacts: Project operations in the vicinity of Midwest, Edgerton, and other residences could result in increased safety risk, property damage, and general nuisance. BLM and DOE have limited authority, and landowners and the Towns are responsible for negotiating their own mitigation with Veritas. Veritas is currently developing agreements with property owners to be affected by the proposed project. No unresolved issues are known and no adverse impacts are foreseen.

Landowners within the project area will receive compensation for surface access. This will provide an incremental economic benefit to the local economy. Surveying, project management and field operations will be conducted by existing (non-local) staff and crews. Wyoming subcontractors will be used to perform any required environmental inventories in support of the project. Meals, lodging, fuel, and incidental supplies for the staff, crew, and subcontractors will be purchased locally (principally in Casper) for the duration of the project. Most of the workers are either single or have families in a permanent residence elsewhere, consequently the project is not expected to place any demands on schools or other similar facilities. Local and regional economies will realize a minimal short-term positive impact.

Successful completion of this project is expected to increase development of recoverable oil and gas reserves, and reduce risks and associated costs of future exploration and development in the area, which would have a greater and longer term positive effect on local and regional economies. The local economy would benefit through additional employment of workers in development and production of anticipated recoverable reserves, support services for the wells, and revenues generated from production royalties. The long term impact of project completion is anticipated to be positive.

Mitigation: None needed.

3.4.4 Visual Resources and Recreation

As reflected in the Roads, Wells, Utilities and Other Developments section of this EA, the visual setting of the project area is heavily dominated by oilfield development and has been for many decades.

The entire project lies in the Salt Creek RMU (RMU #5) where BLM has decided that, "The area will be managed as an extensive recreation area where visitors will have freedom of recreational choice with minimal regulatory constraint, except that ORVs will be limited to existing roads and vehicle routes" (PRRA RMP RPD p. 61). However, temporary ORV use is allowed for performance of necessary tasks as defined by IM WY-81-213 (PRRA RMP ROD Decision R.2).

Recreational use in the overall project area is light. Activities include wildlife viewing, hunting activity (deer, antelope, and likely some sage grouse, prairie dog, and cottontail rabbit hunting), ATV and motorcycle riding, and fishing. No improved campgrounds exist in the project area, but two reservoirs are being developed to offer recreational fisheries. Location of these new fisheries (Petro Reservoir and Water Tank Reservoir) is depicted on EA **figure 5**. For more information on recreational opportunities and use in the current project area, please refer to the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment ,* (AATA 2003).

Impacts: Project-related off-road vehicle traffic could cause long linear visual obtrusions (i.e., two-track roads) across the landscape. Any off-road vehicular traffic impacts created by the project could be exacerbated by hunters and ORV recreationists making use of the freshly-blazed vehicle routes. Because 1) most project vehicular activity will be confined to existing roads, 2) receiver equipment will be laid via use of helicopter assisted pedestrians, minimizing traffic on receiver lines, and 3) the spread-out vehicle pattern prescription for off-road traffic will be applied to this project (see below), no significant impact is foreseen in this regard.

Project operations could disrupt the quality of dispersed recreation activities by visibly and audibly intruding on recreationists. In addition, project activities would temporarily displace game, which would add to the inconvenience for hunters. Overall, considering 1) the low level of recreational activity characteristic of the project area, 2) the preponderance of other human disturbances present, and 3) the size of the project operations area as compared to the size of surrounding wildlife habitat and hunting area boundaries, project impacts to recreation are expected to be negligible.

Mitigation*:*

- The geophysical operator shall ensure that off-road vehicle traffic does NOT drive the same track as another vehicle, terrain permitting

3.5 ENVIRONMENTAL CONTAMINANTS

3.5.1 Air Quality

Air quality within the Salt Creek Oil Field is believed to be very good due to the minor emission sources and the windiness of the area (AATA 2003, p.70). The entire Platte River Resource Area (the Casper Field Office) is formally designated as a Class II emissions management area under Prevention of Significant Deterioration (PSD) stipulations for the Clean Air Act. Class II areas are those in which industrial activity from new or modified sources is allowed to incrementally proceed up to a certain limit above background levels for total suspended particulates, nitrogen dioxide and sulfur dioxide. PSD regulations are intended to limit deterioration of air quality that is currently cleaner than national ambient air quality standards. Air quality is monitored and administered by the Wyoming Department of Environmental Quality (DEQ). For more detailed information refer to the *Salt Creek CO2 Enhanced Oil Recovery Project Environmental Assessment ,* (AATA 2003), the Platte River Resource Area Oil & Gas Environmental Assessment (PRRA O&G EA) (BLM 1981) and the Wyoming Air Quality Standards and Regulations, administered by and available through the Wyoming DEQ Air Quality Division.

***Impacts**:* Anticipated impact to air quality would occur from the exhaust emitted by the vibrators, ATVs, the helicopter, and miscellaneous support vehicles (e.g., mechanic truck, archeologists, permit agent, company supervisors). The maximum number of vehicles operating at a given time would be 1 helicopter, 4 buggy vibes, 6 ATVs, and 6 miscellaneous support vehicles. Average exhaust emission would be similar to 6 diesel powered semi-trucks and 8 gasoline powered pickups. The maximum emission would be present during the 2.5 month long duration of proposed field operations. Impacts resulting from exhaust emissions are expected to be negligible.

Air quality contributions would also include fugitive dust resulting from helicopter turbulence at landing and takeoff, vehicle travel on existing roads and trails, and to a much lesser extent, dust from cross-country vehicular travel. Impacts on air quality via dust contribution are anticipated to be not significant.

Of note, impacts of projected geophysical exploration on air quality were analyzed in the PRRA O&G EA and determined to be insignificant (BLM 1981, p.67).

Mitigation: None needed

3.5.2 Noise

Average noise level in undeveloped portions of the southern project area is estimated to range from 30 Db(A) to 40 Db(A), the noise level of a rural prairie. Areas of somewhat higher noise levels are common in the project area, associated with highway traffic, the Towns of Midwest and Edgerton, and as a result of on-going oil and gas activities and other land uses.

Impacts: Vibroseis source creation and helicopter operations are expected to raise the noise level at activity sites. Noise elevation could annoy and disrupt the activities of wildlife and livestock. Overall, animal perception of changes in the noise level is anticipated to be minor, owing to the relatively moderate, short-term, transient, and highly localized nature of the changes.

Human presence in the project area is concentrated in the Towns of Midwest and Edgerton. Any vibroseis activity in the Towns or elsewhere on private land will be permitted separately with the respective owner/operators, and timing restrictions are standard (Craig Hanley, Veritas Permit Agent, personal communication). Helicopter activity in the vicinity of residences is restricted by FAA regulations. In all, human perception of noise level changes caused by the proposed project is expected to be less than significant.

Mitigation: None needed.

3.5.3 Solid Waste, Hazardous Materials, and Safety Issues

Three leaking underground storage tank 'contaminated sites' are located in or near the project. One of these is at the Junction Convenience Store at 265 Lewis Street in Midwest. The other two contaminated sites are associated with the Teapot Motor Lodge in Edgerton. None of these sites are believed to merit project avoidance measures beyond those standard for their associated buildings (DEQ-Casper Field Office, telephone communication).

Three permitted solid waste facilities are also located within the project, as follows. Midwest-Edgerton's Municipal Landfill #1 is located in T40N – R78W, Sec. 19, and Municipal Landfill #2 is located in Section 7 of the same township. The third permitted facility, the Salt Creek South Unit Industrial Landfill is now closed. Located in T39N - R79W, Sec. 13, this facility was authorized in 1979 for temporary disposal of oilfield debris, and was backfilled and reclaimed by Terra Resources in 1981 No special avoidance of these is considered necessary (DEQ-Cheyenne Office, telephone communication). More information on contaminated sites and solid and hazardous waste sites is available through http://deq.state.wy.us. Private lands within the project area may also include small solid waste deposits and informal dumps associated with private ranches.

As may be expected, hazardous materials exist in the project area in the form of well drilling reserve pits, produced water, natural gas/oil pipelines, above ground fuel tanks at ranches, and fuel tanks of parked and moving vehicles. These materials, however, are contained and readily recognizable. Owing to the abundance and density of pipelines and other petroleum containing facilities in the project area, particular attention to these and preparedness for response is appropriate.

H2S gas is produced by the existing Salt Creek Field wells, and is present in varying concentrations (personal communication, John Farrell, EHS Rep. Anadarko). Particular attention and appropriate safety training and/or planning is warranted here as well.

Material Safety Data Sheets (MSDS's) for all hazardous materials associated with the proposed geophysical operations are maintained by Veritas' Safety Officer Dylan Shorter (cell phone 281-433-5453) and are available for review upon request.

The proposed 3D seismic project is planned for mid-summer, a season when fire hazard generally ranges from moderate to high. Cheatgrass abounds in portions of the project area, providing significant potential wildfire fuel. Particular attention to fire prevention and preparedness for response is therefore appropriate.

***Impacts**:* Project markers in the form of wooden lath, ribbon flagging, pin-flags and spray paint could contribute litter / 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.

Small amounts of substances such as vehicle lubricating and hydraulic oil will be used in the field during project operations for maintenance of project vehicles. These could contaminate natural resources. With implementation of the waste disposal prescription below, no significant impact is foreseen.

Fires could be lit, causing serious safety hazards and loss of or damage to property. With implementation of safety precautions, no undue risk is foreseen.

***Mitigation**:*

- Veritas shall clean up all diesel or hydraulic fuel spills, including contaminated soils. All spill-related material should 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 a brief but specific instruction plan for emergency fire response and submit it to the BLM Authorized Officer for concurrence.

- Veritas shall comply with all applicable Federal laws and regulations, existing or enacted or promulgated hereafter. In any event, the operator shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by, or stored within the authorized geophysical activity boundaries. (See 40 CFR, 702-799 and especially the provisions on polychlorinated biphenyls at 40 CFR 761.1 thru 761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the report(s) to the involved Federal agency or State government.

- Veritas agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 6901, et seq.) on the geophysical operations (unless the release or threatened release is wholly unrelated to the geophysical operators activity). This agreement applies without regard to whether a release is caused by the operator, its agent, or unrelated third parties.

4.0 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 impacts are those impacts on the environment which result from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions regardless of what agency or persons undertake such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Evidence of past physical construction in the project area, such as of the towns, camps, well field, roads, pipelines, powerlines and railroad, is reflected in the Affected Environment portion of this document, and overall human modifications are pervasive. Projected environmental impacts of the currently proposed vibroseis project as modified via mitigative measures attendant to the EA are anticipated to be very minimal, probably barely perceptible. The cumulative direct effects of authorization of this undertaking are concluded to be less than significant.

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 modified proposed action. Well drilling and hydrocarbon production activity (and associated impact) is generally anticipated in the project area in the foreseeable future, but this is anticipated with or without completion of the proposed geophysical survey. Well drilling and 'enhanced recovery' activity, if, when, and where it occurs, is the function of multiple factors, principally whether economically-producible oil and gas resources are present. While the geophysical project proponent is hopeful that data gathered via the project will be very positive, there is no guarantee of this.

It is concluded that the modified proposed geophysical data-gathering project will not in and of itself cause important direct or indirect change. Analysis of impacts related to future well drilling or other changes in field production must be addressed when plans, including at least a general outline of a proposal, are more firm.

In sum, given 1) the relatively low level and short term nature of the anticipated project impacts 2) that an estimated 70% of project activity will occur on areas of existing disturbance, and 3) the implementation of the mitigative measures described herein, the proposed Veritas Exploration Salt Creek 3D Vibroseis Project, together with other federal actions and local commercial and recreational activities, is not expected to appreciably affect critical elements of the human environment. No significant cumulative impact is expected to result from project-related activities.

5.0 RESIDUAL IMPACTS OF THE PROPOSED ACTION

Mitigation measures developed through this EA addressing potential environmental impacts will be included as Terms and Conditions attendant to approval of the NOI. As the mitigation measures will avoid or minimize impacts, no residual effects are foreseen.

6.0 ENVIRONMENTAL CONSEQUENCES 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 (i.e., 2.2% of the surface area in the project would not be subjected to tire impacts; buggy vibes, 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 / habitat fragmentation. Seismic exploration is one of the less surface disturbing means available to a leaseholder for exploration.

< To fully develop the field / 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. Without 3D data, lessee willingness to directional drill to preserve sensitive areas will likely be less.

< Project-driven (and financed) archeological and 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 the 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.

7.0 MONITORING

BLM will implement a monitoring program including field inspections to assure compliance with project Conditions of Approval.

- Prior to initiating recording operations, a pre-work meeting shall be held between the BLM CFO and the Veritas field managers. Project procedures relating to fire, hazard spills, trash, slopes, seasonal restrictions, off- road travel, archaeological resources, and raptor nest, sage grouse lek, and prairie dog town avoidance shall be reviewed at the meeting. A map showing access routes to the project area and staging areas within the project area should be provided to the BLM at that time if it has not been provided previously.

8.0 PERSONS / AGENCIES CONSULTED

The following persons were consulted: Patrick Moore (Assistant Field Manager - Minerals & Lands), Jim Bauer (Physical Scientist), Ken McMurrough (Physical Scientist), Joseph Meyer (Physical Scientist), James Wright (Wildlife Biologist), Bruce Parker (Range Specialist), Christopher Arthur (Archaeologist), Don Whyde (Assistant Field Manager - Renewable Resources), from the BLM-CFO; Kathy Firchow (Wildlife Consulting Services), Melanie Arnett (WYNDD Database Specialist), John Farrell (Anadarko EHS Specialist) and Craig Hanley (Veritas permit agent).

Kail Consulting, Ltd. of Pinedale Wyoming, an environmental consulting firm, with guidance, participation, and independent evaluation by the Bureau of Land Management, prepared this environmental assessment. The BLM, in accordance with federal regulation 40 CFR 1506.5(a) and (b), is in agreement with the findings of the analysis, and approves and takes responsibility for the scope and the content of this document.

Prepared by:

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Carmel Kail, Emily Jones, Richard Kail
Kail Consulting, Ltd. (307) 367-3058
P.O. Box 684
Pinedale, WY 82941

Under the direction of :

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James Bauer, Physical Scientist
BLM Casper Field Office

9.0 REFERENCES CONSULTED

AATA International, Salt Creek Environmental Assessment CO2 Enhanced Oil Recovery Project, 2003 Fort Collins, CO. On file with the BLM Casper Field Office, Casper, Wyoming.

BLM Platte River Resource Area, Resource Management Plan Draft Environmental Impact Statement. 1984 On file with the BLM Casper Field Office, Casper, Wyoming.

BLM Platte River Resource Area, Resource Management Plan Final Environmental Impact Statement. 1984 On file with the BLM Casper Field Office, Casper, Wyoming.

BLM Platte River Resource Area, Record of Decision for the Resource Management 1985 Plan / Final Environmental Impact Statement. On file with the BLM Casper Field Office, Casper, Wyoming.

BLM Platte River Resource Area, Revised and Updated Decisions of the Platte River Resource Area 1997 Resource Management Plan. On file with the BLM Casper Field Office, Casper, Wyoming.

BLM Casper District, Platte River Resource Area Oil & Gas Environmental Assessment. 1981 On file with the BLM Casper Field Office, Casper, Wyoming.

BLM Wyoming State Office, Standards for Healthy Rangelands and Guidelines for Livestock Grazing 1997 Management. BLM Wyoming State Office, Cheyenne, Wyoming.

BLM Washington Office, 3150 Onshore Oil and Gas Geophysical Exploration – Surface Management 1994 Requirements Manual. BLM Washington Office, Washington, DC.

BLM Washington Office, H-3150-1 Onshore Oil and Gas Geophysical Exploration – Surface Management 1994 Requirements Handbook. BLM Washington Office, Washington, DC.

Buehler, D.A, Bald Eagle (Haliaeetus leucocephalus) in: The Birds of North America, #506 , 2000 (A. Pool & F. Gill, editors) The Birds of North America Inc., Philadelphia, PA.

Campbell, Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J. Cooper, G. Kaiser and M.C. McNall. 1997 Birds of British Columbia: Volume 3. University of British Columbia Press, Vancouver, BC.

Cerovski, A., M. Gorges, T. Byer, K. Duffy, D. Felly, Wyoming Bird Conservation Plan, version 1.0 2001 Wyoming Partners in Flight, WG&F Lander, WY.

Clark, T.W and M.R. Stromberg, Mammals in Wyoming, University of Kansas Press, Lawrence KS. 1987

Fertig, Walter, Wyoming Rare Plant Field Guide, multi-agency cooperative publication. The Nature 1994 Conservancy, WYNDD, Laramie, Wyoming.

Hoppes, W., Sagebrush flat. Page 97 in W. T. Van Velzen, ed. Forty first breeding bird census. 1978 Am. Birds 32:49-125.

USDA Natural Resources Conservation Service, Soil Survey of the Natrona County, Wyoming Area. 1997 In cooperation with the USDI-BLM and Wyoming Agricultural Experiment Station. USDA-NRCS, Casper Wyoming.

USFWS, Division of Endangered Species. Listed Species by County. January 2005. 2004 http://mountain-prairie.fws.gov/endspp/CountyList/WYOMING08003.htm,

USFWS. Mountain plover survey guidelines, U.S. Fish and Wildlife Services, Region 6, Denver, CO. 2002

WGFD. Atlas of Birds, Mammals, Amphibians, and Reptiles in Wyoming. 2004 Nongame Program, Lander, WY 206 pp.

REFERENCES CONSULTED (continued)

Websites consulted:

Audubon2.org/webapp/watchlist/viewSpecies

http://ridgwaydb.mobot.org (plant profiles)

http://www.r6.fws.gov/ (Threatened & endangered species list)

http://deq.state.wy.us (contaminated sites and solid / hazardous waste sites)

uwadmnweb.uwyo.edu/wyndd (Wyoming species abstracts)

http://www.sdvc.uwyo.edu/wbn/gap.html (species atlas)

Natureserve.org

APPENDIX A

PRE-PLOT MAP OF SOURCE AND RECEIVER LINES

APPENDIX B

AFFECTED GRAZING LESSEES

Frank Shepperson
Box 189
Midwest, WY 82643

Lynn Shepperson
c/o Frank Shepperson
Box 189
Midwest, WY 82643

Jack Wright
P. O. Box 207
Kaycee, WY 82639

APPENDIX C

FIRE RESPONSE PLAN

APPENDIX D

WILDLIFE INVENTORY REPORTS

Filename: SALTCREEK3D EA.doc
Directory: P:\DFreeman\NEPAdocs\EA-1544
Template: C:\Documents and Settings\freeman\Application Data\Microsoft\Templates\Normal.dot
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Subject:
Author: win98
Keywords:
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