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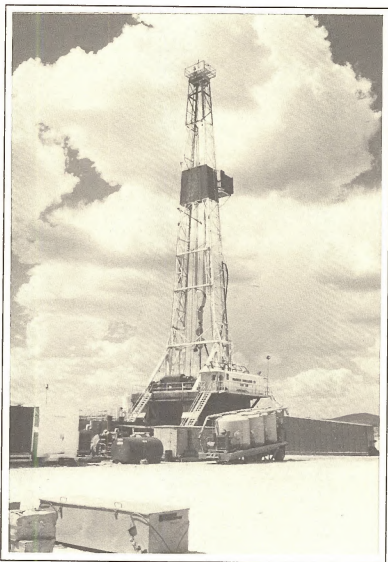
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management



Ely District Office
Egan Resource Area
HC 33 Box 33500
Ely, Nevada, 89301-9408

February 1992

Egan Resource Management Plan Draft Oil & Gas Leasing Amendment and Supplemental Environmental Impact Statement



Tommyknocker Well, T61x-33G, Mobil Oil Corp., Long Valley, NV.
(Photo by Brian Amme)

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Nevada State Office
850 Harvard Way
P.O. Box 12000
Reno, Nevada 89520-0006



IN REPLY REFER TO:

1610 (EGN)
(NV-047/NV-933.1)

February 21, 1992

Dear Reader:

Enclosed for your review and comment is the Egan Resource Management Plan (RMP) Draft Oil and Gas Leasing Amendment and Supplemental Environmental Impact Statement. This RMP amendment outlines management of oil and gas resources on approximately 3.8 million acres of public land in White Pine, Lincoln and Nye Counties, Nevada. Three alternatives for oil and gas leasing, including the Preferred Alternative, were analyzed.

Your review and comments are needed at this time to ensure that your concerns have been considered in the planning process. Please submit written comments to Mr. Gene L. Drais, Area Manager, Egan Resource Area, Bureau of Land Management, Ely District, HC 33, Box 33500, Ely, NV 89301. Written comments must be postmarked no later than June 5, 1992.

Oral comments will be accepted at the following public meetings:

<u>Date and Time</u>		<u>Location</u>
April 21, 1992	7:00 P.M.	Ely District Office 702 N. Industrial Way Ely, Nevada
April 22, 1992	7:00 P.M.	Holiday Inn 1000 E. 6th St. Reno, Nevada

Dependent upon the number of people who wish to make a statement, a time limit may be placed on oral comments. Oral comments should be accompanied by a written text or written synopsis of the presentation. Written and oral comments will be fully considered and evaluated in preparation of the Proposed Resource Management Plan Amendment and Final Supplemental Environmental Impact Statement.

Sincerely,

Billy R. Templeton
State Director, Nevada

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EGAN RESOURCE MANAGEMENT PLAN

DRAFT

OIL AND GAS LEASING AMENDMENT

AND

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

Prepared by the
**DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ELY DISTRICT**



Billy R. Templeton
State Director, Nevada

This oil and gas leasing amendment to the Egan Resource Management Plan is the draft long-range plan to manage leasing of oil and gas resources on approximately 3.8 million acres of public lands administered by the Ely District Egan Resource Area. The plan amendment has been prepared to bring the approved Egan Resource Management Plan into conformance with the Supplemental Program Guidance for Oil and Gas Resources (BLM Manual 1624, released November 14, 1986). The plan amendment describes and analyzes determinations (leasing decisions) for oil and gas resources in relation to other natural and cultural resources within White Pine and portions of Lincoln and Nye counties, Nevada.

For further information contact: Mr. Gene L. Drais, Area Manager, Egan Resource Area, Bureau of Land Management, Ely District, 702 N. Industrial Way, HC 33, Box 33500, Ely, NV 89301, or telephone (702) 289-4865.

Please submit written comments to Mr. Gene L. Drais at the above address by June 5, 1992.

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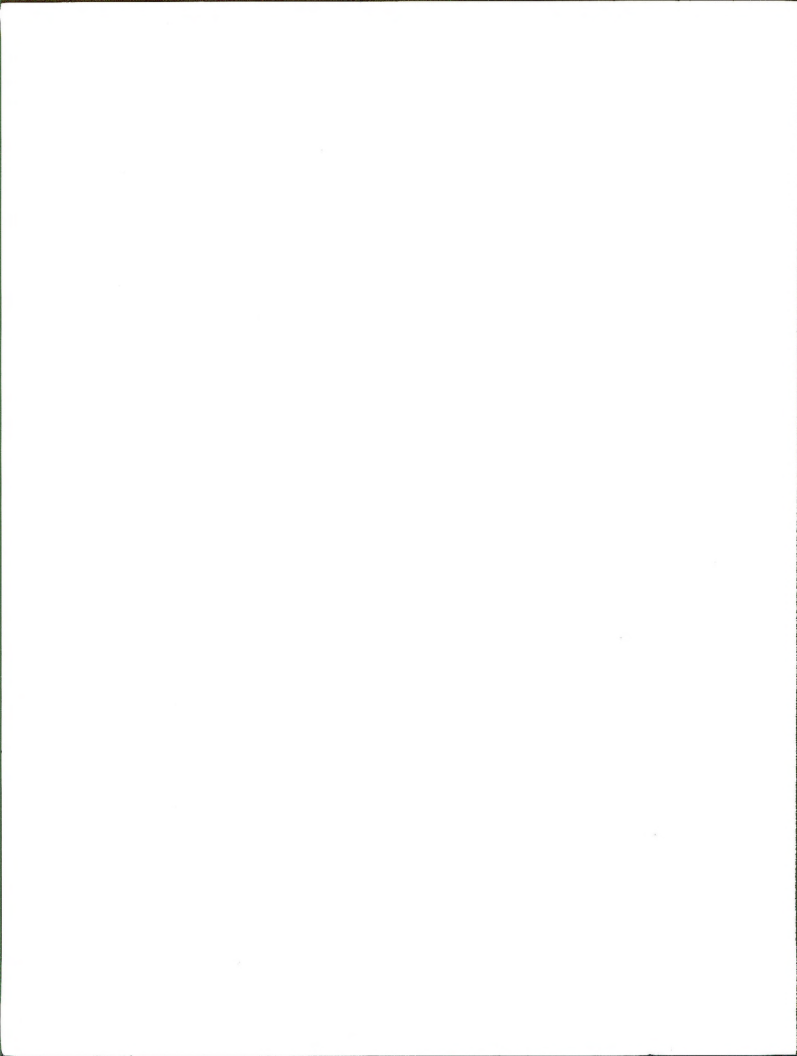


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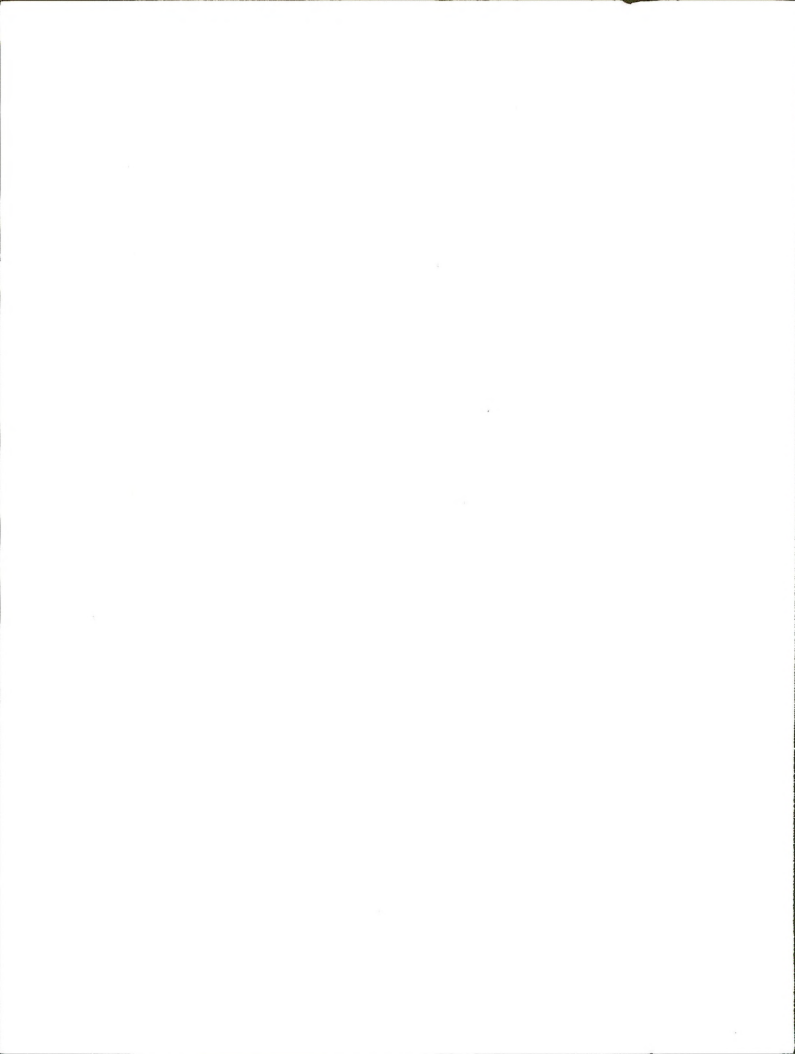
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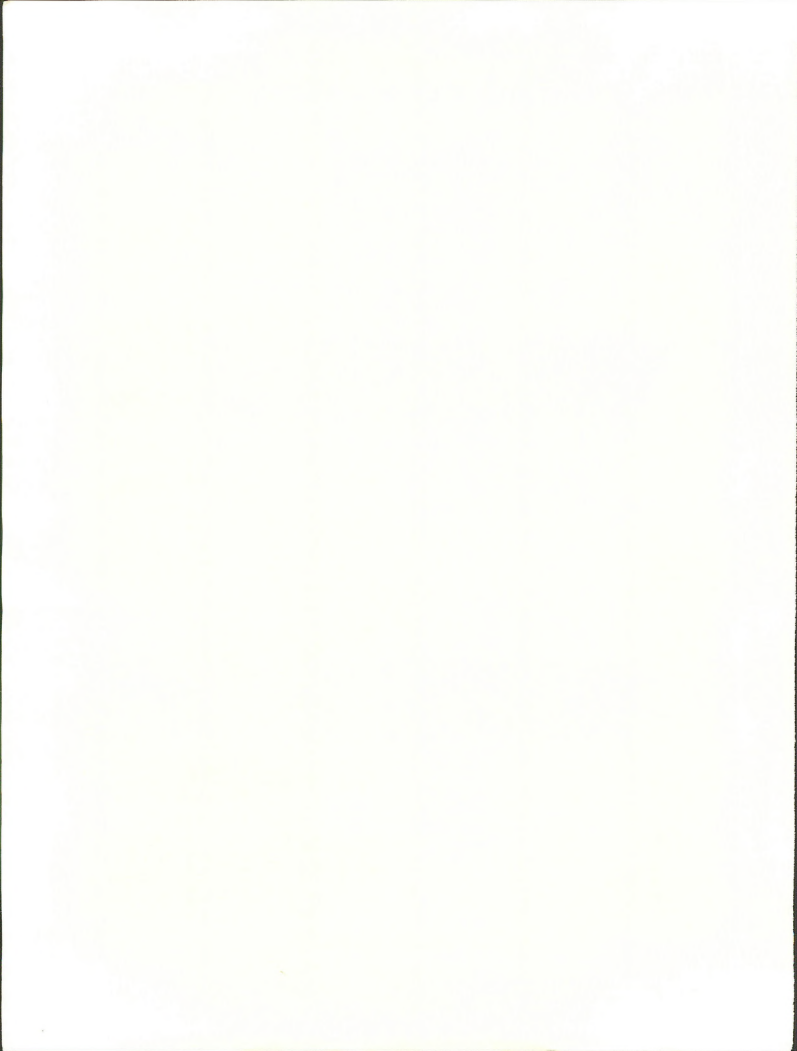
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SUMMARY



SUMMARY

This document is a draft Resource Management Plan Amendment (RMPA) and Supplemental Environmental Impact Statement (SEIS) for the Bureau of Land Management (BLM) Ely District Egan Resource Area and incorporates oil and gas management into the Egan Resource Area land use plan. The Egan RMP is being amended to conform to the latest program guidance outlined in Bureau Manual 1624 Supplemental Program Guidance (SPG) for oil and gas resources. This program guidance requires the BLM to estimate oil and gas development potential and to base leasing strategy on this potential and balanced management of other natural resources. A reasonable foreseeable development (RFD) scenario guides alternative analysis and impact assessment.

The issues and management concerns identified during public scoping were: determining which lands would be leased without special stipulations and conditions; which lands contained resource values that would require leasing stipulations and conditions for their protection; and what the impacts of leasing stipulations and conditions would be to the oil and gas industry. This amendment describes the determinations (types of leasing restrictions) for leasing and the resource concerns which require the determination.

The Preferred Alternative (Alternative B) which is the environmentally preferable alternative in this document, would allow for 61% of the resource area (2,343,388 acres) to be open to leasing under standard terms and conditions; 1.7% of the resource area (67,500 acres) open to leasing with No Surface Occupancy (NSO) stipulations; 30.9% of the resource area (1,186,580 acres) open to leasing with timing (seasonal) limitations to protect wildlife values; 0.1% of the resource area (3,024 acres) closed to leasing for discretionary reasons and 6.3% of the resource area (241,171 acres) closed to leasing for nondiscretionary reasons (WSAs/ISAs).

The Preferred Alternative is analyzed along with two other alternatives which are the Continuation of Present Management Alternative or No Action Alternative (Alternative A) and the Standard Terms and Conditions Alternative (Alternative C).

The Preferred Alternative balances oil and gas exploration and development with protection of natural resources in a manner which provides consideration of the resource in question without being overly or unnecessarily restrictive to the oil and gas industry.

The Continuation of Present Management Alternative (No Action) analyzes the impact to natural resources and the oil and gas industry from the present management situation. Analysis of the present situation has indicated that certain important resource values are not adequately protected through leasing stipulations or conditions while other resources are over-protected or do not occur where the leasing stipulations apply. Overall, this alternative may contribute toward long-term degradation of certain natural resources and incur unnecessary costs and constraints to the oil and gas industry.

The Standard Terms and Conditions Alternative would provide the minimum protection to resource values that the BLM could legally implement. Leases would not have stipulations attached and protection of natural resources would rely upon conditions of approval and existing federal laws. Discretionary closures to leasing would be minimal. This alternative, while providing the greatest flexibility and least restrictions to operate, could potentially lead to the long-term loss or degradation of some natural resources.

A part of the analysis in this document addresses the impacts that oil and gas exploration and development may contribute cumulatively towards constraining the ability of the federal government to effectively manage other natural resources and maintain or enhance resource productivity. The cumulative impact analysis demonstrates that oil and gas exploration and development, in relation to other actions or developments in the resource area, would not noticeably contribute to the degradation of other resource values.

Table S-1 provides a summary of leasing determinations by alternative for each resource. Table S-2 provides a summary of impacts to resources from the alternatives.

TABLE S-1
SUMMARY OF LEASING DETERMINATIONS
BY ALTERNATIVE

RESOURCES	ALTERNATIVE A (No Action)	ALTERNATIVE B (Preferred)	ALTERNATIVE C (Standard Terms and Conditions)
Wildlife Habitat	Closed to Leasing: 1,900 acres; No Surface Occupancy: 84,380 acres; Timing Limitations: 717,360 acres.	No Surface Occupancy: 9,280 acres; Timing Limitations: 1,186,580 acres.	Standard Terms and Conditions; COAs.
T&E Species	No Surface Occupancy: 1,920 acres.	No Surface Occupancy: 9,430 acres.	Standard Terms and Conditions; COAs.
Riparian Habitat	Standard Terms and Conditions; SOPs.	No Surface Occupancy: 320 Acres; Standard Terms and Conditions; COAs.	Standard Terms and Conditions; COAs.
Mineral Resources	Open to Leasing: 2,183,342 acres.	Open to Leasing: 2,343,388 acres.	Open to Leasing: 3,594,908 acres.
Woodland Resources	No Surface Occupancy: 1,935 acres	No Surface Occupancy: 715 acres.	Standard Terms and Conditions; COAs.
Cultural Resources	Closed to Leasing: 17,920 acres; No Surface Occupancy: 93,910 acres.	No Surface Occupancy: 29,734 acres.	Closed to Leasing: 2,560 acres; Standard Terms and Conditions; COAs.
Wilderness	Closed to Leasing: 241,171 acres.	Same as Alternative A.	Same as Alternative A.
Recreation	Closed to Leasing: 640 acres; No Surface Occupancy: 12,580 acres.	Closed to Leasing: 760 acres; No Surface Occupancy: 6,101 acres.	Closed to Leasing: 760 acres; Standard Terms and Conditions; COAs.
Visual Resources	Standard Terms and Conditions; SOPs.	Standard Terms and Conditions; COAs.	Same as Alternative B.
Livestock and Vegetation	Standard Terms and Conditions; SOPs.	Standard Terms and Conditions; COAs.	Same as Alternative B.
Wild Horses and Burros	Controlled Surface Use: 261,440 acres.	Standard Terms and Conditions; COAs.	Same as Alternative B.
Soils	Controlled Surface Use: 206,400 acres.	Standard Terms and Conditions; COAs.	Same as Alternative B.
Water Resources	Standard Terms and Conditions; SOPs.	Standard Terms and Conditions; COAs.	Same as Alternative B.

TABLE S-1
SUMMARY OF LEASING DETERMINATIONS
BY ALTERNATIVE

RESOURCES	ALTERNATIVE A (No Action)	ALTERNATIVE B (Preferred)	ALTERNATIVE C (Standard Terms and Conditions)
Air Quality	Standard Terms and Conditions; SOPs.	Standard Terms and Conditions; COAs.	Same as Alternative B.
Lands	Standard Terms and Conditions; SOPs.	Closed to Leasing: 2,264 acres; Standard Terms and Conditions; COAs.	Same as Alternative B.
Social Economics	No Leasing Restrictions.	Same as Alternative A.	Same as Alternative A.

TABLE S-2
SUMMARY OF IMPACTS
BY ALTERNATIVE

RESOURCES	ALTERNATIVE A (No Action)	ALTERNATIVE B (Preferred)	ALTERNATIVE C (Standard Terms and Conditions)
Wildlife Habitat	Losses of mule deer winter habitat from oil and gas exploration would be negligible. Impacts would be expected on 349,685 acres of sage grouse leks and winter habitat. There could be impacts to ferruginous hawk nest sites and nesting territories.	Mule deer - Same as Alternative A. All identified sage grouse leks and crucial winter habitat and all known ferruginous hawk nest sites and their nesting territories would be protected from oil and gas exploration impacts.	Mule deer - Same as Alternative A. Impacts would be expected on 916,845 acres of sage grouse leks and winter habitat. Impacts from oil and gas exploration would be expected on 9,280 acres of ferruginous hawk nest sites and 116,615 acres of nesting territories.
T&E Species	Adverse impacts from oil and gas exploration would be expected on six T&E plant species and four T&E candidate fish species. Impacts would be expected on T&E candidate ferruginous hawk populations.	Leasing stipulations and restrictions would protect identified T&E species and critical habitats.	Same as Alternative A.
Riparian Habitat	No noticeable impacts to riparian habitat are expected from oil and gas exploration.	Same as Alternative A. 320 acres of wet meadow habitat in Orchard Canyon would be specifically protected with NSO leasing stipulations.	Same as Alternative A.
Mineral Resources	Unnecessary leasing restrictions exist. Leasing restrictions are inconsistently applied. There would continue to be increased costs for oil and gas exploration and development.	More public lands open to oil and gas exploration and development with fewer leasing restrictions. Leasing stipulations are appropriately applied for the protection of resource values.	Minimal leasing stipulations allow lessee to operate with greatest flexibility in the exploration and development of oil and gas resources.
Woodland Resources	There would be a long-term loss of productivity on 500 acres of woodlands. There would be protection of sensitive and unique species.	Same as Alternative A.	There would be a long-term loss of productivity on 500 acres of woodland. Sensitive and unique species would not be specifically protected.

TABLE S-2
SUMMARY OF IMPACTS
BY ALTERNATIVE

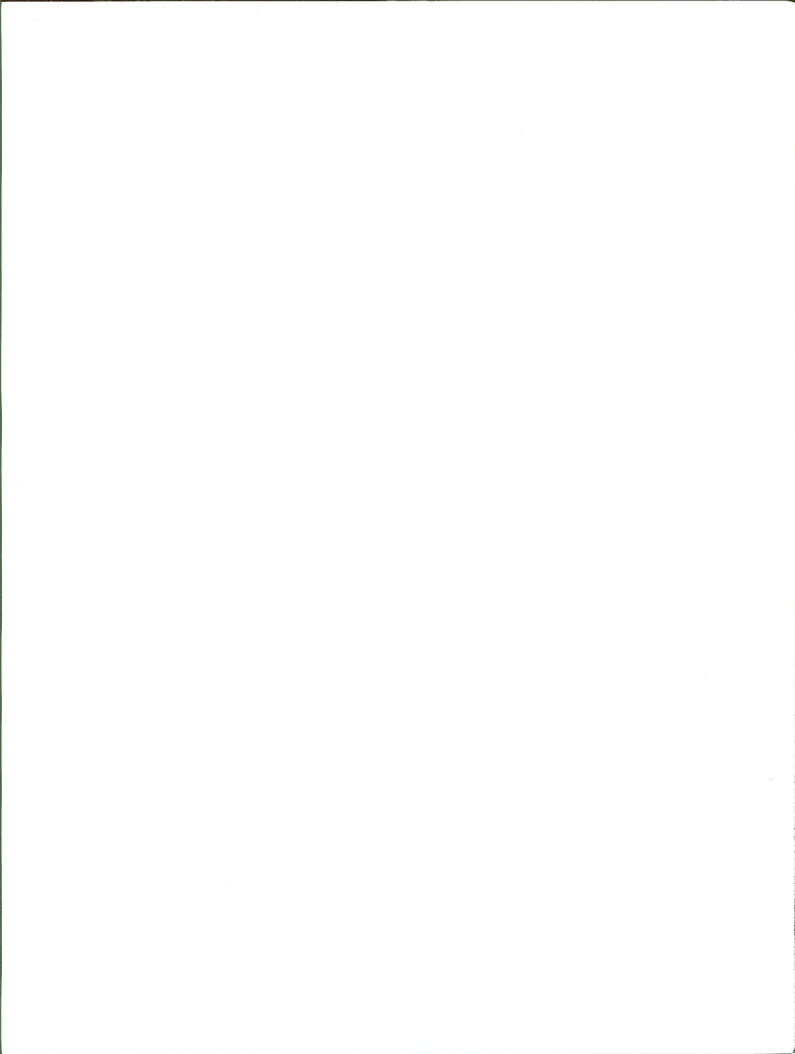
RESOURCES	ALTERNATIVE A (No Action)	ALTERNATIVE B (Preferred)	ALTERNATIVE C (Standard Terms and Conditions)
Cultural Resources	There would be leasing restrictions on 56,180 acres of land containing cultural resources. There would be 55,650 acres of NSO leasing stipulations along 57 miles of the Pony Express Trail.	There would be the added protection of leasing restrictions on 29,734 acres of identified fragile cultural resource values and management districts. The Pony Express Trail would be managed through VRM decisions in the Egan ROD.	Impacts would occur on 27,174 acres of land containing identified fragile cultural resource values. A total of 2,560 acres of land would be closed to leasing to protect sensitive cultural resources within the Sunshine Locality National Register District.
Wilderness	Wilderness values would continue to be preserved for any lands designated wilderness by Congress. For lands not designated as Wilderness, there would be short-term impairment of opportunities for solitude and direct long-term impacts on naturalness on 52 acres and indirect impacts on naturalness on 1,760 acres.	In the absence of wilderness designation, 7,650 acres of T&E Bonneville cutthroat trout habitat would continue to be protected in Goshute Basin. Same as Alternative A.	In the absence of wilderness designation, potential adverse impacts from oil and gas exploration could occur on T&E Bonneville cutthroat trout habitat in Goshute Basin. Same as Alternative A.
Recreation	13,220 acres of land containing scenic values and unique natural resources would be protected from oil and gas exploration and development.	6,661 acres of scenic values and SRMA recreation sites would be protected from oil and gas exploration and development.	560 acres of SRMA recreation sites would be closed to leasing.
Visual Resources	Scenic values would be preserved within areas designated wilderness by Congress. Noticeable visual impacts could occur within the Mount Grafton Scenic area and at existing and proposed recreation sites. There would be long-term visual impacts to 1,274 acres in the RA.	Scenic values would be preserved within areas designated wilderness by Congress. Scenic values at Mount Grafton Scenic Area and at existing and proposed recreations sites would be maintained. There would be long-term visual impacts to 1,274 acres in the RA.	Scenic values would be preserved within areas designated wilderness by Congress. For lands released from wilderness consideration there would be noticeable impacts to scenic values from oil and gas exploration. There would be long-term visual impacts to 1,274 acres in the RA.

TABLE S-2
SUMMARY OF IMPACTS
BY ALTERNATIVE

RESOURCES	ALTERNATIVE A (No Action)	ALTERNATIVE B (Preferred)	ALTERNATIVE C (Standard Terms and Conditions)
Livestock and Vegetation	There would be a long-term loss of 147 livestock AUMs. There would be a long-term loss of forage productivity on 1,274 acres of land.	Same as Alternative A.	Same as Alternative A.
Wild Horses and Burros	261,440 acres of controlled surface use stipulations on critical wild horse habitat provides no added benefit to wild horse populations. There would be a long-term loss of 43 wild horse AUMs. There would be a long-term loss of forage productivity on 1,274 acres of land. Up to seven horse or foals per year would be lost to vehicle collisions and/or abandonment. Disruption of migration routes and/or band structure would affect up to 250 animals if full development were concentrated within a single herd use area.	Removal of 261,440 acres of Controlled Surface Use stipulations on critical wild horse habitat would have no impact to wild horse populations. There would be a long-term loss of 43 wild horse AUMs. There would be a long-term loss of forage productivity on 1,274 acres of land. Up to seven horse or foals per year would be lost to vehicle collisions and/or abandonment. Disruption of migration routes and/or band structure would affect up to 250 animals if full development were concentrated within a single herd use area.	Same as Alternative B.
Soils	Soils would be protected on 206,400 acres of land with controlled surface use restrictions. There would be a long-term loss of 1,274 acres of soil on unreclaimed lands.	Controlled surface use restrictions would be incorporated into COAs and applied to the entire resource area. There would be a long-term loss of 1,274 acres of soil on unreclaimed lands.	Same as Alternative B.
Water Resources	No impacts to water quality are expected from oil and gas exploration and development.	Same as Alternative A.	Same as Alternative A.

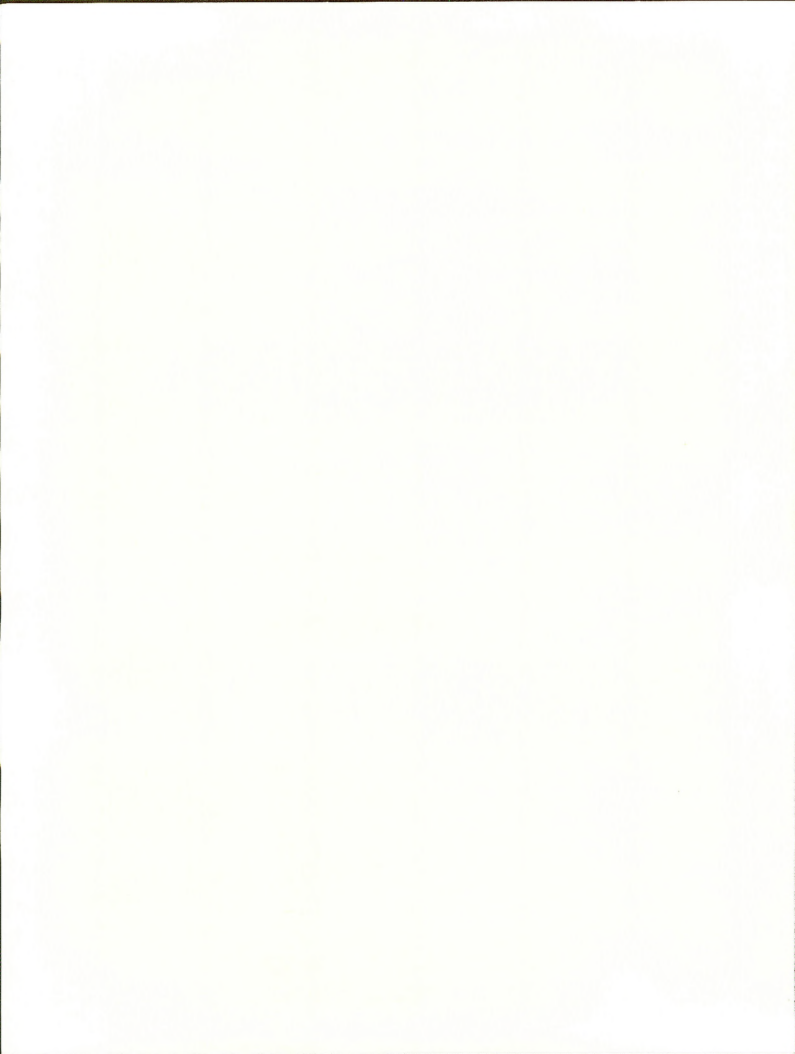
TABLE S-2
SUMMARY OF IMPACTS
BY ALTERNATIVE

RESOURCES	ALTERNATIVE A (No Action)	ALTERNATIVE B (Preferred)	ALTERNATIVE C (Standard Terms and Conditions)
Air Quality	Short-term localized degradation of air quality would occur from fugitive dust. Field development could result in release of gases into the atmosphere and locally degrade air quality over the long-term.	Same as Alternative A.	Same as Alternative A.
Lands	R&PP leases would not be exempted from oil and gas leasing.	2,264 acres of R&PP leases would be exempted from oil and gas leasing.	Same as Alternative B.
Social Economics	No impacts are expected to the social or economic structure of the region.	Same as Alternative A.	Same as Alternative A.



CHAPTER 1

INTRODUCTION



CHAPTER 1

INTRODUCTION

PURPOSE AND NEED

The Egan Resource Area (RA) administers lands which have potential for oil and gas resources. Major oil companies have submitted development contracts to the Nevada State Office which indicate the commitment to explore and develop for these resources. Historically, the first exploratory oil well drilled in the Egan RA was along the Illipah anticline in 1920. The drilling of the Standard-Conoco Meridian Unit #1 in 1950 marked the beginning of modern oil exploration in Nevada (NBMG Bull. 104; 1988).

Since 1984, the Egan RA has experienced steady geophysical exploration and exploratory well drilling. Oil and gas reserves are located and economically extracted in an area bordering the resource area within Railroad Valley which borders the resource area to the south. Oil and gas resources are also extracted from Pine Valley to the north of the resource area. Current geological models called "plays" indicate that oil and gas reserves may extend into the Egan RA.

Portions of the Egan RA are included in high oil and gas potential areas. Exploration and development of these resources, in some cases, may be in potential conflict with other land uses and management objectives. The surface disturbance and removal of vegetation and habitats associated with exploration activity, construction of support facilities for oil and gas development and final reclamation upon abandonment of once-producing fields are raising issues and management concerns to be considered in land use decisions.

General concerns include the cumulative effects of oil and gas exploration and development to resources such as wildlife habitat, wild horse herds, livestock forage, recreation, wilderness and cultural resources. There is also concern on how discretionary leasing decisions may affect exploration and development of oil and gas

resources, as well as prudent reclamation of lands and habitat disturbed through these activities.

The approved Egan Resource Management Plan (RMP) does not address issues relating to oil and gas exploration and development. Consequently, the Egan RMP, as implemented with the signing of the Record of Decision (ROD) on February 3, 1987, is not in conformance with BLM Manual 1624 Supplemental Program Guidance (SPG) for Energy and Minerals (released; November 14, 1986) and does not specifically address how oil and gas leasing within the Egan RA will be accomplished now or in the future.

The BLM has made a commitment with the final approval of Manual 1624 in 1986, after extensive public comment, to have all approved RMPs throughout the BLM be in conformance with this Manual supplement. The purpose of this oil and gas leasing amendment is to bring the approved Egan RMP into conformance with Manual 1624 by generating both general and specific decisions which will allow sound multiple-use management of natural resources in light of potential development of oil and gas resources.

General decisions resulting from the RMP amendment will be in the form of oil and gas leasing determinations and appropriate leasing restrictions necessary to protect other resource values. These determinations and restrictions will apply to all public lands administered by the Egan RA. Determinations for oil and gas resources will designate which lands within the Egan RA will be open to leasing with standard terms and conditions; open to leasing with minor constraints (e.g. timing limitations); open to leasing with major constraints (e.g. No Surface Occupancy); and which lands would be closed to leasing.

Specific decisions resulting from the amendment will be in the form of stipulations or conditions to leasing or development. The stipulations and conditions will be implemented to achieve resource

condition objectives outlined as decisions in the Egan ROD or to protect sensitive or fragile natural resources that may be adversely impaired by management actions resulting from oil and gas leasing.

The Egan RMP Oil and Gas Leasing Amendment and Supplemental EIS (SEIS) will analyze different management alternatives to examine the potential effects of oil and gas leasing, exploration and development on BLM-administered lands and resources in the Egan RA. The effects of BLM management actions on adjacent other federal and private lands are also considered in the analysis.

The potential effects to natural resources in each alternative will be analyzed through the identification of oil and gas potentials within the resource area and comparing these resource potentials with reasonable foreseeable development (RFD) for oil and gas resources. RFD scenarios are an estimation of what types of activities can be expected to take place within the Egan RA based on current knowledge of resource potentials,

current technology and the economic feasibility of developing these resources.

This plan amendment and SEIS will also address the cumulative effects of other reasonably foreseeable future actions (RFAs) which consist of similar projects or projects with similar impacts and are in addition to the anticipated surface disturbance from oil and gas exploration and development on public lands, as well as the impact to the energy industry from stipulations and conditions placed on oil and gas leasing.

LOCATION AND LAND STATUS

The planning area encompasses the Egan RA of the Bureau of Land Management Ely District (refer to Planning Area Location Map, Map 1-1). The Egan RA comprises approximately 3.8 million acres of public lands within White Pine, Nye and Lincoln Counties, Nevada (refer to Table 1-1 below for a breakdown of the land status by entity within the RA).

Entity	Total Acres
Bureau of Land Management	3,841,663
Private	181,135
State, County, City	5,280
BLM Withdrawals	480
BLM Split-Estate	21,300*
Other Federal Agencies	460,107
Total Acres	4,488,665

* acreage for these split-estate lands is included within the total for Private.
Source: U.S. Department of the Interior, Ely District Office, August 1990.

PLANNING PROCESS OVERVIEW

The objective of this amendment is to develop alternatives and decisions to guide the management of oil and gas resources in the Egan RA. This amendment will supplement the approved Egan RMP and add to the existing decisions within the Egan ROD. The amendment planning process incorporates the nine basic steps common to all BLM planning efforts:

Step 1: Issue Identification

Planning issues are matters of controversy or dispute over resource management activities or land use that are well defined or topically discrete and entail alternatives between which to choose or decide. Issue identification for the Egan RMP Oil and Gas Leasing Amendment was initiated by the BLM. A Notice of Intent was published in the Federal Register inviting the public, industry and other federal and state agencies to participate in the planning process. Public workshops to identify potential issues were held in Ely and Reno, Nevada. In addition, a mailing soliciting written comment from the public was initiated with the publication of the Federal Register notice. The planning issues identified for analysis in the amendment and SEIS after scoping and public comment are:

Issue 1

Determination of which lands will be designated open to oil and gas leasing.

Issue 2

Determination of what stipulations, conditions or designations are necessary for exploration and/or development of oil and gas resources to protect, maintain, and/or enhance other resources.

Issue 3

Determination of the impacts to the oil and gas industry from the conditions placed on oil and gas leasing, exploration and development.

Step 2: Planning Criteria Development

Planning criteria form the parameters used for decision-making, analysis, and data collection in developing sound resource management decisions that are the product of the planning process. These criteria serve to focus the amendment on the planning questions that are generated from the issues and management concerns.

Planning criteria are based on existing management standards as prescribed by laws, regulations and guidance from several sources including, but not limited to, resource management plans, records of decision, environmental impact statements, relevant environmental analyses, as well as public input, professional judgement and management direction.

The planning criteria for this amendment have been developed based on the consideration of current issues and management concerns, how they relate to the objectives of the plan amendment and public comment. The criteria that will be used in this amendment are listed below:

- A. Decisions proposed through this amendment will be in conformance with the decisions in the Egan ROD.
- B. BLM Manual 1620; Supplemental Program Guidance (SPG) and Manual 1624 for Energy and Mineral Resources, will be utilized to identify the determinations to be made.
- C. Determinations for other resources, as they apply to the oil and gas leasing amendment, will follow the Manual 1620 series SPG for those resources.
- D. The Bureau Fluid Minerals Handbook (H-1624-1) will be used to guide the application of the SPG for oil and gas resources.
- E. Management of Wilderness Study Areas (WSAs) for oil and gas resources will continue under the Interim Management Policy and Guidelines for Lands Under Wilderness Review (referred to as IMP). If all or part of any of the WSAs in the Egan RA are released by Congress from

wilderness study, management for oil and gas resources will come under the scope of the determinations made for the resource area as a result of this amendment.

- F. Existing studies, the most current available inventories, current publications, and professional judgement will be used to determine potential occurrence for oil and gas resources, as well as potential impacts.
- G. Reasonable foreseeable development scenarios (RFDs) will be based on available data and trends and will be projected for the life of the Egan RMP (or the year 2007).
- H. An interdisciplinary approach will be used to prepare reasonable foreseeable development scenarios; analyze impacts, including cumulative impacts to natural and cultural resources and the social and economic environment; identify alternatives and make determinations.
- I. Impacts from oil and gas exploration and development on BLM-administered lands within the Egan RA to adjacent other federal, split-estate, state and private lands will be considered.

Step 3: Inventory Data and Information Collection

Resource data necessary to complete analysis of the issues and impacts is collected and existing data updated.

Step 4: Analysis of the Management Situation (AMS)

The existing management situation as it relates to oil and gas leasing is assessed to identify management opportunities, limitations, capabilities and demands on the resources under consideration. The Continuation of Present Management Alternative Maps (Map 2-1 and 2-2) displays the existing management situation for oil and gas leasing in the Egan RA. All existing leasing stipulations and standard operating procedures (SOPs) were reviewed on a site-specific basis and assessed for their ability to provide identified resource protection in relation to the management decisions and resource objectives contained in the

Egan ROD as well as their conformance to the 1624 Manual.

Step 5: Alternative Formulation

Based on the issues, management concerns, and planning criteria, three alternatives were developed for analysis. The No Action alternative is required by law and represents a continuation of present management. The remaining two alternatives consider different levels of resource management to resolve the issues and concerns raised by the analysis of the management situation for leasing, exploration and development of oil and gas resources. Other alternatives were considered early in scoping but were eliminated from detailed analysis. These alternatives are discussed in Chapter 2.

Step 6: Estimation of Effects

In accordance with the National Environmental Policy Act of 1969; Title 16; 42 U.S.C. 4321-4347, (NEPA); the physical, biological, social and economic effects of implementing each of the alternatives are estimated to allow for a comparative evaluation of impacts (refer to Chapter 4).

Step 7: Preferred Alternative Selection

Based on the analysis of the issues between anticipated land uses and affected resources, a Preferred Alternative is selected. After the selection and approval of the Preferred Alternative, the Draft Amendment and SEIS is published and distributed to the public, interest groups and other government agencies for a 90-day review and comment period.

Step 8: Select The Plan

Based on evaluation of public comment on the draft, an alternative is selected by the Authorized Officer as the amendment's proposed action. The proposed action may be any one of the alternatives developed for analysis. Once the proposed action is selected, the Proposed RMP Amendment and Final SEIS (PRMPA/FSEIS) is sent to the State Director for approval. Upon approval, the PRMPA/FSEIS is filed with the Environmental Protection Agency (EPA) and distributed to the public.

The proposed amendment is then subject to a 60-day Governor's consistency review allowing the State to determine whether the amendment is consistent with State and local government plans and policies.

A 30-day protest period begins when the document is filed with the EPA. If no protests are received during this time, the amendment will be approved and a Record of Decision (ROD) published. If protests are received, the protests must be resolved before the amendment is approved and the ROD published.

Step 9: Monitoring and Evaluation

Resource management plans and plan amendments incorporate periodic monitoring and evaluation as part of the implementation process. The monitoring and evaluation process provides for identifying changes in federal or state legislation which may affect plan implementation and serves to determine the effectiveness of the decisions for resolving resource issues and management concerns. Periodic review also ensures mitigation measures for the protection of resources are effective and ascertains whether or not the assumptions used for impact analysis are accurate. The ultimate objective of monitoring and evaluation is to determine whether or not implementation of the plan is achieving the desired results. Information obtained through the evaluation process will be used in future planning, including any subsequent amendments or revisions to the resource plan.

Implementation of the approved amendment decisions will be monitored annually. The Five Year

Evaluation of these decisions will be done on the same schedule as the original Egan RMP. Effectiveness of the determinations in this amendment for maintaining and enhancing resource conditions while facilitating oil and gas exploration and development will be evaluated to determine if changes are needed.

CONFORMANCE STATEMENT

The analysis of this amendment will supplement the analysis of the existing Egan RMP. Upon approval, this amendment will become part of the Egan RMP. All subsequent activity plans and actions will be in conformance with the land use plan as amended.

CONSISTENCY WITH OTHER PLANS

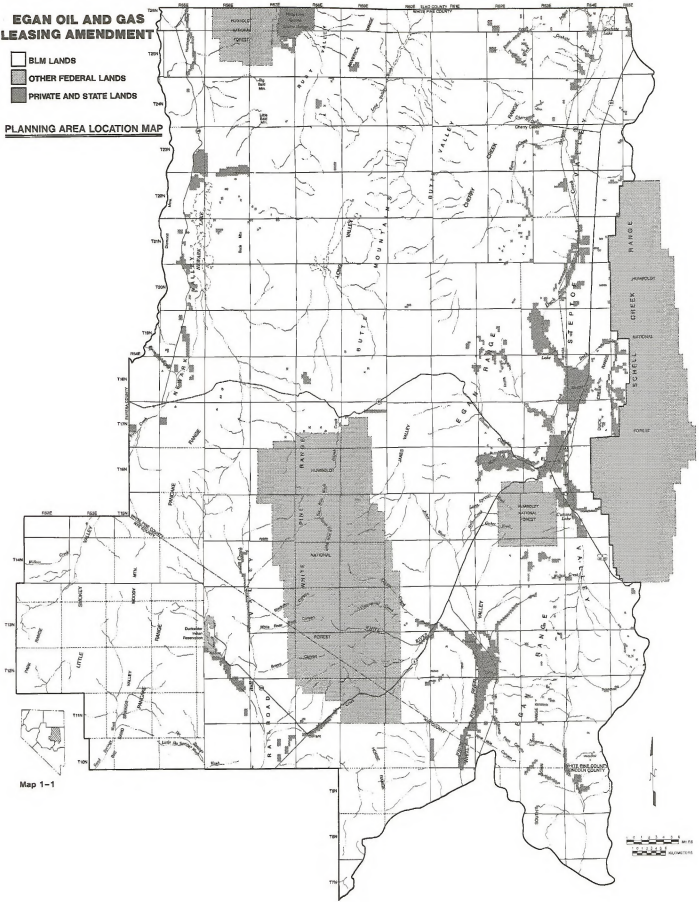
The Egan RMP Oil and Gas Leasing Amendment has been coordinated with adjacent Federal, State and local entities. The amendment is consistent with the officially approved or adopted resource related plans, policies and programs of other Federal agencies, State and local governments and Indian Tribes. Existing BLM land use plans that cover lands contiguous to the planning area include the Elko RMP, Wells RMP, Shoshone-Eureka RMP, Tonopah MFP, and Schell MFP.

The Humboldt National Forest Land Use Plan addresses resource management on lands administered by the U.S. Forest Service. These lands are located both within and adjacent to the planning area.

EGAN OIL AND GAS LEASING AMENDMENT

- BLM LANDS
- OTHER FEDERAL LANDS
- PRIVATE AND STATE LANDS

PLANNING AREA LOCATION MAP



Map 1-1

CHAPTER 2

ALTERNATIVES



CHAPTER 2

ALTERNATIVES

INTRODUCTION

This chapter presents the three alternatives which have been developed for analysis in the Egan RMP Draft Oil and Gas Leasing Amendment and SEIS. These alternatives represent a reasonable range of management opportunities to analyze varying degrees of impacts to natural resources on public lands from oil and gas exploration and development. The analysis of each alternative is based on expected impacts from typical oil and gas exploration and development activities and projection of those activities in a reasonably foreseeable development (RFD) scenario for oil and gas resources in the Egan RA.

Appendix A describes typical oil and gas operations including preliminary exploration (geophysical, wildcat drilling), drilling of individual wells, production of the resource and final abandonment of the wells. The RFD scenario for oil and gas is presented in Chapter 4.

A description of each alternative, leasing determinations common to all alternatives and a discussion of other alternatives considered but eliminated from further analysis are presented in this chapter. Table S-1, located in the Summary at the beginning of this document, summarizes and compares the different leasing determinations by alternative for each resource affected.

Table S-2 summarizes and compares the impacts of each of the alternatives on the affected resources. Chapter 4 describes in more detail, the nature and extent of the impacts to the various resources.

Alternatives for oil and gas leasing are defined through the different application of determinations for oil and gas leasing (BLM Manual 1624). Determinations are in the form of land use designations such as "open" or "closed" to leasing or in the form of special stipulations attached to the lease (e.g. "open" to leasing with timing limitations or No Surface Occupancy). The stipulations which comprise the determinations are

considered to be either major or minor restrictions. Major restrictions include "Closed" to leasing designations and No Surface Occupancy. Minor restrictions to leasing consist of timing limitations (seasonal restrictions) and controlled surface use (CSU) stipulations. Timing limitations indicate that an area is generally open to leasing except during a specified period of time to protect identified resource values. Normally, timing limitations are used when the time period to protect the resource values would exceed the 60-day limitation contained in the lease instrument. CSU stipulations allow use and occupancy of the leaseholding (unless restricted by another stipulation), but identified resource values require special operating constraints that may modify the lease rights.

Lease Stipulations

A stipulation to a lease is a provision that modifies standard lease rights and is attached to and made part of the lease. Restrictions applied to field operations by federal regulation, based on applicable laws and section 6 of the lease instrument are found in the Code of Federal Regulations (CFR), Part 43 sub-part 3100 and Appendix D of this document. These regulations give the Authorized Officer authority to determine how field operations are conducted. Since federal regulations make these requirements mandatory, they are not repeated in the leasing stipulations. Some requirements may be noted in lease notices for special emphasis.

Conditions of Approval

In addition to lease stipulations, resource values are also protected through restrictions or conditions attached to field operation applications, such as Applications for Permit to Drill (APDs) and sundry notices. These restrictions are referred to as Conditions of Approval (COAs). COAs are requirements that can be placed on oil and gas operations on a site-specific basis to protect other resources. For Notices of Intent (NOIs) to conduct geophysical exploration, resources are protected on

a site-specific basis by following standard practices and procedures.

Authority to apply COAs stems from and must be consistent with the lease rights granted. The BLM may not give a lease holder the right to extract minerals, and then, at the time of development, require mitigation not specified in the lease that would disallow part or all of the mineral extraction. Minimum measures under lease rights are defined in 43 CFR 3101.1-2. These measures allow for the relocation of a proposed well up to 200 meters and restriction of timing of the operations by as much as 60 days.

The conditions placed on the operation require the lessee to conform to certain standards, such as constructing roads in such a way as to minimize soil erosion or abide by certain restrictions, such as not constructing a road when the ground is water-saturated during a thaw cycle. The COAs may be chosen to mitigate environmental impacts identified on a site-specific basis at the field development stage or through an Environmental Assessment (EA) which is completed on actions such as APDs. If the analysis in the EA determines that the COAs are sufficient and the lease stipulations are not required to prevent impacts, exceptions to the stipulation would be developed and added to the APD. Existing COAs for oil and gas activities and standard practices and procedures for geophysical exploration are also referred to as Standard Operating Procedures (SOPs) in the Egan ROD.

Leasing stipulations developed in this amendment are not applicable to existing leases. As existing leases expire and new leases are issued, the leasing stipulations developed in this amendment will be implemented. The analysis of impacts in Chapter 4 have taken the existing leases into account.

Lease Stipulations Waivers, Exceptions and Modifications

Under certain conditions, waivers, exceptions and modification of lease stipulations may be granted. A waiver is a permanent exemption of lease stipulation. An exception is a one time exemption to a lease stipulation which is determined on a case-by-case basis. A modification is a change to the provisions of a leased stipulation, either temporarily or for the term of the lease. Generally

a waiver, exception or modification may be approved if the record shows that the resource values have changed or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts and that less restrictive stipulations will be in the public interest. Waivers, exceptions or modifications can only be approved by the authorized officer. If the proposed waiver, exception or modification is inconsistent with the plan, the plan will be amended or the change to the stipulation will be disallowed.

A Waiver means the complete elimination of a stipulation from a particular lease contract. A lease stipulation is waived by the authorized officer after preparation of an environmental assessment and a decision is made that the stipulation in question is no longer required for that particular lease. The decision to waive a substantial stipulation requires a plan amendment and a 30-day public notice period prior to waiver.

An Exception is a case by case exception from a lease stipulation. The stipulation continues to apply to all other sites within the leasehold to which the restrictive criteria applies. Exceptions to leasing stipulations will be granted by the authorized officer if the reason for the exception is consistent with that analysis. No public notice is required for exceptions to lease stipulations which conform to the resource management plan. Other possible exceptions may be granted only upon plan amendment and public notification.

A Modification is a fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exception from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the lease hold to which the restrictive criteria applied.

Modifications to stipulations are made if and when resource management determines the stipulation is no longer effective as written. This situation occurs when new information shows that the protective measures are unnecessarily restrictive. Modification of a stipulation requires the preparation of an environmental assessment to determine the potential impacts and plan amendment or maintenance needs. If the modification is determined by the authorized officer

to be substantial, a 30-day public notice will be issued prior to modifying the lease stipulation.

LEASING DETERMINATIONS COMMON TO ALL ALTERNATIVES

The standard terms and conditions contained in the lease instrument found in Appendix D and the 241,171 acres closed to leasing (non-discretionary) because of wilderness study area status are the leasing determinations common to all alternatives.

Should Congress release all or part of any of the WSAs from wilderness study, the lands would return to multiple-use management and be generally available for leasing. Any leasing determinations made for these lands as a result of this amendment would apply in the absence of wilderness designation.

Management of visual resources within the RA and the SOP contained in the Egan ROD concerning visual management objectives for the Pony Express Trail are common to all alternatives.



Ferruginous hawk on nest. *(Photo by Mike Perkins)*

**ALTERNATIVES CONSIDERED
IN THIS AMENDMENT**

**ALTERNATIVE A - Continuation of Present
Management Alternative (No Action)**

The objective of the No Action or Continuation of Present Management Alternative is to allow continued oil and gas leasing, exploration and development as outlined under five existing Environmental Analysis Records (EARs) which date back to 1976. A number of amendments have modified the restrictions within the EARs up to 1982, the date of the last EAR amendment. These EARs contain the current restrictions placed on oil and gas leasing for the resource area.

Many of the restrictions placed on leasing are based on limited inventories, out-dated and incomplete resource information and do not reflect current management objectives as outlined in the

Egan ROD. In many cases, the current restrictions in the combined EARs are inconsistently applied, may be in contradiction with other restrictions or management objectives, based on incorrect legal locations or unnecessarily restricting leasing where resource values do not exist. The No Action Alternative is not in conformance with the 1624 Manual for oil and gas leasing. The five EARs, as amended, which comprise existing management are available for public review and are on file at the Ely District Office.

Current standard practices and procedures for geophysical exploration and standard operating procedures for APDs under the Continuation of Present Management Alternative are described in Appendix B.

The availability of federal lands for oil and gas leasing in the Egan RA under the Continuation of Present Management Alternative is summarized below in Table 2-1.

Determination	Acres	Percent of RA
Open to Leasing with Standard Terms and Conditions	2,183,342	56.8
Open to Leasing with Major Restrictions (No Surface Occupancy)	210,850	5.5
Open to Leasing with Minor Restrictions (Timing Limitations)	1,185,200	30.9
No Leasing (Discretionary)	21,100	0.5
No Leasing - WSA/ISAs (Non-discretionary)	241,171	6.3
Total:	3,841,663	100.0

Under the Continuation of Present Management Alternative, the resources and land uses within the Egan RA identified for major restrictions to leasing include: Wilderness Study Areas (WSAs), Instant Study Areas (ISAs), National Register properties, scenic areas, the Pony Express Trail, unique natural features, Threatened and Endangered (T&E) species and sage grouse leks.

Major restrictions under this alternative total 473,121 acres. The different resources associated with major leasing restrictions under this alternative, the type of restriction and the approximate acreage for the restriction are summarized below in Table 2-2 (refer to Continuation of Present Management Alternative Map, Map 2-1).

TABLE 2-2
CONTINUATION OF PRESENT MANAGEMENT ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
SUMMARY TABLE
(Major Restrictions)

Resource/Land Use	Determination	Acres
WSAs/ISAs	Closed - Nondiscretionary	241,171
Sunshine Locality National Register District	Closed - Discretionary	17,920
Ruby Lake National Wildlife Refuge	Closed - Discretionary	1,900
Park Range Scenic Area	Closed - Discretionary (acres entirely within WSA)	(17,920)
Ragged Ridge Scenic Area	Closed - Discretionary (acres outside of WSA)	1,280 (640)
Sunshine Locality National Register District	No Surface Occupancy	16,640
Ruby Lake National Wildlife Refuge	No Surface Occupancy	5,500
Park Range Scenic Area	No Surface Occupancy (acres outside of WSA)	18,400 (4,540)
Ragged Ridge Scenic Area	No Surface Occupancy (acres outside of WSA)	6,400 (3,200)
Pony Express Trail	No Surface Occupancy	55,650
Other Cultural Resources	No Surface Occupancy	21,620
Unique Natural Features	No Surface Occupancy	4,840
Threatened and Endangered Species	No Surface Occupancy	1,900
Sage Grouse Leks	No Surface Occupancy	79,880
Total:		473,121

Under the Continuation of Present Management Alternative, the resources and land uses within the Egan RA identified for minor restrictions to leasing include: Mule deer winter and spring range habitat, sage grouse leks and winter habitat, Golden Eagle habitat, crucial chukar habitat, critical wild horse habitat, unstable soils, and critical watershed.

Minor restrictions under this alternative total 1,185,200 acres. The different resources associated with minor leasing restrictions under this alternative, the type of restriction and the approximate acreage for the restriction are summarized below in Table 2-3 (refer to Continuation of Present Management Alternative Map, Map 2-2).

TABLE 2-3
CONTINUATION OF PRESENT MANAGEMENT ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
SUMMARY TABLE

(Minor Restrictions)

Resource/Land Use	Determination	Acres
Mule Deer Winter Range Habitat	Timing Limitation (NSO - November through March)	152,640
Mule Deer Spring Range Habitat	Timing Limitation (NSO - April 1 to June 15)	40,320
Sage Grouse Leks and Winter Habitat	Timing Limitation (NSO - March through May)	487,280
Golden Eagle Habitat	Timing Limitation (NSO - March through June)	20,800
Crucial Chukar Habitat	Timing Limitation (NSO - December 1 to March 31)	40,320
Critical Wild Horse Habitat	Controlled Surface Use (CSU) (Restrictions: fencing of mud pits and drill sites, protection of springs and water developments and rehabilitation of the drill site).	261,440
Unstable Soils/Severe Erosion Critical Watershed	Controlled Surface Use (CSU) (Restrictions: no surface occupancy of selected areas, restrictive surface entry during excessive runoff, and/or special reclamation techniques).	206,400
Total:		1,185,200

ALTERNATIVE B - Preferred Alternative

The Preferred Alternative was developed through reviewing the effectiveness of existing leasing stipulations and SOPs to sufficiently mitigate impacts to resource values. If a stipulation or SOP was considered adequate, it was carried forward into the Preferred Alternative as a stipulation or a condition of approval (COA). If the stipulation or SOP was considered inadequate to protect resource values, a new stipulation or COA was developed for the Preferred Alternative that would address and mitigate impacts to the resource in question. If a stipulation or SOP was found to be unnecessary for protection of resource values, the stipulation or SOP was not carried forward into the preferred alternative.

The objective of the Preferred Alternative is to allow oil and gas leasing in the resource area while providing adequate protection to resource values of concern. Leasing would be based on the standard terms and conditions of the lease and appropriate updated lease stipulations to prevent unacceptable or unnecessary impacts to natural resource values from oil and gas operations. These lease

stipulations as well as conditions of approval to control surface disturbing activities are developed through the plan amendment process and are based on analysis of updated resource inventory data, public comment and applying the resource condition objectives outlined in the Egan ROD. This alternative would provide optimum management opportunities for balanced use of all resources.

Stipulations developed under this alternative cannot be attached to existing leases without the consent of the lessee. The existing stipulations attached to those leases are retained as long as the lease is valid. If the acreage involved in these expired leases is re-offered for leasing, the new stipulations developed under the Preferred Alternative would be attached to the new lease.

Current standard practices and procedures for geophysical exploration and COAs for APDs developed for the Preferred Alternative are described in Appendix C.

The availability of federal land for leasing in the Egan RA under the Preferred Alternative is summarized below in Table 2-4.

TABLE 2-4
PREFERRED ALTERNATIVE
DETERMINATION SUMMARY TABLE

Determination	Acres	Percent of RA
Open to Leasing with Standard Terms and Conditions	2,343,388	61.0
Open to Leasing with Major Restrictions (No Surface Occupancy)	67,500	1.7
Open to Leasing with Minor Restrictions (Timing Limitations)	1,186,580	30.9
No Leasing (Discretionary)	3,024	0.1
No Leasing - WSA/ISAs (Non-discretionary)	241,171	6.3
Total:	3,841,663	100.0

Under the Preferred Alternative, the resources and land uses within the Egan RA identified for major restrictions to leasing include: Wilderness Study Areas (WSAs), Instant Study Areas (ISAs), Recreation and Public Purposes (R&PP) leases, recreation sites, natural features, National Register properties, scenic areas, riparian areas, T&E

species, and birds of prey nest sites. Major restrictions under this alternative total 311,695 acres. The different resources associated with major leasing restrictions, the type of restriction and the approximate acreage for the restriction are summarized below in Table 2-5 (refer to Preferred Alternative Map, Map 2-3).

TABLE 2-5
PREFERRED ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
SUMMARY TABLE
(Major Restrictions)

Resource/Land Use	Determination	Acres
WSAs/ISAs	Closed - Nondiscretionary	241,171
R&PP Leases	Closed - Discretionary	2,264
Recreation Sites	Closed - Discretionary	560
Natural Features	Closed - Discretionary	200
Sunshine Locality National Register District		
	No Surface Occupancy	18,400
Other Cultural Resources		
	No Surface Occupancy	11,334
Mount Grafton Scenic Area		
	No Surface Occupancy	8,080*
Regged Ridge Scenic Area		
	No Surface Occupancy (acres outside of WSA)	7,680* (3,840)
Goshute Canyon Natural Area		
	No Surface Occupancy	7,650*
Recreation Sites		
	No Surface Occupancy	2,264
Natural Features		
	No Surface Occupancy	715
Riparian Areas		
	No Surface Occupancy	320
Threatened and Endangered Species		
	No Surface Occupancy	1,740
Ferruginous Hawk Nest Sites		
	No Surface Occupancy	9,280
Bald Eagle Roost Site		
	No Surface Occupancy	40
Total:		311,695
* Acres are within existing WSAs and are Closed to Leasing. In the absence of wilderness designation by Congress, the lands would be generally available for leasing and the NSO stipulation in this alternative would apply.		

Under the Preferred Alternative, the resources and land uses within the Egan RA identified for minor restrictions to leasing include: Sage Grouse leks and winter habitat and Ferruginous hawk nesting territories. Minor restrictions under this

alternative total 1,186,580 acres. The different resources associated with major leasing restrictions, the type of restriction and the approximate acreage for the restriction are summarized below in Table 2-6 (refer to Preferred Alternative Map, Map 2-4).

<p style="text-align: center;">TABLE 2-6</p> <p style="text-align: center;">PREFERRED ALTERNATIVE</p> <p style="text-align: center;">LEASING DETERMINATIONS BY RESOURCE</p> <p style="text-align: center;">SUMMARY TABLE</p> <p style="text-align: center;">(Minor Restrictions)</p>		
Resource/Land Use	Determination	Acres
Sage Grouse Leks and Winter Habitat	Timing Limitation	1,069,965
Ferruginous Hawk Nesting Territories	Timing Limitation	116,615
Total:		1,186,580

The following tables (Tables 2-7 through 2-11) describe in detail the major and minor leasing restrictions by resource for the Preferred Alternative which are summarized in Tables 2-5 and 2-6 above. The determinations for the resources in these tables form the basis for the Preferred Alternative determinations summarized on Table 2-4 above. The specific R&PP leases,

recreation sites and natural features which will be closed to leasing for oil and gas resources are listed in Table 2-7 below. A total of 3,024 acres will be closed to leasing (discretionary) under the Preferred Alternative. The cultural resources in the RA which will be leased under No Surface Occupancy are listed in Table 2-8. NSO restrictions for cultural resources total 29,734 acres.

TABLE 2-7
PREFERRED ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
LANDS AND RECREATION

(Closed - Discretionary)

Resource/Land Use	Acres
State of Nevada Maximum Security Prison	1,059
State of Nevada Prison Honor Camp	15
State of Nevada Ward Owens Historical Monument/State Park	520
White Pine County Shooting Range	670
Illipah Recreation Area	300
Cold Creek Reservoir Recreation Site	220
Goshute Creek Recreation Site	40
Goshute Cave Geologic Area	160
Cave Valley Geologic Area	40
Total:	3,024

TABLE 2-8
PREFERRED ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
CULTURAL RESOURCES

(No Surface Occupancy)

Resource/Land Use	Acres
Sunshine Locality National Register District	18,400
Little Smoky Valley Antelope Wall	320
Little Smoky Valley Paleolndian Quarry	3,200
City of the Rocks Archaeological District	6,514
Huntington Valley Village	640
Newark Cave	120
Black Point Complex	540
Total:	29,734

The various recreation sites, scenic areas, natural areas and natural features which include riparian values and botanic resources in the RA which will

be leased under No Surface Occupancy are listed in Table 2-9. NSO restrictions for these resources total 7,136 acres.

TABLE 2-9 PREFERRED ALTERNATIVE LEASING DETERMINATIONS BY RESOURCE RECREATION AND NATURAL FEATURES (No Surface Occupancy)	
Resource/Land Use	Acres
Ward Mountain Winter Sports Area	1,600
Garnet Hill Recreation Area	181
Antelope Summit Recreation site	160
Bassett Lake Recreation Site	160
Comins Lake Recreation Site	160
Bristlecone Pine Interpretive Area	480
Mount Grafton Scenic Area	8,080*
Regged Ridge Scenic Area	7,680
	3,840*
Swamp Cedar Area	235
Orchard Canyon Riparian Area	320
Goshute Canyon Natural Area	7,650*
Total:	7,136
* These areas are contained within WSAs and the acres are calculated into the acreage for Closed to Leasing (Non-discretionary).	

The threatened and endangered plant and animal species and other sensitive species which will be protected through No Surface Occupancy leasing stipulations under the Preferred Alternative are listed in Table 2-10. NSO restrictions for T&E

and sensitive species total 11,060 acres. The wildlife species and the acreage that will be leased with timing limitation stipulations are listed in Table 2-11. Timing limitation restrictions for wildlife species total 1,186,580 acres.

TABLE 2-10

PREFERRED ALTERNATIVE

LEASING DETERMINATIONS BY RESOURCE
T&E AND WILDLIFE SPECIES

(No Surface Occupancy)

Resource/Land Use	Acres
Monte Neva Paint Brush	180
Welsh's Cateye	20
Highway 6 Area T&E Species	720
White River T&E Species	520
Newark Valley Tui Chub	40
Railroad Valley Springfish	730
Bonneville Cutthroat Trout	4,480*
Ferruginous Hawk Nest Sites	9,280
Bald Eagle Roost Site	40
Total:	11,060

* These acres are contained within the Goshute Canyon WSA and are calculated into the acreage for Closed to Leasing (Non-discretionary)

TABLE 2-11

PREFERRED ALTERNATIVE

LEASING DETERMINATIONS BY RESOURCE
WILDLIFE SPECIES

(Timing Limitations)

Resource/Land Use	Acres
Sage Grouse Leks (2-mile radius) (March 15 to May 1)	916,845
Sage Grouse Winter Habitat (November 1 to March 1)	153,120
Ferruginous Hawk Nesting Territories (March 15 to July 1)	116,615
Total:	1,186,580

ALTERNATIVE C - Standard Terms and Conditions Alternative

The objective of this alternative is to allow oil and gas leasing of the resource area under the standard terms and conditions of the lease only. Under this alternative, lands within the resource area would be either open to leasing or closed to leasing. There would be no lease stipulations developed through the plan amendment process under this alternative and stipulations, other than closed to leasing, currently in effect would be eliminated for all new leases. Conditions of approval to control surface disturbing activities would be developed through the plan amendment process. Natural resources would be protected only through 43 CFR 3101.1-2 (surface use rights) and COAs.

A copy of the oil and gas lease instrument (Form 3100-11, June 1988), which contains the standard terms and conditions, is provided in Appendix D. The terms and conditions of the lease cover such items as bonding, rental and/or royalty, inspections, safety and protection of other resources. Specifically, section 6 of the lease instrument establishes general requirements for conducting operations on the lease and is referred to as the "Standard" lease term for protection of surface resources.

This section, in conjunction with the regulations in 43 CFR 3100 and applicable Notices to Lessees (NTLs) and Oil and Gas Onshore Orders, provides latitude for modification of siting (relocation of the proposed well of up to 200 meters), facility design, timing of operation (delay of operations of up to 60 days), and requirements for interim and final reclamation measures. The standard lease term specifically requires that prior to conducting any surface-disturbing activities, the lessee/operator will contact and receive approval from the BLM, and the lessee may be required to complete minor inventories and/or short-term special studies.

No special stipulations were developed for this alternative. COAs developed for the Preferred Alternative would apply in this alternative. The regulatory authority to limit operations by as much as 60 days would be used to restrict the timing of operations to give at least partial protection during critical stages during the life cycle of wildlife. The regulatory flexibility of moving a proposed operation up to 200 meters would be employed as needed to protect raptor nests, fragile soils, riparian areas, and other resource values or land uses.

The land availability of federal land for leasing in the Egan RA under the Standard Terms and Conditions Alternative is summarized in Table 2-12 below.

Determination	Acres	Percent of RA
Open to Leasing with Standard Terms and Conditions	3,594,908	93.6
Open to Leasing with Major Restrictions (No Surface Occupancy)	0	0
Open to Leasing with Minor Restrictions (Timing Limitations)	0	0
Closed to Leasing (Discretionary)	5,584	0.1
Closed to Leasing - WSA/ISAs (Non-discretionary)	241,171	6.3
Total:	3,841,663	100.0

Under the Standard Terms and Conditions Alternative, the resources and land uses identified for closed to leasing (nondiscretionary and discretionary) determinations include Wilderness Study Areas (WSAs), Instant Study Areas (ISAs), R&PP leases, recreations sites, natural features and National Register properties. Major restrictions

under this alternative total 246,755 acres. The different resources that would be closed to leasing under this alternative and the approximate acreage for the restriction are summarized in Table 2-13 below (refer to Standard Terms and Conditions Alternative Map, Map 2-5).

TABLE 2-13
STANDARD TERMS AND CONDITIONS ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
SUMMARY TABLE
(Major Restrictions)

Resource/Land Use	Determination	Acres
WSAs/ISAs	Closed - Nondiscretionary	241,171
R&PP Leases	Closed - Discretionary	2,264
Recreation Sites	Closed - Discretionary	560
Natural Features	Closed - Discretionary	200
Sunshine Locality National Register District	Closed - Discretionary	2,560
Total:		246,755

The specific discretionary closures to leasing under the Standard Terms and Conditions Alternative are listed in Table 2-14. Discretionary closures under this alternative total 5,584 acres.

The determinations for each of the alternatives are summarized for comparison in Table 2-15 below by total acres and percent of the resource area included under each determination for leasing.

Table 2-16 summarizes and compares the differences between the alternatives for the various resource values described in Alternative A (Tables 2-2 and 2-3), Alternative B (Tables 2-5 and 2-6) and Alternative C (Table 2-13). Many of the resources listed in Table 2-16 are grouped and summarized under the larger resource category headings in Table S-1 at the beginning of this document.

TABLE 2-14
STANDARD TERMS AND CONDITIONS ALTERNATIVE
LEASING DETERMINATIONS BY RESOURCE
LANDS, RECREATION, CULTURAL RESOURCES
(Closed - Discretionary)

Resource/Land Use	Acres
State of Nevada Maximum Security Prison	1,059
State of Nevada Prison Honor Camp	15
State of Nevada Ward Owens Historical Monument/State Park	520
White Pine County Shooting Range	670
Illipah Recreation Area	300
Cold Creek Reservoir Recreation Site	220
Goshute Creek Recreation Site	40
Goshute Cave Geologic Area	40
Cave Valley Geologic Area	40
Sunshine Locality National Register District	2,560
Total:	5,584

TABLE 2-15
ALTERNATIVE COMPARISON
SUMMARY TABLE
LEASING DETERMINATIONS BY ALTERNATIVE
Acres (Percent of RA)

Determination	Alternative A (No Action)	Alternative B (Preferred)	Alternative C (Standard Terms)
Open to Leasing with Standard Terms and Conditions	2,183,342 (56.8)	2,343,388 (61.0)	3,597,468 (93.6)
Open to Leasing with Major Restrictions (No Surface Occupancy)	210,050 (5.5)	67,500 (1.7)	0 (0)
Open to Leasing with Minor Restrictions (Timing Limitations, CSU)	1,185,200 (30.9)	1,186,580 (30.9)	0 (0)
Closed to Leasing (Discretionary)	21,100 (0.5)	3,024 (0.1)	5,584 (0.1)
Closed to Leasing (Nondiscretionary)	241,171 (6.3)	241,171 (6.3)	241,171 (6.3)

TABLE 2-16
ALTERNATIVE COMPARISON
SUMMARY TABLE
LEASING DETERMINATIONS BY RESOURCE
(Determination/Acres)

Resource/Land Use	Alternative A	Alternative B	Alternative C
WSAs/ISAs	Closed - 241,171	Closed - 241,171	Closed - 241,171
Sunshine Locality National Register District	Closed - 17,920 NSO - 16,640	NSO - 18,400	Closed - 2,560
Ruby Lake National Wildlife Refuge	Closed - 1,900 NSO - 5,500	0	0
Park Range Scenic Area	Closed - 17,920* NSO - 18,400*	0	0
Ragged Ridge Scenic Area	Closed - 1,280* NSO - 6,400*	NSO - 7,600*	0
Mount Grafton Scenic Area	0	NSO - 8,080*	0
Goshute Canyon Natural Area	0	NSO - 7,650*	0
R&PP Leases	0	Closed - 2,264	Closed - 2,264
Recreation Sites	0	Closed - 560 NSO - 2,261	Closed - 550
Pony Express Trail	NSO - 55,590	0	0
Other Cultural Resources	NSO - 21,260	NSO - 11,334	0
Natural Features	NSO - 4,840	Closed - 200 NSO - 715	Closed - 80
T & E Species	NSO - 1,920	NSO - 1,780	0
Sage Grouse Leaks and Winter Habitat	NSO - 79,880 Timing - 487,280	Timing - 1,069,965	0
Ferruginous Hawk Nest Sites and Nesting Territories	0	NSO - 9,280 Timing - 116,615	0
Mule Deer Winter Range	Timing - 152,640	0	0
Mule Deer Spring Range	Timing - 16,320	0	0
Golden Eagle Habitat	Timing - 20,800	0	0
Crucial Chukar Habitat	Timing - 40,320	0	0
Critical Wild Horse Habitat	CSU - 261,440	COAs - Entire RA	COAs - Entire RA
Unstable Soils/Severe Erosion Critical Watershed	CSU - 206,400	COAs - Entire RA	COAs - Entire RA

* - Acres are totally or partially within existing WSAs and are Closed to Leasing (nondiscretionary). In the absence of wilderness designation by Congress, the lands would be generally available for leasing and the Leasing Determination would apply.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

In developing the alternatives, the following alternatives were suggested, considered and subsequently eliminated from detailed analysis.

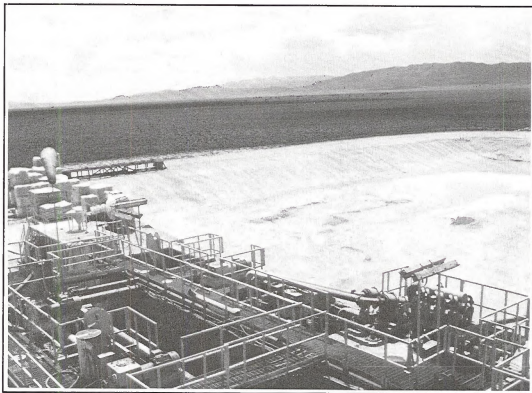
No Leasing Alternative

A No Leasing Alternative would mean that all 3.8 million acres of land within the Egan RA would be closed to leasing for oil and gas resources. Under the public policy expressed in the Mineral Leasing Act (MLA) of 1920 (30 U.S.C. 181 *et seq.*) and BLM's mandate for multiple use of public lands as described in the Federal Land Policy and Management Act (FLMPA) of 1976 (43 U.S.C. 1701 *et seq.*, P.L. 94-579), public lands are generally available for oil and gas leasing. Therefore, an alternative of no leasing over the entire resource area was not analyzed.

Limited Open Leasing Alternative




This alternative would mean that only those lands where no resource impacts were demonstrated would be available for leasing for oil and gas resources under standard terms and conditions of the leasing agreement. Lands where conflicts with resources existed would be closed to leasing.

The Manual 1624 SPG, which forms the basis of this amendment, provides the guidance which indicates that if a closure or other major operating constraint is discretionary by the agency, the supporting record must show that less restrictive measures were considered but found to be inadequate to provide the appropriate protection of resource values which were incompatible with a land use of oil and gas development. Since less restrictive measures can be placed on leasing to mitigate impacts and provide appropriate protection of resources, this alternative was not analyzed.







Tommyknocker Well, T61x-33G, Reserve Pit, Long Valley, NV
(Photo by Brian Ammel)

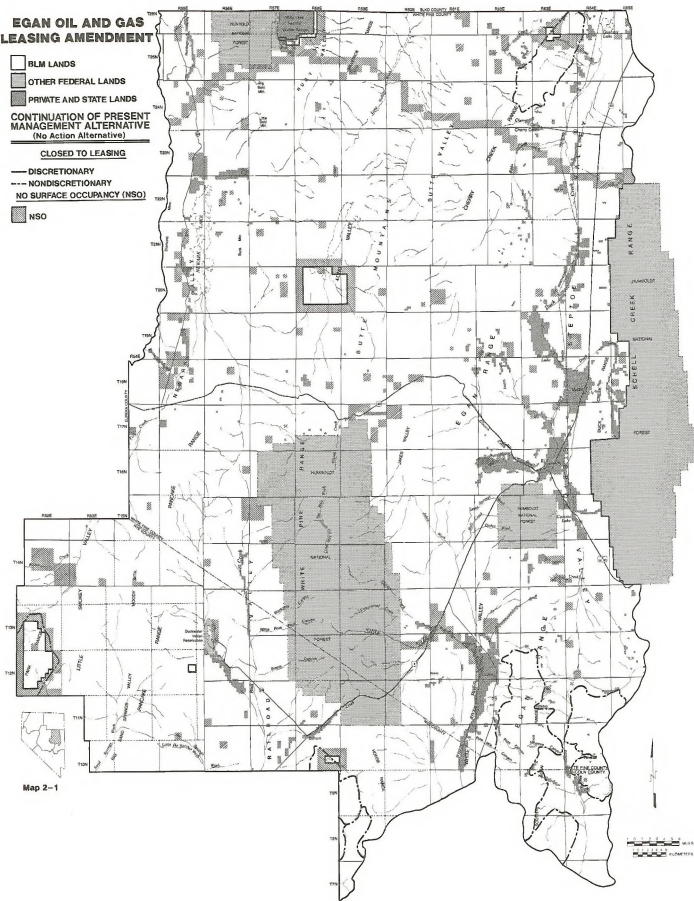
EGAN OIL AND GAS LEASING AMENDMENT

-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS

CONTINUATION OF PRESENT
MANAGEMENT ALTERNATIVE
(No Action Alternative)




CLOSED TO LEASING

-  DISCRETIONARY
-  NONDISCRETIONARY
-  NO SURFACE OCCUPANCY (NSO)
-  NSO



Map 2-1

EGAN OIL AND GAS LEASING AMENDMENT



-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS

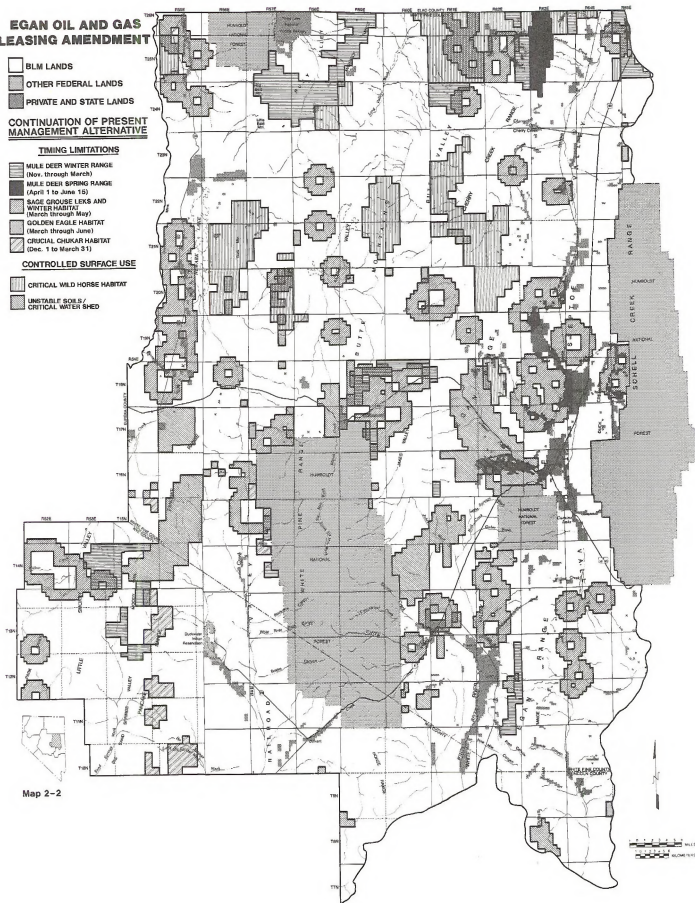
CONTINUATION OF PRESENT MANAGEMENT ALTERNATIVE

TIMING LIMITATIONS

-  MULE DEER WINTER RANGE (Nov. through March)
-  MULE DEER SPRING RANGE (April 1 to June 15)
-  SAGE GROUSE LEKS AND WINTER HABITAT (March through May)
-  GOLDEN EAGLE HABITAT (March through June)
-  CRITICAL CHUKAR HABITAT (Dec. 1 to March 31)

CONTROLLED SURFACE USE

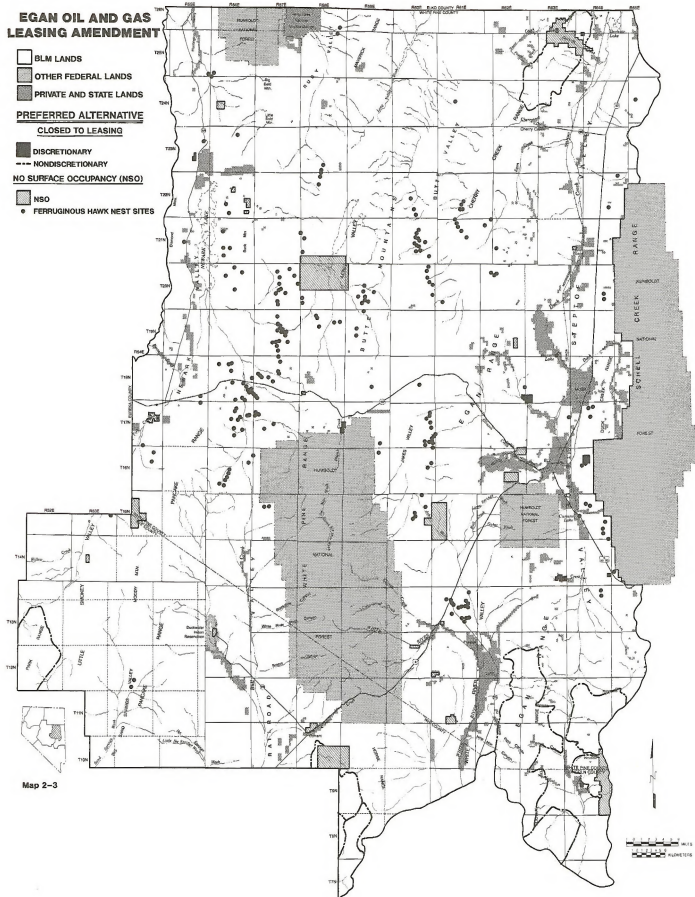
-  CRITICAL WILD HORSE HABITAT
-  UNSTABLE SOILS / CRITICAL WATER SHED



Map 2-2




EGAN OIL AND GAS LEASING AMENDMENT

- BLM LANDS
- OTHER FEDERAL LANDS
- PRIVATE AND STATE LANDS
- PREFERRED ALTERNATIVE**
 - CLOSED TO LEASING
 - DISCRETIONARY
 - NONDISCRETIONARY
- NO SURFACE OCCUPANCY (NSO)
 - NSO
 - FERRUGINOUS HAWK NEST SITES





Map 2-3

EGAN OIL AND GAS LEASING AMENDMENT



-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS

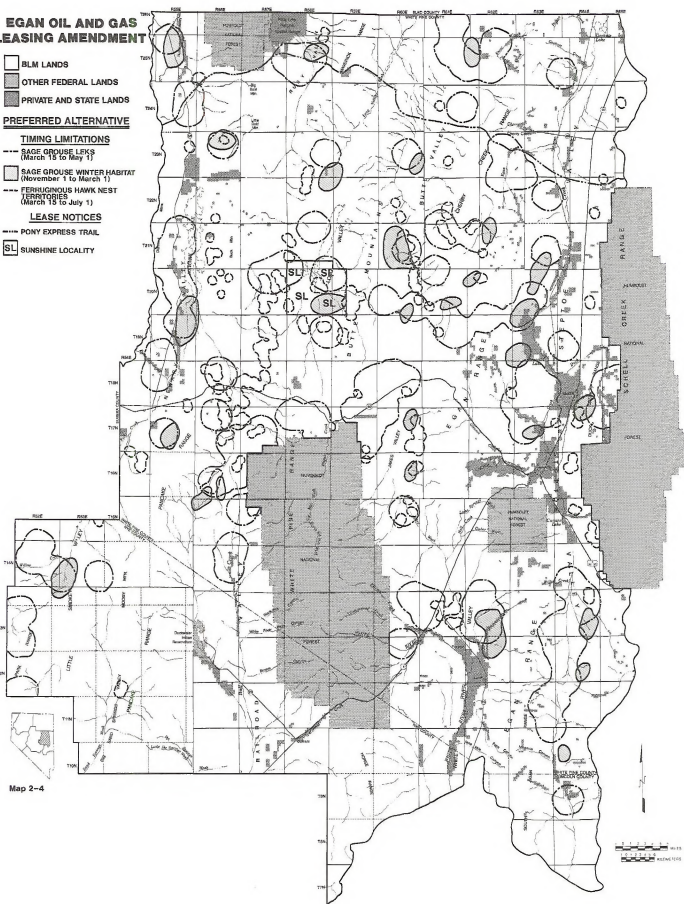
PREFERRED ALTERNATIVE

TIMING LIMITATIONS

-  SAGE GROUSE LEKS
(March 15 to May 1)
-  SAGE GROUSE WINTER HABITAT
(November 1 to March 1)
-  FERRUGINOUS HAWK NEST
TERRITORIES
(March 15 to July 1)




LEASE NOTICES

-  PONY EXPRESS TRAIL
-  SUNSHINE LOCALITY





Map 2-4

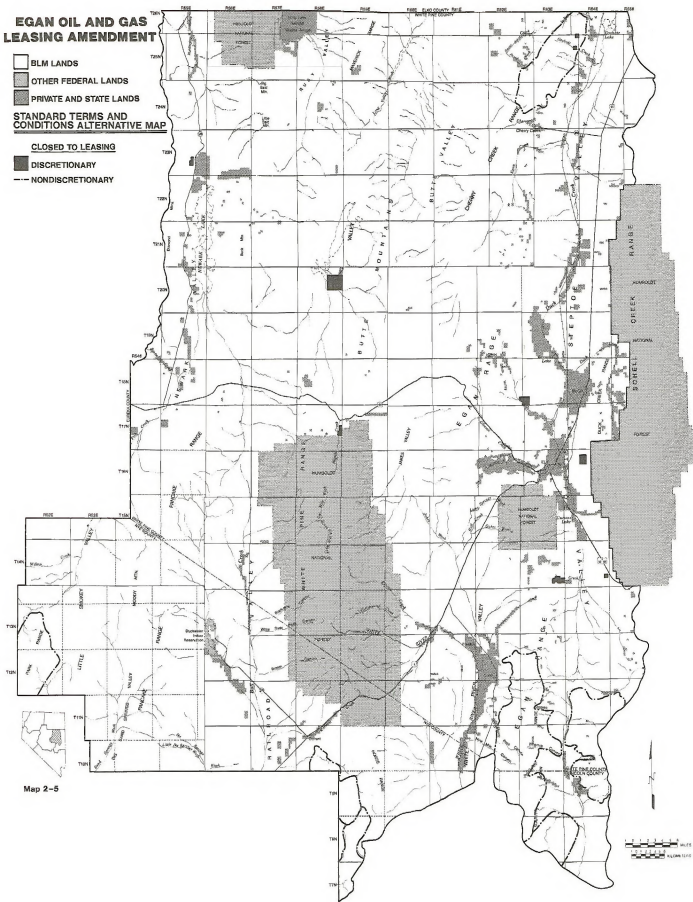
EGAN OIL AND GAS LEASING AMENDMENT

-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS

STANDARD TERMS AND CONDITIONS ALTERNATIVE MAP

CLOSED TO LEASING

-  DISCRETIONARY
-  NONDISCRETIONARY



Map 2-5

CHAPTER 3

AFFECTED ENVIRONMENT



CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the affected environment for the Egan Resource Area of the Ely District. The following descriptions of natural resources are presented as new or updated resource inventory data as it relates to oil and gas leasing. Since this document supplements the approved Egan RMP Final EIS (FEIS), Chapter 3, Affected Environment, will not be repeated here in its entirety. Resources that are covered in the draft and approved RMP are vegetation, livestock, wildlife, wild horses, lands and transportation, wilderness, water resources, soils, cultural resources, off-road vehicles, minerals and energy, and the social and economic environment. A limited number of copies of these two documents are available for review by the public at the following BLM offices and Public libraries: Nevada State Office, Ely District Office, White Pine County Library, Washoe County Library, Clark County Library.

WILDLIFE HABITAT

Detailed discussion of the major species of large game, upland game, waterfowl and aquatic animals are discussed in the Egan Draft and Proposed RMP. The information presented below represents new inventory data gathered since the implementation of the RMP.

Mule Deer

There are approximately 1,110,000 acres of mule deer habitat within the resource area (Refer to Big Game Habitat Map, Map 3-1). As many as 24,000 mule deer can be expected to migrate into the Buck and Bald and Maverick mountains crucial mule deer winter habitat area in a normal winter. These deer originate from the Ruby Mountain herd which is the largest herd within the confines of the state.

Elk

Presently, 300-500 elk occupy 140,800 acres of elk habitat within the resource area on a year-round basis. There have been two elk augmentations within the resource area since 1987, totalling 56 animals.

Pronghorn Antelope

There are an estimated 600-800 pronghorn antelope occupying 300,000 acres of antelope habitat within the resource area on a year-round basis. There have been two pronghorn antelope augmentations since 1985, totalling 100 animals.

Bighorn Sheep

Two species of bighorn sheep inhabit approximately 25,880 acres of bighorn sheep habitat within the resource area. A remnant population of Desert bighorn sheep utilize the resource area in severe winters north of the town of Currant, Nevada. Approximately 25-30 Rocky Mountain bighorn sheep inhabit the resource area in the area of Mount Grafton.

Upland Game

There are several species of upland game that inhabit the resource area. These species include Chukar and Hungarian partridge, California and Scaled quail, Ringneck pheasant, Blue and Sage grouse, and Cottontail and Pygmy rabbits.

Sage grouse winter and breeding seasons are the critical periods when impacts would be expected to occur. Sage grouse are almost entirely dependent upon sagebrush for food and cover, especially in the winter. Only sagebrush of a certain density, height, and type appear to be suitable as winter habitat. The birds are concentrated during the winter and extremely susceptible to disturbance. Sage grouse in this region of Nevada appear to be

bred on the leks within the valleys and then leave the vicinity of the lek to nest within close proximity to acceptable brooding habitat (San J. Stiver, NDOW, personal communication, 1990). This distance varies with each lek. Some brooding habitat is within a 2 mile radius of the lek; however, most brooding habitats are located several miles from the valley lek, usually within the foothills and mountains.

Recent sage grouse (1989) lek survey information indicate that sage grouse populations in the resource area are estimated to be at static levels to possibly increasing slightly. There are approximately 120 leks and approximately 1,000,280 acres of sage grouse habitat identified within the resource area (refer to Sage Grouse Habitat Map, Map 3-2).

Ferruginous hawks

The ferruginous hawk has been recently listed by the U.S. Fish & Wildlife Service (USF&WS) as a category 2 species. This categorization by the USF&WS means that the bird is a candidate for listing as threatened or endangered. A petition to list the ferruginous hawk as an endangered species has been received by the U.S. Fish and Wildlife Service in 1991. The ferruginous hawk nests in all valleys of the resource area. Typically, the hawk nests on the edge of juniper stands, near the end of stringers, generally on west facing slopes, within two miles of white sage vegetation (Perkins, *et al*, 1983).

The Egan RA has been identified by the Nevada Department of Wildlife (NDOW) as the most important BLM resource area in the State of Nevada for nesting of the ferruginous hawk. Approximately 2,300,000 acres of the resource area is identified as habitat for the ferruginous hawk.

Habitat and nest inventories in 1981 and 1982 identified 56 occupied ferruginous hawk nest sites within the resource area. In 1983, 66 occupied nest sites were documented. Nest site monitoring has continued on an annual basis and a drastic decline in occupied nest sites within the resource area has been documented. During 1990, inspection of ferruginous hawk nesting territories determined that only 25 of the 66 nest sites

occupied in 1983 were occupied (38%). There has been a steady decline in occupied ferruginous hawk nest sites since the 1983 high of 66 occupied sites. Map 3-3 depicts the general locations of 117 identified ferruginous hawk nesting territories which contain inventoried nest sites.

THREATENED AND ENDANGERED SPECIES

Animals

A total of 12 animal species occur in the Egan RA which are currently federally listed as either endangered, threatened or a candidate for listing as a Threatened and Endangered (T&E) species.

Endangered

The White River spinedace (*Lepidomeda albivallis*) is federally listed as endangered and has critical habitat at Preston Big Springs and Lund Town Springs on private land. The spinedace may also occur within the White River system on both public and private lands.

The endangered bald eagle winters in the area and roost sites have been identified on private land in Railroad Valley and on BLM land on Cedar Mountain in Newark Valley. The bald eagle will migrate into the region as early as November and depart as late as May each year.

The NDOW has identified two sites in the Diamond Mountains (Cristina Peak and Water Canyon) as artificial nest sites for future reintroduction of peregrine falcon, a listed endangered species.

Threatened

The Railroad Valley springfish (*Crenichthys nevadae*) a listed threatened species with critical habitat at Big Warm Springs and Little Warm Springs which have portions on the Duckwater Indian Reservation and on BLM land.

Category 2

The ferruginous hawk (*Buteo regalis*) is a category 2 species and is currently being considered for listing as an endangered species. The hawk nests

on public lands throughout the resource area (refer to ferruginous hawk discussion above).

The Bonneville cutthroat trout (*Oncorhynchus clarki utah*) occurs in Goshute Creek.

The Newark Valley tui chub (*Gila bicolor newarkensis*) occurs at three private spring sites and one public spring in Newark Valley.

The Pahranagat speckled dace (*Rhinichthys osculus velifer*) occurs at Preston Big Spring on private land.

The Railroad Valley tui chub (*Gila bicolor ssp.*) occurs at Green Springs and Bull Creek on private lands.

The Relic (Steptoe) dace (*Relictus solitarius*) occurs at three springs on private and possibly in one public spring in Steptoe Valley.

The White River desert sucker (*Catostomus clarki intermedius*) occurs at Preston Big Spring and Lund Town Spring on private lands, and in the White River system on both public and private lands.

The Preston White River springfish (*Crenichthys baileyi albivallis*) occurs at Preston Big Springs on private land.

Plants

A total of six candidate T&E plant species have been identified within the resource area.

Category 1

The Monte Neva paintbrush (*Castilleja salsuginosa*) occurs on private land in Steptoe Valley.

Category 2

The Currant milk-vetch (*Astragalus uncialis*), Baine's pincushion cactus (*Sclerocactus blaines*) and tufted globemallow (*Sphaeralcea caespitosa*) occur near Currant, Nevada.

The Welsh's catseye (*Crymoterus basalticus*) occurs in Jakes Valley.

The Sunnyside green gentian (*Frasera gypsicola*) occurs in White River Valley.

RIPARIAN HABITAT

There has been an increased emphasis on riparian management and protection since the implementation of the Egan RMP. The stream riparian portion is well documented in the RMP; however, the widely scattered riparian vegetation at springs, meadows and aspen stands are not well documented. The 1980-81 riparian survey of the Egan RA recorded an estimated 6,106 acres of wet meadows, 18,984 acres of aspen and 4,530 acres of other riparian habitat. This survey needs to be verified and better quantified because review of the survey since 1981 has shown that acres of riparian habitat within the resource area are overestimated.

MINERAL RESOURCES

Minerals have been explored and developed in Nevada since the early settlement of the region by man. Indian cultures used minerals and mineral materials for paints, pottery, ornaments, projectile points and other tools for survival.

Geology

The Egan RA is within the Basin and Range physiographic province. The region has had a complex geological history. Even though the region is now under extensional tectonic stress, the region has undergone several episodes of sedimentation, igneous activity, orogenic deformation and continental rifting.

In the early Paleozoic Era the region was a marginal coastal zone, with deposition of sediments occurring in a geosynclinal environment. A carbonate belt was deposited in the Egan RA with the detrital coastal deposits to the east and the deep ocean sediments to the west. The rock types consist of shales and limestones. This depositional environment remained up to the Devonian.

In the middle Paleozoic Era the region experienced its first compressional event. The Antler Orogeny began in central Nevada and resulted in the emplacement of the Roberts Mountain autochthon.

A subduction zone was established to the west and a volcanic island arc was developed with a foreland basin.

A foreland basin environment is where mountainous terrain occurs in the ocean away from the coast line and a basin is developed in which sediments are deposited from both sides. Typically, clastic sediments (sand and silt) are intermixed with limestone type deposits. Within this basin the sediments comprising the Pilot shale, Joana Limestone, Guilmette Formation, Chainman Shale and the Diamond Peak Formation were deposited. During the Antler Orogeny the Roberts Mountain thrust was developed and it is believed that the coastal sediments and crust were compressed by at least 100 km. The Sonomia orogeny was also accreted onto the continental crust in central Nevada in the late Paleozoic Era.

With the accretion of the Sonomia orogeny, a subduction zone was established to the west side of Nevada. This subduction marks the beginning of the modern circum-Pacific orogenic system. The Pacific Ocean seafloor's Kula Plate was subducted under the North American continental crust. North America changed it's direction of motion relative to the western ocean floor plate by rotating clockwise. A thermal bulge, relating to volcanism, occurred along the Sonomia suture zone. Sediments were transported to the north and east of the developed highlands. The volcanism subsided in the Late Triassic and the highlands to the southern end of Nevada subsided and was again below sea level.

With the onset of the Jurassic, events to the east set the stage of the geography we see today. The Atlantic sea floor spreading center was developed and the subduction to the west intensified. These

events where in relationship to the break up of the supercontinent Pangea. During the early stages of the break up, sediments were deposited in the interior regions of North America, Great Basin and Colorado Plateau.

The corresponding Rocky Mountain uplift event is known as the Cordilleran Orogeny. Several major thrust belts are associated with this subduction zone. The major thrust belt in Nevada is the Savier belt. The crustal shortening is estimated to be about 100 km. The volcanic activity associated with subduction also began in the region. The volcanic activity extended between the Sierra Nevada to the Rocky Mountains in step with the subduction rate of the oceanic plate.

From the middle Cenozoic Era to the present, extensional forces developed with the Basin and Range. The high angle fault controlled mountain ranges and intervening valleys are the result of the regional extensional forces. Volcanic activity increased with the extensional forces and the accompanying thinning of the continental crust. Valley fill within the area contains the erosional remnants of the mountain blocks.

Oil and Gas

A description of typical oil and gas operations is presented in Appendix A. The discussion describes the basic operations of the oil and gas industry from exploration activities through field development.

Exploration for oil and gas has increased in the Egan RA with the increase in oil and gas prices. A total of 76 exploration wildcat wells have been drilled in the resource area since 1920 (refer to Table 3-1).

TABLE 3-1

EGAN RA OIL AND GAS
DRILLING HISTORY

Year Drilled	# of Wells	Year Drilled	# of Wells
1920	1	1974	1
1926	1	1975	5
1928	2	1976	1
1950	1	1977	1
1951	1	1978	7
1952	1	1979	3
1954	1	1980	5
1957	1	1981	2
1961	1	1983	1
1964	2	1984	1
1965	4	1985	9
1966	2	1986	3
1967	4	1987	3
1968	1	1988	1
1970	5	1989	2
1971	1	1990	1
Total = 76 wells			

Of these wells, there was a total of twenty-five oil shows, five oil and gas shows and three gas shows or 44% of the wells drilled indicating presence of potential oil and gas resources within the resource area. In 1989, there were four wildcat wells drilled and an estimated 276 miles of geophysical seismic lines run, as well as several other geophysical programs such as gravity surveys and induced polarization surveys.

There are three major development contracts for oil and gas exploration between the Nevada BLM and industry. There are no producing fields in the Egan RA but producing fields are operating south of the resource area in Railroad Valley and northwest of the resource area in Pine Valley. Currently, there are 1,126 active leases covering 976,309 acres or 22% of the total land within the resource area. There are approximately 21,300 acres of split-estate lands (private surface/federal minerals) in the Egan RA. This acreage comprises approximately 0.5% of the total lands within the resource area.

Based on the regional geology for the area, the U.S. Geological Survey (USGS) published Eastern Great Basin and Snake River Downward, Geology and Petroleum Resources (Open File Report, 88-450-H). This report presents information for developing oil and gas potential for the region and identifies two potential oil and gas plays for Eastern Nevada. A "play" refers to an exploration target that may have the potential for payable quantities of oil and gas. The Egan RA is completely contained in each play described in the report.

The two oil and gas plays applied to this region are described as an "unconformity play" and an "Upper Paleozoic play". The unconformity play is a structural trap where the potential oil field is bounded by faults and sealed by weathered Tertiary volcanics or valley fill. The source rocks are the Mississippian-age Chainman Shale and Pilot Shale of the Sheep Pass Formation. These are the types of oil fields now producing in the Grant Canyon field in Railroad Valley, Nevada, located just south of the Egan RA.

The Upper Paleozoic play is a possible stratigraphic trap between the Diamond Peak Formation and the Chainman Shale Formation with the seals for the trap being composed of layers of shale within the system. The primary focus for this type of trap is tectonic movements of the Basin and Range may have disrupted the stratigraphic traps. This type of trap is producing oil in the Blackburn field in Pine Valley, Nevada, located to the northwest of the Egan RA. Chainman shale is the reported source rock. The report also describes a Pre-Devonian play that could be present; however, Basin and Range tectonic events may have destroyed any traps or seals.

The mountainous regions of the state have not been drilled to the extent the valley areas have; however, there has been extensive interest in an overthrust form of trap in the western edge of the resource area. Several large development contracts have been negotiated for the area. The information developed from these contracts has shown some good basis for the overthrust theory. The Antler and Sevier thrust are two events that have occurred in the geologic past. There are several known thrust belt areas in the state that could contribute to possible oil and gas development.

The oil and gas potential for the Egan RA is high in the valley bottom fill areas with direct and indirect geologic and geophysical evidence. The Diamond, Buck, Bald, Pancake, White Pine, Butte, and Grant mountain ranges have a moderate potential for oil and gas with indirect evidence. The rest of the mountainous areas have a low potential for oil and gas (refer to Oil and Gas Resource Potential Map, Map 3-4).

The Egan RA contains approximately 2.2 million acres of high oil and gas potential, 1.1 million acres of moderate oil and gas potential and 0.5 million acres of low oil and gas potential.

Locatable Minerals

Base mineral mining has been ongoing since the 1800's in the Egan RA. The first mineral discovery was in the Cherry Creek mining district north of Ely, Nevada in 1861. Since that time exploration and production of precious and base metals such as gold, silver, copper, lead, and zinc have continued to be produced. The largest operation is

the Robinson Mining District which produced copper for approximately 80 years.

Currently, gold is being produced and searched for the most part by mining companies. A total of ten mines are either producing minerals or are in the developing stage. These mines are the Bald Mountain Mine, Little Bald Mountain Mine, Alligator Ridge Mine, Casino Mine and the White Pine Mine all located in the Bald Mountain mining district; The Green Springs Mine, Easy Junior Mine and the Mount Hamilton Mine in the White Pine mining district; Golden Butte Mine in the Cherry Creek mining district; and the Ward Mountain Mine in the Ward mining district.

Salable Minerals

There are several types of salable minerals in the resource area. The most common is gravel deposits. Gravel deposits are associated with the colluvium which was deposited off the mountain ranges. The other types of deposits include topsoil, decorative type rock and sand. These types of salable minerals are widely distributed throughout the resource area. There is no major exploration ongoing for salable minerals. There are five community pits in the resource area and a total of eighty-three right-of-way pits established for the federal highway system.

Other Leasable Minerals

The solid leasable minerals in the Egan RA include the potassium and phosphates that are associated with Pleistocene-age lakes. When these lakes evaporated, they had the potential to precipitate mineral salts from a saline environment. There are also two very small occurrences of coal resources in the resource area that have been produced locally in the past. These sources have not been worked since the early 1900's. There are two source areas for possible geothermal resources in the area, Cherry Creek and Lund areas. Geothermal activity is low and is not expected to increase. The last well for geothermal was drilled in 1980 and plugged and abandoned in 1989. There is no exploration or development work ongoing for geothermal resources. There is low potential in the resource area for potassium and sodium with minor potential for phosphates. Currently, there is no exploration or development

work occurring for these solid leasable mineral resources.

WOODLAND PRODUCTS

The majority of the forest resources occurring within the Egan RA are comprised of the pinyon-juniper type. This type has an overstory of Utah juniper (*Juniperus osteosperma*) at the lower elevations and on drier sites, mixing with singleleaf pinyon (*Pinus monophylla*) at mid-ranges and dominated by pinyon mixed with mountain mahogany and occasional Rocky Mountain juniper (*Juniperus scopulorum*) at the upper elevations or on wetter sites.

The chief woodland products derived from woodland resources in the Egan RA consist of firewood, cedar posts, pinyon pinenuts and Christmas trees.

Four species of tree are considered unique in occurrence on public lands within the resource area: Swamp cedar (*Juniperus scopulorum*), Ponderosa pine (*Pinus ponderosa*), Bristlecone pine (*Pinus longaeva*, var. *aristata*), and White fir (*Abies concolor*).

The swamp cedar is a specialized variety of Rocky Mountain juniper, occurring on alkali flats in valley bottoms on the edge of the playas. This variety occurs on one known site in the Egan RA in the White River Valley. Generally, Rocky Mountain juniper is found at elevations above 7,800 feet or along water courses. This site is at 5,400 feet with no open water.

Ponderosa Pine, while not uncommon in the resource area during the early settlement era (1850-1900 A.D.), was heavily cut for building material and has all but disappeared from most mountain ranges. Some groves remain as isolated, inaccessible remnant populations. Where these species occur within Wilderness Study Areas (WSAs), they are considered a special feature adding to the overall wilderness values. The ponderosa groves serve as isolated genetic pools for varieties of ponderosa which may be better adapted to this environmental zone than common nursery stock. The seed has been collected for the

Nevada Division of Forestry and has been planted at state campgrounds in other areas.

Bristlecone pine is documented on a few sites above 8,000 feet in elevation. As an extremely long-lived species, this tree has scientific value in recording long-term climatic patterns in the growth rings. Both the living trees and nearby dead material are used to create an overlapped dendrochronology extending into the past some 6,000 years. These trees exhibit an unusual growth form and have a unique aesthetic value. Although only a few sites have been documented, due to the difficulty of access, isolated occurrences or groves may be found anywhere in mountainous terrain above 8,000 feet. There is one Bristlecone Natural Area within the Egan RA located on the crest of the Egan Range between Smith and Steptoe Valleys.

White Fir are found in small groves and pockets on north aspects in the steep upper elevations of the higher mountain ranges of the resource area. The trees are also found in successional association with quaking aspen (*Populus tremulaoides*) on moist sites in open basins at high elevations (above 8,000 feet).

CULTURAL RESOURCES

The Egan RA contains a wide variety of both prehistoric and historic cultural resources. Prehistoric resources can be found virtually everywhere in the resource area. Site types include, but are not limited to: open lithic scatters relating to hunting, collecting, tool production, temporary or semi-permanent habitation; quarry locales; hunting blinds and antelope traps; petroglyphs and pictographs; rockshelters; wicki-ups; and isolate artifacts.

Cultural components span at least 10,000 years and include manifestations of the Paleo-Indian Western Pluvial Lakes Tradition (WPLT); the Early Archaic transition from moist conditions to the dryer adaptation known as the Desert Archaic Tradition, which continued until approximately 1,500 years ago. The Late Prehistoric period is marked by the shift from the spear-thrower to the bow and arrow technology. During this period, there is evidence of at least three distinct cultural groups inhabiting the region: the indigenous

Archaic populations, the Numic culture, and the semi-puebloan Fremont culture from western Utah.

The prehistoric cultural resources of the Egan RA can be considered to be rich in variety and in scientific research domains. Currently, one university and the Nevada State Museum are conducting long-term research projects within the resource area. In general, most cultural resources occur in the high and moderate oil and gas potential zones.

Historic cultural resources within the resource area are equally varied and unique. Much of eastern Nevada experienced some of the earliest mining activity in the state. A number of mining districts are located in the region and have associated remnants of mining camps and towns. Numerous locations related to early charcoal production by the "Carbonari" are present. These sites are comprised of large complexes of charcoal "platforms" widely dispersed throughout the Pancake Range, Buck Mountain, and Antelope Mountain. The "Carbonari" were Italian-Swiss immigrants who in the mid-1870's, virtually clear-cut the pinyon and juniper forest for a 45-mile radius surrounding the town of Eureka, Nevada, to reduce charcoal in support of the local smelters. The cut stumps of old-growth trees can be found scattered on many hillsides, indicating a more open woodland in the historic past. Today the landscape is characterized by dense stands of second-growth closed canopy pinyon-juniper woodland.

Other historic resources include the routes and trails of early explorers seeking transportation routes to the west, the Pony Express trail and associated way-stations, stage routes and stations between mining towns, early ranches, and the Northern Nevada Railway.

The Egan RA also contains Native American reservations and colonies within its boundaries. The historic Native Americans are the Duckwater tribe of the Western Shoshone. The American Religious Freedom Act (AIRFA) of 1979 (P.L. 95-341; 92 Stat. 469; 42 U.S.C. 1996) directs federal agencies to ensure that Indian religious rights and freedoms are not unnecessarily disrupted by federally-approved actions.

The Bureau includes in the definition of cultural resources the concept of traditional lifeway values. These values are the quality of being useful in or important to the maintenance of a specified social or cultural group's traditional systems of religious belief, cultural practices, identity, or social interaction. Traditional lifeway values may be associated with properties from either the prehistoric or historic eras. When the value is associated with the prehistoric era it is also associated with Native American traditional values, traditional land uses, and/or religious beliefs and may be subject to the requirements of AIRFA. Values associated with the historic era are not necessarily associated with Native Americans, but can be associated with other social or cultural groups.

The historic era blends into contemporary times in ways that preserve elements of traditional and historic cultures and lifeways. For example, Native Americans have continued traditional religious beliefs and practices and in many cases have maintained treaty rights to exploit traditional plant gathering areas and hunting rights. Other groups of people, such as Mormon pioneers, have also maintained traditional religious and cultural beliefs and practices. Traditional lifeway values may include maintaining access to vegetation communities, such as pinyon-juniper woodlands to gather traditional food resources; gather materials to make culturally significant artifacts or gather traditional plants for medicinal or religious uses. These values can also include maintaining a traditional landscape that embodies religious symbolism or is used for religious practices and may include maintaining an historic landscape that exemplifies an historic lifeway such as ranching or mining.

Very few sites have been identified in the Egan RA which are Native American religious sites. One site located in Steptoe Valley is the location of the most recent "Sundance" which was held in the 1960's and led by Mary Stanton, a local elder, now deceased.

Some of the more significant prehistoric and historic cultural resources and districts within the resource area are listed below (refer to Cultural Resources Map, Map 3-5). The cultural resources

listed below are arranged according to the oil and gas potential zone in which they occur.

Prehistoric Properties

High Potential Zone

- The Sunshine Locality National Register District
- Long Valley Quarry
- The City of the Rocks Archaeological District
- Little Smoky Valley Quarry
- Little Smoky Valley Antelope Wall
- Huntington Valley Proto-historic Village
- Black Point Complex
- Newark Cave
- Northern Railroad Valley Archaeological Study Area

Moderate Potential Zone

- Park Range Archaeological Study Area
- Mahoney Canyon Quarry
- Giroux Wash Wicki-ups

Historic Properties

High Potential Zone

- Pony Express Trail and Stations

Moderate Potential Zone

- Ward Mining District (town and cemetery)
- Ward Charcoal Ovens National Register Property

- Fort Schellbourne National Register Property
- Egan Canyon Cemetery
- Buck Mountain Historic District
- Bald Mountain Mining District
- Cherry Creek Mining District
- Pancake Range Carbonari Study Area
- Antelope Summit Carbonari Study Area

WILDERNESS

There are portions of seven Wilderness Study Areas (WSAs) and two Instant Study Areas (ISAs) within the Egan RA, totalling 241,171 acres (refer to Table 3-2 below).

The four WSAs administered by the Egan RA (Park Range, Riordan's Well, Goshute Canyon, and South Egan Range) cross administrative boundaries with the Shoshone-Eureka, Tonopah, Elko, Wells, and Schell Resource Areas. Two WSAs administered by the Schell RA (Mount Grafton and Far South Egans) are partially (61,600 acres) within the Egan RA. One WSA administered by the Battle Mountain District (Blue Eagle) is partially (14,650 acres) within the Egan RA.

Both ISAs are completely within the Egan RA. Within the Egan RA, the WSAs total approximately 238,050 acres and ISAs total 3,121 acres. Approximately 82,650 acres are recommended as suitable for wilderness designation (Egan, Schell, Tonopah Wilderness Recommendations Final EISs; 1987).

TABLE 3-2

**EGAN RESOURCE AREA
WILDERNESS AND INSTANT STUDY AREAS
(WSAs/ISAs)**

WSA/ISA Name	WSA Number	Total Acres	Acres Egan RA	Suitable Acres Egan RA
Goshute Canyon	NV-040-015	35,594	35,400	22,100
Park Range	NV-040-154	47,268	17,000	31,300
Riordan's Well	NV-040-166	57,002	17,000	0**
South Egan Range	NV-040-168	96,916	78,100	0
Mount Grafton	NV-040-166	73,216	43,500	12,650
Far South Egans	NV-040-172	53,224	18,100	16,600
Blue Eagle	NV-060-158/199	59,560	14,650	0**
Goshute Canyon Natural Area ISA	NV-040-015A	2,641*	2,641	0
Huesser Mountain Bristlecone Pine Natural Area ISA	NV-040-048A	480	480	0
Total Acres:		425,901	241,171	82,650
<p>* Acres outside of Goshute Canyon WSA (NV-040-015) ** Changes from Final Wilderness EISs:</p> <p>The Riordan's Well WSA (NV-040-166) and the Blue Eagle WSA (NV-060-158/199) original recommendations of 37,542 acres and 59,350 acres, respectively, as suitable for wilderness designation was changed to 0 acres suitable for each WSA in 1989. This change from the Final EISs was the result of an administrative decision by the Nevada State Director after review of data published by the USGS which indicated the WSAs should be classified as high potential for oil and gas resources.</p>				

RECREATION

Dispersed backcountry recreation is the predominant type of outdoor recreation in the Egan Resource Area. Primitive backcountry opportunities are abundant, especially in mountainous areas. The backcountry provides solitude and a base for activities such as hunting, fishing, spelunking, trapping, rock climbing, rock hounding, winter sports, camping, sightseeing, day hiking, backpacking, pine nut gathering, horseback riding, picnicking, and off-road and off-highway vehicle (ORV/OHV) driving. These outdoor activities are held in high regard by local residents and visitors to this area.

The east-central Nevada area has been identified in the Nevada Statewide Comprehensive Outdoor Recreation Plan as the "playground" for Las Vegas and Clark County residents. With the tremendous population growth in Clark County, recreation demands are expected to increase.

Important areas or sites on public lands which are managed for recreation include the Mount Grafton Scenic Area, Goshute Canyon Natural Area, Goshute Canyon Campground, Goshute Cave and Cave Valley Cave Geologic Areas, and the Ward Mountain Winter Sports Recreation Area (refer to Recreation Map, Map 3-6).

The Goshute Canyon Campground is a two unit primitive campground development adjacent to Goshute Creek. Goshute Cave is a highly decorated limestone solution cave located in the northern end of the Egan Range. Cave Valley Cave is an unusual mud cave located in the northern end of Cave Valley.

Four recreation attractions in the Egan RA comprise the "Loneliest Highway" Special Recreation Management Area (SRMA) and are discussed below.

- Illipah Reservoir is a 200-acre lake with an adjacent campground. The lake is located at the base of the White Pine Range and provides excellent fishing opportunities.

- Cold Creek Reservoir is a 10-acre impoundment located at the base of the Diamond Mountains and provides fishing opportunities. Recreation improvements are planned for the area around this reservoir.

- Garnet Hill is managed for recreational rockhounding and is located just outside of Ely. There are three developed picnic units at this site.

- The Pony Express Trail traverses the northern part of the resource area for 57 miles. One of the primary management goals for this historical attraction is to maintain the visual integrity of the trail and bordering lands. A 1/4-mile visual management zone has been established on either side of the trail (Egan ROD; p.40, 1987). The trail is proposed to be designated by Congress as a National Historic Trail.

Areas and sites that are proposed for intensive recreation management and development in the Recreation 2000 Strategy Plan for Egan RA include: Buck's Station along the Elko-Hamilton Stage route; the Egan Canyon Pony Express Station; the Horse and Cattle Camp Backcountry Byway; Bristlecone Pine Interpretive Area; campgrounds at Antelope Summit, Bassett Lake, and Comins Lake; and development of the Egan Crest Trail. Designation of the Ragged Ridge Scenic Area was proposed in the Egan RMP.

Many of the backcountry sites in the Egan RA are only accessible by unimproved roads. These sites include hundreds of backcountry campsites which have been defined through use and are visited regularly by recreationists.

The entire resource area is open to use by ORVs and OHVs except for portions of Riordan's Well WSA and the South Egan Range WSA within which off-road travel is designated as limited to existing roads and trails. In accordance with BLM's Wilderness Interim Management Policy (IMP), ORV and OHV use in all WSAs is restricted to existing roads and ways; however, this policy does not constitute an ORV designation made through a land use decision. Most "off-road" use in the resource area actually occurs on existing roads and backcountry trails due to the physical barriers to travel presented by topography and vegetation.

The Egan RA provides quality hunting for a variety of game animals. These include mule deer, elk, antelope, sage grouse, cottontail rabbit, mourning dove and mountain lion. Hunting for big game is regulated through a quota system established by the NDOW. The quota system is oversubscribed each year for deer, elk and antelope tags because demand far exceeds the supply.

Management objectives for the Egan Recreation Program are:

- To enhance opportunities for high quality outdoor recreation experiences in an essentially primitive setting.

- To foster public understanding and appreciation of the BLM's multiple-use management mission through interpretive information and programs.

- To provide high quality visitor services, including developed camping and day-use facilities.

- To provide for winter recreation opportunities near Ely.

- To provide recreational facilities, management and other services required as a result of the increasing population in White Pine County.

VISUAL RESOURCES

Visual resource management classes have not been established in any of the land use plans completed within Egan RA. Earlier plans, such as the Duckwater MFP, were prepared prior to development of the VRM program. In the Egan RMP, visual resources were not considered to be a land use issue and, therefore, inventory, evaluation and determination of VRM objectives was not completed. Visual resources will be inventoried and VRM classes will be determined during the next planning cycle.

In accordance with the Visual Resource Management (VRM) policy contained in BLM Manual section 8400, visual resources are to be considered in environmental assessment documents. When an oil and gas exploration or development project proposal occurs, interim visual management objectives will be developed on a site-specific basis. VRM policy requires that design considerations to minimize impacts to visual resources shall be incorporated into all surface disturbing projects in order to minimize costly mitigation of impacts at a later date.

WILD HORSES AND BURROS

At present, wild horses are found in and adjacent to nine identified herd use areas covering all or part of thirty-three grazing allotments in the resource area. The 1990-1991 census of existing wild horse numbers based on aerial census in the Egan RA is 3,926 horses and three burros. This includes horses censused in and adjacent to the nine identified herd use areas as well as horses

censused along the east slope of the Diamond Mountains adjacent to the Battle Mountain District's Diamond Herd Area (refer to Table 3-3). The largest wild horse herd in the resource area is within the Buck and Bald herd use area with an estimated population of 1,228 horses (excluding Elko) and the smallest herd is Cherry Creek herd use area with no horses (excluding Elko).

The Egan RMP determined present wild horse herd use area boundaries and periodic census determines wild horse numbers; however, wild horse populations fluctuate and bands move across herd use area, resource area and district boundaries. Wild horses in the Antelope, Butte, Cherry Creek, Buck and Bald, and Diamond Hills South herds cross into the Elko District. The Diamond Hills South and the Sand Springs East herds utilize portions of the Battle Mountain District. The Antelope and White River herds move between the Egan and Schell Ras of the Ely District and the Monte Cristo herd utilizes U.S. Forest Service-administered land in the Humboldt National Forest. There is also considerable wild horse movement between herd use areas that adjoin each other within the Egan RA.

Wild horse populations have historically fluctuated, due to natural increase and private gatherings prior to the passage of the Wild Horse and Burro Act and 11 BLM gatherings since 1971.

The most recent information indicates that wild horse populations in the Egan RA are increasing in all herd use areas with the exception of Cherry Creek which has decreased in population (past census data on-file at the Ely District Office).

TABLE 3-3
EGAN RESOURCE AREA
WILD HORSE CENSUS DATA

Herd Use Area Number	Herd Use Area	1990-1991 Census
401	Antelope	33
402	Monte Cristo	725
409	Buck and Bald	1,228
409	Sand Springs East	936
409	Cherry Creek	0
402	Butte	508*
409	Jake's Wash	33
409	White River	52
412	Diamond Hills South	208
	Diamond Horse-Free Area	206
Total:		3,929*
* Includes three burros.		

SOILS

The soils in the Egan RA are highly variable in texture, depth, fertility, and age. Young soils are found in drainage ways where deposition occurs and on unstable slopes where erosion is taking place. Older soils occur on stable uplands and in higher precipitation areas reflected by increased vegetative cover. Texture varies from fine clays to coarse sands. Depth varies from shallow soils (less than 20 inches), as on ridges and steep side slopes, to very deep soils (greater than 60 inches), as found in alluvial drainages. Soil fertility may be reflected by the density of the vegetation. Those with a sparse vegetative cover are not considered to be fertile soils, and the soil building processes are very slow. Those with a dense vegetative cover reflect higher fertility and faster soil building processes.

Fine sediments generally accumulate on internally drained lake plains and lagoons. These landforms are found on the lowest geographic positions with less than 1% slopes. They generally pond (retain water on the surface) for brief periods during the winter, early spring, and after intense summer convective storms. Axial-stream floodplains contain perennial surface water which occurs as streams, seeps, ponds and riparian areas.

The soils in the valley bottoms generally have a silt or silt loam surface with a strong platy surface structure. Undisturbed these surfaces are very resistant to wind erosion; however, alteration of the surface morphology (crust rupture) and removal of protective vegetative cover can result in an increase in wind erosion potential during dry periods.

Relict lake terraces and bars contain soils with surfaces which are resistant to wind erosion due to their generally high coarse fragment content. Slopes range from 2 to 15 percent, with localized steeper escarpments along terraces and convex bar formations.

Soils on alluvial fans have a loamy surface modified by up to 60 percent gravel. Areas with high coarse fragment content are resistant to erosion; however, many alluvial fans have areas with little or no surface rock fragments present.

WATER RESOURCES

Surface water occurrence within the resource area is largely seasonal and with the exception of small streams which originate in the mountain areas or from springs, streamflow occurs only during or following periods of snowmelt or heavy rainfall. There are a number of springs (30+) within the resource area with flows over 200 gallons per minute (USGS Hydrologic Investigations Atlas HA-694-C, 1988).

Estimates of surface water or lake evaporation in the valley bottoms range from 42 to 60 inches per year. Transpiration estimates range from a few inches per year for scattered vegetation types to about 18 inches per year for wetland areas. In most areas, water availability is the main factor limiting evapotranspiration.

Groundwater occurs both within the unconsolidated valley fill and bedrock units. In the valleys, the major component of groundwater recharge comes from precipitation from the bordering mountain ranges through infiltration of surface runoff on the alluvial slopes and by underflow from the bedrock units which comprise the mountain ranges.

In general, the direction of groundwater flow in the shallow flow systems within the valley fill materials is controlled by the surface topography and by the thickness and physical composition of the unconsolidated materials. Groundwater flow within the deep bedrock system is controlled by the geologic structure, stratigraphy and by major topography features. A deep regional groundwater system within the carbonate section has been identified in eastern Nevada.

Within both the shallow and deep flow systems, groundwater flow tends to be from areas of higher elevation toward the valleys. The major areas of groundwater discharge are located along the perimeter and within the central portion of the valleys. The primary mechanism for groundwater discharge within the valley floor is evapotranspiration. In some of the valleys, groundwater is discharged as springs and seeps along the edges of the valley and directly to stream channels or other topographically low areas.

Although the majority of the groundwater basins in the resource area are topographically closed basins, inter-basin groundwater transfer occurs through unconsolidated valley fill materials and through the bedrock. The quantity of inter-basin flow is generally small in relation to the total volume of water annually recharged to, and discarded from, the alluvial valley aquifer systems. It may, nevertheless, be a significant part of the of the total hydrologic budget in some valleys.

The uses of waters on public lands are usually not used for domestic purposes; therefore, the quality of the water used is not a consideration and water quality is not monitored.

Produced waters from oil and gas exploration and production originate from a variety of aquifers and hydrogeologic formations associated with the locations of operations. Quality of produced waters is not known until they are tested. State law requires that produced waters that are reinjected into aquifers must be of equal or better quality of water in the aquifer.

AIR QUALITY

The Clean Air Act provides for the establishment of National Ambient Air Quality Standards (NAAQS). Establishment of ambient air quality standards is the responsibility of the Environmental Protection Agency (EPA) and the State of Nevada Division of Environmental Protection (NDEP).

Air quality is considered acceptable if pollutant levels are continuously less than or equal to NAAQS or in the case of short-term federal standards (24-hour average or less), exceed the standards no more than once each year. State of

Nevada ambient air quality standards are also not to be exceeded.

Federal and state standards require the Prevention of Significant Deterioration (PSD) of air quality in regions that attain NAAQS. The attainment area classification that affects the entire district is Class II which is for areas where normal industrial growth is allowed. The Egan RA is a rural area with limited industrial activity, and there are no nonattainment areas relative to the Class II designation in the resource area.

LANDS AND TRANSPORTATION

Lands

The land ownership pattern of the Egan RA is characterized by large tracts of public land with small parcels of private and non-federal land dispersed throughout the resource area.

Public lands and Federal mineral estate comprise about 85 percent of the land area within the Egan RA (refer to Table 1-1, Chapter 1). The proportion of the land potentially available for federal leasing is, therefore, locally significant. The number of parcels of split-estate lands (Federal ownership of the mineral resources underlying private lands) aggregate less than 1 percent of the total land area in the resource area.

Various types of land use authorizations are scattered throughout the public lands in the resource area. These include linear rights-of-way, such as power and telephone lines and roads; site-type rights-of-way such as microwave relay facilities or water reservoirs; leases under the Recreation and Public Purposes Act (R&PP) and leases/permits for other non-energy land uses such as agricultural authorized under section 302 of FLPMA. The approved Egan RMP either identifies corridors suitable for linear rights-of-way or uses a combination of environmental assessment and zoning approach to identify areas suitable or unsuitable for rights-of-way placement.

The greatest number of existing authorizations are related to linear rights-of-way, including some for major facilities such as power transmission lines and state or federal highways. No oil and gas

transportation pipelines presently cross the resource area.

Transportation

Primary access within the resource area is furnished by interstate highways, state highways, county roads, and public access roads. The majority of the public lands are accessible to the general public via one of these roads. Some areas do have large amounts of BLM managed land that are not accessible due to steep terrain and lack of maintained roads. Legal access across private lands is generally not a problem. This is due to the fact that most private lands in the area are accessible only by crossing BLM lands on BLM or county roads, and the fact that many of these main access roads crossing valleys in the area also cross through these private lands while providing them access. Approximately 85 percent of the roads are not maintained on a regular basis.

SOCIAL ECONOMICS

Social and Economic Conditions

The Egan RA includes the western two-thirds of White Pine County and small portions of northeastern Nye and northern Lincoln Counties. The Affected Environment, for purposes of economic analysis, is confined to White Pine County. Any potential for population, employment, or income effects beyond this area is considered negligible.

Population

White Pine County is predominately rural and sparsely populated with population density averaging about 1.0 persons per square mile. The reported 1980 census population of 8,167 grew to 8,830 in 1989, and is projected to grow to 9,700 in 1990 and 12,410 by 1995 (Nevada State Department of Administration), indicating an anticipated growth of approximately 52 percent over the 15-year period.

Eighty-one percent (7,160 persons) of the county's population is concentrated in the Cities of Ely (5,190), Ruth (470) and McGill (1,500). A small segment of the population lives on ranches and

mining settlements scattered throughout the county (population for Ruth and McGill are BLM estimates).

Income and Employment

The industrial sector and total income and employment and relative importance of each sector for the study area is listed in Table 3-4. Figures for 1988 show trade, services, government and mining to be the primary sources of employment.

In 1988, mining provided the major source of income, estimated at 30 percent of total industrial income for the county. Government, services, and trade followed, in that order.

Total personal income for White Pine County, in 1988, is estimated at \$120,223,000. This includes the \$84,190,000 of industrial earnings listed in Table 3-4 below, plus income from dividends, interest, rent, and transfer payments. White Pine County's per capita personal income for 1988 was estimated at \$15,140, while the state average was \$17,525.

The unemployment rate as of December, 1988, was reported as 5.1 percent; with a total labor force of 3,910, there were 200 persons unemployed at that time. Figures for July, 1990, indicate an unemployment rate of 6.9 percent with 370 persons unemployed out of a labor force of 5,340.

Social Setting, Attitudes, and Values

Analyses of social attitudes, expectations, and lifestyles have been previously presented in Socio-Economic Profiles and Planning Area Analyses prepared by BLM. From these sources it can be concluded that the majority of both urban and rural

residents are pleased with their communities and lifestyles, while the rural residents are less tolerant of outside influences in their lives.

Generally, residents strongly value such things as quality educational opportunities for their children, family life, friendship, personal honesty and trust. In the rural areas, particularly, personal independence, responsibility, and self-reliance are prized virtues. Economic development, industrial growth, and community expansion are favored, while personal status and environmental concerns receive less emphasis. Positive community attributes include such factors as (1) a good place to raise a family, (2) recreational opportunities, (3) and quality of the physical environment. The lack of adequate hospital and medical care are principal concerns. Most of the townspeople feel that the highest and best use of the land would come through private economic development, while recreation groups are concerned about preserving the quality of their outdoor recreation opportunity. Many residents value the area's lack of population and the area's scenic values; however, with regard to their economic well-being, most people endorse population growth and industrial expansion. In contrast, some outside area recreation and conservation groups wish to preserve the local area beauty even at the expense of economic development.




To local residents, agricultural land, minerals, water, and energy are identified as being most important to Nevada. While many residents maintain that some of the public lands should be preserved as wilderness, they feel that agricultural or mineralized areas should not be included. There is a strong feeling that too much of the county's land is in federal control. Some local residents feel that a large portion of federal lands should be transferred to State or private ownership.

TABLE 3-4
WHITE PINE COUNTY
TOTAL INCOME AND EMPLOYMENT
1988

Source	Employment Persons (Percent)	Income \$1,000 (Percent)
Agriculture	219 (5.3)	2,459 (2.9)
Mining	652 (15.9)	25,219 (30.0)
Construction	281 (6.9)	6,547 (7.8)
Manufacturing	31 (0.8)	1,710 (2.0)
Trade	898 (22.0)	12,094 (14.4)
Services	839 (20.5)	12,416 (14.7)
Finance, Insurance and Real Estate	180 (4.4)	1,617 (1.9)
Transportation and Public Utilities	220 (5.4)	6,483 (18.6)
Government	770 (18.8)	15,645 (18.6)
Total:	4,090 (100.0)	84,190 (100.0)

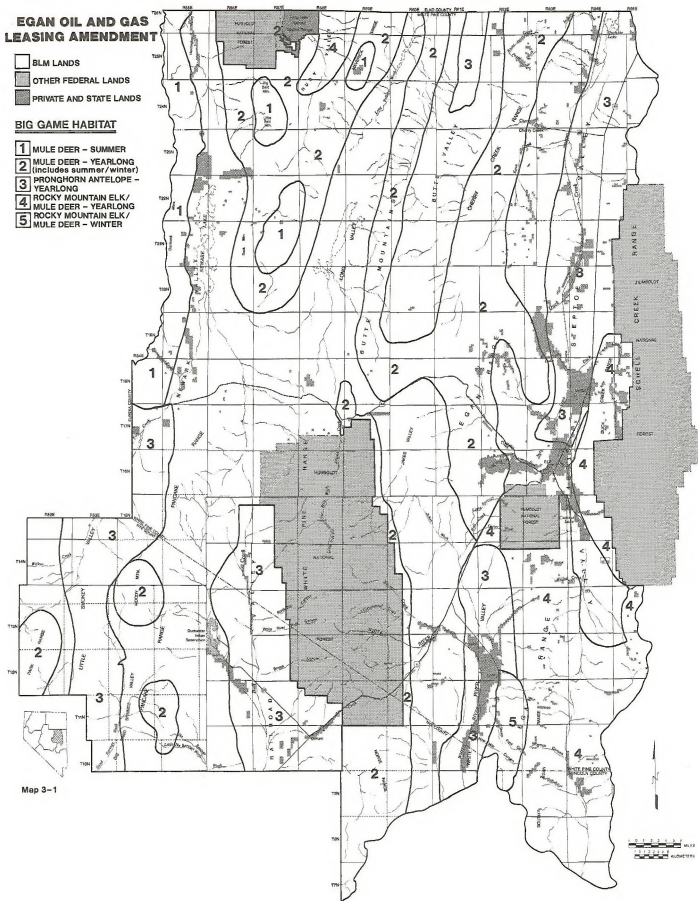
Source: Regional Economic Information System, Bureau of Economic Analysis, 1990.

EGAN OIL AND GAS LEASING AMENDMENT

-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS




BIG GAME HABITAT

- 1** MULE DEER - SUMMER
- 2** MULE DEER - YEARLONG (includes summer/winter)
- 3** PRONGHORN ANTELOPE - YEARLONG
- 4** ROCKY MOUNTAIN ELK / MULE DEER - YEARLONG
- 5** ROCKY MOUNTAIN ELK / MULE DEER - WINTER



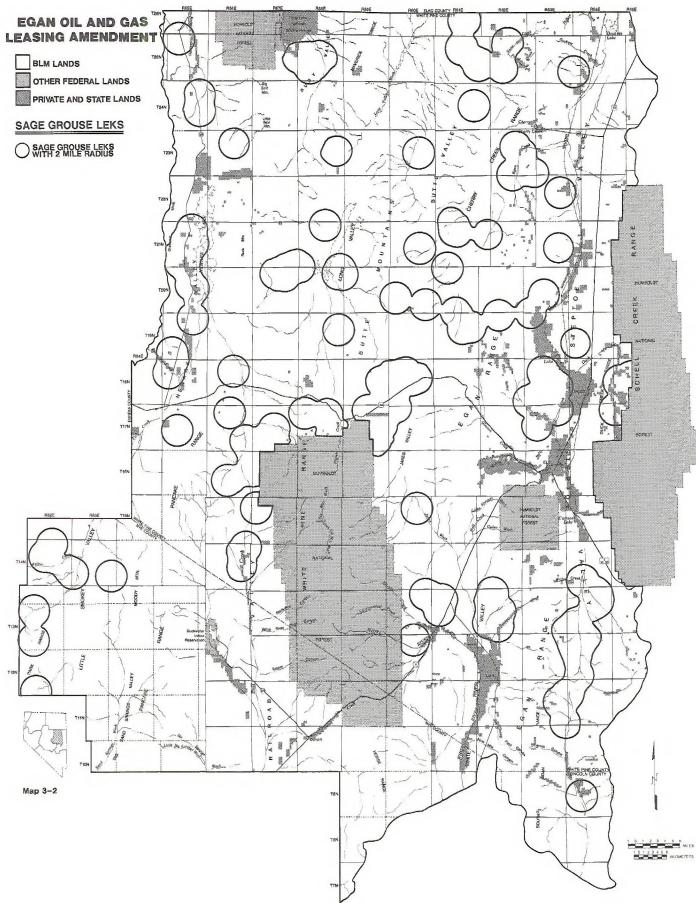
Map 3-1

**EGAN OIL AND GAS
LEASING AMENDMENT**

-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS

SAGE GROUSE LEKS

-  SAGE GROUSE LEKS WITH 2 MILE RADIUS



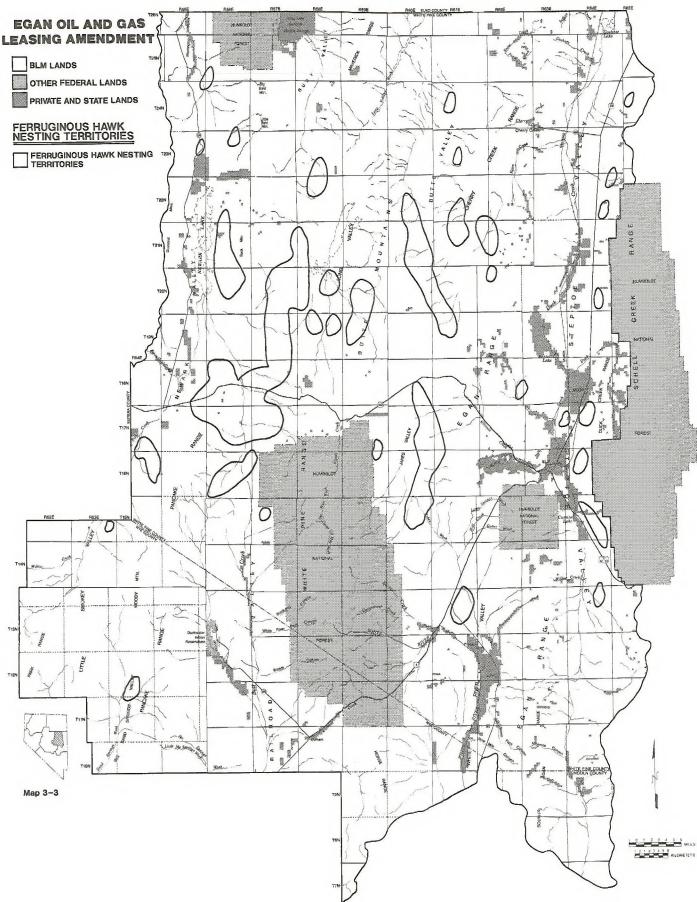
Map 3-2

EGAN OIL AND GAS LEASING AMENDMENT

- BLM LANDS
- OTHER FEDERAL LANDS
- PRIVATE AND STATE LANDS

FERRUGINOUS HAWK NESTING TERRITORIES

- FERRUGINOUS HAWK NESTING TERRITORIES



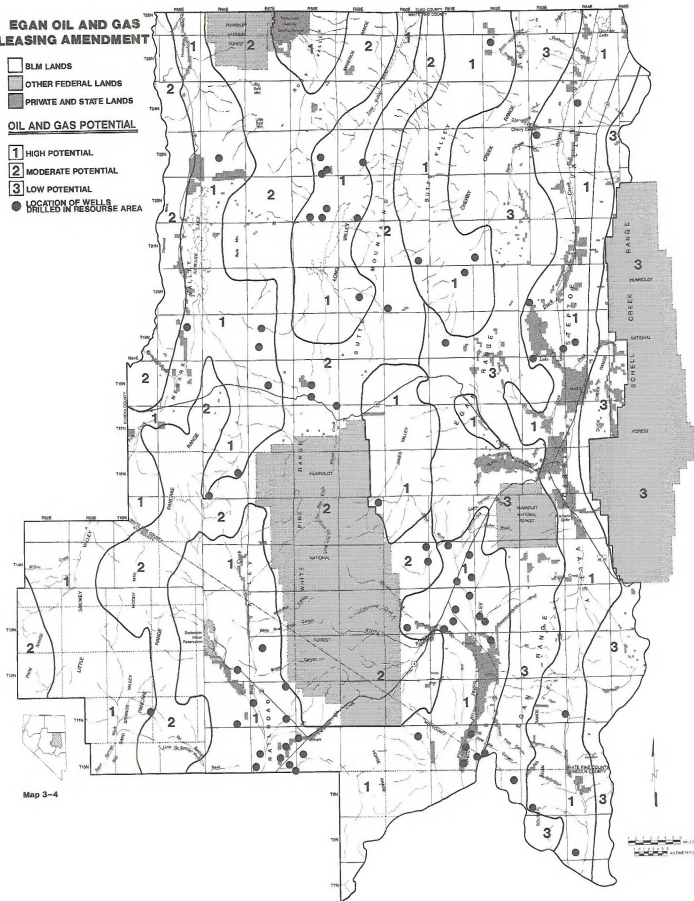
Map 3-3

EGAN OIL AND GAS LEASING AMENDMENT

- BLM LANDS
- OTHER FEDERAL LANDS
- PRIVATE AND STATE LANDS

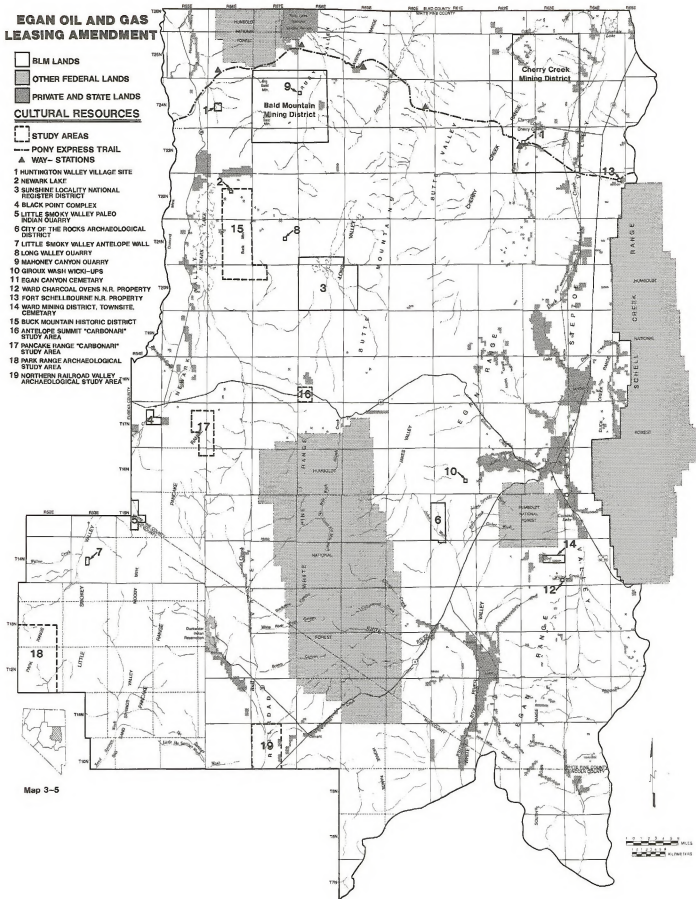
OIL AND GAS POTENTIAL

- 1 HIGH POTENTIAL
- 2 MODERATE POTENTIAL
- 3 LOW POTENTIAL
- LOCATION OF WELLS DRILLED IN RESOURCE AREA



Map 3-4

EGAN OIL AND GAS LEASING AMENDMENT

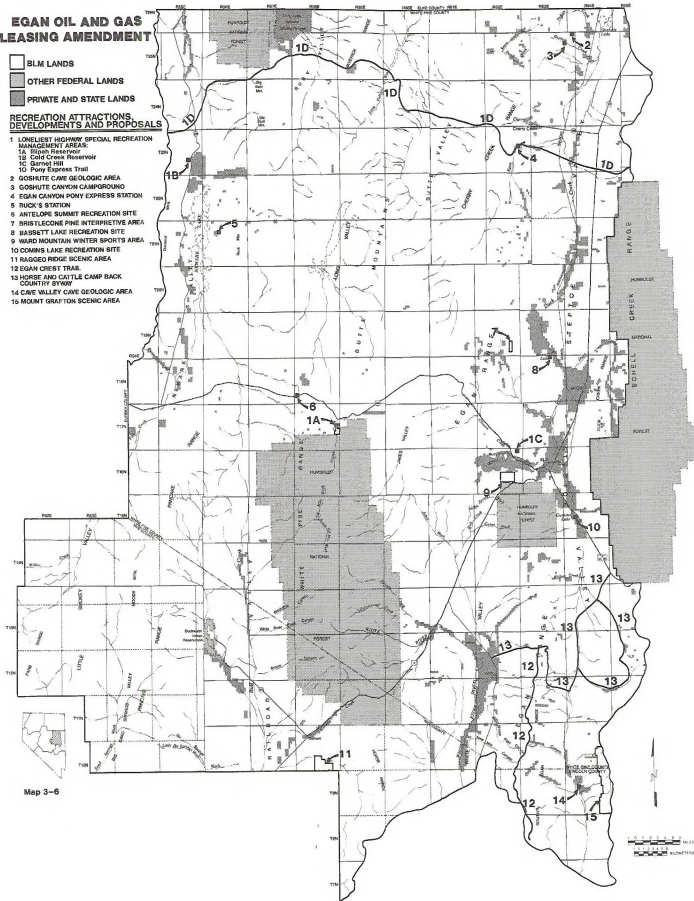


EGAN OIL AND GAS LEASING AMENDMENT

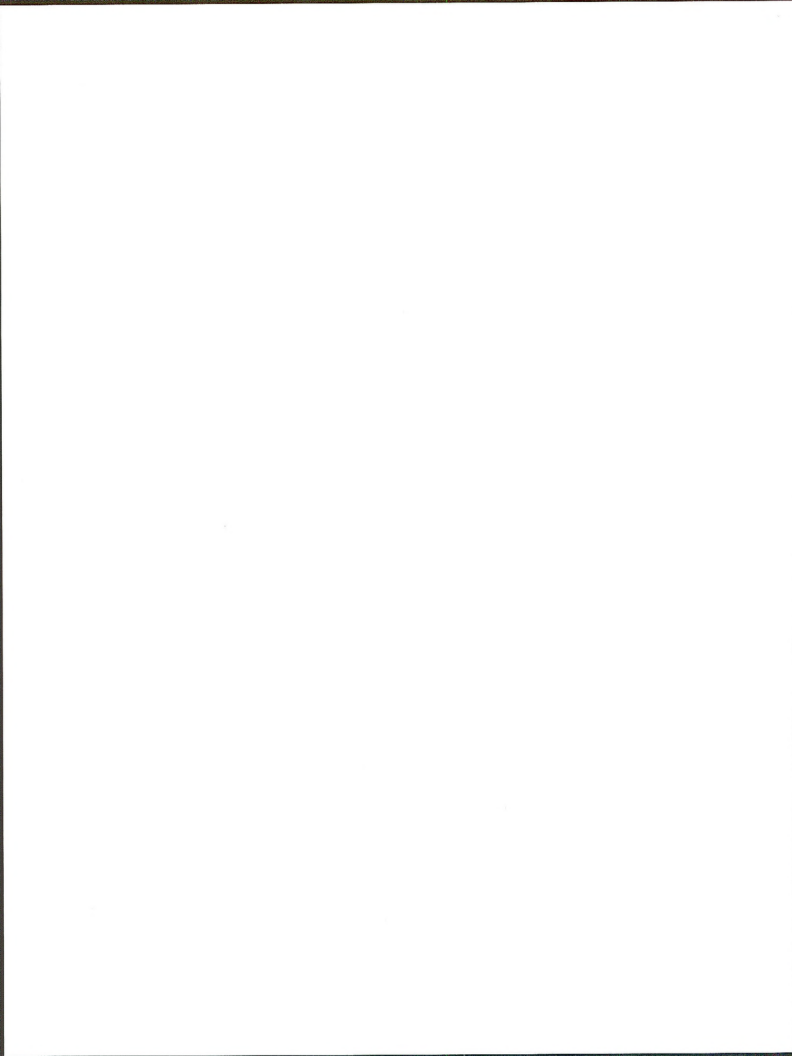
- BLM LANDS
- OTHER FEDERAL LANDS
- PRIVATE AND STATE LANDS

RECREATION ATTRACTIONS, DEVELOPMENTS AND PROPOSALS

- 1 LONELIST HIGHWAY SPECIAL RECREATION MANAGEMENT AREA:
- 1A Elsie Reservoir
- 1B Cold Creek Reservoir
- 1C Garfield Hill
- 1D Pony Express Trail
- 2 GOSHUTE CAVE GEOLOGIC AREA
- 3 GOSHUTE CANYON CAMPGROUND
- 4 EGAN CANYON PONY EXPRESS STATION
- 5 RUCK'S STATION
- 6 ANTELOPE SUMMIT RECREATION SITE
- 7 BRISTLECONE PINE INTERPRETIVE AREA
- 8 MASSSETT LAKE RECREATION SITE
- 9 WARD MOUNTAIN WINTER SPORTS AREA
- 10 COMANS LAKE RECREATION SITE
- 11 RAGGEO RIDGE SCENIC AREA
- 12 EGAN CREST TRAIL
- 13 HORSE AND CATTLE CAMP BACK COUNTRY STAY
- 14 CAVE VALLEY CAVE GEOLOGIC AREA
- 15 MOUNTAIN GRAYTON SCENIC AREA



Map 3-6



CHAPTER 4

ENVIRONMENTAL CONSEQUENCES



CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter analyzes the impacts of federal oil and gas leasing and the resulting exploration and development of these energy resources on the various natural and cultural resources managed within the Egan Resource Area. The chapter also analyzes the impacts to the oil and gas industry from the stipulations, conditions and closures placed on oil and gas leasing. The environmental components described in Chapter 3 have been analyzed for each alternative based on the reasonable development scenario presented below. Only those resources are discussed that would be affected as a result of implementation of any of the alternatives.

ASSUMPTIONS FOR ANALYSIS

In any impact analysis, certain assumptions are made to provide consistency in the analysis and continuity in resource management over the long term. The assumptions for analysis in this plan are:

- 1) There will be no substantial change in the laws, regulations or policies governing management of oil and gas resources during the land use planning period.
- 2) The leasing stipulations and conditions of approval developed through this plan will be adhered to for each leasing activity proposed.
- 3) The actual locations of potential exploration wells and field development are unknown. The impacts associated with these activities are likely to occur anywhere within the resource area that is of high or moderate potential for oil and gas resources.

- 4) The appropriate NEPA documentation will be completed for all oil and gas actions on a site-specific basis prior to implementation.

REASONABLE FORESEEABLE DEVELOPMENT SCENARIO (RFD)

The following reasonable development scenario for the Egan RA is based on the development history observed within Railroad Valley which is located partially within the Egan RA. Railroad Valley contains the first producing oil fields within the state of Nevada. This scenario holds for all alternatives. Any discoveries within the Egan RA may experience development similar to the following scenario:

Assumptions for Exploration

- 1) An estimated 175 wells will be drilled during the life of the plan.
- 2) Egan RA is considered a high-risk (wildcat) exploration region.
- 3) Approximately 10% of the wells drilled will be producers.
- 4) An estimated 158 wells will be reclaimed by the end of the land use planning period.
- 5) Drilling time will average three to four weeks per well.
- 6) The average pad size will be 2 acres.
- 7) The average access road will be 20 feet wide by five miles long and will be surfaced with six inches of gravel.

- 8) No more than three drill rigs will be operating in the same hydrographic basin at the same time.

Based on the above assumptions, the total surface disturbance from exploratory well pads is estimated at 350 acres with 2,100 additional acres disturbed from development of access roads. Surface disturbance from oil and gas exploration will total 2,450 acres.

Reclamation of the above disturbance will result in 316 acres in well pads and 1,896 acres in access roads being reclaimed. Reclamation for oil and gas exploration will total 2,212 acres.

Beginning geophysical surveys may cross the entire resource area in a very broad brush fashion. These surveys will attempt to piece together the overall regional geology. Once geologic structures of interest are located, surveys of specific areas will be intense and may be repeated frequently. There will be an estimated 50 to 150 miles of line surveyed per year. Each year there will be up to 200 acres disturbed from geophysical exploration. There will be 100% reclamation completed on these lines by the year's end. This reclamation will be from either natural recovery or from efforts taken by the geophysical company.

Based on past drill history, most of the drilling will occur in the high potential valley bottoms (refer to Oil and Gas Potential Map, Map 3-4). The USGS has identified two possible geologic structural models (plays) for identifying production zones within these high potential areas. Historically, oil discoveries in Nevada have been exclusively in the high potential valley bottoms. Recently; however, new theories outline a possible overthrust "play" in some of the lower potential mountainous regions.

The high potential valleys will receive 95% (166 wells) of the projected exploration wells and of these, five will be in lower potential valley bottoms. The remaining 5% (9 wells) of the drilling activity will occur in moderate potential zones.

Drilling trends may fluctuate greatly, with no drilling occurring in as many as five consecutive years to half of the wells being drilled in a ten year period. Each new discovery will foster an increase in drilling activity which may last for two to three years.

Assumptions for Production

The average size for a producing oil and gas field is 640 acres. There will be 40-acre spacing for wells less than 5,000 feet in depth and 160-acre spacing for wells more than 5,000 feet in depth. Normally, drilling depths are greater than 5,000 feet; therefore, most of the well spacing can be expected to be 160 acres.

No more than three drilling or workover rigs will be in operation in a field at the same time. Limited reclamation work would occur until the producing field is abandoned. No producing fields will be abandoned during the land use planning period.

As many as six producing fields may be discovered by the end of the land use planning period. These fields are hypothesized to be equivalent in size and surface disturbance to the Kate Springs and Trap Spring Oil Fields within Railroad Valley. Of the projected producing fields, two will be the equivalent to the Traps Spring Field and four would be the equivalent to the Kate Springs Field. The fields would be as close as one mile and as far as 15 miles from each other.

The risk factors involved would usually limit drilling to depths of 6,000 feet, although some operators would speculate that larger reservoirs would be encountered at greater depths (10,000 to 15,000 feet). Production rates of each field would range from negligible amounts (10 Barrels of Oil per Day [BOPD]) to extremely prolific (6,300 BOPD). The production life of a field would last from 18 months to 35 years. Oil and gas reserves estimated by the USGS (Open File Report 88-450-4) are estimated at 97.03 Millions Barrels of Oil (MMBO) and 59.6 Billions Cubic Feet (BCF) of gas for the Egan RA.

For an oil field equivalent to the Kate Springs Oil Field the following assumptions are made.

- 1) Twenty-two wells will be drilled. There will be seven producing wells, three injection wells and twelve plugged and abandoned wells in the field.
- 2) Tank batteries will be placed on existing drill pads.
- 3) The field will be six miles from a major existing road. This field will require a major access road six miles long and 50 feet wide surfaced with three feet of gravel.
- 4) Eight miles of 30-foot wide service road will be required and surfaced with two feet of gravel.
- 5) Drill pads will be 200 by 250 feet and surfaced with two and one-half feet of gravel.
- 6) Two miles of pipeline will be required. The disturbance will be 15 feet in width.
- 7) Gravel will be obtained locally. Gravel pits are assumed to average 12 feet in depth.

Total acres disturbed for the Kate Springs Model are listed below:

Well Pads	25 acres
Service Roads	29 acres
Major Access	36 acres
Pipeline	4 acres
Gravel pits	<u>20 acres</u>
Total	114 acres

For an oil field equivalent to the Trap Springs Oil Field the following assumptions are made.

- 1) Eighty wells will be drilled. There will be 40 producing wells, 10 injection wells and 30 plugged and abandoned wells in the field.

- 2) Tank batteries will be placed on existing drill pads. Thus no additional surface disturbance will be required.
- 3) The field will be six miles from a major existing road. This field will require a major access road six miles long and 50 feet wide surfaced with three feet of gravel.
- 4) Drill pads will be 200 by 250 feet and surfaced with two and one-half feet of gravel.
- 5) Five miles of pipeline will be required. Surface disturbance is estimated to be 15 feet in width along the pipeline.
- 6) There will be 21.5 miles of access roads 30 feet wide and surfaced with two feet of gravel.
- 7) Gravel will be obtained locally. Gravel pits are assumed to be 12 feet deep.

Total acres of disturbance for the Trap Springs Model are listed below:

Well Pads	92 acres
Service Roads	78 acres
Major Access	36 acres
Pipeline	9 acres
Gravel pits	<u>42 acres</u>
Total	257 acres

With the production of oil there is the possibility of a oil refinery being built. Construction of a refinery would disturb 20 acres. It is anticipated that a pipeline will be built from the new oil fields to the proposed refinery. The pipeline will be 25 miles long and will result in an additional 46 acres of surface disturbance, including disturbance at the gravel source.

Exploration and Production Summary

The following list summarizes the number of wells that are projected to be drilled during the land use planning period.

<u>ACTIVITY</u>	<u>NUMBER OF WELLS</u>
Exploration	175
New Small Fields	88
New Large Fields	<u>160</u>
Total	423

The total surface disturbance associated with the RFD for oil and gas exploration and development activities is summarized below.

175 exploration wells	2,450 acres
4 Small fields	456 acres
2 Large fields	514 acres
1 Refinery	20 acres
7 mi. Pipelines	<u>46 acres</u>
Total	3,486 acres

In summary, there would be a total surface disturbance of 3,486 acres from oil and gas exploration and development by the end of the land use planning period. A total of 2,212 acres would be reclaimed from exploration wells only; no reclamation is expected on developed oil fields by the end of the land use planning period. Surface disturbance from oil and gas activities would result in 1,274 acres not reclaimed by the end of the land use planning period.

The following list summarizes unreclaimed acres from oil and gas exploration and development.

Exploration Wells	34 acres
Access Roads	204 acres
Oil Fields	970 acres
Refinery	20 acres
Pipelines	<u>46 acres</u>
Total	1,274 acres

IMPACTS COMMON TO ALL ALTERNATIVES

Based on the above RFD for oil and gas exploration and development, the following section discusses the direct and indirect

impacts to natural and cultural resources which may be generally expected to occur from these activities. Since the RFD applies to all alternatives, the impacts discussed below are common to all alternatives.

WILDLIFE HABITAT

Impacts to wildlife habitat from oil and gas activities will be direct and indirect. An example of a direct impact is the loss of habitat resulting from an action which destroys that habitat or simply drives animals from the area. An indirect impact would be mortality of a species that was driven from traditional habitat into habitats that are not capable of maintaining that species.

The direct loss of approximately 34 acres in unreclaimed drill pads and an additional 204 acres of unreclaimed roads would not be a detectable impact to wildlife habitat in the RA; however, if all oil and gas activity were concentrated in a small area over an extended period of time, detectable impacts to wildlife habitat would occur. The severity of impacts to habitat would depend on factors such as time of year, duration of activity, human presence and the sensitivity of species to these factors.

Oil and gas activities may have an additional subtle but important effect on wildlife often overlooked during impact assessment (Bromley, 1985). Deviations from normal wildlife activity patterns and habitat-use may have effects on the welfare and productivity of an animal (Burton and Huston, 1978; in Bromley, 1985). Effects of environmental disruptions (flight, avoidance, interference with movement) increase the effort for survival at the expense of reproduction and growth (Geist, 1970; in Bromley, 1985). These effects would have their greatest influence during critical seasons when the animals are already under stress.

Terrestrial

The effects of temporary disturbance associated with oil and gas activity (for

example, geophysical exploration) during noncritical periods seldom cause major impacts to big game because of minimal habitat disturbance and short duration of activity. The affected animals would be temporarily displaced but would return after the activity ceased with no mortality or other permanent impacts to habitat expected.

Geophysical exploration involving surface shots (Poulter method) with helicopter support would have an impact to big game populations if the activity occurs prior to or after the hunting season, a critical period for the animals. The pressures of hunting combined with the geophysical exploration activity would temporarily drive animals from traditional winter range during this crucial period. Traditional areas are preferred because of the existence of optimal conditions for the highest rate of survival of newborn animals.

Displacement from traditional winter range would lead to overstocking of the new winter range to which animals have retreated and increased competition among ungulates. These factors would result in a higher probability of increased winter mortality, reduced fertility, and a decline in new born survival.

Most big game winter range occurs in moderate potential zones and 5 percent (nine wells) of the oil and gas exploration is anticipated to take place in these zones. Prior to reclamation of these well sites, up to 127 acres of winter range habitat would be lost to well pads and roads.

In general, reclamation success in replanting or seeding shrub species suitable for forage is rather low in eastern Nevada because of marginal soils and a low moisture regime. Shrub species on disturbed habitat must therefore regenerate naturally. There would be a long-term impact to habitat forage productivity on the 127 acres of disturbed winter range habitat for a period of 15 to 30 years.

It is expected that impacts to big game populations from exploratory drilling would be

more pronounced than geophysical exploration because the period of disturbance is longer. Animals would be displaced from traditional winter range and activity occurring within traditional calving or fawning areas would cause animals to move to adjacent and possible marginal habitat resulting in an increase in mortality of newborn animals and a temporary reduction in population size.

Construction of new roads in relatively undisturbed areas would lead to a loss of escape and thermal cover in wooded areas. Indirect impacts associated with increased access would be increased legal and illegal harvest of animals. Road kills of deer, antelope, mountain sheep and elk would be expected to increase above existing levels. Unintentional harassment of wildlife would be expected to increase with oil and gas exploration and development due to the presence of more people in remote areas normally occupied by big game.

Upland Game

Any type of oil and gas activity that disrupts sage grouse during the critical periods of strutting or nesting would result in losses to the population associated with the affected lek.

Sage grouse populations decrease dramatically during initial stages of oil field development. The decrease is related to road development and a loss of habitat as well as noise from pumping activities, powerline development and other associated human activities. As an oil or gas field "matures" and equipment is modernized (noise is decreased), sage grouse increasingly can be found within the oil or gas field, apparently attracted to vigorous sagebrush growth along disturbed areas (Remington, 1983). Leks do occur within and adjacent to "mature" oil fields and it is not unusual for sage grouse to winter in or adjacent to oil fields. The evidence thus supports a scenario of dramatic population decreases, low population levels followed by slow increases in population size during development and maturity of oil and gas fields.

The effects of exploration without development have not been well studied; however, it is known that road development, site preparation, and drilling have impacts which may be short term (wildcat drilling) or long term (field development). Refineries, pumping stations, gasification plants, and associated developments may have permanent impacts on sage grouse populations (Braun, 1987).

Sage grouse leks within the RA occur primarily in high oil and gas potential zones. It is expected that given the distribution of leks within the RA, full development of up to six well fields would likely lead to the abandonment of up to eight leks over the long-term.

Ferruginous Hawks

Impacts to ferruginous hawks from oil and gas operations would include direct destruction of nest sites and the possibility of nest abandonment from nearby disturbance. The valleys with the highest potential of oil field development have the highest nesting densities of the hawk in the Egan RA. Oil field development would possibly preclude the ferruginous hawk from occupying any breeding territories within one mile of a developed field.

With the decline in occupied ferruginous hawk territories within the resource area, any territory not occupied as a result of oil or gas field development would be considered a serious impact (ibid).

Indirect impacts to ferruginous hawk populations would occur from nest abandonment prior to egg-laying or the failure of parent birds to return to eggs or young. In addition to abandonment, females flushing from a nest can crack eggs or injure young. Late in the nesting period, disturbance is unlikely to cause abandonment but the young birds may attempt to fly before they are ready, causing injury or death. Other problems associated with disturbance to nesting raptors include cooling or overheating of eggs, chilling of

young birds, and missed feedings, as the adults remain away from the nest because of human presence.

With the development of up to six fields for oil and gas as described in the RFD, it is anticipated that up to eight ferruginous hawk nesting territories will be directly or indirectly affected by exploration and development activities.

Nongame Wildlife

If oil or gas field development occurred in the vicinity of ground squirrel burrowing areas this would eliminate the squirrels and other small mammals and rodents which are the main prey base for the ferruginous hawk (Perkins, *et al*, 1983). By elimination of this prey base, an indirect impact would occur to the ferruginous hawk and other raptors inhabiting the area.

THREATENED AND ENDANGERED SPECIES

Standard operating procedures outlined in the Egan ROD require that the BLM consult with the USF&WS prior to allowing any action which may affect a federally listed threatened or endangered species or its critical habitat. Should the action be found to impact any listed species or its critical habitat, the action will be modified or denied to protect the species.

To comply with requirements of the Endangered Species Act (ESA) of 1973 (Title 16, Ch. 35 U.S.C.; P.L. 93-205, 81 Stat. 884, as amended), all oil and gas activities would be cleared for species occurrence at the operational stage on a case-by-case basis rather than at the leasing stage. This ensures that each site with the potential for T&E species would be inventoried and site locations changed to avoid any discovered species. One constraint for T&E plants is that accurate inventories must be accomplished during the spring flowering period. This may prevent any inventory prior to a scheduled action. By avoiding all known T&E habitat areas, impacts to candidate species can be minimized.

MINERAL RESOURCES

With the potential of a total of 277 wells being drilled (175 exploration wells and 102 development wells) by the end of the land use planning period, the most favorable conditions for exploration and development operations would be with as few restrictions as possible. Section 6 of the lease instrument (refer to Appendix D, page D-3) requires the lessee to protect other mineral, environmental, renewable and land-use resources. Any further discretionary lease stipulations or mitigation for these resources brings about an even greater impact to oil and gas development.

Oil and Gas leases will be available and can be obtained under all alternatives. No Surface Occupancy (NSO), Timing Limitations and Controlled Surface Use stipulations only limit or restrict activities on the lease, not the ability to obtain and develop a lease. Only areas that are Closed to Leasing would not be available for leasing and development.

All areas except those closed to leasing will be eligible for leasing under standard terms and conditions and the leasing stipulations developed through the RMP process. Timing limitations require the operator to not operate during certain time periods. Controlled surface use stipulations regulate the way surface disturbance may be allowed. NSO stipulations require the operator to not occupy the surface while developing the oil and gas resources.

NSO stipulations allow the federal land and mineral manager greater control over the subsurface energy resources than does an area closed to leasing. NSO stipulations prohibit the lease owner from use or disturbance of the surface of the lease but does not prohibit the lessee from extracting any federal oil and gas within the leased lands.

If an oil and gas reservoir is located under lands closed to leasing and adjacent to private lands, any oil and gas production on the private lands would drain resources from both the public and private lands. With the lands closed to leasing,

the government would not be allowed to collect federal revenues. However, if the public lands are leased with no surface occupancy the federal government will be allowed to collect the federal revenues on the lost oil and gas.

Unit Agreements allow the land manager to manage common reservoir energy resources between a number of adjacent leases. If all or part of the public lands above the reservoir are not available for leasing, the minerals manager ability to manage the reservoir is constrained.

Historically, leases sold in Nevada have included both No Surface Occupancy and Timing Limitation stipulations. The last ten oil and gas lease sales in Nevada ending November 10, 1990, showed the following relationship in leasing trend.

Only 41% of the lease offers in Nevada were sold. Of the leases bought, 36% have timing limitation stipulations attached, 2% have NSO stipulations and 62% have standard terms and conditions. A total of 30% of the leases offered in Nevada with NSO restrictions were bought and 10% were bought under the competitive bid systems with bonus bids received. Therefore, leasing history has demonstrated that leases with the most restrictive lease stipulations (NSO) attached have continued to be sold and noticeable reductions in federal revenues from lease sales have not been experienced.

Under Timing Limitation and Controlled Surface Use Stipulations, rentals and royalties will continue to be received by the federal government. Royalties are paid only by leases that have wells that are producing oil and gas resources. The NSO stipulation also has rentals being charged but royalties may not come directly from the lease. Only under Closed to Leasing stipulations will the government not receive any rental or royalties monies. Royalties in Nevada traditionally are about 50% of the total dollars received in Nevada. The ability to lease an area for oil and gas may provide more monies to the government than from the future production in the area.

The designation of WSAs as wilderness would affect federal management of oil and gas resources ranging from the loss of some rental income to the irreversible and irretrievable losses of oil and gas resource and the associated royalty income. The magnitude of the loss would depend on the resources available in the particular WSA. Except for the Riordan's Well and Blue Eagle WSAs which have been rated as high potential for oil and gas resources by the USGS, the WSAs and portions of WSAs within the Egan RA have low to moderate potential for oil and gas resources.

Other Minerals

The location of oil and gas wells is determined at the time of APD approval. Conflicts between other minerals, oil and gas development and rights of ways would be alleviated through standard lease terms or through negotiations between operators. As development continues, specific conflicts will become evident. No short-term or long-term impacts to development of other mineral resources are expected to occur under any of the alternatives.

WOODLAND RESOURCES

In all alternatives, the impacts to woodland products from oil and gas exploration and development remains the same. Woodland resources would not return to pre-disturbance levels by the end of the land use planning period with reclamation due to the length of time required to restore woodlands to their previous productivity. Other forest resources, particularly special species and forest types of limited range, will be affected differently by the various alternatives.

The quantity of woodland products which would potentially be lost to exploration and development of oil and gas resources is modest but contains value. Over the long-term up to 500 acres of woodland products would be affected in moderate and high oil and gas potential areas. This loss is estimated to be between 1,000 and 1,500 cords.

The allowable sale quantity for the resource area is affected by any amount of long-term disturbance from field development and the annual allowable sale quantity would be reduced by approximately three cords per acre disturbed in the year of activity. For reclaimed areas, there would be a loss in production of approximately one cord per year for every 30 acres. Under maximum development, should 500 acres remain in a non-woodland condition, there would be a loss of 17 cords per year of foregone production. This loss is considered an inconsequential effect on the 409,600 acres of manageable woodland in the resource area. Manageable woodlands are defined as administratively available (i.e. woodlands not otherwise removed from availability to harvest by law, policy or regulation), practicably workable (under 30% slope) and accessible.

In portions of the resource area, the demand for woodland products is approaching the current allowable sale quantity. As accessible area is a major factor in calculating allowable harvest, increased access to woodland areas for potential harvest of not only the salvage fuelwood but also the secondary products of Christmas trees and pinenuts would help to offset any potential losses of woodland production due to oil and gas exploration or development.

Certain forest and woodland species are considered sensitive and to some extent, unique in the plan area. The scientific, botanical, recreational and aesthetic values of these species are noted in Chapter 3, Affected Environment. The Swamp cedar is the only sensitive species that occurs within a high oil and gas potential zone. Small groves and copses of mixed conifer, aspen, Ponderosa pine and Bristlecone pine occur in high elevation low oil and gas potential zones. Many of these species are located within WSAs and considered special features contributing to the wilderness values. If allowed, relatively small exploration activities would result in noticeable long-term impacts to these unique and sensitive species.

CULTURAL RESOURCES

Direct impacts to cultural resources occur from physical alteration of the setting in which they are found, thus affecting the property's integrity. In most cases, surface disturbance resulting in horizontal and/or vertical displacement of topsoils which contain cultural materials is the mechanism for physical alteration or destruction of cultural resources. Indirect impacts such as vandalism may result in the physical removal of components of the property, thus also affecting the integrity. Less tangible impacts can occur to traditional lifeway values of Native American or other ethnic groups from oil and gas activities allowed on public lands.

The degree or severity of direct or indirect impacts to cultural resources from oil and gas exploration or development is dependant upon the type of technology employed to explore for the resource. For example, geophysical exploration techniques usually do not involve direct surface disturbance and would result in compaction of soils, shallow localized displacement of top soils where shot holes are drilled and crushing of vegetation.

Construction of well pads, access roads and pipelines or other facilities would result in vertical and horizontal displacement of top soils on 3,486 acres under full development as described in the RFD. The average site density for high oil and gas potential zones within the Egan RA is 1 large site (defined as over 20 artifacts) for every 65 acres. Should cultural resources be present and not avoided by construction activities, there would be potential adverse effects to approximately 54 archaeological properties through physical destruction or alteration of the setting in which they occur. In the same manner, traditional lifeway values would be affected if not previously identified.

The creation of road networks may provide access into otherwise remote areas and indirect impacts to cultural resources would result from increased vandalism. Other indirect impacts that would result from development are visual

intrusions that may be out of character with the setting in which the resources are found. This latter consideration often has an impact on historic values, although prehistoric values such as petroglyph and pictograph properties can be affected as well. Historic and prehistoric structures constructed of perishable materials (cabins, antelope corrals, wicki-ups) can be indirectly affected should accidental ignition of fuels and spread of fire result from exploration or development activities. This indirect effect would result in physical destruction of the resource.

If cultural resources are identified in the area of potential impact by the oil and gas activities, eligibility of the property to the National Register of Historic Places is determined through consultation with the Nevada State Historic Preservation Office (SHPO) as required under sections 106 and 110 of the National Historic Preservation Act of 1966 (Title 16, U.S.C. 470, P.L. 96-515, as amended). If the property is determined to be eligible to the National Register, then a Determination of Effect to the property is made.

Where project-related effects are determined to be adverse, a data recovery program is developed in consultation with the SHPO and implemented to mitigate the effects to the resource or the project is re-designed such that the property is avoided resulting in no effect to the cultural values. The data recovery process is rarely implemented, as it is costly and time consuming for the operator. Avoidance through project redesign is almost always the alternative implemented. In some cases, especially with regard to historic or traditional lifeway values, it may not be possible to mitigate all effects to the resource from project-related activities and adverse effects would still result.

WILDERNESS

Impacts from oil and gas exploration and development on wilderness values have been analyzed in the Egan, Schell and Tonopah Resource Area Wilderness Recommendations

Final EISs, 1987, 1988. Under all alternatives, designation by Congress of the proposed suitable portions of the WSAs as wilderness would continue to provide protection of the wilderness values through No Leasing determinations. Nonsuitable portions of WSAs would be released from wilderness consideration and be available for future leasing. If Congress does not designate any wilderness in the Egan RA, wilderness values would be affected through oil and gas exploration.

Short-term impairment of opportunities for solitude would occur during the conduct of geophysical exploration or the drilling of wildcat wells. Long-term effects to naturalness would be directly affected on 32 acres disturbed by 15 1/2 miles of seismic lines and 20 acres would be disturbed due to the drilling of four wildcat wells. Naturalness values would be directly affected on a total 52 acres.

Indirect impacts to naturalness are expected in areas adjoining disturbances resulting from construction of 2 3/4 miles of access roads for drilling of wildcat wells. It is estimated that naturalness would be impaired within a one-mile corridor bordering the wildcat wells and access roads which would affect a maximum of 1,760 acres. Indirect effects to naturalness are not anticipated to occur from seismic lines because the straight-line nature of these routes would not create off-site impacts.

RECREATION

Most of the recreational activities that occur on public lands in the Egan RA are dispersed throughout the public lands. Recreationist outdoor pursuits such as hunting, hiking, camping, horse back riding, ORV use, etc. would avoid areas of activity for oil and gas exploration and development with little to no impairment of their recreation experience. These dispersed types of recreation uses can shift to other suitable areas at the discretion of the user.

Impacts to dispersed recreation uses from oil and gas exploration and development are expected to be minimal. Also, it is likely that most oil and gas activities would be located in valley bottoms, which are less attractive for recreational pursuits. Some recreational activities, such as hunting and ORV use would continue to occur in oil and gas exploration and development areas, as well as other parts of the Egan RA. Increased access and improved conditions of roads that result from oil and gas activities would increase the availability of some areas for dispersed recreation.

Any work force increases as a result of oil and gas exploration or development activities would result in increased consumptive recreation activities. Angling pressure on the limited fishing areas would increase. Any permanent increase in the work force would affect local hunting opportunities. There would be increased competition for the already over-subscribed deer, elk and antelope tags. There would be slight increases in competition for available campsites. Developed and semi-developed campgrounds in the area are only near capacity on holiday weekends during periods of good weather.

Should oil and gas exploration and development activity occur in close proximity to developed recreation sites or sites of concentrated recreation use, there would be some impairment to the recreational experience expected.

VISUAL RESOURCES

Under each of the alternatives, both short-term and long-term visual impacts would occur. Geophysical exploration and wildcat well drilling would result in short-term visual intrusions primarily within valley areas which are less scenic than mountainous locations. Development of well fields and ancillary facilities would present long-term visual intrusions within valley areas. Mitigation of visual contrasts through project design, proper location, painting of facilities to blend with natural landscape colors or reclamation of

disturbed areas would lessen the severity of visual impacts.

LIVESTOCK AND VEGETATION

Temporary forage loss would continue as long as the access roads and drill pads were in use; however, timely reclamation would restore forage production. The revegetation process would include eliminating livestock use on drill sites for up to two growing seasons. Exclusion from two-acre drill pads should not affect normal grazing use of an allotment.

Possible impacts to livestock resulting from field development include the possibility of livestock being killed on unfenced roadways by traffic associated with drilling activity. The presence of poisonous or noxious weeds in disturbed areas would also have a detrimental effect on livestock.

The current active preference in the resource area is 206,744 Animal Unit Months (AUMs). These AUMs are allocated to both livestock and wild horses. Based on current livestock permits and wild horse numbers, approximately 77.5 percent of the total AUMs are allocated to livestock and 22.5 percent to wild horses.

Full development, as described under the RFD, would result in the loss of a total of 147 livestock AUMs of forage by the end of the land use planning period. This loss is considered negligible in relation to the total available AUMs for the RA.

Conducting geophysical exploration would cause the loss of some vegetation. Vegetation would be crushed by vehicles on the line, and therefore, the loss would be minimal and short-term in nature. Overland travel off existing roads for seismic exploration during wet or extremely dry soil conditions would increase the degree of destruction to vegetation.

Construction of access roads and drill pads for drilling wildcat wells would result in the loss of an average of 14 acres of vegetation per APD. With proper reclamation following completion

of drilling activities, this loss of vegetation would be short-term, assuming that reclamation success would take approximately three to five years. There is a likelihood that undesirable weeds would invade the disturbed ground at some point before reclamation is complete.

On the sites where wildcat wells become discovery wells, the loss of vegetation due to access roads and drill pads would become more long-term due to the relative permanence (in excess of 15 years) of these installations. Although as much as one half of the two-acre drill pad may be reclaimed at the time of developing a permanent well site, additional road, pipeline, and other facility development would increase the actual loss of vegetation associated with each well. The maximum amount of vegetation that would be lost during the planning period amounts to 3,486 acres with approximately 2,212 acres being eventually reclaimed. This is considered to be a negligible impact to vegetation in the resource area.

On split-estate lands, impacts to vegetation would be more severe. Requirements on private surface lands are negotiated with the landowner and the operator. In the absence of successful reclamation, disturbed areas would become infested with noxious, poisonous, or other undesirable weeds. Split-estate lands comprise less than one percent of the resource area and these impacts are not expected to be noticeable.

WILD HORSES AND BURROS

Temporary forage loss would continue as long as the access roads and drill pads were in use. The revegetation process in pad reclamation would eliminate wild horse use for up to two growing seasons through the placement of temporary fences around the area.

Possible impacts to wild horses due to field development include the possibility of wild horses being killed on unfenced roadways by traffic associated with drilling activity. The presence of poisonous or noxious weeds in

disturbed areas would also have a detrimental effect on wild horses. It is anticipated that a maximum of two horses would be lost annually from the above effects.

Full development, as described under the RFD, would result in unreclaimed acreage for a loss of 43 AUMs of forage for wild horses by the end of the land use planning period. This loss is considered negligible in relation to the total available forage in the resource area.

Other impacts to wild horses which would occur due to field development include disruption of daily and seasonal migration routes, unintentional physical harassment of wild horses due to increased activity from vehicles and aircraft in the area and disruption of band structure either temporarily or permanently resulting in stress to individual animals or bands. If full development of six fields were concentrated within one herd use area this would impact an estimated 250 animals. If development is dispersed over the resource area as is anticipated, these impacts would be negligible.

Unintentional physical harassment would result in stress to pregnant and lactating mares and small foals and sometimes even death to harassed animals. Disruption of band structure would result in abandoned foals and death to young foals. These impacts, however, are considered to be negligible due to the limited amount of potentially disturbed acreage in relation to the size of the herd use areas. It is anticipated that less than five horses would die each year from project-related effects of oil and gas exploration and development.

SOILS

Disturbance of 3,486 acres would have no detectable effect on the total vegetative productivity within a given soil or vegetative site. Localized and site specific short-term impacts would occur in the areas of disturbance. The effects of surface disturbance on soils is highly variable based on its location, timing, and degree. Factors such

as soil moisture content, soil texture, slope, and depth are primary elements in the analysis. Impacts to soils from oil and gas exploration and development activities are similar for each soil unit present within the resource area.

During wet periods there is a reduction in load bearing capacity of the soils on lake plains, lagoons and axial stream flood plains. The ability of the soils to sustain traffic becomes a major concern. Vehicles not designed for these conditions may become mired. If this occurs, the potential for additional surface disturbance by recovery vehicles would exacerbate the situation.

Removal of vegetation and the establishment of new surface channels by the alteration of existing drainage patterns have the potential of creating severe localized soil erosion. The steeper slopes allow water to runoff which minimizes potential impacts from compaction because conditions for optimal moisture-density water content occurs for a very brief period of time.

Changes in micro-topographical features from disturbances such as well pad construction and areas of steeper slopes may experience accelerated gully and rill erosion.

Soil compaction is a major concern during fall, winter, and spring because these areas receive additional run-on from adjacent terrain and are, therefore, more likely to have an optimal water content for compaction. Soil compaction may result in reduced vigor of vegetation and hamper reestablishment of vegetation. Compaction lowers soil productivity by reducing root penetration and permeability. Compaction is most severe when heavy equipment is used on moist soil or makes repeated trips over the same area.

There are impacts related to abandonment with the stockpiled topsoil. Mixing during construction and soil salvage operations and the possibility of compaction during soil reapplication would have an impact on revegetation potential and vegetative productivity depending upon the results of

salvage operations and soil reapplication. Soil loss as a result of erosion can be expected during the soil stockpiling and revegetation phase of the project. Also, if the substrate is not ripped or fractured, the potential for erosion after the topsoil has been applied will be increased as precipitation percolates through the permeable upper level and encounters the impervious or less permeable substrate, and either erosion or ponding will occur.

WATER RESOURCES

There are some direct impacts related to surface water. The initial impacts would occur during preliminary and exploratory phases from access road construction and vehicular traffic during project construction. This would result in localized soil erosion from disturbance of fragile sites resulting in increased sediment and salinity loads within some watersheds and cause accelerated sediment loading to local surface water resources. These increases would also accelerate stream bank erosion and instability; however, these would be short-term effects since reclamation is initiated within about one year.

Geophysical exploration employing shot-hole methods would potentially disrupt normal flows of springs and wells depending upon the proximity. Accidental spillage of fuel, oil, or other materials during any phase of exploration, production, or abandonment would result in localized degradation of water quality in nearby streams.

Most oil and gas is produced at depth in Nevada. During exploratory drilling or production, the produced water may be disposed of either in evaporation pits or by reinjecting the water back into the producing reservoir or similar formation. Because of the State of Nevada requirement of reinjection of produced waters into aquifers being of equal or better quality, the water quality of the aquifer would not be degraded.

Water found in these deposits is in a closed system associated with oil and gas and not

associated with the general ground water hydrology of the region. In addition, the produced water is chemically contaminated and not potable.

Generally, ground water depletion and structural subsidence are not a problem associated with oil and gas exploration and development and no impacts of this nature are expected under any of the alternatives.

If a well becomes a producer, about half the size of the pad is reclaimed, and the remaining access roads would be upgraded to provide drainage through waterbars or culverts, road ditching, and some spot gravel surfacing in soft areas. The upgrading of access roads has proven to be effective mitigation of erosion problems in the past.

AIR QUALITY

There would be localized short-term degradation of air quality resulting from fugitive dust where soils have been removed due to construction activities, geophysical exploration and vehicular travel. Operation of production fields and refineries would introduce gases into the atmosphere from flaring and refining processes which would degrade air quality in those areas.

LANDS AND TRANSPORTATION

Existing facilities and rights-of way (ROWs) for other land uses would be affected by lease development and production depending on the location and placement of new oil and gas facilities. Linear-type facilities such as roads, pipelines and powerlines have the greatest potential to be affected, primarily during construction, maintenance and reclamation activities of oil and gas facilities.

The location of a well pad may necessitate realignment of short segments of roads or powerlines because of topographic constraints (narrow valleys, ridges). Pipeline construction across a road would cause damage to the road

surface and temporarily disrupt use of the road. Construction of a buried pipeline across an existing pipeline would expose and possibly rupture the pipeline resulting in a spill. Road maintenance activities would expose and possibly rupture a buried pipeline. These impacts are rare and usually short term because compliance with construction and safety standards generally prevents such impacts, and damage is promptly repaired.

Placement of oil and gas-related surface facilities, particularly the linear facilities such as roads, powerlines and pipelines, would tend to dominate the land use in areas where these facilities are concentrated. This would tend to dictate location of future facilities as well as limit other authorized uses or users.

New oil and gas drilling activity generally results in construction of new access roads to the specific location unless an adequate road already exists. When new oil and gas fields are expanded, roads are usually constructed to each new site as needed.

Road development for oil and gas development may result in improved access into an areas of fragile resources (T&E species, cultural resources, etc.). To prevent potential impacts, the land manager may require the lessee to install a locked gate to restrict access to administrative access (BLM and its licensees and permittees only).

If a location proves to be a dry hole, the roadway would be closed and rehabilitated unless public benefit would be realized by leaving the road open for either public or administrative use. If roads are retained rather than rehabilitated, increased costs of road maintenance must be borne by the BLM. Even if maintained, these roads may fall to a lower standard. If the roads are not maintained, they may become unusable and contribute to soil erosion.

If a well is a producer, the road would be upgraded by providing proper drainage and/or resurfacing the road for all-weather use in order to provide year-round access.

BLM's road construction standards are utilized in the designing of access roads to producing well locations. These standards have proven to be effective in the mitigation of erosion problems that would arise from improperly constructed roads.

SOCIAL AND ECONOMIC ASSESSMENT

Population, Income, and Employment

Little social or economic impacts may be inferred to result from implementation of any of the alternatives and no alteration of the area's social or economic structure may be expected. Minor population, income, and employment effects will be unnoticeable.

Oil and gas exploration and development has been and will continue to be ongoing within the RA. None of the alternatives provide sufficient inducement or discouragement to effect a major change in the plans or perceptions of that industry, which may be expected to continue its efforts subject to the usual business and economic influences.

Very little, if any, direct local employment results from oil and gas exploration and development. All of the work entails considerable investment, planning, and preparation and requires employees with specialized education, skills, and experience. Some of the workforce are regular full-time company employees, primarily supervisory; others may be consultants or contract-hires employed through the exploration companies' established sources. A minor amount of indirect local income and employment may result from field crew expenditures for food, lodging and vehicle maintenance including gasoline and tire purchases.

Geological exploration usually occurs during a three-month summer field season, and on average, consist of three crews of from one to three geologists performing general field and site specific evaluations.

Geophysical exploration may occur throughout the year and consist of two distinct data gathering and analysis phases. The first, seismic acquisition, generally requires a crew of from 15 to 20 people, who will intensively work in the local area for two to three weeks. The second phase, gravity and magnetic acquisitions, involves a smaller crew, generally two people, and requires three to four months in the field. From time to time, the magnetic survey crew may need to hire a local pilot and aircraft.

Exploratory drilling is conducted as a 24-hour per day operation and generally requires two crews of five people each (one driller, three assistants and one "mud-logger") plus a support group consisting of a "tool-pusher" and a company supervisor. The exploratory drilling crew are non-local hires brought in with the equipment. These crews may or may not require local food and lodging, depending upon the location of the particular operation.

Drilling a well may take anywhere from three weeks to (in extreme cases) three months to complete; with 1 in 10 to 1 in 16 wildcat wells successfully producing commercial amounts of oil and gas.

The development or production phase generally employs two people who remain on-site on a 24-hour basis. One of these employees, the pumper, may be hired locally. The other, the sales representative (or bookkeeper) is ordinarily a company representative.

The majority of all equipment needs for the above operational phases are purchased non-locally from regional equipment suppliers to the industry usually located in Bakersfield, California; Vernal, Utah; Denver, Colorado; or Rock Springs or Evanston, Wyoming. Incidental tool and equipment requirements may, of course, be purchased locally.

Generally, for the reclamation effort, the operators will employ temporary local labor and custom workers who possess the necessary heavy equipment to conduct the reclamation work attendant to abandonment of a site.

The population, direct income and employment effects of oil and gas operations in the local area are moderate in terms of the local economy. Local expenditures for food, lodging, entertainment, vehicle maintenance, gasoline, incidental tools, equipment, and supplies are also moderate and represent a part of the everyday transfer of goods and services that contribute to the region's economic health and viability. To individual operators of motels, restaurants, gas stations, etc., such expenditures may, indeed, represent an important increment of their incomes.

Woodland Products

The fair market value of firewood is estimated at \$100 per cord. There would be a lost harvest of 1,000 to 1,500 cords (refer to Woodland Resources section). The average annual loss of firewood available for harvest is estimated at 17 cords per year through the end of the land use planning period which represents an average annual loss in value to consumers of \$1,700.

Recreation

There would be no effect on general recreation expenditures under any of the alternatives. Oil and gas exploration and development activity already exists within the resource area and no specific expansion is foreseen. Population pressure due to oil and gas exploration is not likely to increase. These operations employ a very limited number of incoming workers, all of whom are in an unsettled, transient, short-term status. Oil and gas production, as well, would generate little additional permanent population in the local area.

Wildlife-associated recreation expenditures would be moderately reduced if any decline in habitat quality were to result in a reduction of wildlife populations below existing numbers. Impacts, while not quantifiable, would result in fewer hunter and angler days and a comparable reduction in associated expenditures.

Livestock Grazing

The long-term loss of 1,274 acres by the end of the land use planning period would result in a potential loss of up to 53 livestock AUMs. Any such loss may be expected to be spread across a number of ranch operations, with total net ranch income for all ranchers in the resource area combined being reduced by an estimated \$1,060 - less than 1/10 of 1 percent of total estimated net ranch income of approximately \$2.8 million. Value of grazing permits for agricultural loans or ranch sales would be reduced by an estimated \$2,650 throughout the resource area.

UNAVOIDABLE ADVERSE IMPACTS

Exploration and development of oil and gas resources would result in the direct loss of some wildlife habitat.

Unavoidable impacts would occur as a result of disturbance to undiscovered raptor nests, sage grouse leks or T&E species.

There would be a permanent loss of some cultural resources from project-related effects from oil and gas exploration and development.

Areas released from further wilderness consideration would result in the loss of wilderness values previously protected from oil and gas exploration by nondiscretionary leasing closures.

There would be a temporary deterioration of localized ambient air quality as a result of construction activities.

There would be a loss of 190 AUMs of forage for livestock and wild horses.

Increased human activity would disrupt normal grazing patterns of livestock, foraging patterns of wildlife and wild horses and affect traditional recreation uses such as hunting and fishing.

RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Long-term productivity of the land would not be restored on 1,274 acres of land. Reclamation efforts on 2,212 acres would eventually restore previous productivity. Long-term uses of the land in the form of oil and gas development would result in an increase of associated royalties and contribute to stabilization of an energy-dependant economy.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Discovery and extraction of oil and gas resources would result in the permanent loss of these resources.

Designation of WSAs as wilderness would result in the permanent loss of royalty income associated with development of oil and gas resources which may be present.

Site-specific changes to the landscape would result in localized destruction of soil integrity and vegetation productivity and potential.

ALTERNATIVE ANALYSIS

This section discusses the impacts to natural resources from exploration and development of oil and gas resources by alternative. Each resource is analyzed according to the types of impacts expected and the degree to which the resource in question would be protected or mitigated under each alternative. Table S-2 at the beginning of this document provides a summary of the differences of impacts by resource for each alternative.

ALTERNATIVE A - Continuation of Present Management Alternative (No Action)

WILDLIFE HABITAT

Under this alternative, a total of 1,900 acres of lands closed to leasing and 5,500 acres of NSO stipulations forming a buffer zone around the

Ruby Lakes National Wildlife Refuge within the Egan RA exists. In addition, there are a total of 152,640 acres having timing limitations of crucial mule deer winter range and 16,320 acres on mule deer spring range.

A total of 79,880 acres of sage grouse leks have one half mile NSO stipulations as well as timing limitations on 487,280 acres surrounding these leks. Other timing limitations under this alternative include a total of 20,800 acres for golden eagle habitat and 40,320 acres for crucial chukar partridge habitat.

Since implementation of these leasing closures, stipulations and timing limitations in 1978, these major and minor restrictions to oil and gas leasing for wildlife protection have not demonstrated any noticeable benefit to wildlife species in relation to oil and gas exploration. In many cases, similar protection of the species and their habitats can be accomplished with less restrictive measures. Currently, existing leasing restrictions provide protection to only about half of the identified sage grouse leks and crucial winter habitat in the resource area.

Oil and gas exploration would result in minor losses to crucial big game winter habitat from disturbance to isolated or roadless areas not covered by timing limitations.

Under this alternative there would be some temporary loss of forage (depending on location of activity) in mule deer winter habitat and possibly a minor amount of displacement due to human presence. Because most of these species recover quickly from disturbance, impacts would be short-term and would not affect the long-term productivity of the species. These impacts are considered to be negligible over the long-term.

Impacts would be expected on 349,685 acres of sage grouse leks and sage grouse winter habitat which are not currently covered by NSO or timing limitation stipulations.

Temporary disturbance during nesting periods would subject the ferruginous hawk to minor losses in the general population.

THREATENED AND ENDANGERED SPECIES

NSO leasing stipulations and compliance with section 7 of the Endangered Species Act would be adequate to protect four identified critical habitats for T&E fish species located on adjacent private or state-owned properties would be affected by actions on nearby public lands. NSO stipulations will also protect a roost site for the endangered Bald Eagle.

There would be impacts to a total of five category 2 plant species which occur at three locations on public lands. Permitted oil and gas activities would impact a sixth species (category 1) located on adjacent private land. BLM Manual 6840, Special Status Species Management, provides for "the conservation of candidate species and their habitats and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as T&E". The ability of the land manager to fully meet this requirement would be lessened under this alternative; however, actions detrimental enough to cause listing would be avoided.

Existing COAs for the protection of riparian values will serve to protect candidate T&E fish species located on private lands adjacent to public lands. The legislative mandated protection of the Goshute Canyon WSA will protect the Bonneville cutthroat trout in Goshute Creek.

Adverse impacts to six species of plants and four species of T&E candidate fish would be expected under this alternative. Impacts would be expected on T&E candidate ferruginous hawk populations under this alternative as well. Should the Goshute Canyon WSA be released from wilderness consideration, there would also be potentially adverse impacts to Bonneville cutthroat trout habitat.

RIPARIAN HABITAT

Under this alternative, riparian and wetland habitat is protected through existing standard practices and procedures for geophysical

exploration and APDs. These SOPs provide for the prohibition of operation during wet periods and drilling within 500 feet of any pond, reservoir, canal, spring or stream. This flexibility should prevent any noticeable impacts to nearly all riparian areas within the resource area.

Wet meadow habitat totalling 320 acres identified in Orchard Canyon is not specifically protected under this alternative. Any geophysical or development activities in this critical wet meadow habitat would be destructive.

No noticeable impacts to riparian habitat in the resource area are expected from oil and gas exploration under this alternative.

A total of 320 acres of wet meadow habitat in Orchard Canyon would not be afforded specific protection.

MINERAL RESOURCES

Under this alternative the number of leasing restrictions currently in place for oil and gas activities would remain. A total of 2,183,342 acres (56.8% of the RA) would be available for lease under standard terms and conditions. A total of 21,100 acres would remain closed to leasing for discretionary reasons and 241,171 acres closed to leasing for nondiscretionary reasons (WSAs/ISAs). A total of 210,850 acres would be leased under NSO stipulations. Timing limitations and controlled surface use restrictions would remain on 1,185,200 acres (refer to Chapter 2, Table 2-1). The majority of the existing restrictions are located in high and moderate potentials areas for oil and gas resources.

Leasing restrictions comprise an economic factor in the oil and gas industry's ability to explore for oil and gas resources due to cost and timing of operations. Timing limitations would result in exploration projects requiring more time and expenditures. If it is determined that not enough time is available to complete exploration projects or drilling programs,

complete and detailed information on the geology may not be acquired for the next phase of the exploration plan. This would result in the oil and gas company incurring greater costs for oil and gas production.

Additional stipulations and conditions would also result in increased costs for oil and gas resources. In areas that have NSO requirements, the oil company will be required to either directional or horizontal drill to produce oil and gas reserves. The cost of a normal operation for drilling and completion of a producing well is an estimated 1.5 million dollars. The cost of directional and horizontal drilling technology increases the drilling cost an estimated 50%. The cost to conduct geophysical exploration ranges from 10-30,000 dollars based on the type of operation, i.e. Poulter method or helicopter supported operations and the geographic terrain in which they occur. Timing limitations on both geophysical exploration and drilling may increase costs of the operations up to an additional 25%. These costs would include rental payment of specialized equipment, crew demobilization and remobilization costs and rig standby time costs.

This alternative contains numerous forms of leasing restrictions and discretionary closures which have been found to be either unnecessary for the protection of resource values or addressable in less restrictive COAs. In some cases, restrictions exist in areas where there is no demonstrable resource value to protect. Retention of these restrictions and closures would unnecessarily increase costs to the oil and gas industry for exploration and development activity. This alternative would not conform to the 1624 SPG for oil and gas resources.

WOODLAND RESOURCES

Under this alternative, the swamp cedar, *Juniperus scopularum* would remain specifically protected with NSO leasing stipulations. Other sensitive species would only be protected from oil and gas exploration and development

activities through standard practices and procedures, SOPs and the standard terms and conditions of the lease instrument.

Oil and gas exploration and development will result in the long-term loss of productivity on 500 acres of woodland.

Swamp cedar would be afforded protection on 235 acres under this alternative.

CULTURAL RESOURCES

Under this alternative, a limited number of historic and prehistoric cultural properties identified prior to 1982 are protected under NSO leasing restrictions regardless of the properties' eligibility to the National Register of Historic Places. Cultural properties identified after 1982 are protected only through compliance with sections 106 and 110 of the NHPA and avoidance through section 6 of the lease instrument. There are no special leasing provisions in the form of NSO for any fragile or National Register (NR) eligible sites identified after 1982. Also, a number of fragile or NR-eligible properties identified prior to 1982 are not protected through any special leasing provisions.

The Sunshine Locality National Register District (34,560 acres) is protected from impacts from oil and gas exploration and development through No Leasing (17,920 acres) and NSO (16,640 acres) leasing restrictions. The Pony Express Trail and associated way stations are protected through NSO leasing for the entire length (640-acre aliquots) and a 300-foot buffer either side of the trail. All currently listed National Register Properties on BLM-administered lands are protected through NSO leasing. Some cultural properties located on private lands are also identified for NSO restrictions.

Adverse impacts would accrue to NR-eligible sites which are not protected by NSO leasing restrictions in the case of field development. No adverse impacts are expected to cultural

resources for exploration activities as long as compliance with Section 106 of the NHPA is maintained for each action. Avoidance of cultural properties through section 6 of the lease instrument is adequate to protect the majority of cultural resources within the resource area, including many of the properties currently under NSO restrictions.

Cultural properties currently protected under this alternative would continue to be protected through NSO leasing restrictions (38,260 acres) and No Leasing restrictions (17,920 acres). NR-eligible properties identified since 1982 would be protected only through the section 106 compliance process and avoidance through application of section 6 of the lease instrument.

WILDERNESS

Impacts would be expected to wilderness values in WSAs released from consideration through congressional action. The entire Goshute Canyon Natural Area located partially within the Goshute Canyon WSA would remain under closed to leasing (1,200 acres) and NSO (9,080 acres) restrictions should the suitable portion of the WSA not be designated as wilderness. The NSO restrictions would be to protect the sensitive T&E species of the Bonneville cutthroat trout and its habitat. A total of 17,440 acres of scenic areas included within the Park Range WSA and 640 acres within the Blue Eagle WSAs totalling 18,080 acres would remain designated as No leasing and a total of 7,640 acres surrounding these two areas would remain under NSO restrictions should these WSAs be released from wilderness consideration.

Wilderness and scenic values would be preserved for any lands designated wilderness by Congress. Leasing restrictions that existed in areas prior to designation as WSAs would remain should the WSA be released from wilderness consideration under this alternative. These restrictions may not be in conformance with the 1624 SPG for determinations for major leasing restrictions.

RECREATION

Under this alternative serious impacts would occur from exploration and development at areas of recreation use. These areas include designated and developed BLM recreation sites or dispersed use areas at Illipah Recreation Area, Ward Mountain Winter Sports Area, Cold Creek Reservoir Recreation Site, Garnet Hill Rockhounding Area, and the Cave Valley Cave Geologic Area. Impacts would consist of damage to recreation facilities, impairment of visitor experiences and alteration of ROS (Recreation Opportunity Spectrum) classes through development of roads and other surface disturbances which would change the natural setting and disturb resources upon which recreation activities are based.

Areas of concentrated recreation use that would be afforded protection through an existing NSO stipulation consist of the Goshute Creek Recreation Site and the Goshute Cave Geologic Area. Areas of dispersed recreation use which are currently protected through an existing combination of a no leasing central core surrounded by bordering lands with a NSO stipulation are the proposed Ragged Ridge Scenic Area and the Goshute Canyon Natural Area. The dispersed recreation use zone along the Pony Express Trail within the resource area is protected within a 600-foot wide corridor with a NSO stipulation. A designated area for dispersed recreation use which has no protection is the Mount Grafton Scenic Area.

In addition, under the current situation there is no stipulation against blasting, exploration or development in the vicinity of recognized significant cave resources. This would result in destruction of speleothems from underground shock waves, alteration of subsurface drainage patterns, or damage to cave dwelling organisms.

A total of 13,220 acres of land containing scenic values and unique natural resources would continue to be protected with NSO stipulations or remain closed to leasing under this alternative.

Adverse impacts to recreational resources that are not afforded protection leasing stipulations or closures would be expected.

VISUAL RESOURCES

Visual values would be protected in sensitive areas that have preservation objectives during the short-term. Designation of wilderness areas by Congress would ensure long-term objectives are met. If any WSAs and ISAs are released from wilderness study status, they may be subjected to projects which would degrade visual values. Without proper design or impact mitigation for projects, visual impacts may occur that exceed the allowable contrast for interim management objectives that are developed.

Under this alternative, noticeable visual impacts could occur within the Mount Grafton Scenic Area and at existing or proposed campground locations (Illipah Reservoir, Garnet Hill, Cold Creek, Antelope Summit, Bassett Lake, Comins Lake, and the Horse and Cattle Camp Backcountry Byway).

Potential impacts within valley bottoms and major mining areas would be in compliance with VRM objectives as long as impacts are mitigated.

Scenic values would be preserved within areas designated as wilderness by Congress.

For all other lands, visual impacts would be mitigated through proper project design or post-impact mitigation.

There would be long-term visual impacts to 1,274 acres located primarily in valley bottom settings.

LIVESTOCK AND VEGETATION

There are no special leasing restrictions for livestock grazing under this alternative. Loss of forage productivity on 1,274 acres of land and

147 livestock AUMs would occur as described in the RFD and Impacts Common To All Alternatives section above.

There would be a long-term loss of 1,274 acres of forage productivity and loss of 147 livestock AUMs by the end of the land use planning period under this alternative.

WILD HORSES AND BURROS

Controlled surface use leasing restrictions on 261,440 acres of critical wild horse habitat would remain in effect. Impacts to wild horses and burros from oil and gas exploration and development would be negligible under this alternative.

There would be a long-term loss of 1,274 acres of forage productivity and the loss of 43 wild horse AUMs by the end of the land use planning period.

SOILS

Under this alternative, adherence to the standard terms and conditions of a lease and application of the existing standard operating procedures (SOPs) would mitigate most impacts of individual field operations on a site specific basis. Continuance of applying controlled surface use stipulations on 206,400 acres would prevent undue degradation on these acres.

Oil and gas activities would contribute to the degradation of soils on 3,486 acres under this alternative. There would be a long-term loss of 1,274 acres of soil on unreclaimed lands.

WATER RESOURCES

There would be no substantial impact expected to water quality or quantity from exploration or development of oil and gas resources under this alternative.

AIR QUALITY

Fugitive dust from surface disturbance associated with oil and gas exploration and development project-related activities would result in short-term degradation of air quality in localized areas. Release of gases into the atmosphere from production fields would result in more long-term degradation of air quality.

LANDS AND TRANSPORTATION

Oil and gas exploration and development would conflict with existing ROWs in some cases. Additional ROWs for access roads would likely be issued as a direct result of oil and gas exploration and development.

Existing R&PP leases are not specifically exempted from oil and gas activities under this alternative and land use conflicts would arise.

Oil and gas exploration and development would conflict with existing ROWs. Additional ROWs for access roads would likely be issued as a direct result of oil and gas exploration and development.

R&PP leases would not be exempted from oil and gas leasing under this alternative.

SOCIAL AND ECONOMIC ASSESSMENT

Under this alternative, leasing restrictions will continue to have an effect upon oil and gas exploration costs due to the constraints such restrictions imposed on scheduling and operating efficiency. No evidence is available to indicate these additional costs have been sufficiently prohibitive to discourage exploration.

No major impacts to the oil and gas industry or local economies can be identified with this alternative.

ALTERNATIVE B - Preferred Alternative

WILDLIFE HABITAT

This alternative would eliminate or reduce impacts of oil and gas activities to certain wildlife species through seasonal lease restrictions (timing limitations) on identified crucial habitats or during breeding periods.

Habitats utilized by most big game species are in low to moderate potential areas for oil and gas resources. Under the RFD scenario only 5% (9 wells) of oil and gas exploration drilling will take place in the moderate potential mountainous regions, with no anticipated production. It is expected that impacts from oil and gas exploration to big game and their habitats will be minimal.

Removal of timing limitations on 152,640 acres of mule deer winter range and 16,320 acres of mule deer spring range will have no impact on these animals. Mule deer are highly variable in utilizing different habitats depending on local weather conditions. Timing limitations currently exist on only 28% of the estimated total of 529,753 acres of available winter habitat in the resource area. Any exploration activity within the remaining 72% of mule deer winter range not covered by timing limitations is not expected to have a noticeable effect on the winter habitat or big game populations. Spring range is not considered crucial and any potential impacts to populations or habitat would be mitigated through COAs on a site-specific basis.

Any oil and gas exploration within crucial wildlife habitat not covered by leasing restrictions would result in some loss of habitat and displacement of disturbed animals. Small losses of habitat, such as that resulting from a single well, would have a minimal effect on the availability of crucial habitat. Exploration activity with areas covered by lease timing limitations would be restricted to non-critical periods and disturbance to wildlife would not be a factor.

Timing limitations on 916,845 acres of known sage grouse leks and winter habitat in high and moderate potential valley bottoms would minimize or preclude impacts to sage grouse populations from oil and gas exploration activity. Removal of the 1/2-mile NSO stipulation surrounding only a portion of the known sage grouse leks would have no effect on these populations as these areas would be adequately covered through timing limitations.

NSO leasing stipulations on 9,280 acres surrounding (40-acre aliquots) known Ferruginous hawk nest sites and 116,615 acres of timing limitations on their nesting territories would protect this sensitive species from any impacts resulting from oil and gas exploration.

Removal of 1,900 acres of Closed to Leasing and 5,500 acres of NSO stipulations surrounding portions of the Ruby Lake Wildlife Refuge within the Egan RA will have no impact on management of the refuge by the USF&WS. The 7,400-acre buffer zone of leasing restrictions surrounding the refuge in White Pine County are not consistently applied. Less restrictive measures contained within the lease instrument can accomplish the same objective during critical breeding periods.

Removal of timing limitations on 20,800 acres of potential golden eagle habitat will have no impact on this species. Wildlife inventories have identified actual nest sites and any impacts would be mitigated through application of COAs on a site-specific basis.

Removal of timing limitations on 40,320 acres on crucial chukar habitat in the Pancake Range will have no impact on this species. Chukar populations are highly variable in the resource area due to the marginal habitat provided in this region of Nevada. Any potential impacts to this species would be mitigated through COAs on a site-specific basis.

Under this alternative, impacts to mule deer winter range would be the same as the Continuation of Present Management Alternative.

All identified sage grouse leks and sage grouse winter habitat would be protected through timing limitation leasing stipulations for oil and gas exploration. There would be no detectable impact projected for other upland game species.

All known ferruginous hawk nest sites and nesting territories would be protected from oil and gas exploration and development through NSO and timing limitation leasing stipulations.

There would be no detectable impact to non-game wildlife species.

THREATENED AND ENDANGERED SPECIES

Requirements listed under section 7 of the Endangered Species Act will prevent any serious impacts to the listed or candidate T&E fish species in the resource area. Identified T&E plant and animal species would be afforded protection through NSO leasing stipulations on the public lands on which they occur.

Identified T&E species habitat would be protected under the Preferred Alternative. No major impacts to listed or candidate animal or plant species is expected as a result of implementation of this alternative.

RIPARIAN HABITAT

Under this alternative, COAs should prevent impacts to the estimated 6,106 acres of wet meadow, 18,984 acres of aspen and 5,430 acres of other riparian habitats. NSO leasing for Orchard Canyon would protect 320 acres of important riparian habitat.

A total of 320 acres of wet meadow habitat in Orchard Canyon would be specifically protected with NSO leasing stipulations. COAs would mitigate any impacts from oil and gas activities on all riparian habitat within the resource area under this alternative.

MINERAL RESOURCES

Under this alternative the amount of land open to leasing under standard terms and conditions would increase by 160,046 acres (61% of the RA). Public lands closed to leasing for discretionary reasons would decrease by 19,456 acres and lands under NSO leasing stipulations would decrease by 143,350 acres. Public lands under timing limitations would increase by 1,380 acres. There would be no acreage under controlled surface use leasing stipulations (refer to Chapter 2, Table 2-4).

The reduction in lands closed to leasing and NSO stipulations under this alternative would benefit the oil and gas industry by providing more area open to exploration and drilling for oil and gas resources. The majority of this acreage is located within high to moderate potential for oil and gas resources. The increase of 1,380 acres of timing limitations should not noticeably affect the cost of oil and gas operations over existing conditions (refer to Social and Economic Assessment Section below).

Under this alternative, the oil and gas industry is provided more public land open to leasing with fewer leasing restrictions attached. Unnecessary leasing restrictions would be removed and operating COAs improved to address specific resource concerns that were not addressed in the Continuation of Present Management Alternative or under more restrictive leasing stipulations.

While the cost of drilling would increase as a result of directional drilling in NSO areas or higher performance standards, these costs should not be overwhelmingly greater than which exist under the Continuation of Present Management Alternative. Under the Preferred Alternative, there would be no increase in drilling costs that would be considered unnecessary for the protection of resource values.

Seasonal restrictions would result in access times being too short for effective exploration and development programs; however, this

impact should not be any greater than under the Continuation of Present Management Alternative due to the very slight acreage increase in timing limitation acreage.

WOODLAND RESOURCES

Under this alternative, sensitive and unique species and varieties would be protected and riparian species such as aspen would be considered in each application with appropriate conditions of approval applied. The swamp cedar would continue to be protected through NSO leasing stipulations.

Oil and gas exploration and development will result in the long-term loss of productivity on 500 acres of woodland.

Sensitive and unique species would be afforded protection under this alternative.

CULTURAL RESOURCES

Under this alternative, identified fragile or NR-eligible properties and listed properties are protected through NSO leasing stipulations. NSO restrictions would also be in place for properties within the Sunshine Locality National Register District. A total of 11,334 acres are identified for NSO restrictions to protect six fragile and NR-eligible cultural properties and management districts.

Within the Sunshine Locality National Register District, 18,400 acres surrounding the complex of paleo-Indian sites are identified for leasing with NSO restrictions. Approximately 16,160 acres within the National Register District would be open to leasing with no major restrictions. Compliance with Section 106 of the NHPA would be mandatory for any activities on these acres. A Leasing Notice informing the lessee of potential time delays up to 300 days for consultation and implementation of treatment plans for activities on these acres would be issued.

Under the NSO restrictions proposed, no adverse impacts to the values contained within the National Register District are expected. NSO restrictions on the six additional properties and management districts would negate adverse impacts from exploration or development of oil and gas resources.

All other sites and properties not identified for specific NSO or No Leasing restrictions would be protected through standard mitigation procedures employed through the Section 106 process and avoidance through section 6 of the lease instrument.

The Pony Express Trail would be managed through the visual management objectives in the Egan RMP.

Under this alternative, identified fragile and NR-eligible cultural properties would be protected through a total of 29,734 acres of NSO restrictions. A limited number of cultural properties would have a total of 21,620 acres of unnecessary leasing restrictions removed. Potential impacts to the Pony Express Trail would be mitigated through the visual management objectives contained within the approved Egan RMP.

WILDERNESS

Impacts would be expected to wilderness values in WSAs released from consideration through congressional action. The Goshute Canyon Natural Area located partially within the Goshute Canyon WSA would retain 4,480 acres of NSO restrictions should the suitable portion of the WSA not be designated as wilderness. The leasing restrictions would be to protect the sensitive T&E species of the Bonneville cutthroat trout and its habitat. A total of 18,080 acres of closed to leasing for scenic values included within the Park Range under the Continuation of Present Management Alternative would be removed. Should the WSA be released from wilderness consideration, these values would be potentially impaired.

Under this alternative, in the absence of wilderness designation, the 7,850-acre Goshute Canyon Natural Area would be leased with NSO restrictions to protect the Bonneville cutthroat trout habitat. Closed to leasing and NSO stipulations for scenic values within the Park Range and Blue Eagle WSAs would be removed and these acres would be open to leasing with no major restrictions. This may result in potential impairment to scenic values in these two areas.

RECREATION

With this alternative, areas with concentrated recreation use would be protected from oil and gas exploration and development activities by being closed to leasing. This would apply to the Illipah Recreation Area, Cold Creek Reservoir Recreation Site, Goshute Creek Recreation Site, Goshute Cave Geologic Area and Cave Valley Cave Geologic Area.

Other designated areas which receive a more dispersed type of recreation use and proposed recreation development areas would be protected from oil and gas exploration activities by a NSO stipulation. These areas consist of the Ward Mountain Winter Sports Area, Garnet Hill Rockhounding Area, Goshute Canyon Natural Area, the Mount Grafton Scenic Area, and proposed campground areas at Antelope Summit, Bassett Lake, Bristlecone Pine Interpretive Area and Comins Lake. Under this alternative the no leasing portion of the Goshute Canyon Natural Area and the proposed Ragged Ridge Scenic Area would be changed to no surface occupancy.

The visual integrity of the Pony Express Trail would be protected through application of the visual management SOP contained in the Egan ROD which is specific to the Pony Express Trail. The NSO stipulation which currently exists for the Pony Express Trail is unnecessary for protecting the natural condition of the trail due to the existing SOP which would accomplish the same objective. The existing

SOP used in combination with standard terms and conditions on the lease form will allow for protection of the trail while allowing other multiple use activities to take place.

Caves would be protected from nearby exploration and development activities by a COA. The standard terms and condition of moving a proposed drill site up to 200 meters from cave entrances, drainage areas and subsurface aspects would allow for appropriate adjustments to minimize impacts.

In this alternative the recreation resource would be better protected than under the Continuation of Present Management Alternative. Recreation experiences and resource based opportunities in designated and concentrated recreation use areas would be protected.

Under this alternative there would be greater protection to recreation resources. A total of 6,851 acres of scenic values and sites identified for recreation development and dispersed use in the Egan ERMA and Loneliest Highway SRMA would be either closed to leasing or under a NSO leasing stipulation.

VISUAL RESOURCES

Impacts would be similar to the Continuation of Present Management Alternative with the exception that the Mount Grafton Scenic Area and all existing and proposed recreation sites would be closed to leasing or leased as NSO areas. Noticeable visual impacts would not occur in these areas.

Scenic values would be preserved within areas designated as wilderness by Congress.

For all other lands, visual impacts would be mitigated through proper project design or post-impact mitigation.

There would be long-term visual impacts to 1,274 acres located primarily in valley bottom settings.

LIVESTOCK AND VEGETATION

Same as Alternative A.

There would be a long-term loss of 1,274 acres of forage productivity and loss of 147 livestock AUMs by the end of the land use planning period under this alternative.

WILD HORSES AND BURROS

Removal of controlled surface use stipulations on 261,440 acres of critical wild horse habitat will have no impact on these animals. Identification of wild horse key use areas in the Egan RMP and the subsequent formation and definition of herd management and use areas have precluded the definition of wild horse critical habitat.

COAs would be applied on a site-specific basis and serve to adequately mitigate any potential impacts to these animals from oil and gas activities. Impacts to wild horses and burros from oil and gas exploration and development would be negligible under this alternative.

There would be a long-term loss of 1,274 acres of forage productivity and the loss of 43 wild horse AUMs by the end of the land use planning period.

SOILS

Removal of controlled surface use stipulations on 206,400 acres identified in the Continuation of Present Management Alternative would have no impact to soils. These stipulations would be incorporated into the COAs for this alternative which would continue to mitigate impacts to soils throughout the resource area on a site specific basis.

WATER RESOURCES

Same as Alternative A.

AIR QUALITY

Same as Alternative A.

LANDS AND TRANSPORTATION

A total of 2,264 acres of R&PP leases would be closed to leasing. These closures would preclude any conflicts with existing land uses covered in the R&PP leases.

Oil and gas exploration and development would conflict with existing ROWs. Additional ROWs for access roads would likely be issued as a direct result of oil and gas exploration and development.

R&PP leases would be closed to oil and gas leasing under this Alternative.

SOCIAL AND ECONOMIC ASSESSMENT

The reductions in the acreage closed to oil and gas leasing, together with the release of 143,350 acres from the NSO restrictions provide an encouragement to exploration.

Any increases or decreases in operating costs that might result from such adjustments are not likely to have any effect on an individual operator's decision to undertake exploration in a particular area. Such costs are incidental, not prohibitive, and may be found to exist in one form or another in every exploration area. Operator's generally consider such costs to be a normal part of the cost of doing business.

ALTERNATIVE C - Standard Terms and Conditions

WILDLIFE HABITAT

Under this alternative, wildlife habitat would only be protected from disturbance under the standard lease terms by specific conditions applied to oil and gas activities (APDs, ROWs and NOIs) at the time of permit application.

Standard lease terms would, for the most part, allow the BLM to mitigate the most detrimental impacts to wildlife from oil and gas exploration and development. These activities would result in disruption of big game calving and fawning periods and displacement of animals would result during the critical winter season if the 60-day timing limitation contained in the lease instrument were not long enough to cover these periods. Losses to big game populations would occur from oil and gas development on crucial habitats during these seasons.

With the absence of specific timing limitations to protect key wildlife species (sage grouse, Ferruginous hawks), exploration and field development would result in substantial disturbance to sage grouse winter, nesting, breeding, and brood rearing habitat would result in long-term losses to populations.

Disturbance to nesting raptors, especially during the pair bonding phase of the courtship ritual, would result in nest abandonment which would ultimately result in long-term reductions in raptor populations.

Under this alternative, there would be no detectable impacts to mule deer winter range. Impacts would be expected on 916,845 acres of sage grouse leks and winter habitat. Impacts would also be expected on 9,280 acres of ferruginous hawk nest sites and 116,615 acres of nesting territories.

THREATENED AND ENDANGERED SPECIES

There would be no special leasing stipulations provided to T&E species under this alternative. Only T&E species which are formally listed as federally threatened or endangered would receive protection as mandated under section 7 of the Endangered Species Act. Impacts to T&E species within WSAs would be precluded by nondiscretionary leasing closures. Should WSA status be removed, impacts to the Bonneville cutthroat trout in Goshute Creek would be expected. Impacts to candidate species habitat would be avoided as much as possible but some impacts would likely occur.

Adverse impacts to six species of plants and four species of T&E candidate fish would be expected under this alternative. Impacts would be expected on T&E candidate ferruginous hawk populations under this alternatives as well. Should the Goshute Canyon WSA be released from wilderness consideration, there would also be potentially adverse impacts to Bonneville cutthroat trout habitat.

RIPARIAN HABITAT

Under this alternative, impacts to the estimated 6,106 acres of wet meadows, 18,984 acres of aspen and 4,530 acres of other riparian habitat would be mitigated through COAs and section 6 of the lease instrument.

No noticeable impacts to riparian habitat in the resource area are expected from oil and gas exploration under this alternative.

A total of 320 acres of wet meadow habitat in Orchard Canyon would not be afforded specific protection.

MINERAL RESOURCES

Under this alternative the land would be either open to leasing under standard terms and conditions or closed to leasing for discretionary and nondiscretionary reasons. There would be no minor or major restrictions to the oil and gas industry.

A total of 3,594,908 acres (93.6% of the RA) would be open to leasing under standard terms and conditions. A total of 5,584 acres would be closed to leasing for discretionary reasons (refer to Chapter 2, Table 2-12).

This alternative would allow the oil and gas industry more simplified and comprehensive development of oil and gas resources. Protection of other resources would be accomplished through selected areas closed to leasing, standard practices and procedures, COAs and the standard terms and conditions of the lease instrument.

This alternative would provide the least impact to oil and gas industry by allowing lessees to operate with the greatest flexibility under the standard terms and conditions of the lease instrument and the fewest lease restrictions.

WOODLAND RESOURCES

Under this alternative there is no specific protection provided for Bristlecone pine and swamp cedar areas. The potential for damage to Bristlecone pine is slight due to its occurrence in high altitude mountainous country which has low potential for oil and gas. Impacts would be expected to swamp cedar as it is located within a high oil and gas potential valley bottom.

Oil and gas exploration and development will result in the long-term loss of productivity on 500 acres of woodland.

Potential impacts to sensitive and unique species and swamp cedar would occur under this alternative.

CULTURAL RESOURCES

Under this alternative, the protection of cultural properties would be through standard avoidance or mitigation procedures under section 106 of the NHPA and section 6 of the lease instrument. There would be no added protection for six fragile and NR-eligible cultural properties and management districts.

Adverse impacts would be expected to fragile Paleo-Indian complexes within the Sunshine Locality National Register District as a result of exploration or development activities. A total of 2,560 acres within the National Register District would be identified for No Leasing to protect extremely fragile and scientifically important cultural resources. Cultural resources contained within the remainder of the National Register District would be adversely affected by oil and gas exploration and development. There would also be adverse

impacts to the setting and environmental context in which the site complexes are located. These values are included in the actual nomination and would be difficult to mitigate.

In the case of field development, there would be direct and indirect impacts to a number of other historic and prehistoric cultural properties located within the resource area. These impacts would be in the form of inadvertent destruction of properties not previously identified, disruption of natural setting and context, and potential vandalism through increased access into otherwise remote areas not previously accessible.

Under this alternative, adverse impacts would be expected to occur on up to 27,174 acres of identified fragile and NR-eligible cultural properties without the benefit of special leasing restrictions. Within the Sunshine Locality National Register District, 2,560 acres would be identified for No Leasing to protect extremely fragile and scientifically important cultural resources. All other cultural resources would be protected only through compliance with Section 106 of the NHPA and application of section 6 of the lease instrument.

WILDERNESS

For any lands released from wilderness consideration, there would be potential impacts to wilderness and scenic values. There would be potential adverse impacts to the habitat of the T&E Bonneville cutthroat trout within the Goshute Canyon Natural Area should the Goshute Canyon WSA be released from wilderness consideration.

Under this alternative, there would be potential adverse impacts to Bonneville cutthroat trout habitat should the Goshute Canyon WSA be released from wilderness consideration. There would be potential impairment to scenic values contained within the Park Range and Blue Eagle WSAs in the absence of wilderness designation.

RECREATION

Under this alternative areas where concentrated recreation use occurs would be protected from oil and gas exploration and development by being closed to leasing. These consist of Illipah Recreation Area, Cold Creek Reservoir Recreation Site, Goshute Creek Recreation Site, Goshute Cave Geologic Area and Cave Valley Cave Geologic Area. Other areas of recreation use would be open to leasing under standard terms and conditions. This would result in less impact to the recreation resource than the Continuation of Present Management Alternative but more impact to dispersed recreation use areas than would occur under the Preferred Alternative.

This alternative would protect 560 acres which would be closed to leasing. Other existing and proposed development sites and areas with dispersed recreation use are expected to be adversely affected by this alternative.

VISUAL RESOURCES

For any lands released from wilderness consideration, there would be noticeable potential impacts to scenic values if oil and gas exploration takes place. All other anticipated impacts are estimated to conform with visual objectives.

Scenic values would be preserved within areas designated as wilderness by Congress.

For all other lands, visual impacts would be mitigated through proper project design or post-impact mitigation.

There would be long-term visual impacts to 1,274 acres located primarily in valley bottom settings.

LIVESTOCK AND VEGETATION

Same as Alternative A. There would be a long-term loss of 1,274 acres of forage productivity and loss of 147 livestock AUMs by the end of the land use planning period under this alternative.

WILD HORSES AND BURROS

Same as Alternative B. There would be a long-term loss of 1,274 acres of forage productivity and the loss of 43 wild horse AUMs by the end of the land use planning period.

SOILS

Same as Alternative B.

WATER RESOURCES

Same as Alternative A.

AIR QUALITY

Same as Alternative A.

LANDS AND TRANSPORTATION

Same as Alternative B.

SOCIAL AND ECONOMIC ASSESSMENT

This alternative offers the greatest potential for operating economies in oil and gas exploration, development and production; however, such economies are not likely to be of sufficient increase to provide inducement to expanded exploration and development activities.

CUMULATIVE IMPACTS

INTRODUCTION

The term cumulative impacts refers to the concept that the various environmental effects of two or more projects or actions, when considered together, may compound or increase environmental impacts beyond what would be expected if each project were considered separately. Cumulative impacts include the combined effect of specific planned projects and other reasonably foreseeable future actions (RFAs) within the project study area to which the oil and gas exploration and development may add incremental impacts.

The cumulative impacts analysis was conducted using the five sequential steps below:

- 1) Define the timeframe for the analysis.
- 2) Identify those resource activities affected by the oil and gas exploration and development for which cumulative impacts will be analyzed.
- 3) Identify past, present and reasonably foreseeable actions to be analyzed.
- 4) Consider the area of analysis for each resource to be analyzed in regard to cumulative impacts.
- 5) Analyze impacts in a cumulative sense.

The time frame for cumulative impact analysis encompasses the remainder of the Egan RMP land use planning period or to the year 2007 (refer to Chapter 1, page 1-5, planning criterion G). The area of analysis encompasses the entire BLM Egan Resource Area and USFS public lands of the Humboldt National Forest contained within the resource area (refer to Chapter 1, page 1-5, planning criterion I).

The resources that would be directly or indirectly affected by the consequences of oil and gas leasing or other actions that will be

analyzed in a cumulative sense consist of wildlife habitat, woodland products, cultural resources, recreational and visual resources, livestock and vegetation, wild horses and burros, soils and air quality. The cumulative analysis is based upon the RFD for oil and gas resources presented at the beginning of this chapter and the RFAs presented below. These development scenarios apply to all the alternatives described above. The differences in cumulative impacts between alternatives are considered negligible, therefore, the discussion below assumes the cumulative impacts to be common to all alternatives. Table 4-3 at the end of this section provides a summary of cumulative impacts by resource.

REASONABLY FORESEEABLE ACTIONS (RFAS)

The following RFAs describe the amount and types of surface disturbance anticipated as a result of the reasonably foreseeable actions which have similar impacts and which are in addition to the projected surface disturbance from oil and gas exploration and development. The RFAs described below include lands and realty actions and minerals actions other than oil and gas exploration and development.

LANDS AND REALTY ACTIONS

The RFAs for lands and realty actions within the Egan RA include applications and possible agricultural development through conveyance of public lands to private ownership through Desert Land Entry (43 U.S.C. 321-323; as amended) and the Carey Act (43 U.S.C. 641 et seq.); a major electric transmission line right-of-way and construction of a power-generating facility. These RFAs hold for all alternatives.

Desert Land Entry (DLE) and Carey Act (CA)

These programs provide public land for agricultural development. Impacts associated with DLE and CA transfers are derived from removal of present vegetation and habitat for the development of agriculture. This

development would involve clearing land for crop production, access roads, water well drilling, water pipelines and ancillary facilities. These actions, therefore, will be restricted to primarily the high oil and gas potential valley bottoms. DLEs and Cas usually cause little impact to leasable energy minerals such as oil, gas and geothermal, due to the fact that the mineral estate is reserved to the Federal government at the DLE or CA patent issuance stage.

Of the current total of 6,325 acres of approved DLE and CA applications approved since 1979, no surface disturbance has occurred to date. During the land use planning period, application for an additional 960 acres of DLE and CA applications are expected to be approved. Of the 7,285-acre total approved and projected applications, an estimated 2,268 acres will be disturbed with 762 acres reclaimed by the end of the land use planning period. A total of 1,506 acres of surface disturbance is expected due to DLE and CA development.

White Pine Power Project (WPPP)

The WPPP Draft and Final Environmental Impact Statements were dated October 20, 1983 and August 20, 1984, respectively. The Record of Decision (ROD) for the project was signed March 26, 1985 by the Nevada State Director of the Bureau of Land Management. To date, construction for this project has not occurred; however, it is anticipated that construction will occur by the end of the land use planning period. This project would occur within North Steptoe Valley which is a high oil and gas potential zone.

It is estimated that 2,250 acres of surface disturbance would result from construction of a power-generating facility and associated railroad spur. Five water well fields, totalling 15 acres of disturbance would also be developed. Powerlines, access roads and utility corridors for pipelines to provide water from the five well fields to the power-generating facility would disturb an additional 500 acres.

Transmission lines to distribute the power generated from the WPPP will involve construction of 116 miles of two parallel 500 KV (232 miles total), 60 miles of 230 KV, and 40 miles of 69 KV transmission lines. Roads for construction and maintenance of these transmission lines would disturb 528 acres. Tower sites and marshalling yards along these routes will disturb 292 acres. Microwave sites are expected to disturb 10 acres.

Total surface disturbance expected from the WPPP is 3,595 acres. Of these 3,595 acres, approximately 1,000 acres are expected to be reclaimed; however, reclamation would likely occur after the end of the land use planning period.

Southwest Intertie Project; Utah-Nevada Transmission Project (SWIP/UNTP)

This project is currently in the planning stages and a Draft EIS is in progress. It is anticipated that construction of this project and some reclamation will occur during the land use planning period. Surface disturbance associated with this project would primarily occur within high oil and gas potential zones.

The SWIP/UNTP will involve construction of 163 miles of 500 KV transmission lines within the Egan RA. Roads for construction and maintenance of the transmission line would disturb 326 acres. Tower sites and marshalling yards along the route would disturb 163 acres. Construction of at least one substation within the Egan RA would disturb 120 acres. Microwave sites are expected to disturb 4 acres. Total surface disturbance expected from the SWIP/UNTP is 613 acres. Of the 613 acres disturbed, approximately 326 acres would be reclaimed by the end of the land use planning period.

Based upon the above RFAs, there is expected to be a net total of 5,388 acres disturbed within the Egan RA from lands and realty actions by the end of the land use planning period.

OTHER MINERALS ACTIONS

Minerals related actions within the Egan RA include exploration and development of oil and gas resources, geothermal resources, salable resources (mineral materials) and locatable resources. Surface disturbance associated with these types of developments may include development of oil and gas, geothermal and water well fields, access roads, power lines, open pit mines, refinery and process facilities and other ancillary developments.

Solid Leasable Minerals

Solid leasable minerals do not occur in economic quantities within the Egan RA, therefore, exploration or development of solid leasable minerals is not expected to occur by the end of the land use planning period.

Geothermal Resources

Geothermal production will not occur by the end of this land use planning period. Approximately 25 acres of disturbance is expected from very limited exploration. This disturbance will be reclaimed by the end of the land use planning period.

Mineral Materials

Mineral material activity will be confined mostly to existing material sites which total 1,200 acres within the resource area. Expansion of existing mineral materials sites will disturb an additional 10 acres per year. One new material site is expected to be established each year of the land use plan with a total of 40 acres of new disturbance anticipated from these additional material sites. An additional 200 acres of mineral materials sites will be developed in connection with the White Pine Power Project (WPPP) and the Southwest Intertie Project (SWIP).

Locatable Minerals

There are twelve active mines and 292 active mining notices on file in the BLM Egan RA and adjacent USFS Humboldt N.F. as of May 6,

1991. Total surface disturbance from active mining in the resource area is estimated to be approximately 5,000 acres. An estimated 3,000 acres of the existing surface disturbance will be reclaimed by the end of the land use plan. The high and moderate potential zones for locatable minerals are confined mostly to the mountainous portions of the resource area (refer to Locatable Minerals Potential Map, Map 4-1).

Mineralization in the valley bottoms is harder to locate and exploration activities in these areas have been limited. If gold prices increase in the future, exploration for valley fill targets would also increase as they become more economic. Mining activity is expected to continue into the future within the Egan RA with most of the existing and projected exploration and mine development being limited to the current active mining districts except the development of the Robinson Mining District for copper production. Some mineral exploration will occur in areas that have not been previously explored to any great degree, such as the Butte Mountains.

Based on this current and projected mining activity, the Egan RA should receive 36 mining notices per year, 17 exploration plan of operations (POOs) per year, four mine expansion POOs per year, one cyanide mine operation every other year, two small scale mining operations, one underground operation and two large scale mine operations by the end of the land use planning period. Associated reclamation that will occur includes both active reclamation and, to a slight degree, natural reclamation.

A total of 17,230 acres of surface disturbance will result from existing and projected mining within the resource area and adjacent forest service lands by the end of the land use planning period. Of the 17,230 acres, a total of 8,245 acres will be reclaimed during the same period.

A total of 8,985 acres of surface disturbance from mining activities will be left unreclaimed by the end of the land use plan. A total of 8,185 acres will be reclaimed after the end of

this land use planning period. Approximately 800 acres will remain unreclaimed in open walls and waste rock dump faces after final reclamation has been completed on all projects.

Table 4-2 below, summarizes the total acres of expected surface disturbance from the reasonable foreseeable actions (RFAs) in the Egan RA.

TABLE 4-1
CUMULATIVE IMPACTS
SURFACE DISTURBANCE SUMMARY
LANDS AND MINERALS ACTIONS

RFA Activity	Total Acres Disturbed	Total Acres Reclaimed	Net Total Acres Disturbed
DLE	1,026	0	1,026
CA	1,242	762	480
WPPP	3,595	0	3,595
SWIP	613	326	287
Geothermal	25	25	0
Solid Leasables	0	0	0
Oil and Gas	3,486*	2,212	1,274
Mineral Materials	1,600	0	1,600
Locatable Minerals	17,230*	8,245	8,985
Totals:	28,817	11,570	17,247

* Includes projected exploration and development activity on the Humboldt National Forest within the Egan RA.

CUMULATIVE IMPACT ANALYSIS

The following analyses consider the cumulative effects of the above RFAs on the resources in question that have been demonstrated to be directly or indirectly affected by oil and gas exploration and development. Those resources where the effects of oil and gas exploration and development are negligible or undetectable will not be discussed in relation to cumulative impacts.

WILDLIFE HABITAT

Mule Deer Winter Range

Locatable mineral exploration and development in moderate oil and gas potential areas is the principal activity which would affect crucial mule deer winter range in the long-term. A total of 8,985 acres of unreclaimed land will result in the loss of available forage for wintering mule deer equivalent to approximately 450 AUMs; however, forage utilized by wintering mule deer are predominately in areas exclusive of livestock and wild horse use and/or exclusive of livestock and wild horse forage preferences.

Removal of forage and habitat from direct surface disturbance will also result in the additional loss of thermal and escape cover for the deer populations. Loss of 8,985 acres of forage habitat by the end of the land use planning period amounts to approximately 3% of the total crucial winter range habitat available to deer populations within the resource area. This loss is considered to be negligible to overall mule deer winter survival.

Direct mortality of mule deer will result from increased traffic associated with these activities. Disruption of migration corridors and traditional wintering areas which has occurred in the past from locatable mineral activity has resulted in animals being displaced into marginal habitats. Impacts to wintering mule deer are variable and dependant on the length and severity of the winter. These marginal habitats do not contain all the requirements to

meet maintenance needs of wintering mule deer and unusually high mortalities within the fawn segment of mule deer populations result.

Upland game

Oil and gas development, DLE/CA agricultural development, the WPPP and SWIP all occur in high oil and gas potential valley bottoms. Sage grouse leks are the principal habitat that would be affected by these developments. Direct impacts to sage grouse leks and adjacent nesting habitat from agricultural development through DLE/CA applications would be precluded by decisions contained within the Egan ROD which do not allow for disposal of public lands within sensitive upland game bird habitat.

Indirect loss of sage grouse would occur from habitat modifications resulting from powerlines and fences associated with DLE/CA development and construction of the WPPP and SWIP/UNTP. Powerlines and fences would create new perches for raptors in sage grouse use areas increasing predation. Direct impacts from mineral activities on sage grouse brooding habitat in the foothills and mountains would result in indirect impacts to valley bottom sage grouse leks by reducing numbers of birds that attend the leks.

A total of six oil and gas fields are expected to be developed in high oil and gas potential areas over the life of the plan. With the high distribution of sage grouse leks within these zones, the six fields are likely to be in proximity of one to two sage grouse leks each. Field development is expected to contribute to the abandonment of 8 sage grouse leks by the end of the land use planning period. Agricultural development under the DLE/CA and construction of the WPPP and SWIP are not expected to contribute to the abandonment of any sage grouse leks.

Ferruginous Hawks

Oil and gas exploration, mineral material development, transmission lines associated with the WPPP and SWIP in high oil and gas

potential zones; and oil and gas exploration (including geothermal) and locatable mineral exploration and development in moderate oil and gas potential zones are the principal activities which would affect ferruginous hawk populations and nesting territories. Surface disturbance and human activity within nesting territories would affect ferruginous hawk populations through destruction of actual nests precluding re-use by the birds or abandonment of nesting sites due to activities nearby during critical nesting periods. These types of activities would also occur in prey (Townsend ground squirrels) burrowing areas which would lead to a loss of prey for the hawks. This would result in unsuccessful nesting attempts.

With development of six fields for oil and gas, construction of 495 miles of transmission lines and development of up to 12 new mines, it is expected that a total of 10 ferruginous hawk nesting territories will be affected either directly or indirectly. Although nesting populations within the resource area have shown a steady decline over the past decade, it is unknown whether these activities would directly lead to nest abandonment by the ferruginous hawk.

WOODLAND RESOURCES

Surface disturbance associated with DLE and CA development, the WPPP and the SWIP/UNTP will occur within the high oil and gas potential valley bottom zones and will have minimal impacts on woodland product resources.

Cumulative impacts to woodland product resources in high and moderate oil and gas potential zones will be derived from oil and gas exploration and development, locatable mineral exploration and development and some transmission line construction associated with the WPPP and SWIP/UNTP where the ROWs cross mountainous portions of the resource area.

An estimated 9,960 acres of woodlands are expected to be lost from locatable mineral development and approximately 500 acres from

oil and gas exploration and development by the end of the land use planning period. An estimated 350 acres of woodland may be lost during construction of the WPPP and SWIP.

The combined RFAs may result in a potential 10,460 acres of woodland being taken out of production. This amount of disturbance will result in the loss of approximately 39,000 cords of standing wood, 22,600 Christmas trees and 31,000 posts by the end of the land use planning period. An estimated four pine nut crops averaging 120,000 pounds of pine nuts each will be lost.

The growth loss is approximately 750 to 925 cords per year and approximately 1100 Christmas trees which would reach size and saleable form each year. By the end of the land use planning period, this would accumulate to 12,750 - 15,725 cords of wood and 18,700 Christmas trees. The allowable sale quantity for the resource area would be reduced accordingly.

This is not to imply that demand is going to adsorb this entire supply but given access, the pinenuts would sell, some of the other products would be harvested and the remainder would be stored as standing volume of various species.

The resource area as a whole contains approximately 409,600 acres of manageable woodland. The large portion of expected disturbance in the combined RFAs would be within this manageable area. The amount of expected disturbance represents an annual growth potential of 36,220 cords of wood which would be offered for sale per year or 615,400 cords by the end of the planning period.

The ingrowth of Christmas trees would be 43,000 per year, balanced by outgrowth, natural mortality and harvest. Thus, over the entire resource area, a total of 731,000 well-formed pinyons, suited for the Christmas tree market will enter the appropriate size class and either grow out of the size class, die or be harvested during the plan period. Past trends

and current demand for woodland products has been approximately 1,700 cords of firewood and 4,500 Christmas trees per year. The dispersed 10,460 acres of woodland products that would be potentially taken out of production would have a negligible to moderate affect on the ability of the land managing agency to meet demand in an economical manner depending on the actual location of the disturbed acres in relationship to the higher demand zones within the resource area.

CULTURAL RESOURCES

By the end of the land use planning period, a number of developments are anticipated to take place within the resource area in addition to the oil and gas exploration and development (refer to RFAs). Since each of these foreseeable actions involve similar forms of surface disturbance, they are considered to have the potential to cumulatively affect cultural resources. In general, the basin and range setting within the resource area can be divided into three topographical zones which correspond to the oil and gas potential zones: valley bottom, mid-elevation (pinyon-juniper), and upper montane. In order to assess the cumulative effects on cultural resources, existing records must be used to determine site densities in each zone in which actions are likely to occur.

Ely District cultural resource inventory records indicate that the high oil and gas potential valley bottom zones contain a site density of approximately 1 large prehistoric surface site (defined over 20 artifacts) for every 65 acres inventoried. Of these, approximately one property in five is considered significant (eligible to the National Register of Historic Places) or 1 property for every 320 acres inventoried. Moderate oil and gas potential zones correspond to the pinyon-juniper zone and contain site densities of approximately 1 property per 15 acres inventoried. The ratio of significant properties remains constant resulting in 1 significant property per 75 acres inventoried. Low oil and gas potential zones in the higher montane zones have an estimated

site density exceeding one property for every 100-150 acres inventoried and one significant property for every 750 acres inventoried.

The RFAs for the resource area indicate that 11,586 acres of disturbance are anticipated within the high oil and gas potential zone from the combined actions of oil and gas exploration and development, agricultural development, construction of a power plant and a major transmission line. This equates to potential impacts to approximately 178 large prehistoric properties of which 35 properties would be considered significant.

A total of 17,230 acres of surface disturbance is anticipated in moderate oil and gas potential zones. This zone is high potential for locatable minerals and thus, disturbance generated in this zone will be primarily from locatable mining actions. This equates to potential impacts to approximately 1,148 properties of which 229 properties would be considered significant.

During the land use planning period, 28,816 acres of surface disturbance in high and moderate oil and gas potential zones is anticipated. In response to this surface disturbance, an estimated 1,326 large prehistoric properties would be identified through inventory, which would potentially be affected by surface disturbance. A total of 264 of these properties would be considered significant.

The combined RFAs would necessitate increased inventories in the resource area which would add to the overall data base for cultural resources. Compliance with sections 106 and 110 of the National Historic Preservation Act (NHPA) would result in evaluation and treatment plans for the significant properties identified. This would increase overall knowledge of cultural resources in the resource area and result in better management and treatment of cultural resources in the future.

Nevertheless, even with mitigation through data recovery, there would be a permanent loss of some prehistoric and historic resource values

through physical destruction. This type of impact is more likely to occur through agricultural development, mining and industrial development for electrical power generation rather than from oil and gas exploration and development. To date, physical avoidance of the property is almost always the form of mitigation for oil and gas development in the resource area. This form of mitigation is standard within the COA's and leasing stipulations proposed within this document, therefore, is anticipated to continue through the life of the plan.

There would be corresponding cumulative effects on traditional lifeway values of Native American and other ethnic groups from developments anticipated in the combined RFAs. For example, Native Americans traditionally utilize the pinyon-juniper zone for pine nut collection and this is recognized as a traditional lifeway. Loss of woodland resources through the combined RFAs may lead to a loss of up to four pine nut crops by the end of the land use planning period.

RECREATION

The cumulative effect of oil and gas exploration and development and actions in the combined RFAs on recreational resources is anticipated to be minimal. The Goshute Canyon Recreation Site would continue to be segregated from mining activity. Two areas where mining activity would affect recreation opportunities are the Cold Creek and Garnet Hill Recreation Areas; however, existing management plans for these sites call for future withdrawal from mineral location. Impacts are not expected to all other recreation development sites and dispersed use areas from mineral activities. All of the sites and dispersed use areas will not be affected by proposed lands and mineral sale activities. Oil and gas exploration and development and the combined RFAs would not affect management of the Loneliest Highway SRMA.

In areas where mineral exploration or development activities occur there would be

modifications in access for recreation. Some areas may be temporarily unavailable due to safety reasons while mining operations are occurring or may be unavailable during the long term due to the presence of oil production equipment or open mine pits, tunnels and shafts. The availability of alternative use areas and access routes would reduce the severity of potential impacts to displaced recreation users.

Resident populations are expected to increase due to the projected activities which will place increased recreational demands on developed sites and dispersed use areas; however, since developed sites are used at capacity for only several days each year and there are vast areas available for dispersed uses, cumulative impacts are estimated to be minor. Big game hunting opportunities will be subjected to increased demands from a larger population of local residents, and there will be reduced probability of being selected for a big game tag.

VISUAL RESOURCES

There would be cumulative impacts to visual resources in the short-term when surface disturbances are created on the 28,817 acres projected in the RFD for oil and gas and RFAs for other activities. It is expected that part of the short-term impacts would be minimized through proper project design and location. Reclamation would reduce the magnitude of long-term visual impacts on 11,570 acres. It is projected that major long-term visual impacts would remain on 7,512 acres affected by major mining activity, haul road construction, construction of the White Pine Power Plant, and installation of 500 KV electric transmission lines.

LIVESTOCK AND VEGETATION

Cumulative impacts to livestock forage is directly tied to the net acreage remaining disturbed after reclamation. Assuming that reclaimed acres produce pre-disturbance amounts of forage and applying an average forage rating of 18.4 acres per AUM for the

resource area and the 77.5% AUM allocation to livestock (refer to Livestock and Vegetation Section; Impacts Common to All Alternatives, above), approximately 295 AUMs would be lost in high oil and gas potential zones from agricultural development, construction of the WPPP and SWIP and mineral material sales. An additional 54 AUMs would be lost to oil and gas exploration and development. Locatable mineral exploration and development would result in a net loss of 380 AUMs in moderate oil and gas potential zones. The combined RFAs and oil and gas exploration and development would result in a cumulative net loss of approximately 729 livestock AUMs by the end of the land use planning period.

The total of 940 AUMs of forage loss (livestock and wild horses) constitutes less than 1/2 of 1 per cent of the 206,744 AUMs in current grazing allocations within the resource area.

Excluding actual forage loss, other impacts to livestock include displacement of animals to other areas due to disturbances from the development activities and direct loss of livestock through poisoning (cyanide heap leaching) and collisions due to increased vehicle activity. These impacts, however, are expected to be negligible.

WILD HORSES AND BURROS

A total of 85 AUMs of forage for wild horses would be lost in high oil and gas potential zones from agricultural development, construction of the WPPP and SWIP and mineral material sites. An additional 16 AUMs of forage would be lost to oil and gas exploration and development. Locatable mineral development would result in a net loss of 110 AUMs of forage in moderate oil and gas potential zones. The net forage loss to wild horses in the resource area from the combined RFAs and oil and gas exploration and development will be approximately 211 AUMs by the end of the land use planning period.

The impact of this loss, however, is proportional to the actual numbers of animals

that may exist in a given herd area. For example, the loss of 196 AUMs attributable to the WPPP would only affect about 43 wild horse AUMs within the Antelope Herd Area which equates to about five animals yearlong. In this case the impact of forage loss to the wild horse herd area would be negligible. The cumulative effects of forage loss to wild horses is negligible.

Other impacts excluding forage loss include displacement of wild horses due to human activity in the area. Large project developments would result in interruptions of summer to winter range migrations and access to water depending on the location of the development in relation to established movement patterns. Possible interruption of foaling periods may result depending on the timing of the project development. Incidence of vehicle collisions resulting in animal injury and death may increase with increased traffic associated with construction and operation of the WPPP, other established mines and oil and gas developments such as refineries.

SOILS AND AIR QUALITY

Soils

It is expected that soils on 17,247 acres in mostly high and moderate oil and gas potential zones will be disturbed but not reclaimed by the end of the land use planning period from impacts associated with the RFD for oil and gas and the combined RFAs.

Construction of the facilities for the WPPP and SWIP/UNTP projects would increase erosion due to modification of existing drainages, soil compaction and removal of vegetation. Disturbed sites associated with agricultural development but are not reclaimed are likely to become vegetated with dominant undesirable species such as *Halogeton glomeratus* and *Chrysothamnus nauesosus*. Prior to the establishment of these undesirable species the top soil would be more susceptible to wind and water erosion.

If stockpiling of topsoil takes place at the site for redistribution when the area is reclaimed, some soil loss from erosion can be expected.

Mine areas left unreclaimed include open pits and waste dumps. Steep slopes from high walls and dumps create a more droughty site because precipitation is more rapidly lost to runoff which increases localized erosion resulting in headcuts, rills and gullies forming on the landscape.

Air Quality

The primary sources for pollutant emissions from the RFD for oil and gas and the combined RFAs are emissions of fine soil particulates occurring during construction and from vehicle traffic on unpaved roads; emissions of carbon monoxide and oxides of nitrogen from gasoline and diesel engines; hydrogen sulfide emissions from flaring and/or treater firing; and projected emissions from the White Pine Power Project.

Construction and operation of the WPPP power-generating facility would be the primary source for various air emissions. WPPP would be a new major stationary source with the potential to emit more than 100 tons per year of a pollutant, therefore, it is subject to regulations under the Clean Air Act requiring a Prevention of Significant Deterioration (PSD) of air quality as established by the National Ambient Air Quality Standards (NAAQS). This would be in an attainment Class II area.

The maximum emission limitations for specific types of pollutant emissions in the Class II area associated with the WPPP steam generators would be:

- Sulfur dioxide-0.6 pounds per million British thermal units (lbs/Mbtu) and a minimum reduction of 70% of uncontrolled emissions;

- Oxides of nitrogen-0.6 lbs/Mbtu for bituminous coals and 0.5 lbs/Mbtu for subbituminous coals;

- Particulate matter-0.03 lbs/Mbtu;

- Opacity-less than 20% (6-minute average) except for one 6-minute periods per hour of no more than 27%. Eight of the ten pollutants expected to be emitted from the generating station will exceed EPA significant levels; therefore, to comply with PSD regulations, the emissions must be controlled using equipment reflecting Best Available Technology (BACT). BACT must be at least as stringent as New Sourced Performance Standards (NSPS) delineated by law but the latitude allowed in the case-by-case determination provides room for specific negotiation.

Maximum projected pollutant emission levels are not definitively set or known at this time but they will be established by monitoring. If nonattainment occurs, the source would be required to use Lowest Achievable Emission Rate (LAER) control technology. The maximum allowable emissions levels for a Class II area are defined and it is probable that those levels will most certainly occur; however, it is also probable that those levels will be exceeded and that other pollutants generated by the WPPP would exceed Class II levels because of the negotiation procedure. This procedure allows certain levels to be exceeded for certain periods without technically being classed as nonattainment.

TABLE 4-2
CUMULATIVE IMPACTS BY RESOURCE
SUMMARY TABLE




Resources	Oil and Gas Development	Locatable and Other Minerals Actions	WPPP, SWIP, UNTP	DLEs/CAs	Accumulation of Impacts
Mule Deer Winter Range	Losses of 127 acres of mule deer winter habitat from oil and gas exploration would be negligible.	Long-term loss of 9,985 acres of mule deer winter habitat.	Minor losses of winter habitat, negligible impacts to mule deer populations.	No impacts to mule deer winter range.	Long-term loss of 9,112 acres of mule deer winter habitat.
Sage Grouse Leks and Habitat	Abandonment of 8 sage grouse leks over the long-term.	Direct impacts to brooding habitat in foothills would result in indirect impacts reducing lek populations in valley bottoms.	Negligible impacts to sage grouse habitat and populations.	No direct impacts to sage grouse populations.	Abandonment of 8 sage grouse leks over the long-term.
Ferruginous Hawk Nests and Nesting Territories	Oil and gas development would affect 8 nesting territories.	Locatable and mineral material development would indirectly affect nesting territories.	Power-generating facility and transmission line construction would affect 2 nesting territories.	Agricultural development would indirectly affect nesting territories.	10 ferruginous hawk nesting territories would be affected by development under the RFD and RFAs.
Woodland Resources	Long-term loss of productivity on 500 acres of manageable woodland.	Long-term loss of productivity on 9,960 acres of manageable woodland.	Negligible impact on woodland productivity.	No impact on woodland productivity.	Long-term loss of 10,460 acres of manageable woodland.
Cultural Resources	Potential impacts to 54 large sites. 10 sites would be potentially N.R.-eligible.	Potential impacts to 1,148 large sites. 229 sites would be potentially N.R.-eligible.	Potential impacts to 65 large sites. 12 sites would be potentially N.R.-eligible.	Potential impacts to 35 large sites. Seven sites would be potentially N.R.-eligible.	Potential impacts to 1,302 large sites. 258 sites would be potentially N.R.-eligible.
Recreation	No conflicts with recreation areas. Some dispersed recreation opportunities would be affected.	Potential conflicts with two recreation areas.	Temporary increased use of recreation developments anticipated with addition of large work force.	No conflicts with recreation management.	Potential conflicts with two recreation areas and increased demand on recreation resources.

TABLE 4-2
CUMULATIVE IMPACTS BY RESOURCE
SUMMARY TABLE


Resources	Oil and Gas Development	Locatable and Other Minerals Actions	WPPP, SWIP, UNTP	DLEs/CAs	Accumulation of Impacts
Visual Resources	Short-term visual impacts on 3,511 acres. Long-term visual impacts on 1,274 acres.	Short-term visual impacts on 18,830 acres. Long-term visual impacts on 10,585 acres.	Short-term visual impacts on 4,208 acres. Long-term visual impacts on 3,882 acres.	Short-term visual impacts on 2,268 acres. Long-term visual impacts on 1,506 acres.	Short-term visual impacts on 28,817 acres. Long-term visual impacts on 17,247 acres.
Livestock and Vegetation	Long-term loss of 54 livestock AUMs and loss of forage productivity on 1,274 acres.	Long-term loss of 443 livestock AUMs and loss of forage productivity on 10,585 acres.	Long-term loss of 162 livestock AUMs and loss of forage productivity on 3,882 acres.	Long-term loss of 63 livestock AUMs and loss of forage productivity on 1,506 acres.	Long-term loss of 722 livestock AUMs and loss of forage productivity on 17,247 acres.
Wild Horses and Burros	Long-term loss of 16 wild horse AUMs and loss of forage productivity on 1,274 acres.	Long-term loss of 129 wild horse AUMs and loss of forage productivity on 10,585 acres.	Long-term loss of 47 wild horse AUMs and loss of forage productivity on 3,882 acres.	Long-term loss of 18 wild horse AUMs and loss of forage productivity on 1,506 acres.	Long-term loss of 210 wild horse AUMs and loss of forage productivity on 17,247 acres.
Soils and Air Quality	Long-term loss of soils on 1,274 acres. Localized degradation of air quality with field development.	Long-term loss of soils on 10,585 acres. No noticeable long-term impacts to air quality.	Long-term loss of soils on 3,882 acres. Long-term degradation of air quality from WPPP emitting 100 tons on pollutant per year.	Long-term loss of soils on 1,506 acres. No long-term impacts to air quality expected.	Long-term loss of soils on 17,247 acres. Localized degradation of air quality with field development. Long-term degradation of air quality from WPPP emitting 100 tons of pollutant per year.

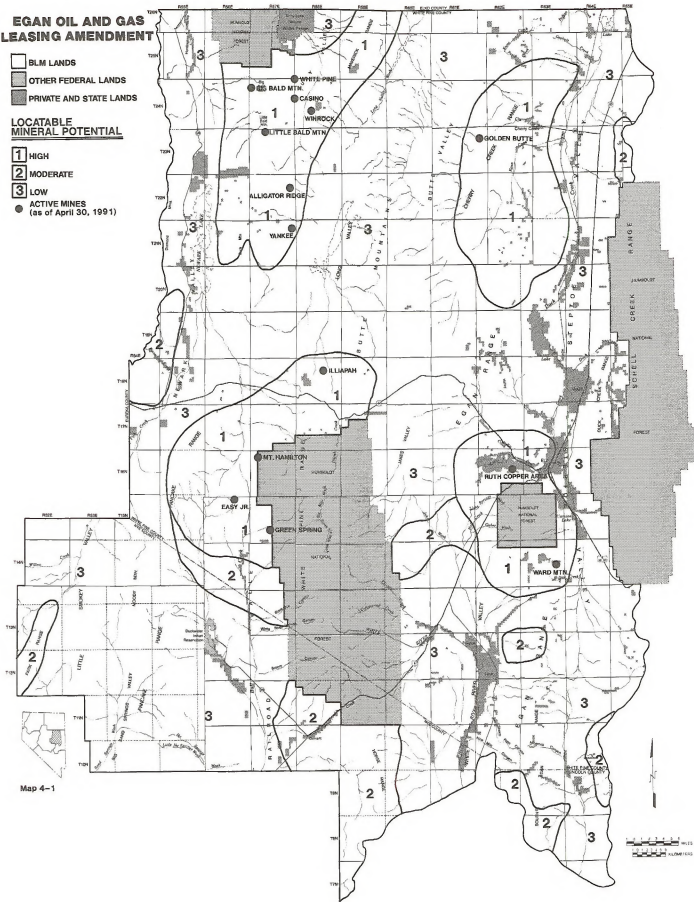
Note: The RFD for oil and gas and the RFAs described in the cumulative analysis section overlap in some cases. Therefore, the additive totals given in the "Accumulation of impacts" column represent an approximation of the total cumulative impacts. Where activities overlap, acreages and effects will be less than given in the column.

**EGAN OIL AND GAS
LEASING AMENDMENT**

-  BLM LANDS
-  OTHER FEDERAL LANDS
-  PRIVATE AND STATE LANDS

**LOCATABLE
MINERAL POTENTIAL**

- 1** HIGH
- 2** MODERATE
- 3** LOW
-  ACTIVE MINES
(as of April 30, 1991)



CHAPTER 5

CONSULTATION AND COORDINATION



CHAPTER 5

CONSULTATION AND COORDINATION

INTRODUCTION

This chapter summarizes the consultation and coordination conducted in the preparation of the Egan Resource Management Plan (RMP) Oil and Gas Leasing Amendment and Supplemental EIS. In preparing this document, formal and informal efforts have been made to involve the public, other Federal agencies, and State and local Governments in the planning process as per 40 CFR 1502.25 and 43 CFR 1610.3.

PUBLIC PARTICIPATION

In accordance with the public participation plan developed for this planning effort, public participation began with the publication of the Federal Register Notice of Intent (Vol. 54, No. 192, Thursday, October 5, 1989) to prepare an energy and minerals amendment to the resource management plan. With this notification, a scoping document was sent to approximately 760 individuals, State and Federal agencies, units of local Government, organizations and members of private industry. The public was asked to evaluate the issues, planning criteria and management concerns and to identify any additional issues, management concerns, and planning criteria that should be addressed in the resource management plan amendment.

The Ely District held two public meetings on the issues, planning criteria and management concerns. The first meeting was held in Ely, Nevada on October 26, 1989 and a second meeting in Reno, Nevada on October 27, 1989. There were 15 participants at the Ely meeting and 3 participated at the Reno meeting.

A total of 54 written responses were received in response to the 30-day comment period. The letters and comments received are on file at the Ely District Office and are available for public review.

After review of the public comments received during the initial scoping period, the complexity of issues related to locatable and other mineral commodities, indicated the need to treat these mineral resources in a later separate amendment. Based on the public response, the scope of this amendment would focus on oil and gas leasing issues only. On Friday, August 17, 1990, an amendment to the Federal Register notice was issued changing the scope of the document.

CONSULTATION

Various Federal, State and local agencies have been consulted throughout the planning process. Information, ideas and interpretations were exchanged through formal and informal meetings, telephone calls, and correspondence.

PUBLIC REVIEW OF THE DRAFT AMENDMENT

Upon publication of the Federal Register notice of availability, public meetings will be initiated to solicit comments on the Draft Egan RMP Oil and Gas Leasing Amendment and Supplemental EIS. In addition, the Draft Egan RMP Oil and Gas Leasing Amendment and Supplemental EIS will be made available to the general public and the following:

Congressional Delegation

Honorable James H. Bilbray
Honorable Richard H. Bryan
Honorable Harry Reid
Honorable Barbara Vucanovich

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
Forest Service
Agricultural Stabilization and Conservation
Service

Department of the Interior
Bureau of Indian Affairs
Bureau of Mines
Bureau of Reclamation
Fish and Wildlife Service
Geological Survey
National Park Service
Office of Environmental Project Review
Environmental Protection Agency

State Agencies

Nevada Department of Environmental Protection
Nevada Department of Wildlife
Nevada State Clearinghouse
Office of the Governor
State Senators and Assemblymen (Clark, Lincoln,
Nye, Washoe, White Pine Counties)
University of Nevada, Reno and Las Vegas
Desert Research Institute
Nevada Bureau of Mines
Nevada State Historical Society

Local Government

Eureka County Planning Commission
Lincoln County Administrator
Lincoln County Clerk
Lincoln County Commissioners
Lincoln County Conservation District
Lincoln County Planning Commission
Mayor of Ely
McGill Town Council
Nye County Clerk
Nye County Commissioners
Nye County Planning Commission
Preston/Lund Town Council
White Pine Chamber of Commerce
White Pine Conservation District
White Pine County Clerk
White Pine County Commissioners
White Pine County Extension Agent
White Pine County School Board

White Pine County School Board
White Pine Economic Diversification Coordinator
White Pine Regional Planning Commission
White Pine Wildlife Advisory Board

Native American Councils

Duckwater Shoshone Tribe
Ely Colony Council
Goshute Tribal Council
Western Shoshone National Council

Minerals Industry

Alta Gold Company
American Copper and Nickel Co.
Anadarko Petroleum Co.
Artemis Exploration Co.
Atlantic Richfield Company
Atlas Precious Metals Inc.
B.P. Minerals America
Battle Mountain Gold Co.
BHP - Utah International
Bill Wilkinson
Biomyne Inc.
Chevron Exploration & Production Serv.
Conoco Inc.
Coral Resources, Inc
Desert Enterprises
Echo Bay Exploration Inc.
Exxon Minerals Co., USA
Exxon Company, U.S.A.
FMC Gold Company
Freeport Mc Moran Gold Co.
Frontier Exploration Inc.
Geo Seismic Service
Gexa Gold Corp
Halliburton Geophysical Services, Inc.
Hecla Mining Co.
Homestake Mining Company
Kennecott Minerals Corp.
Keradamex Inc.
Lana Resources (US) Inc.
Lyle F. Campbell
Magma Nevada Mining Co.
Merlin Mining Co.
Nerco Minerals Co.
Newmont Exploration Limited
Norco Gravity Exploration
Pegasus Gold Corp.
Petro Source Corporation

Phelps Dodge
Pioneer Oil & Gas
Placer U.S. Inc.
Santa Fe Pacific Mining Co.
Seismic Information Services, Inc.
Teck Resources (U.S.), Inc.
Tenneco Minerals
Texaco, Inc.
The Anschutz Corp
TI Cup Mining Corp.
U.S. Minerals Exploration Co.
Umont Mining Inc.
US Gold
Westmont Mining Inc.
WX Syndicate

Other Organizations

American Wild Mustang and Burro Foundation
American Mustang and Burro Association
Animal Protection Institute of America
Commission for the Preservation of Wild Horses
and Burros
Eastern Nevada Miners and Prospectors Association
Environmental Strategies, Inc.
Fund For Animals
Humane Society of Southern Nevada
L.I.F.E. Foundation
Los Angeles Department of Water and Power
Minerals Exploration Coalition
Mount Wheeler Power Company
National Mustang Association, Inc.
Natural Resources Defence Council
Nevada Archaeological Association
Nevada Mining Association
Nevada Power Company
Nevada Outdoor Recreation Association
Nevada Federation of Animal Protection
Organizations
New White Pine Sportsman's Club
Resource Concepts, Inc.
Save The Mustangs
Sierra Power Company
Sierra Club
The Wilderness Society
The Nature Conservancy
Wild Horse Organized Assistance

Public Libraries

Clark county Library
1401 E. Flamingo Rd.
Las Vegas, NV 89109

DOI Natural Resources Library
Serials Branch-GE
18th & C Streets, NW
Washington D.C. 20240

Elko County Library
720 Court Street
Elko, NV 89801

Lincoln County Library
P.O. Box 248
Pioche, NV 89043

Nye County Library
P.O. Box 153
Tonopah, NV 89049

State of Nevada Library
Library Bldg.
Capitol Complex
Carson City, NV 89701

University of Nevada, Las Vegas
James R. Dickenson Library - Documents Dept.
4505 S. Maryland Parkway
Las Vegas, NV 89154

University of Nevada, Reno
Getchell Library
Government Publications Dept.
Reno, NV 89507

Washoe County Library
Documents Dept.
P.O. Box 2151
Reno, NV 89505

White Pine County Library
Courthouse Plaza
Ely, NV 89301

Bureau of Land Management Offices

Battle Mountain District Office
North 2nd and South Scott Streets
Battle Mountain, NV 89820

Caliente Resource Area Office
Caliente, NV 89008

Carson City District Office
1050 E. William Street
Carson City, NV 89801

Elko District Office
2002 Idaho Street
Elko, NV 89801

Ely District Office
702 N. Industrial Way
HC-33 Box 33500
Ely, NV 89301

Las Vegas District Office
4765 West Vegas Drive
Las Vegas, NV 89126

Tonopah Resource Area Office
Battle Mountain District
102 Old Radar Base Road
Tonopah, NV 89049

Winnemucca District Office
704 E. 4th Street
Winnemucca, NV 89445

PREPARERS AND REVIEWERS



CHAPTER 6

PREPARERS AND REVIEWERS

The Egan RMP Oil and Gas Leasing Amendment was prepared by an interdisciplinary team of resource specialists from the Egan Resource Area, Ely District and Nevada State Office resources and minerals management staff. Table 6-1 lists the names and experience of each team member.

The Egan RMP Oil and Gas Leasing amendment was reviewed by resource specialists, planning and management staff within the Egan Resource Area, Ely District and Nevada State Offices of the BLM. Reviewers and review responsibilities are listed in Table 6-2.

TABLE 6-1
LIST OF PREPARERS

Name	Responsibility	Education	Experience
Brian C. Amme	Team Leader; writer/editor; Cultural Resources	B.A. Anthropology	8 years BLM
Mark Barber	T&E Plants and Animals; Riparian Habitat	B.S. Wildlife Management	12 years BLM
Robert Brown	Wild Horses and Burros	B.S. Zoology	16 years BLM
Michael Bunker	Recreation; Wilderness; VRM	B.S. Forestry; Outdoor Recreation	17 years BLM
Jim "Cap" Caplinger	Cartography	Mapping Sciences	9 years BLM
Bill Lindsey	Livestock and Vegetation	B.S. Range Resources	13 years BLM
Paul Myers	Social Economics	B.S. Economics	13 years BLM
Daniel Netchar	Assistant Team Leader; Writer Mineral Resources	B.S. Geology	8 years BLM
Michael Perkins	Wildlife	B.S. Wildlife Science	16 years BLM
Harry T. Rhea	Woodland Resources	B.S. Forestry	18 years BLM
Loran Robison	Soil, Water, Air	A.A. Science; B.S. Forestry and Range Management	18 years BLM
Ronald Sjogren	Lands and Transportation	B.A. Geography	29 years BLM
Joe Stratton	Wild Horse and Burros	B.S. Wildlife	1 year BLM

TABLE 6-2
LIST OF REVIEWERS

Name	Program/Title	Office	Review Responsibility
Pat Barker	Cultural Resources	BLM/NVSO *	Cultural Resources
Neal Brecheisen	Fluid Minerals	BLM/NVSO	Fluid Minerals
Osborne Casey	Woodland Resources	BLM/NVSO	Woodland Resources
Gene Drais	Egan Area Manager	BLM/ERA **	Complete Document
Brad Hines	Range Management	BLM/NVSO	Range Resources
Richard Hoops	Fluid Minerals	BLM/NVSO	Fluid Minerals
Jim McLaughlin	Soil, Water, Air	BLM/NVSO	Soil, Water, Air
Norm Murray	Environmental Protection Specialist	BLM/NVSO	Surface Compliance; Planning Coordinator
Paul Myers	Economist	BLM/NVSO	Social Economic; Planning Coordinator
Tom Pogacnik	Wild Horses and Burros	BLM/NVSO	Wild Horses and Burros
Jacob Rajala	Environmental Coordinator	BLM/EDO ***	Complete Document
Tim Reuwasat	Assistant District Manager; Resources	BLM/EDO	Complete Document
William Robison	Minerals	BLM/EDO	Fluid Minerals
Jack Seley	Chief; Planning and Environmental Coordination	BLM/NVSO	Complete Document
Steve Smith	Recreation/VRM	BLM/NVSO	Recreation/VRM
John Stout	Oil and Gas Production	BLM/NVSO/EDO	Fluid Minerals
Ken Stowers	Lands	BLM/NVSO	Lands and Transportation
Neil Talbot	Regional Planner	BLM/NVSO	Complete Document; Planning Coordinator
Ed Tilzey	Environmental Policy	BLM/NVSO	NEPA Compliance; Cumulative Impacts
Kenneth Walker	District Manager	BLM/EDO	Complete Document
Curtis Werrick	Wildlife Habitat	BLM/NVSO	Wildlife
Dave Wolf	Wilderness	BLM/NVSO	Wilderness

* NVSO - Nevada State Office
 ** ERA - Egan Resource Area
 *** EDO - Ely District Office

APPENDICES



APPENDIX A

**DESCRIPTION
OF
TYPICAL OIL AND GAS ACTIVITIES**



APPENDIX A

DESCRIPTION OF TYPICAL OIL AND GAS ACTIVITIES

INTRODUCTION

Oil and gas exploration and development activities progress through four phases that are, in part, sequential and may overlap in time. The four phases are: preliminary exploration; exploratory drilling; field development and production; and field abandonment. Oil and gas leases are obtained prior to the exploratory drilling phase.

I. PRELIMINARY EXPLORATION PHASE

Petroleum exploration occurs in unexplored portions of areas where petroleum is known or projected to occur in commercial quantities. An area where petroleum is projected to occur in commercial quantities is known as a frontier or rank wildcat area. With declining known oil and gas reserves, it has become profitable to explore for oil and gas in less promising geological provinces and in areas where the climate, terrain, depth of deposits, and other obstacles have discouraged previous efforts. Increasingly sophisticated exploration techniques, improved oil and gas drilling, and transportation technologies have also enhanced prospects for locating, extracting, and marketing petroleum resources.

Regardless of where or why, the goal of exploration is always to find where oil and gas resources are likely to occur, how much may be present, and how deep it is located; specifically, the goal is to detect probable traps, quality and type of reservoir, source rocks, and the thickness and age of the sedimentary rocks in the area. During the preliminary exploration phase of an area, geological and geophysical exploration takes place.

Geological Exploration

Where the bedrock geology of an area is well exposed, it is often possible to predict where oil might gather. The potential traps (anticlines, faults or formations with varying porosity) can sometimes be located with the aid of published geological maps, aerial photos, and landsat imagery. Occasionally, additional data will be gathered by aircraft. Low altitude reconnaissance flights, frequently at elevations of 100 to 500 feet, help identify rock outcrops that can be studied later on the ground.

Once potential target areas are identified, one or more geologists may examine and sample the rock outcrops in the area and map the surface geology. Geological exploration can be performed with little surface damage; 4-wheel drive pickups, motorcycles or all-terrain vehicles are commonly used to access the area.

Geophysical Exploration

Surface geology is not always accurately indicated by surface outcroppings. In such cases, geophysical prospecting is used. Three subsurface characteristics are measured by geophysical methods including gravitational field, magnetic field, and seismic characteristics.

Geophysical (Seismic) Surveys

Seismic surveys are the most popular of the geophysical methods and seem to give the most reliable results. A seismic survey is a method of gathering subsurface geological information by recording impulses from an artificially-generated shock wave. The common procedure used in seismic surveys on land

consists of creating shock waves and recording, as a function of time, the resultant seismic energy as it arrives at groups of vibration detectors (one-half to 5-pound seismometers, ("geophones" or "jugs") arrayed on the ground at spaced intervals). These arrays of seismometers are connected to a recorder truck that receives and records the reflected seismic energy.

The seismic sensors and energy source are located along lines on a one to two mile grid. Surveys may be laid out in excess of 40 miles in a series of grid patterns or in a single line.

Where possible, existing roads are used to conduct seismic operations. Some lines may require clearing of vegetation and loose rock to improve vehicle access. Each mile of line, cleared to a width of 8 to 14 feet, represents disturbance of about 1 acre; however, completely clearing a seismic line is unusual. Most lines in remote and unroaded areas are not bladed except as required to cross drainages or washes. Support and operating vehicles travel overland for the most part. In extreme cases, a bulldozer may be used to tow the vehicles through rough spots or in sandy areas.

In remote areas where there is little known subsurface data, a series of short seismic lines may be required to determine the characteristics of the subsurface formations. After this, seismic lines would be aligned to make seismic interpretations more accurate. Although alignment may be fairly critical, spacing of the lines can often be changed up to a quarter of a mile on 1-mile grid before the results will affect the investigation program. This allows some adjustment for existing or alternate access of lines.

Seismic methods are usually referred to by the various methods of generating the shock wave. The following are some of the more common methods.

Vibroseis

The vibrator (or vibroseis) method is widely used and is replacing the explosive method in accessible areas. A typical operation would use 3 or 4 large trucks or tractors, each equipped with a vibrator mounted between the front and back wheels, 4 or 5 support vehicles, and a crew of 10 to 15 people.

The vibrator pads (about 4 feet square) are lowered to the ground and vibrators on all trucks are triggered electronically from a recording truck. After the information is recorded, the trucks move forward a short distance and the process is repeated.

The above referenced methods have similar surface-disturbing factors in common. Generally, the methods involve travel either on existing roads or off-road with four to five energy source trucks (usually weighing 10 to 20 tons) plus the recording truck and cable trucks or pickups. The vehicles may travel off-road along a single two-lane trail made by the trucks as the survey progresses. The vehicles may make several parallel trails in an attempt to distribute travel loads over a broader area. Travel along the line or seismic "trail" usually consists of one or two passes by the vehicle since the energy source is mobile and recording is accomplished as the vehicles move down the line.

Explosives

Historically, explosives have been the most widely used way to generate seismic shock waves. Subsurface and surface explosives are used.

Subsurface Explosives

In the subsurface explosive method, 5 to 50 pounds of explosive charge are detonated at the bottom of a 25 to 200-foot drill hole. The hole is usually 2 to 6 inches in diameter and

drilled with a truck-mounted drill. Access suitable to the travel of drill and recording trucks across the surface is desirable. Detonation of the charge usually results in no surface disturbance; however, depending on the nature of the soils or valley fill, a small shallow depression up to 6 feet in diameter may result.

Cuttings from the well are normally hauled to a suitable disposal site, scattered by hand near the "shot hole," or put back into the shot hole afterwards. Bentonite mud is often used to plug the shot hole. The same hole may be reloaded and shot several times to find the depth and charge returning the best signal.

Shot hole operations are similar to vibroseis operations since the drill is transported by truck. As with other truck transported operations, existing roads may be used or trails may be blazed by the drill vehicles and/or a bulldozer. A truck-mounted drill and shot operation generally takes longer to complete and requires more trips by vehicles along a line (drill service equipment) than does vibroseis operations.

Where access limitations, topography, or other restraints prevent use of truck-mounted drill rigs or recording trucks, light weight, portable drill equipment can be used. Various kinds of portable drills can be backpacked or delivered by helicopter to the area. These portable operations use a pattern of holes drilled to a depth of about 25 feet. The holes are loaded with explosives and detonated simultaneously.

Surface Explosives

The surface explosives charge method (Poulter method) involves placing explosives directly on ground, on snow, or on a variety of stakes and platforms. Paper cones, survey stakes, lathes, or 2x4s up to 8 feet in length have been used with varying success in different areas. The use of explosives on tall stakes or explosives placed on the surface of deep snow results in good seismic data in some areas while creating little or no visible surface disturbance.

Surface explosive methods are very mobile. Generally, 4x4 vehicles are used for transportation, although the method is adaptable to airborne and pack teams.

A given area may be explored several times by the same or different companies over a long period of time. Multiple exploration programs may be undertaken because first attempts were unsuccessful, another company wants its own information or new, different techniques and/or equipment are available.

Other Geophysical Methods

Other geophysical methods used to explore for oil and gas resources include gravitational, magnetic, induced polarization (IP), soil-gas probes and controlled source audio-frequency magnetotelluric (CSAMT) surveys. These methods utilize small portable units that are easily transported via light ground vehicles such as four-wheel drive Off-Highway Vehicles (OHVs) or aircraft. Off-highway vehicle traffic is common with these types of surveys. Data acquisition along the test lines or grids for these methods sometimes require small holes to be hand dug for instrument placement.

II. EXPLORATORY DRILLING PHASE

Drilling does not begin until a lease has been acquired by the operator. When preliminary investigations are favorable and warrant further exploration, exploratory drilling may be justified. Stratigraphic tests and wildcat tests are the two types of exploratory drill holes.

Stratigraphic Tests

Stratigraphic ("strat") tests involve drilling relatively shallow holes to supplement seismic data. These tests aid in revealing the nature of near-surface structural features. The holes are usually from 100 to several thousand feet deep, and are drilled primarily by rotary drill rigs. As the rock is drilled, the resulting rock chips are brought to the surface by a high-pressure airflow or circulating drilling mud.

Samples of these chips are collected, bagged and identified as to depth of origin. These are then studied by a geologist to determine composition, age, and possible formation.

Truck-mounted drilling equipment for strat tests is fairly mobile; therefore, roads and trails to test locations on level solid ground are temporary and involve minimal construction. Generally, access roads are bladed to a width of 12 to 14 feet and are not crowned or ditched. Some roads may simply be surface scraped; i.e., vegetation is clipped off next to the soil surface. In hilly or mountainous areas, more road building and pad construction may be necessary requiring cuts in excess of 20 feet and fills exceeding ten feet. Strat tests requiring a large amount of construction and several acres of cut and fill are unusual since construction costs may outweigh the information gained.

An area of about one-half acre or less is leveled and cleared of vegetation for the average drill site. If high pressure air is used to remove rock chips of rock cuttings, rock dust may be emitted to the air. If mud is used as a drilling fluid, mud pits may be excavated; more commonly, portable mud tanks are used. Usually one to three days are required to drill the test holes depending on depth to and hardness of the bedrock. In areas with shallow, high pressure water zones, casing may be required to keep water out of the hole.

Exploration ("Wildcat") Wells

After the surface and subsurface geological studies, and geophysical studies are completed, the prospect is evaluated. Only by drilling a wildcat well (a well drilled in unproved territory) will the oil company know if the rocks in the prospect they have identified contain oil or gas.

Nationally, about one in sixteen wildcat wells produces commercial amounts of oil or gas. Locally, success ratios may be as high as one in ten.

The deeper wells may require several months or more to complete; shallower wells up to a few

thousand feet deep may be completed in a few weeks of drilling. As a general rule, the deeper the test, the larger the drilling rig and facilities required.

The position of this well is determined by the lessee and/or operator and a proposal to drill is made to the BLM by either a Notice of Staking (NOS) or an Application for Permit to Drill (APD). In all cases, an on-site inspection of the proposed drilling location is made by representatives of the BLM, the lessee/operator, and other interested parties. During this on-site inspection, the site location and access route most advantageous from an environmental, geologic and engineering standpoint is selected. In addition, surface use and reclamation requirements are developed for inclusion into the APD.

The drilling program provided in the APD is reviewed by the BLM for technical adequacy and protection of subsurface resources. This review ensures the adequacy of all downhole operations associated with the drilling of the well. The APD is also reviewed for surface resource concerns and an environmental assessment (EA) is completed. Approval of the APD incorporates all requirements for surface use and drilling which were identified at the on-site and during the technical review.

After completing the necessary permitting procedures, construction of the access road and well site can begin.

Initially, construction will involve the development of an access route to the well site usually requiring a road with a 12 to 14-foot wide travel surface. Bulldozers, graders, and other types of heavy equipment are used to construct and maintain the temporary roads and the well site.

A drill "pad" (well site) is generally from 1 to 3 acres in size. The pad is cleared of all vegetation, and leveled for the drill rig, mud pumps, mud (or reserve) pit, generators, pipe rack, and tool house. Topsoil is usually removed and stockpiled for use in later reclamation of the well pad area. The mud pit

may be lined with plastic or bentonite to prevent fluid loss or prevent contamination of water resources. Other facilities, such as storage tanks for water and fuel, are located on the pad or are positioned nearby on a separate cleared area. If the well site is not large enough for the equipment required to rig-up (prepare the drilling rig for operation), a separate staging area may be constructed. Staging areas are usually no larger than 200 x 200 feet and may simply be a wide flat spot along the access road on which vehicles and equipment are stored.

The start of a well is called "spudding in." A short piece of tubing called a conductor pipe is set into the ground (sometimes with a pile-driver), and cemented in place. This keeps surface sand and dirt from sloughing into the well hole. Next, the regular drill bit and drill string (the column of drill pipe) take over. These pass vertically through a heavy steel turntable (the rotary table) on the derrick floor and the conductor pipe. The rotary table is geared to one or more engines, and rotates the drill string and bit. As the bit bores deeper into the earth, the drill string is lengthened by adding more pipe to the upper end.

Once the bore hole reaches a depth of several hundred feet, another string of pipe (the surface casing), is set inside the conductor pipe and cemented in place by pumping cement between the casing and hole wall. Surface casing acts as a safety device to protect fresh water zones (aquifers) from drilling fluid contamination. To prevent the well from "blowing out" in the event the drill bit hits a high pressure zone, "blowout preventers" (large metal rams) are attached to the surface casing and are tested to a higher subsurface pressure than is expected to be encountered. These rams will close around the drill string or open hole which will seal the well bore and confine the pressure to the well bore thus preventing a blowout.

After setting the surface casing, drilling resumes using a smaller diameter bit. Depending on well conditions, additional strings of casings (intermediate casing) may be run

(installed) before the well reaches the objective depth (total depth or "T.D.").

During drilling, a mixture of water, clay, barite and chemical additives known as "mud" are constantly pumped down the drill pipe. The mud exits through holes in the bit and returns to the surface outside the drill pipe. As the mud circulates, it cleans and cools the bit and carries the rock chips (cuttings) to the surface. This also helps to seal off the sides of the hole (thus preventing cave-ins) and to control the pressure of any water, gas or oil encountered by the drill bit. The mud is the first line of defense against a possible blow-out since it is used to control pressure. For this reason, the pit containing "reserve" mud (the reserve pit) is maintained on location. The reserve mud is used in emergencies to restore the proper drilling environment when radical unforeseen changes in down-hole pressure are encountered. The cuttings are separated from the mud and sampled so that geologists can note and analyze (log) the various strata through which the bit is passing. The rest of the cuttings pass into the reserve pit as waste. Some holes are drilled at least partially with compressed air which serves the same purpose of cooling and cleaning the bit and evacuating the cuttings from the hole as drilling mud.

From 5,000 to 15,000 gallons of water a day may be needed for mixing drilling mud, cleaning equipment, cooling engines, etc. A surface pipeline may be laid to a stream or a water well or the water may be trucked to the site from ponds, streams or water wells in the area. Commonly, a water well is developed on-site for these purposes.

During or at completion of drilling activity, the well is "logged". Logging means utilizing geophysical instruments to measure the physical characteristics of the rock formations and associated fluids through which the bore-hole passes. These instruments are lowered to the bottom of the well and slowly raised to the surface while recording data. Other measuring procedures include the drill stem test in which pressures are recorded and fluid samples taken from zones of geologic interest. After studying

the data from those logs and tests, the geologist and/or petroleum engineer decide if the well will produce petroleum.

If the well does not encounter oil and gas, it is plugged with cement and abandoned. The well pad and access road are recontoured and reseeded to establish vegetation. If a water well has been developed on-site, the well may be turned over to the land-managing agency for resource enhancement uses such as wildlife or livestock waters. If the well will produce, casing is run to the producing zone and cemented in place. The drill rig is usually replaced by a smaller rig that is used for the final phase of completing the well.

III. FIELD DEVELOPMENT AND PRODUCTION PHASE

Field Development

If a wildcat well becomes a discovery well (a well that yields commercial quantities of oil or gas), additional (development) wells will be drilled to confirm the discovery, establish the extent of the field and to efficiently drain the reservoir. The procedures for drilling development wells are about the same as for wildcats except there is usually less subsurface sampling, testing and evaluation. If formation pressure can raise oil to the surface, the well will be completed as a flowing well. Several downhole acid or fracture treatments to enhance the formation porosity and permeability may be necessary for the well to produce in commercial quantities. A free-flowing well is simply closed off with an assembly of valves, pipes, and fittings (called a "christmas tree") to control the flow of oil and gas to other production facilities. A gas well may be flared for a short period of time to measure the amount of gas per day the well can produce, after which it may be then shut-in or connected to a gas pipeline.

If the well is not free-flowing, it will be necessary to use artificial lift (pump) methods. These are explained, along with well production equipment and procedures, in the following

section on production. After a pump is installed, the well may be tested for days or months to see if it is economically justifiable to produce the well and to drill additional development wells. During this phase, more detailed seismic work may be run to assist in precisely locating the petroleum reservoir and to improve upon previous seismic work.

As with wildcat wells, field development well locations are cadastrally surveyed to establish legal location. The State of Nevada has regulations regarding the location and density (well spacing) of producing oil and gas wells. This well spacing pattern was established by the Nevada State Minerals Commission. Exceptions to state spacing regulations may be granted for pool or field conditions after a public hearing by the Minerals Commission. The BLM has the authority to waive state spacing regulations in the interest of conservation but normally abides by the state spacing regulations.

Oil well spacing for production from federal leases in Nevada is a minimum of 40 acres for wells with depths 5000 feet or less and 160 acres with wells with depths greater than 5000 feet. Most gas well spacing for production from federal leases in Nevada employ units of 160 and 640 acres per well. Spacing for both oil and gas wells is based on the characteristics of the producing formation. If a field is producing from more than one formation, the surface location of the wells may be much closer than one per 40 acres. The State of Nevada revised regulations adopted spacing requirements where Federal oil and gas units are exempt from state spacing requirements. Most of the producing fields in Nevada have been discovered as unit wells. Although federal units are exempt from state spacing regulations, all of the producing oil wells in federal units in Nevada conform to these regulations.

During the development stage, the road system of the area is greatly expanded. Once it is known which wells produce and their potential productive life, a permanent road system can be designed and built. Because it often takes

several years to develop a field and determine field boundaries, the permanent road system is usually built in segments. Since the roads in an expanding and developing field are built in segments, many temporary roads (built initially for wildcats or development) end up as long term (in excess of 15 years) primary access or transportation roads. Planning of temporary roads for wildcat wells and development wells is done with road conversion for the long-term in mind.

Since development wells have longer life spans than wildcat wells, access roads for development wells are better planned, designed and constructed. Access roads are normally limited to one main route to serve the lease areas with a maintained side road to each well. Upgrading of temporary roads may include ditching, draining, installing culverts, graveling, crowning, or capping the roadbed. The amount of surface area needed for roads would be similar to that for temporary roads and would also be dependent on topography and weight loads to be transported over it. Generally, main access roads are constructed with travel surfaces 20 to 24 feet wide and side roads, 14 to 18 feet wide.

When an oil field is developed on the current minimum spacing pattern of 40 acres per well, the wells are 1,320 feet apart in both north-south and east-west directions. Development over one section of land (1 square-mile) with 16 wells usually requires construction of at least 4 miles of access roads. In mountainous terrain, the length of access roads may be increased since steep slopes, deep canyons, and unstable soil areas must often be circumvented in order to construct stable access to the wells.

Surface disturbance for a gas field may be similar to an oil field even though the spacing of wells is usually more at 160 acres. Although a 160-acre spacing allows only four wells per section of land, associated pipeline systems often result in similar amounts of surface disturbance as a well field with 40-acre spacing.

In addition to roads, other surface uses for development drilling may include flowlines; storage tank batteries; facilities to separate oil, gas and water (separators and treaters); and injection wells for water disposal. Some of the facilities may be installed at each producing well site, and others at places situated to serve several wells. These facilities are discussed further in the following section on Production.

The rate of development well drilling depends on a combination of whether the field is operated on an individual lease basis or unitized; the probability of profitable production; availability of drilling equipment; protective drilling requirements (drilling requirements to protect federal land from subsurface petroleum drainage by off-setting non-federal wells) and the degree to which limits of the field are known. The most important development rate factor may be the quantity of production. If the discovery well has a high rate of production and substantial reserves, development drilling usually proceeds at a fairly rapid pace. If there is some question whether reserves are sufficient to warrant additional wells, development drilling may occur at a much slower pace. An evaluation period to observe production performance may follow between the drilling of successive wells.

As previously mentioned, drilling in an undeveloped part of a lease to prevent drainage of petroleum to an offset well on an adjoining lease (protective drilling) is frequently required in areas where fields and lease holdings are intermingled federal and privately owned land. The terms of federal leases provide for such drilling if the offset well is on non-federal lands or on federal lands leased at a lower royalty rate.

Many fields may progress through several development phases. A field may be considered fully developed and produce for several years, then a well may be drilled to deeper pay zone. Discovery of a new pay zone in an existing field is a "pool" discovery as distinguished from a new field discovery. A pool discovery may lead to the drilling of

additional wells, often from the same drilling pad as existing wells with the bore-holes separated only by feet or inches. Existing wells may also be drilled deeper.

Transportation Development

Pipelines 4 to 6 inches in diameter are usually employed to transport the petroleum between the well, treatment, separating facilities and central collection points. These pipelines may be on the surface, buried or elevated. Pipelines may be used to transport oil and gas if the field is of sufficient size. The pipelines are used to move the oil from gathering stations to refineries. Transport by truck is often used move crude oil from small fields where installation of pipelines is not economical and/or the natural gas from the field is not economically marketable.

Production

Production in an oil field begins just after the discovery well is completed and is usually concurrent with development operations. Temporary facilities may be used at first but as development proceeds and reservoir limits are determined, permanent facilities are installed. The extent of such facilities is dictated by the number of producing wells; expected production; volume of gas and water produced with the oil; the number of leases and whether the field is to be developed on a unitized basis.

The primary means of extracting oil from a well is by pump jacks. The pump jacks may be powered by electric motors requiring construction of powerlines. If there is sufficient casing head gas (natural gas produced with the pumped oil) or another gas source available internal combustion engines may be employed.

Any production activities resulting in new or additional surface disturbance and/or not approved under the APD, require approval of the authorized officer of the BLM. Activities requiring prior approval include but are not limited to: re-drilling, deepening, performing casing repairs, plugging back, altering casing,

performing nonroutine fracturing jobs, recompleting in a different interval, performing water shutoff and converting to injection or disposal.

Disposal of Produced Water

Some wells drilled in an area may produce sufficient water which must be disposed of during the operation of the well. Although most produced waters are brackish to highly saline, some are fresh enough for beneficial use. If water is to be discharged, it must meet certain water quality standards. Because water may not come from the treating and separating facilities completely free of oil, oil skimmer pits may be established between separating facilities and surface discharge.

When salt water is disposed of underground, it is usually introduced into a formation containing water of equal or poorer quality. The water may be injected into the producing zone from which it came or into other producing zones. In some cases, it could reduce the field productivity and may be prohibited by state regulation or mutual agreement of operators. In some fields, dry holes or depleted producing wells are used for water disposal but occasionally new wells are drilled for disposal purposes. Cement is squeezed between the casing and sides of the well to prevent the water from migrating up or down from the injection zone into other formations.

Crude oil is usually transferred from the wells to tank storage facilities (a tank battery) before it is transported from the lease. If the oil contains gas and water, they are separated out before the oil is stored in the tank battery. The treating and separating facilities are usually located at a storage tank battery on or near the well site.

After the oil, gas and water are separated, the oil is piped to storage tanks located on or near the lease. Normally, there are at least two storage tanks; so one tank can be filled as the contents of the other are measured, sold, and transported. The number and size of tanks

vary with the rate of production on the lease and with the extent of automation in gauging the volume and sampling the quality of the tank contents.

IV. FIELD ABANDONMENT PHASE

The life-span of fields varies because of the unique characteristics of any given field. Such factors as proven reserves, reservoir characteristics, the nature and quality of the petroleum, subsurface geology, political, economic and environmental constraints all affect a field's life-span from discovery to abandonment. An estimate of 15 to 25 years is used for the average life of a typical field. Abandonment of individual wells may start early in a field life and reach a maximum when the field is depleted.

Well plugging and abandonment requirements vary with the rock formations, subsurface water, well site and the well. Generally, however, in a dry (never produced) well, the bore hole below the casing is filled with heavy drilling mud, a cement plug installed at bottom of the casing, the casing is filled with heavy mud and a cement cap installed on the top of the casing. A pipe monument giving the location, lease number, operator and name of the well is required unless waived by the authorized officer. If waived, the casing may be cut off and capped below ground level. Protection of aquifers and known oil and gas producing formations may require placement of additional cement plugs.

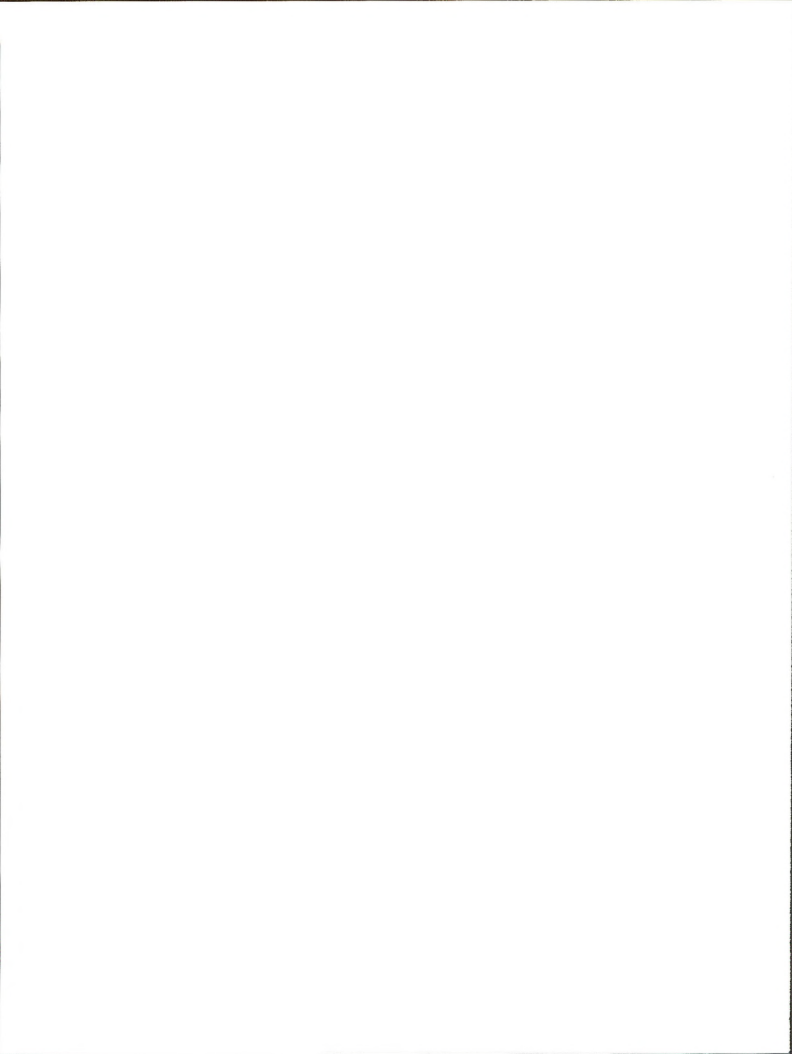
In some cases, wells that formerly produced are plugged as soon as they are depleted. In other cases, depleted wells are not plugged

immediately but are allowed to stand idle for possible later use in a secondary recovery program. Truck-mounted equipment is used to plug former producing wells. In addition to the measures required for a dry hole, plugging of a depleted producing well requires a cement plug in the perforated section in the producing zone.

If the casing is salvaged, a cement plug is put across the casing stub. The cement pump jack foundations are removed or buried below ground level.

Surface flow and injection lines are removed but buried pipelines are usually left in place and plugged at intervals as a safety measure.

After plugging, the drilling rig is removed and the surface, including the reserve mud pit, is restored to the requirements described in the APD. This may involve the use of bulldozers and graders to recontour disturbed areas associated with the drill pad and the access road to the pad. The reserve pit must be evaporated or pumped dry and filled with the top soil material stockpiled when the site was prepared. Little leakage will occur if the pit was lined with plastic or bentonite. The area will be recontoured to restore the landform as near as possible to its original contour, minimize erosion and allow revegetation to take place. After grading the subsoil and spreading the stockpiled topsoil, the site is seeded with a grass mixture that will establish a vegetative cover. A fence may be erected to protect the site until revegetation is complete, particularly in livestock grazing areas. In many instances, any water wells developed are turned over to the land-managing agency to use for resource enhancement; i.e., wildlife, livestock, recreation.



APPENDIX B

**STANDARD PRACTICES AND PROCEDURES
CONTINUATION OF PRESENT MANAGEMENT ALTERNATIVE**



APPENDIX B

STANDARD PRACTICES AND PROCEDURES

CONTINUATION OF PRESENT MANAGEMENT ALTERNATIVE

GEOPHYSICAL EXPLORATION

Geophysical operations are governed under 43 CFR 3150 regulations. The operator is required to submit a Notice of Intent (NOI) to conduct geophysical exploration (form 3040-1), for BLM approval. The following are the standard practices and procedures currently required for operation within the BLM Ely District Egan Resource Area.

1. The operator shall furnish a map with the Notice of Intent showing the approximate line route to be used. A map shall also be filed with the Notice of Completion showing the actual location of the complete line. The map shall be of a minimum scale of 1/2 inch to the mile.
2. Any seismic line location change will be brought to the attention of the Area Manager prior to the change being made on the ground.
3. No blading or other dirt work is allowed unless authorized by the District Manager or his authorized representative.
4. All disturbed areas will be reclaimed as directed by the District Manager or his authorized representative. Bond liability will not be released until this reclamation is completed to the satisfaction of the District Manager or his authorized representative.
5. Reclamation of disturbed areas is to be done concurrently with the geophysical operations insofar as possible.
6. No blasting will be permitted within 1/4-mile of historic trails, natural areas, identified archaeological sites, recreation areas and wells or springs.
7. The operator shall avoid any operations when the ground is muddy or wet. The District Manager or his authorized representative may prohibit operations during wet periods.
8. Vehicular travel off-road shall be held to an absolute minimum necessary.
9. Powder magazines will be located out of sight and at least 1/4-mile from traveled roads. Loaded shot holes and charges will be attended at all times.
10. All trash, flagging, lath, etc. will be removed and hauled to an authorized disposal site. No oil or lubricants shall be drained into the ground surface.
11. The operator shall notify the District Manager or his authorized representative the date rehabilitation operations commence and are completed.
12. Whenever possible, a portable mud pit shall be used when drilling with fluids.
13. The Standard Cultural Resources Stipulation will apply to all portions of the seismic line that does not utilize existing roads, trails and active washes.
14. A copy of these recommended operating procedures shall be kept by the party chief of each seismic crew.

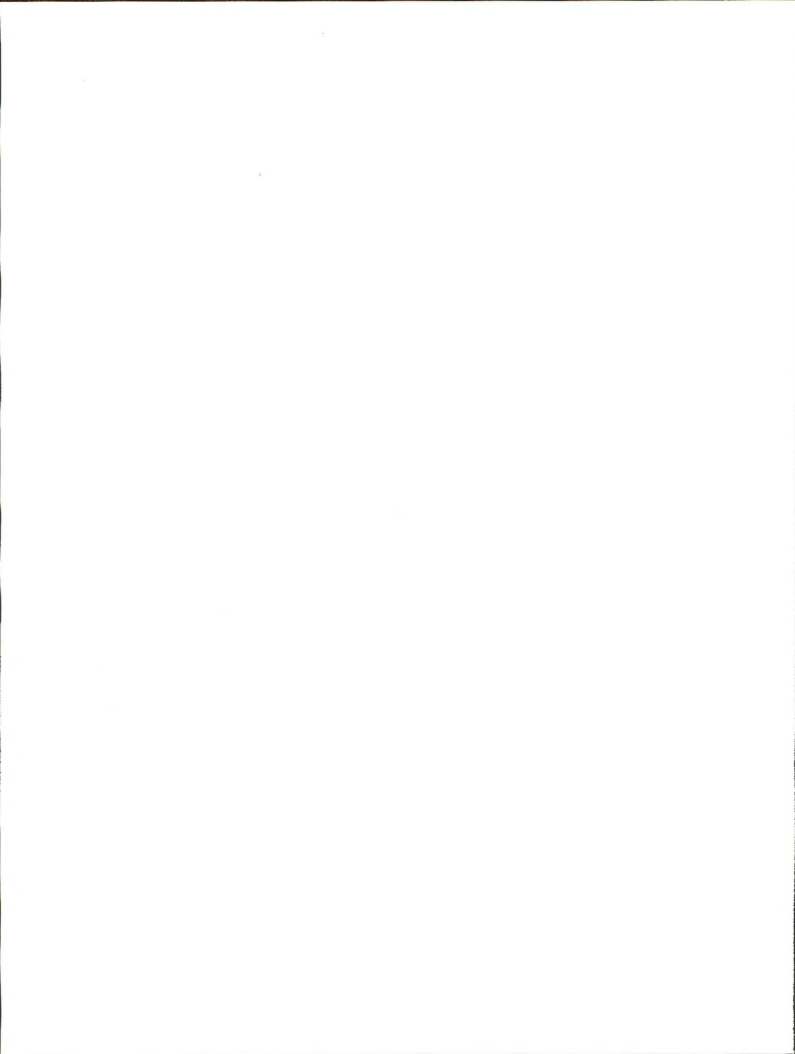
15. The BLM will be notified within 5 days after completion of operations in order to check for compliance to stipulations.
16. The operator may be required to have fire fighting equipment available on site while operations are in progress, depending on hazards inherent in the type of operation and fire hazard levels. The quantity and type of equipment will be specified by the authorized officer. All uncontrolled fires will be reported immediately to the District Manager or his authorized representatives (289-2064 Fire Dispatch number).

APPLICATION FOR PERMIT TO DRILL (APD)

The regulations for drilling operations on public land are stated in 43 CFR 3160. The operator will submit an Application for Permit to Drill (APD) and the following standard practices and procedures may be required for the operation.

1. No Drilling or storage facilities will be allowed within 500 feet of any pond, reservoir, canal, spring or stream. Other buffer zones and areas near water may be restricted to protect riparian habitat. This distance may be modified when specifically approved in writing by the District Engineer, U.S. Geological Survey with the concurrence of the Ely District Manager, BLM. Restricted surface occupancy may be required in other buffer zones to protect other resource values, including threatened or endangered flora and fauna.
2. To secure specific compliance with the stipulations under Sec. 2, paragraph (q) of the oil and gas lease form, the lessee shall, prior to operations, furnish to the authorized officer, a certified statement that either no archaeological values exist or that they may exist on the leased lands to the best of the lessee's knowledge and belief and that they might be impaired by oil and gas operations. Such certified statement must be completed by a qualified archaeologist acceptable to the authorized officer.
3. If the lessee furnished a statement that archaeological values may exist where the land is to be disturbed or occupied, the lessee will engage a qualified archaeologist, acceptable to the authorized officer, to survey and salvage, in advance of any operations, such archaeological values on the lands involved. The responsibility for the cost for the certificate, survey and salvage will be borne by the lessee, and such salvaged property shall remain the property of the lessor or the surface owner.
4. The use of wide or balloon tired vehicles and/or helicopters may be required for any activities in off-road areas where deemed necessary to protect the soil and other resources.
5. Springs and water developments on Federal lands may be used only with the prior written approval of the authorized officer or the water rights holder.
6. The lease area may contain critical habitat for wild and free roaming horses and burros. Therefore, prior to entry into the lands within the described areas the lessee (operator) will discuss the proposed activities jointly with the Area Oil and Gas Supervisor and the surface management agency's authorized officer who may require additional measures for the protection of the horses and burros. Such measures may include:

- A. The fencing of mud pits on drill sites.
 - B. The protection of springs and water developments.
 - C. The rehabilitation of areas of surface disturbance to reestablish the vegetative cover.
7. To maintain esthetics values, all semi-permanent and permanent facilities will be painted or camouflaged to blend with the natural surroundings. The paint selection or method of camouflage will be subject to approval by the District Engineer, U.S. Geological Survey, with the concurrence of the District Manger, Bureau of Land Management.
 8. In order to minimize watershed damage during muddy and/or wet periods, the District Manager, Bureau of Land Management, through the District Engineer, U.S. Geological Survey, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operations of producing wells.
 9. Pad will have irregular shape and the disturbed area kept to the absolute minimum necessary. There will be at least 6" topsoil removed and stockpiled unless changed by the authorized officer.
 10. Cut slopes will be no steeper than 2:1. Fill slopes will be no steeper than 2:1.
 11. Trash will be retained in portable trash cages and hauled to an authorized disposal site for disposal. Burning will not be allowed on the well site.
 12. Permission for drilling a water well on location will be obtained from the Nevada State Water Engineer. All water wells will be abandoned according to state specifications.
 13. A water well may be accepted by the Ely District upon completion of operations. Please submit the following information to the Ely District Office, Bureau of Land Management, HC 33, Box 33500, Ely, NV 89301-9408.
 - A. Water Analysis.
 - B. Type of inside diameter of casing used in well.
 - C. Total depth of well.
 - D. Depth of concrete seal.
 - E. Depth of static water level.
 - F. Water bearing formation or description of aquifer.
 14. The operator or his contractor will contact the Ely District Office in Ely, Nevada (702) 289-4865, 48 hours prior to commencement of site reclamation work and upon completion of restoration measures.
 15. Restoration work may not begin on the well site until the reserve pits are completely dry.
 16. All disturbed areas will be recontoured to conform as near as possible to the natural contour. This includes removing all berms and backfilling all cuts.
 17. All portions of the access roads not needed for other uses will be reclaimed, utilizing the rehab instructions for the well site and its prescribed seed mix.



**STANDARD PRACTICES AND PROCEDURES
FOR
GEOPHYSICAL OPERATIONS
AND
CONDITIONS OF APPROVAL (COAs)**



APPENDIX C

STANDARD PRACTICES AND PROCEDURES FOR GEOPHYSICAL OPERATIONS AND CONDITIONS OF APPROVAL (COAs)

PREFERRED ALTERNATIVE AND STANDARD TERMS AND CONDITIONS ALTERNATIVE

STANDARD PRACTICES AND PROCEDURES

Geophysical Operations

1. The operator shall furnish a project map(s) at a minimum scale of 1:100,000 with the Notice of Intent (NOI) depicting the approximate line route to be used. A map shall also be filed with the Notice of Completion (NOC) depicting the actual location of the complete line.
2. Any changes in location of geophysical lines or test arrays will be brought to the attention of the authorized officer prior to the change being made on the ground.
3. No blading or other dirt work will be allowed without prior approval of the authorized officer.
4. All disturbed areas will be reclaimed as directed by the authorized officer. Bond liability will not be released until this reclamation is completed to the satisfaction of the authorized officer.
5. Reclamation required by the authorized officer will be done concurrently with the geophysical operations insofar as possible or within 30 days of the authorized officer's receipt of the NOC. Reseeding will be undertaken by the operator between the dates of October 1 and March 15.
6. No blasting will be permitted within 1/4-mile of historic trails, natural areas, identified archaeological sites, recreation areas, known caves, water wells or springs.
7. During periods of adverse conditions affecting soil moisture caused by climatic factors such as thawing, heavy rains, snow, flooding or drought, all activities off existing maintained roads that create excessive surface rutting will be suspended. When adverse conditions exist, the operator will contact the authorized officer for an evaluation and decision based on soil types, soil moisture, slope, vegetation, and cover.
8. Off-road vehicular travel shall be held to an absolute minimum necessary to complete operations.
9. Powder magazines shall be located at least 1/4-mile from travelled roads. Loaded shot holes and charges shall be attended at all times.
10. All trash, flagging, lath, etc. will be removed and hauled to an authorized disposal site. No oil or lubricants shall be drained into the ground surface.
11. The operator shall notify the authorized officer the date rehabilitation operations commence and are completed.

12. Whenever possible, a portable mud pit shall be used when drilling with fluids.
13. A copy of these recommended operating procedures shall be kept by the party chief of each geophysical crew.
14. The operator may be required to have fire fighting equipment available on-site while operations are in progress, depending on hazards inherent in the type of operation and fire hazard levels. The quantity and type of equipment will be specified by the authorized officer. All uncontrolled fires will be reported immediately to the authorized officer (702-289-2064; Ely District Fire Control Center or 1-800-633-6092).
15. The use of specialized low surface impact equipment (wide or balloon tired vehicles, ATVs) and/or helicopters may be required for any activities in off-road areas where it is deemed necessary by the authorized officer to protect the fragile soils and/or other resource values.
16. Activities of the geophysical operations shall not prevent, obstruct, or unduly interfere with any activities of other authorized users of the public lands.
17. Removal or alteration of existing improvements (fences, cattle guards, etc.) is not allowed without prior approval of the authorized officer. Existing improvements will be maintained in a serviceable and safe condition.
18. Fences shall not be cut without prior approval of the authorized officer. Before cutting through any fences, the operator shall firmly brace the fence on both sides of the cut; a temporary gate will be installed for use during the course of operations unless the fence is immediately repaired. Upon completion of operations, fences shall be restored to at least their original condition.
19. Drill hole cuttings will be returned to the hole if possible, or at a minimum, raked and spread out so as not to impede regrowth of vegetation or to create erosion problems.
20. Any identified and occupied raptor aeries (nests) will be avoided during geophysical operations. A 1/2-mile buffer zone will be imposed on all activities in these areas.
21. Consultation with the U.S. Fish and Wildlife Service is required per section 7 of the Endangered Species Act if any proposed listed or listed threatened or endangered species or its critical habitat is likely to be affected by project activities. If, through consultation, there is deemed to be an adverse impact to a T&E species or its habitat, the proposal must be modified or denied.
22. Actions which would adversely impact a federally listed candidate threatened or endangered plant or animal species or its habitat will be modified in order to prevent possible future listing of these species as threatened or endangered.
23. Cultural resource inventories, if required, will be conducted on all proposed project routes or areas of potential surface disturbing impacts prior to authorization of the geophysical operations. Inventories will be completed by BLM-approved cultural resource permit holders.
24. All identified cultural resources will be avoided by project-related activities per the Nevada BLM Programmatic Agreement for Cultural Resources. If avoidance is not feasible, geophysical activities must cease until mitigating measures are developed and

implemented and section 106 consultation is completed. Archaeological monitors may be required in special cases.

and any special provisions contained in the specific legislation designating the Wilderness Area.

25. The operator will is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts.
26. During winter geophysical operations, requirements for cultural resource inventories may be waived by the authorized officer if the unsurveyed lines are located on bare and frozen ground or are completely covered (100%) by snow and the snow is sufficiently deep (approximately 4-6") to prevent ground disturbing ruts. Should conditions change while operations are in progress, the Operator must contact the authorized officer to determine if an archaeological monitor or a Class III survey is required prior to continuance of geophysical activities.
27. For any geophysical operations occurring within listed National Register Districts or National Register-eligible properties and districts, a section 106 consultation for a Determination of Effect must be completed and mitigation measures developed and implemented prior to authorization.
28. All geophysical and leasing activities proposed in Wilderness Study Areas (WSA's) will follow the guidance set forth under H-8550-1 Interim Management Policy and Guidelines for Lands Under Wilderness Review.
29. All geophysical or oil and gas activities proposed in designated wilderness areas will follow the guidance set forth under 43 CFR 8560 Management of Designated Wilderness Areas, the Wilderness Management Plan (if any)

CONDITIONS OF APPROVAL (COAs)

Application for Permit to Drill (APD) and Sundry Notices

The regulations governing drilling operations on public lands are stated in 43 CFR 3160. With submittal of an APD or Sundry Notice by the operator or lessee, the following conditions of approval may be required for the operation as applicable.

Pre-Construction

1. Existing roads should be used to the extent possible. Additional roads, if needed, shall be kept to an absolute minimum and the location of routes must be approved by the authorized officer prior to construction.
2. Upon determination of an impending field development, a transportation plan will be requested to reduce unnecessary access roads.
3. All access roads will be constructed and maintained to BLM road standards (BLM Manual Section 9113).
4. Off road travel will be restricted to terrain with less than 30 percent slopes unless approved by the authorized officer.
5. All proposed surface disturbance and vehicular travel will be limited to the approved well location and access route.
6. Any changes in well location, facility location, access or site expansion must be approved by the authorized officer in advance.

7. Prior to approval of an APD or other lease operations, a section 106 consultation must be completed by the authorized officer as provided for under the Nevada BLM Programmatic Agreement for Cultural Resources.
8. Any activity planned within a 1/4-mile on either side of the Pony Express Trail must undergo a visual assessment. Appropriate mitigation of visual impacts will be implemented as necessary to keep the management corridor in as natural a condition as possible.

Well Pad and Facility Construction

1. Every pad, access road or facility site must have an approved surface drainage plan.
2. A site diagram depicting the location of production facilities, recontoured slopes and stabilization measures shall be approved by the authorized officer prior to installation of production facilities.
3. Drainage from disturbed areas will be confined or directed so that erosion of undisturbed areas is not increased. In addition, no runoff water (including that from roads) will be allowed to flow into intermittent or perennial waterways without first passing through a sediment-trapping mechanism. Erosion control structures may include: waterbars, berms, drainage ditches, sediment ponds, or other devices.
4. Access road construction for exploratory wells should be planned such that a permanent road can later be constructed in the event of field development.
5. Construction of access roads on steep hillsides and near watercourses will be avoided where alternate routes provide adequate access.
6. Access roads requiring construction with cut and fill will be designed to minimize surface disturbance and take into account the character of the landform, natural contours, cut material, depth of cut, where the fill material will be deposited, resource concerns and visual contrast.
7. Fill material will not be cast over hilltops or into drainages. Cut slopes should normally be no steeper than 3:1 and fill slopes no steeper than 2:1.
8. Low water crossings should be used whenever possible. Installation of culverts, if necessary, will be designed to maintain the original stream gradient and of adequate size to accommodate a 24-hour 100-year event. Fill material will be properly compacted in layers not exceeding 6 inches in thickness to insure stability and to prevent washing out or dislocation of the culvert. The road surface should not be less than 12 inches above the culvert to prevent crushing from weight loads.
9. As required, fill slopes surrounding culverts will be riprapped with a well graded mixture of rock sized containing no material greater than two feet or smaller than three inches. The ratio of maximum to minimum dimension of any rock shall not exceed 6:1.
10. Water turnouts needed to provide additional drainage will be constructed not to exceed two percent slope to minimize soil erosion.
11. Well site layout should take into account the character of the topography and landform. Deep vertical cuts and steep long fill slopes should be avoided. All cut and fill slopes should be constructed to the least percent slope practical.

12. Trash will be retained in portable trash cages and hauled to an authorized disposal site for disposal. Burning will not be allowed on the well site.
13. No drilling or storage facilities will be allowed within 500 feet of any pond, reservoir, canal, spring or stream. Other protective buffer zones and areas near water may be restricted to protect riparian habitat.
14. Springs and water developments on public lands may be used only with the prior written approval of the authorized officer or the water rights holder.
15. To maintain esthetics values, all semi-permanent and permanent facilities will be painted to blend with the natural surroundings. The Standard Environmental Colors will be used for color selection.
16. Fences shall not be cut without prior approval of the authorized officer. Before cutting through any fences, the operator shall firmly brace the fence on both sides of the cut; a temporary gate will be installed for use during the course of operations unless the fence is immediately repaired. Upon completion of operations, fences shall be restored to at least their original condition.
17. As directed by the authorized officer, cattle guards will be installed whenever access roads are through pasture gates or fences. These cattle guards shall be maintained. This includes cleaning out under cattle guard bases when needed.
18. The depth of surface soil material to be removed and stockpiled will be specified by the authorized officer. If topsoil is stockpiled for more than one year, the stockpile shall be seeded or otherwise protected from wind and water erosion. The stockpile shall be marked or segregated to avoid loss or mixing with other subsurface materials.
19. Any trees removed will be separated from soils and stockpiled separately.
19. Mud, separation pits and other containments used during the exploration or operation of the lease for the storage of oil and other hazardous materials shall be adequately fenced, posted or covered.
20. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized officer. Within five working days the authorized officer will inform the operator as to:
 - whether the materials appear eligible for the National Register of Historic Places;
 - the mitigation measures the operator will likely have to undertake before the site can be used (assuming *in situ* preservation is not necessary); and,
 - a timeframe for the authorized officer to complete an expedited review under 36 CFR 800.11 or other applicable Programmatic Agreement, to confirm, through the State Historic Preservation Officer, that the findings of the authorized officer are correct and that mitigation is appropriate.
21. If the operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with the process described in item 20 above for inadvertent discovery of cultural resources, the authorized officer will assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the operator will be responsible for mitigation costs. The authorized officer will provide technical and procedural guidelines for the conduct of

- mitigation. Upon verification from the authorized officer that the required mitigation has been completed, the operator will then be allowed to resume construction.
22. Known occupied raptor aeries (nests) will be avoided during the nesting and fledging period.
 23. Field development construction activities within 1/2-mile of a sage grouse lek will require all motorized equipment to have noise abatement devices to preclude excessive noise during the sage grouse strutting period.
 24. The cutting of rare, unique or unusual trees will not be permitted. In particular cutting of Bristlecone pine, Swamp Cedar, Ponderosa pine and White Fir will be avoided.
 25. Consultation with the U.S. Fish and Wildlife Service is required per section 7 of the Endangered Species Act prior to approval of an APD or other lease operations if any proposed listed or listed threatened or endangered species or its critical habitat is likely to be affected by project activities. If there is deemed to be any adverse impact the proposal would be modified or the request denied.
 26. Actions which would adversely impact a federally listed candidate threatened or endangered plant or animal species will be modified in order to prevent possible future listing of these species as threatened or endangered.
 27. Fences will be flagged with bright colored flagging at least every rod to make the fences highly visible to wild horses. All fences should be constructed using green steel posts with white or silver tops or to increase visibility. Fences should also avoid obvious horse migration routes (deep trails, stud piles) if at all possible.

Field Operation

1. Operations shall be done in a manner which prevents damage, interference, or disruption of water flows and improvements associated with all springs, wells, or impoundments. It is the operator's responsibility to enact the precautions necessary to prevent damage, interference, or disruptions.
2. Companies controlling roads which provide access into crucial wildlife areas may be required to close the road with a lockable gate to prevent general use of the road during critical periods of the year when resource problems are experienced (during hunting seasons, winter, etc.). This restrictive measure would be applied where needed to protect wildlife resources or to minimize environmental degradation.
3. The use of closed road segments will be restricted to legitimate, authorized agents of the lessee and/or their subcontractor(s), the land managing agency and other agencies with a legitimate need (NDOW, other law enforcement agencies, etc.).
4. Unauthorized use or failure to lock gates during specified time frames by the lessee or its subcontractors would be considered a violation of the terms of the APD or associated grants.
5. The operator shall regularly maintain all roads used for access to the lease operation. A maintenance plan may be required. A regular maintenance program may include, but not be limited to, upgrading of existing roads, blading, ditching, culvert, drainage installation, and graveling or capping of the roadbed.
6. Noxious weeds which may be introduced due to soil disturbance and reclamation will be treated by methods to be approved by the authorized

officer. These methods may include biological, mechanical, or chemical. Should chemical methods be approved, the lessee must submit a Pesticide Use Proposal to the authorized officer 60 days prior to the planned application date.

Reclamation and abandonment

1. A water well may be accepted by the Ely District upon completion of operations. Please submit the following information to the Ely District Office, Bureau of Land Management, HC 33, Box 33500, Ely, NV 89301-9408.
 - A. Water Analysis;
 - B. Type of inside diameter of casing used in well;
 - C. Total depth of well;
 - D. Depth of concrete seal;
 - E. Depth of static water level;
 - F. Water bearing formation or description of aquifer.
2. The operator or contractor will contact the authorized officer 48 hours prior to reclamation work.
3. Restoration work may not begin on the well site until the reserve pits are completely dry.
4. All disturbed areas will be recontoured to blend as nearly as possible with the natural topography prior to revegetation. This includes removing all berms and refilling all cuts. All compacted portions of the pad will be ripped to a depth of 12 inches unless in solid rock.
5. Site preparation for reclamation may include contour furrowing, terracing, reduction of steep cut and fill slopes installation of water bars, etc.
6. All portions of the access roads not needed for other uses as determined by the authorized officer will be reclaimed.
7. The stockpiled topsoil will be spread evenly over the disturbed area.
8. The operator will be required to construct waterbars on abandoned access roads and pipeline routes to minimize erosion as required with appropriate spacing dependent upon topography and slope. Pipeline routes shall be water-barred perpendicular to the fall-line of the slope.
9. The area is considered to be satisfactorily reclaimed when the following criteria have been met when all disturbed areas have been recontoured to blend with the natural topography, erosion stabilized and an acceptable vegetative cover has been established.
10. Rehabilitation shall be planned on the sites of both producing and abandoned wells. The entire site or portion thereof, not required for the continued operation of the well, should be restored as nearly as practical to its original condition. Final grading of back-filled and cut slopes will be done to prevent erosion and encourage establishment of vegetation.
11. Petroleum products such as gasoline, diesel fuel, helicopter fuel, crankcase oil, lubricants, and cleaning solvents used to fuel, lubricate, and clean vehicles and equipment will be containerized in approved containers.
12. Hazardous materials shall be properly stored in separate containers to prevent mixing, drainage or accidents. Hazardous materials shall not be drained onto the ground or into streams or drainage areas.
13. Totally enclosed containment shall be provided for all solid construction waste including trash, garbage, petroleum products and related litter will be removed to an authorized

sanitary landfill approved for the disposal of these classes of waste.

14. All construction, operation, and maintenance activities shall comply with all applicable federal, state, and local laws and regulations regarding the use of hazardous substances.
15. In construction areas where recontouring is not required, vegetation will be left in place wherever possible and the original contour will be maintained to avoid excessive root damage and allow for resprouting.
16. Watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) will be repaired or replaced if they are damaged or destroyed by

construction activities to its predisturbed condition as required by the authorized officer.

17. Mulching of the seed-bed following seeding may be required under certain conditions (i.e., expected severe erosion), as determined by the authorized officer.
18. Seed will be broadcast between October 1 and March 15 using a site-specific seed mixture as determined by the authorized officer. Seed may be applied with a rangeland drill at half the rate of broadcast seeding. Seed depth should not exceed 1/2-inch. All seeding application rates will be in pounds of pure live seed per acre. Seed should be adapted varieties.

APPENDIX D

LEASE INSTRUMENT



APPENDIX D

Form 3100-11
(June 1988)

**UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OFFER TO LEASE AND LEASE FOR OIL AND GAS**

Serial No. _____

The undersigned (reverse) offers to lease all or any of the lands in Item 2 that are available for lease pursuant to the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351-359), the Attorney General's Opinion of April 2, 1941 (40 Op. Atty. Gen. 41), or the

READ INSTRUCTIONS BEFORE COMPLETING

1. Name

Street _____
City, State, Zip Code _____

2. This application/offer/lease is for: (Check only One) PUBLIC DOMAIN LANDS ACQUIRED LANDS (percent U.S. interest _____)

Surface managing agency if other than BLM: _____ Unit/Project _____

Legal description of land requested: _____ *Parcel No.: _____ *Sale Date (m/d/y): _____ / _____ / _____

***SEE ITEM 2 IN INSTRUCTIONS BELOW PRIOR TO COMPLETING PARCEL NUMBER AND SALE DATE.**

T. _____ R. _____ Meridian _____ State _____ County _____

Amount refunded: Piling fee \$ _____ Rental fee \$ _____ Total acres applied for _____
Total \$ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. _____ R. _____ Meridian _____ State _____ County _____

Total acres in lease _____
Rental retained \$ _____

This lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

NOTE: This lease is issued to the high bidder pursuant to his/her duly executed bid or nomination form submitted under 43 CFR 3128 and is subject to the provisions of that bid or nomination and those specified on this form.

Type and primary term of lease:

THE UNITED STATES OF AMERICA

Noncompetitive lease (ten years)

by _____
(Signing Officer)

Competitive lease (five years)

(Title) (Date)

Other _____

EFFECTIVE DATE OF LEASE _____

(Continued on reverse)

4. (a) Underigned certifies that (1) offeror is a citizen of the United States, an association of such citizens, a municipality, or a corporation organized under the laws of the United States or of any State or Territory thereof, (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect, in either public domain or acquired lands do not exceed 246,000 acres in Federal oil and gas leases in the same State, of which not more than 200,000 acres are held under option, or 300,000 acres in leases and not 200,000 acres in options in either leasing District in Alaska; (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located; (5) offeror is in compliance with qualifications concerning Federal coal lease holdings provided in sec. 21427(A) of the Mineral Leasing Act; and (6) offeror is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(e) of the Mineral Leasing Act; and (7) offeror is not in violation of sec. 41 of the Act.

(b) Underigned agrees that signature on this offer constitutes acceptance of this lease, including all terms, conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or in part, unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. 18 U.S.C. Sec. 1601 makes it a crime for any person knowingly and willfully to make any Department or agency of the United States any false, fictitious or fraudulent statements or representations or to any matter within its jurisdiction.

Duly executed this _____ day of _____, 19 _____

(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. **Rentals**—Rentals shall be paid to proper officer of lease in advance of each lease year. Annual rental rates per acre or fraction thereof are:

- Noncompetitive lease, \$1.50 for the first 5 years, thereafter \$2.00;
- Competitive lease, \$1.50; for primary term; thereafter \$2.00;
- Other, see attachment, or as specified in regulations at the time this lease is issued.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due at the rates specified in (a), (b), or (c) for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. **Royalties**—Royalties shall be paid to proper officer of lease. Royalties shall be computed in accordance with regulations on production removed or sold. Royalty rates are:

- Noncompetitive lease, 12 1/2 %;
- Competitive lease, 12 1/2 %;
- Other, see attachment, or as specified in regulations at the time this lease is issued.

Lessee reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and the opportunity to be heard. When paid in value, royalties shall be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production shall be delivered, unless otherwise agreed to by lessee, in merchantable condition on the premises where produced without cost to lessee. Lessee shall not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor shall lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty in case of loss of or less than the rental which otherwise would be required for that lease year shall be payable at the end of each lease year beginning on or after a discovery in paying quantities. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge shall be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (PORMRA) (30 U.S.C. 1701). Lessee shall be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to his failure to comply with any rule, regulation, order, or citation issued under PORMRA or the leasing authority.

Sec. 3. **Bonds**—A bond shall be filed and maintained for lease operations as required under regulations.

Sec. 4. **Diligence, rate of development, utilization, and drainage**—Lessee shall exercise reasonable diligence in developing and producing, and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessee reserves the right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessee.

Sec. 5. **Documents, evidence, and inspection**—Lessee shall file with proper officer of lessee, not later than 30 days after effective date thereof, any contract or evidence of other arrangement or sale or disposal of production. At such times and in such form as lessee may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and various uses for production purposes not unavoidably lost. Lessee may be required to provide plans and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessee, lessee shall keep a daily drilling record, a log, information on wells surveys and tests, and a record of subsurface investigations and furnish copies to lessee when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lease, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations conducted on the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports

costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessee. Lessee shall maintain records for 5 years after they are generated or, if an audit of operations is underway, until release of the obligation to maintain such records by lessee.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. **Conduct of operations**—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessee to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of inspection and final reclamation measures. Lessee reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessee to be approved of procedures to be followed and modifications or reorganization measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete mine inventories or short term special studies under guidelines provided by lessee. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessee. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. **Mining operations**—To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessee reserves the right to deny approval of such operations.

Sec. 8. **Extraction of helium**—Lessee reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessee at no expense to or loss to lessee or owner of the gas. Lessee shall include in any contract of sale of gas the provisions of this section.

Sec. 9. **Damages to property**—Lessee shall pay lessee for damage to lessee's improvements, and shall save and hold lessee harmless from all claims for damage to or harm to person or property as a result of lease operations.

Sec. 10. **Protection of diverse interests and equal opportunity**—Lessee shall, pay when due all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices, and take measures necessary to protect the health and safety of the public.

Lessee reserves the right to require that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated as oil derived from these leased lands, lessee shall comply with section 28 of the Mineral Leasing Act of 1920.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 11. **Transfer of lease interests and relinquishment of lease**—As required by regulations, lessee shall file with lessee any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. **Delivery of premises**—At such time as all or portions of this lease are returned to lessee, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessee and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessee for preservation of producible wells.

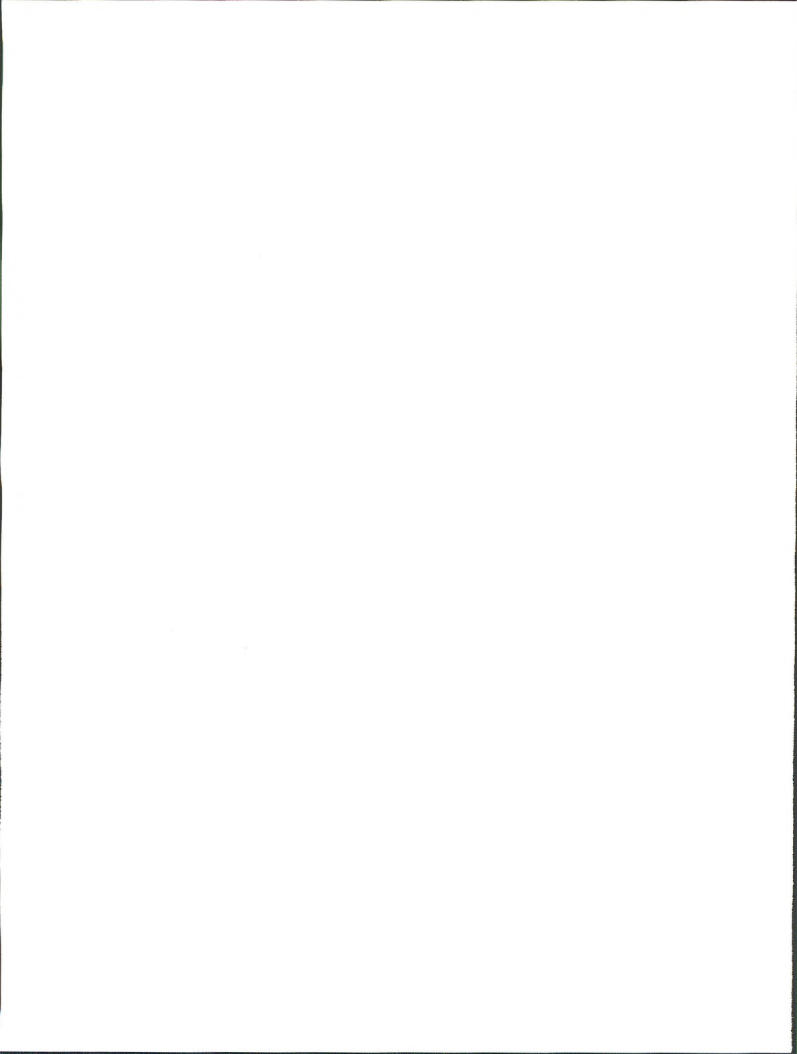
Sec. 13. **Proceedings in case of default**—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation unless or until the leasehold contains a well capable of production of oil or gas in paying quantities, or the lease is committed to an approved cooperative or unit plan or communitization agreement which contains a well capable of production of untaxed substances in paying quantities. This provision shall not be construed to prevent the estate by lessee or of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time. Lessee shall be subject to applicable provisions and penalties of PORMRA (30 U.S.C. 1701).

Sec. 14. **Heirs and successors-in-interest**—Each obligation of this lease shall extend to the heirs, executors, and assigns hereof shall inure to the heirs, executors, administrators, successors, beneficiaries, or any beneficiary of the respective parties hereto.

[Extracted from Lease Instrument, page D-2 above]

Section 6. Conduct of Operations - Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.



APPENDIX E

ABBREVIATIONS AND ACRONYMS



APPENDIX E

ABBREVIATIONS AND ACRONYMS

ACEC	Area of Critical Environmental Concern	FSEIS	Final Supplemental Environmental Impact Statement
ACHP	Advisory Council on Historic Preservation	GPM	Gallons Per Minute
AIRFA	American Indian Religious Freedom Act	HMP	Habitat Management Plan
AFY	Acre Feet Per Year	HMA	Herd Management Area
AMP	Allotment Management Plan	ISA	Instant Study Area
AML	Appropriate Management Level	KV	Kilovolts
APD	Application for Permit to Drill	LBS	Pounds
ARMP	Approved Resource Management Plan	LAER	Lowest Achievable Emission Rate
ARMPA	Approved Resource Management Plan Amendment	MBTU	Millions of British Thermal Units
AUM	Animal Unit Month	MCF	Thousand Cubic Feet
BACT	Best Available Current Technology	MFP	Management Framework Plan
BCF	Billion Cubic Feet	MLA	Mineral Leasing Act of 1920
BLM	Bureau of Land Management	MMBO	Millions of Barrels of Oil
BO	Barrels of oil	MOU	Memorandum of Understanding
BOPD	Barrels of Oil Per Day	MSA	Management Situation Analysis
BTU	Heat Output	NAAQS	National Ambient Air Quality Standards
CA	Carey Act	NDEP	Nevada Division of Environmental Protection
CEQ	Council on Environmental Quality	NF	National Forest
CFR	Code of Federal Regulations	NDOW	Nevada Department of Wildlife
CFS	Cubic feet per second	NEPA	National Environmental Policy Act of 1969
COA	Condition of Approval	NOI	Notice of Intent
CSU	Controlled Surface Use	NHPA	National Historic Preservation Act of 1966
DEIS	Draft Environmental Impact Statement	NR	National Register
DLE	Desert Land Entry	NRHP	National Register of Historic Places
DRMP	Draft Resource Management Plan	NSO	No Surface Occupancy
DRMPA	Draft Resource Management Plan Amendment	NSPS	New Sourced Performance Standards
DOE	Department of Energy	NTL	Notice to Lessees
EA	Environmental Analysis	NVSO	Nevada State Office
EAR	Environmental Assessment Report	NWPS	National Wilderness Preservation System
EIS	Environmental Impact Statement	OHV	Off-Highway Vehicles
EPA	Environmental Protection Agency	ONA	Outstanding Natural Area
ERMA	Extensive Recreation Management Area	POO	Plan of Operation
FEIS	Final Environmental Impact Statement	PRMP	Proposed Resource Management Plan
FLPMA	Federal Land Policy and Management Act of 1976	PRMPA	Proposed Resource Management Plan Amendment
FOOGLRA	Federal Onshore Oil and Gas		

PSD	Prevention of Significant Deterioration	SCS	Soil Conservation Service
RA	Resource Area	SHPO	State Historic Preservation Office
R&PP	Recreation and Public Purposes Act	SPG	Supplemental Program Guidance
RFA	Reasonable Foreseeable Action	SRMA	Special Recreation Management Area
RFD	Reasonably Foreseeable Development	SWIP	Southwest Intertie Project
RMP	Resource Management Plan	T&E	Threatened and Endangered
RMPA	Resource Management Plan Amendment	UNTP	Utah-Nevada Transmission Project
ROD	Record of Decision	USDI	U.S. Department of Interior
ROS	Recreation Opportunity Spectrum	USFS	U.S. Forest Service
RNA	Research Natural Area	USFWS	U.S. Fish and Wildlife Service
ROW	Right-of-Way	USGS	U.S. Geological Survey
SEIS	Supplemental Environmental Impact Statement	USLE	Universal Soil Loss Equation
		VRM	Visual Resource Management
		WPPP	White Pine Power Project
		WSA	Wilderness Study Area
		WPLT	Western Pluvial Lakes Tradition

APPENDIX F

GLOSSARY



APPENDIX F

GLOSSARY

ABANDONMENT

Abandonment is plugging a well, removal of installations, and termination of operations for production from a well.

ACRE-FOOT

The amount of water that will cover one acre of land to a depth of one foot (323,851 gallons or 43,560 cubic feet).

AFFECTED ENVIRONMENT

The biological, physical and social environment that will or may be changed by actions proposed.

AIR QUALITY CLASSES

Classifications established under the Prevention of Significant Deterioration portion of the Clean Air Act which limits the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate to well controlled growth would be permitted; and Class III applies to areas where industrial deterioration would generally be allowed.

ALLUVIAL SOIL

A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

ALLUVIUM

Material including clay, silt, sand, gravel, or similar unconsolidated sediments, deposited by flowing water as sorted or semi-sorted sediment in riverbeds, estuaries, floodplains, lakes and shores, and in fans at the base of mountain slopes.

ALTERNATIVE

One of several policies, plans, projects or actions proposed for decision making.

ANIMAL UNIT MONTH (AUM)

The amount of forage necessary to sustain one

cow and one calf or its equivalent for one month. An animal unit is considered to be one mature cow (1,000 pounds) or its equivalent based upon average daily forage consumption of 26 pounds of dry matter per day.

APPLICATION

A written request, petition, or offer to lease lands for the purpose of oil and gas exploration and/or the right of extraction.

APPLICATION FOR PERMIT TO DRILL, DEEPEN OR PLUG BACK (APD)

The Department of Interior application permit form to authorize oil and gas drilling activities on federal land.

ARCHAIC

A term referring to a time period or cultural tradition denoting a particular level of technology and subsistence strategy for prehistoric populations in the Intermountain West. The Archaic Period generally spans the period of 8000 years before present to 500 A.D. Also referred to as the Desert Archaic or Desert Tradition. This period is loosely broken into three phases; Early, Middle and Late.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)

An area established through the planning process as provided in FLPMA where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values; or to fish and wildlife resources or other natural systems or processes; or to protect like and afford safety from natural hazards.

AUGMENTATION

The act of releasing animals or establishing plants to maintain or enlarge an existing population of the same species within a specified area, sometimes called supplemental transplants.

AUTOCHTHON

A succession of beds that have from moved comparatively little from their original site of formation, although they may be intensely folded and faulted.

BASIN

(a) A depressed area with no surface outlet. (b) A low area in the Earth's crust, of tectonic origin, in which the sediments have accumulated.

BIG GAME

Larger species of wildlife that are hunted, such as elk, deer, bighorn sheep, mountain lions and pronghorn antelope.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

The best available air pollution control technology for a given purpose as stipulated by the U.S. Environmental Protection Agency.

BLOWOUT

An uncontrolled expulsion of gas, oil, or other fluids from drilling a well. A blowout or "gusher" occurs when formation pressure exceeds the pressure applied to it by the column of drilling fluid and when blowout prevention equipment is absent or fails.

BROODING HABITAT (SAGE GROUSE)

Sagebrush habitat (with at least 14% sage brush canopy cover) traditionally utilized by successful nesting hens to raise a clutch of young. As the brood rearing progresses, this habitat is generally associated with mesic and upland meadows.

BUREAU OF LAND MANAGEMENT

The Department of Interior agency responsible for managing most federal government subsurface minerals. It has surface management responsibility for federal lands designated under the Federal Land Policy and Management Act of 1976.

CANDIDATE SPECIES

Any species not yet officially listed but which are undergoing a status review or are proposed for listing according to Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce.

CARBONARI

Italian-Swiss immigrants who practiced the art of charcoal production in Nevada and other western states during the latter half of the 19th century.

CASING

Steel pipe palced in an oil or gas well to prevent the hole from caving.

CATEGORY 1 SPECIES

Taxa for which the U.S. Fish & Wildlife Service has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.

CATEGORY 2 SPECIES

Taxa for which the U.S. Fish & Wildlife Service has information to indicate that listing is possibly appropriate. Additional information is being collected.

CENOZOIC ERA

The latest of the four eras into which geologic time, as recorded by the stratified rocks of the earth's crust, is divided, 67 million years ago to the present.

COMPLETION

The activities and methods to prepare a well for production. Includes installation of equipment for production from an oil or gas well.

CONDITION OF APPROVAL (COA)

Conditions or provisions (requirements) under which an application for a Permit to Drill or a Sundry Notice is approved.

CONTROLLED SURFACE USE (CSU)

Use and occupancy is allowed (unless restricted by another stipulation), but identified resource values require special operational constraints that may modify the lease rights. CSU is used for operating guidance, not as a substitute of the NSO or Timing stipulations.

CULTURAL RESOURCES

Those fragile and non-renewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects,

artifacts, ruins, works of art, architecture, and natural features that were of importance in human events.

CULTURAL RESOURCES INVENTORY CLASSES

CLASS I An existing data survey. This is an inventory of a study area to (1) provide a narrative overview of cultural resources by using existing information, and (2) compile existing cultural resources site record data on which to base the development of the BLM's site record system.

CLASS II A sampling field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites within a portion of an area so that an estimate can be made of the cultural resources for the entire area.

CLASS III An intensive field inventory designed to locate, from surface and exposed profile indications, all cultural resource sites in an area. Upon its completion, no further cultural resources inventory work is normally needed.

CRUCIAL WINTER HABITAT

Describes any particular range or habitat component (often winter, variable due to snow depths) or yearlong range, but describes that component which is the determining factor in a population's ability to maintain and reproduce itself at a certain level over the long-term.

CUMULATIVE IMPACTS

The impact which results from the incremental impact of the action, decision or project when added to other past, present or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts can result from similar projects or actions as well as from projects or actions which have similar impacts.

DEEPEN

To increase the depth of a well. Deepening is generally a workover operation carried out to produce from a deeper formation or to control excessive gas found in the upper levels of a

reservoir.

DEVELOPED RECREATION SITE

Relatively small, distinctly defined area where facilities are provided for concentrated public use, i.e. campgrounds and picnic areas.

DEVELOPMENT WELL

A well drilled in proven territory (usually within one mile of an existing well).

DEVONIAN

The fourth in order of age of the geologic time periods comprising the Paleozoic Era, 586 to 237 million years ago.

DIRECTIONAL DRILLING

Drilling a borehole wherein course of the drill hole is planned before drilling. Such holes are usually drilled with rotary equipment at an angle to the vertical and are useful in avoiding obstacles or in reaching side areas or mineral estate beneath restricted surface.

DISCRETIONARY CLOSURES

Areas where the surface managing agency has determined that energy and/or mineral leasing, entry or disposal, even with the most restrictive stipulations or conditions would not be in the public interest.

DISPERSED RECREATION

That portion of outdoor recreation use which occurs on public lands outside of developed sites, i.e. hunting, fishing, backpacking.

DISPLACEMENT

As applied to wildlife, forced shifts in the patterns of wildlife use, either in location or timing of use.

DISPOSAL WELL

A well into which produced water from other wells is injected into an underground formation for disposal.

DIVERSITY

The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

DRAINAGE

The uncompensated loss of hydrocarbons from federal lands from wells on adjacent nonjurisdictional lands or jurisdictional lands with lower participation, allocation, royalty rate or distribution of funds, resulting in revenue losses to the federal lessor.

DRILL RIG

The mast, drawworks and attendant surface equipment of a drilling or workover unit.

DRY HOLE

Any well incapable of producing oil or gas in commercial quantities. A dry hole may produce water, gas or oil but not enough to justify production.

ENDANGERED SPECIES

Any species which is in danger of extinction throughout all or a significant portion of its range.

ENDANGERED SPECIES ACT OF 1973 (ESA)

Title 16, Ch. 35 U.S.C.; P.L. 93-205, 81 Stat. 884, as amended. This Act establishes the policy for Federal agencies to conserve ecosystems upon which endangered and threatened species depend and establish programs to conserve endangered and threatened species.

ENVIRONMENTAL ASSESSMENT (EA)

A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. It includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.

ENVIRONMENTAL IMPACT STATEMENT (EIS)

A formal public document prepared to analyze the impacts on the environment of a proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.

EXCEPTION

Case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites

within the leasehold to which the restrictive criteria applies.

EXPLORATION WELL

A well drilled in an area where there is no oil or gas production. Same as a "wildcat" well.

FAULT

A fracture or zone of fractures along which there has been displacement of the sides relative to one another parallel to the fracture.

FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLMPA)

Public Law 94-579 signed by the President on October 21, 1976. Establishes public land policy for management of lands administered by the Bureau of Land Management. FLPMA specifies several key directions for the Bureau, notably (1) management be on the basis of multiple-use and sustained yield, (2) land use plans be prepared to guide management actions, (3) public lands be managed for the protection, development and enhancement of resources, (4) public lands be retained in federal ownership and (5) public participation be utilized in reaching management decisions.

FLARE

The piping and burners used to dispose (by burning) of unusable vapors from a well or collection plant.

FOLD

A curve or bend of a planar structure such as rock strata, bedding planes, foliation, or cleavage. A fold is usually a product of deformation, although its definition is descriptive and not of genetic and may include primary structures.

FORAGE

All browse and herbaceous foods that are available to grazing animals.

FORMATION

A body of rock identified by lithic characteristics and stratigraphic position; it is prevailingly but not necessarily tabular, and is mappable at the Earth's surface or traceable in the subsurface.

FOSSIL

The remains or traces of an organisms or assemblage of organisms which have been preserved by natural processes in the earth's crust exclusive of organisms which have been buried since the beginning of historic time. Minerals, such as soil and gas, coal, oil shale, bitumen, lignite, asphaltum, and tar sands, phosphate, limestone, diatomaceous earth, uranium and vanadium, while they may be of biologic origin, are not here considered "fossils." Fossils of scientific value may occur within or in association with such materials.

FRAGILE SOIL

A soil that is especially vulnerable to erosion or deterioration due to its physical characteristics and/or location. Disturbance to the surface or the vegetative cover can initiate a rapid cycle of loss and destruction of the soil material, structure, and ability to sustain a biotic community.

FREMONT

A term given to a semi-puebloan prehistoric population and extinct culture which thrived in what is now the State of Utah and portions of southern Idaho, western Colorado and eastern Nevada between 300 A.D. and 1300 A.D. The "Fremont" were sedentary, practiced agriculture and manufactured plain and painted grayware pottery.

GEOPHYSICS

Study of the Earth by quantitative physical methods.

GRAZING SYSTEM

Scheduled grazing use and non-use of an allotment to reach identified goals or objectives by improving the quality and quantity of vegetation.

GROUND COVER

The area of ground surface occupied by the stem(s) of a range plant, as contrasted with the full spread of its herbage or foliage, generally measured at one inch above soil level.

GROWING SEASON

Generally, the period of the year during which the temperature of vegetation remains sufficiently high to allow plant growth.

HABITAT

A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

HERD AREA

The geographic area identified as having been used by a wild horse herd as it's habitat as of 1971.

HERD USE AREA

The geographic area used by wild horse herds. The herd use area may be larger or smaller than a herd management area.

HERD MANAGEMENT AREA

A wild horse herd area identified in an approved land use plan where wild horses and/or burros will be maintained and managed.

HYDROCARBON

Any organic compound, gaseous, liquid, or solid, consisting solely of carbon and hydrogen.

IGNEOUS

Type of a rock or mineral that solidified from molten or partly molten material.

IMPACT

The effect, influence, alteration, or imprint caused by an action.

INSTANT STUDY AREA

Section 603 of the Federal Land Policy and Management Act mandated that all primitive or natural areas formally identified prior to November 1, 1975, will be studied for wilderness suitability.

INTERIM MANAGEMENT POLICY (IMP)

An interim measure governing lands under wilderness review. This policy protects Wilderness Study Areas and Instant Study Areas from impairment of their suitability as wilderness.

INVERTEBRATE

An animal lacking a backbone or spinal column.

INJECTION WELL

A well used to inject fluids into an underground formation to increase reservoir pressure.

JURASSIC

The middle of three geologic time period comprising of the Mesozoic Era, 237 to 67 million years ago.

KEY WILDLIFE AREA

Any area which is critical to wildlife during at least a portion of the year. This importance may be due to vegetative characteristics such as residual nesting cover or behavioral aspects of the animals such as calving areas. Key areas include: winter ranges, lambing/fawning/calving areas, dancing/strutting grounds, nesting areas, breeding grounds, riparian areas and roosting areas.

LAND TREATMENT

All methods of artificial range improvement and soil stabilization such as reseeding, brush control (chemical and mechanical), pitting, furrowing, water spreading, etc.

LEASE

The tract of land, on which a lease has been obtained, where producing wells and production equipment are located.

LEASE INSTRUMENT

A legal document that conveys to the operator the right to drill for, develop and produce oil and gas resources under certain agreed-upon terms and conditions.

LEASE NOTICE

Provides more detailed information concerning limitations that already exist in law, lease terms, regulations, or operational orders. A Lease Notice also addresses special items the lessee would consider when planning operations, but does not impose new or additional restrictions.

LEASE STIPULATIONS

Additional specific terms and conditions that change the manner in which operation may be conducted on a lease, or modify the lease rights granted.

LEASABLE MINERALS

Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. They include coal, phosphate, asphalt, sulphur, potassium and sodium minerals, and oil and gas.

Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

LEK

Sage grouse strutting ground. Usually located in an open area of low sage, along a ridge, bench, road or airport, near a salt site or reservoir or in a meadow where sage grouse traditionally display and breed.

LOCATABLE MINERALS

Minerals or materials subject to claim and development under the Mining Law of 1872, as amended. Generally includes metallic minerals such as gold and silver, and other materials not subject to lease or sale (some bentonite, limestone, talc, some zeolite, etc.)

MINERAL MATERIALS

Common varieties of sand, building stone, gravel, clay, moss rock, etc., obtainable under the Minerals Act of 1947, as amended.

MINERAL LEASING ACT OF 1920

30 U.S.C. 181 *et seq.*; 41 Stat. 437 as amended. Signed into law February 25, 1920. This Act establishes the policy that the certain mineral deposits including oil and gas resources, in the Public Domain, are generally available for leasing, prospecting and disposal.

MITIGATION

Alleviation or lessening of possible adverse effects on a resource by applying appropriate protective measures or adequate scientific study.

MODIFICATION

Fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites within the leasehold to which the restrictive criteria applied.

MORMON

A person who practices the religious philosophy of the Church of Jesus Christ of the Latter Day Saints. Mormons largely settled the State of Utah.

MULTIPLE-USE

Management of the various surface and subsurface resources so that they are jointly utilized in the manner that will best meet the present and future needs of the public, without permanent impairment of the productivity of the land or the quality of the environment.

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA)

Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

NATIONAL REGISTER OF HISTORIC PLACES (NATIONAL REGISTER, NRHP)

A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of 1966 and maintained by the National Park Service.

NEST SITE

A structure constructed (generally in juniper trees) or a place used by ferruginous hawks for laying and incubation of its eggs and rearing of its young.

NESTING TERRITORY (FERRUGINOUS HAWK)

An area that a breeding pair of ferruginous hawks have chosen for pairbonding, courtship, egg laying and rearing of nestlings. This area is generally within a 2-mile radius of a white sage vegetation community.

NO ACTION ALTERNATIVE

An alternative that maintains established trends or management direction.

NONDISCRETIONARY CLOSURES

Areas specifically closed to energy and/or mineral leasing, entry or disposal by law, regulation, Secretarial decision or Executive Order.

NOTICE OF INTENT (NOI)

Department of Interior application form used to apply for surface-use of public lands to explore the Earth for oil and gas resources with geophysical methods.

NO SURFACE OCCUPANCY (NSO)

A fluid mineral leasing stipulation that prohibits occupancy or disturbance on all or part of the lease surface in order to protect special values or uses. Lessees may exploit the oil and gas or geothermal resources under leases restricted by this stipulation through use of directional drilling from sites outside the no surface occupancy area.

NOTICE TO LESSEES (NTL)

A written notice issued by the Authorized Officer. These notices implement regulation and operating orders, and serve as instructions on specific item(s) of importance within a State, District, or Area.

NUMIC

Refers to contemporary Native American populations and prehistoric populations linked by cultural patrimony, who speak the Numic branch of the Uto-Aztecan language family.

OFF-ROAD VEHICLE (ORV) OR OFF-HIGHWAY VEHICLE (OHV)

Any motorized vehicle designed for or capable of cross-country travel over land, water, sand, snow, ice, marsh, swampland or other natural terrain.

OVERSTORY

That portion of a plant community consisting of the taller plants on the site; the forest or woodland canopy.

OROGENY

The process of forming mountains, particularly by folding and thrusting.

PALEONTOLOGICAL RESOURCE

A site containing non-human life of past geological periods, usually in the form of fossil remains.

PALEOZOIC ERA

One of the Eras of Geologic Time. The Paleozoic Era is between the Precambrian and the Mesozoic Eras, approximately 570 and 240 million years ago.

PARTICULATES

Small particles suspended in the air and generally considered pollutants.

PATENT

A grant made to an individual or group conveying fee simple title to selected public lands.

PLANNING AREA

The geographical area for which land use and resource management plans are developed and maintained.

PLANNING CYCLE

The period of time for which the decisions of an approved land use plan are in effect. The planning cycle begins with the signing of the approved plan's Record of Decision.

PLAY

The extent of a petroleum-bearing formation and the activities associated with petroleum development in an area.

PLEISTOCENE

The earlier of two geologic time periods comprising the Quaternary Period. The Pleistocene began about 2 million years ago and ended about 10 thousand years ago.

PREHISTORIC PROPERTY

A prehistoric archaeological site which is listed on or considered eligible for the National Register of Historic Places.

PREVENTION OF SIGNIFICANT DETERIORATION OF AIR QUALITY (PSD)

A classification established to preserve, protect and enhance the air quality in National Wilderness Preservation System areas in existence prior to August 1977 and other areas of National significance, while ensuring economic growth can occur in a manner consistent with the preservation of existing clean air resources.

PRODUCER

An oil or gas well which produces oil or gas resources in commercial quantities.

PUBLIC LAND

Any land and interest in land (outside of Alaska) owned by the United States and administered by the Secretary of the Interior through the Bureau of Land Management (BLM).

RAPTOR

Bird of prey with sharp talons and strongly curved beaks, e.g. hawks, owls, vultures, eagles and falcons.

REASONABLE FORESEEABLE DEVELOPMENT (RFD)

The projection of activities associated with a particular action which can be reasonably foreseen to occur within the near future based on existing trends and economic factors. RFDs are used to provide a baseline for impact comparison of alternatives in an environmental analysis. An RFD does not represent a "worst case" scenario.

REASONABLE FORESEEABLE FUTURE ACTIONS (RFAs)

Actions or land uses which can be reasonably expected to occur within the near future in addition to an RFD. RFAs are used to provide a baseline of impacts for assessing the cumulative or incremental effects of a particular action or land use.

RECLAMATION

Returning disturbed lands to a form and productivity that will be ecologically balanced and in conformity with a predetermined land management plan.

RECREATION AND PUBLIC PURPOSES ACT (R&PP)

This Act authorizes the Secretary of the Interior to lease or convey public lands for recreational and public purposes under specified conditions to states or their political subdivisions, and to nonprofit corporations and associations.

RESERVE PIT

Excavated pit adjacent to a drill rig that holds drill cuttings and waste mud.

RESOURCE AREA

A geographic portion of the BLM District that is the smallest administrative subdivision in the BLM.

RESOURCE MANAGEMENT PLAN (RMP)

A land use plan that establishes land use allocations, multiple-use guidelines, and management objectives for a given planning area. The RMP planning system has been used by the BLM since about 1980.

RIPARIAN

Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or subirrigation zone of streams, ponds, and springs.

RIPARIAN ZONE

An area encompassing riparian and adjacent vegetation.

ROADLESS

Refers to the absence of roads that have been constructed and maintained by mechanical means to ensure regular and continuous use.

ROADS

Vehicle routes which have been improved and maintained by mechanical means to ensure relatively regular and continuous use. (A way maintained strictly by the passage of vehicles does not constitute a road.)

SAGE GROUSE WINTER HABITAT

A habitat where a population or portion of a population of sage grouse use the suitable habitat sites within the range annually, in substantial numbers only during the winter period (variable, due to snow depths, but commonly between November 1 and March 30).

SALINITY

Refers to the solids such as sodium chloride (table salt) and alkali metals that are dissolved in water. Often in non-saltwater areas, total dissolved solids is used as an equivalent.

SCOPING PROCESS

An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

SEDIMENT YIELD

The amount of sediment produced in a watershed, expressed as tons, acre-feet, or cubic yards of sediment per unit of drainage area per year.

SEISMIC EXPLORATION

Geophysical exploration employing seismic (sound or shock) waves to map underground geologic

features and to locate areas where accumulations of oil and gas might occur.

SENSITIVE SPECIES

those plant or animal species which are susceptible or vulnerable to activity impacts or habitat alterations.

SHEET EROSION

The removal of a fairly uniform layer of soil from the land surface by runoff water.

SHOW

Indication in the drill log or stratigraphic profile that oil or gas resources are present or have been present within a formation; however, not in quantities considered commercial. Usually determined by the presence or residual presence of hydrocarbons.

SOIL PRODUCTIVITY

The capacity of a soil to produce a specific crop such as fiber or forage. Productivity is generally dependent on available soil moisture, nutrients and length of growing season.

SPECIAL RECREATION MANAGEMENT AREA (SRMA)

An area that possesses outstanding recreation resources or where recreation use causes significant user conflicts, visitor safety problems, or resource damage.

SPELEOTHEM

Natural mineral formations or deposits occurring in a cave, including stalactites, stalagmites, helictes, gypsum flowers, soda straws, lavacicles, anthodites, flowstone, rimstone dams, tufa dams, concretions, draperies, etc. Speleothems can be composed of calcite, gypsum, aragonite, celestite, silica, mud, basalt, or other minerals and materials.

SPLIT-ESTATE

Lands where the owner of the mineral rights and the surface owner are not the same party in interest. The most common split estate is Federal ownership of the sub-surface. Where such a condition occurs, the Federal Government can lease the oil and gas rights without surface owner consent.

SPRING RANGE

A transitional range between winter habitat and summer habitat.

STIPULATION

A provision that modifies standard lease rights and is attached to and made a part of the lease.

STREAMBANK (and CHANNEL) EROSION

The removal, transport, deposition, recutting, and bed load movement of material in streams by concentrated water flows.

STRINGER(S)

A line of juniper trees extending down a slope of a hill toward the valley floor.

SUBDUCTION ZONE

Decant of one tectonic unit under another. An elongated region along which a crustal block descends relative to another crustal block.

SUITABILITY (OR NONSUITABILITY)

Used in the context of determining an area's eligibility or non-eligibility for recommendation as wilderness. In the Federal Land Policy and Management Act, suitability means determining whether the area is more suitable for wilderness designation or more suitable for other uses.

SUNDRY NOTICE

Standard form to notify or approve well operations subsequent to Application for Permit to Drill, in accordance with BLM regulations.

SURFACE MANAGEMENT AGENCY

Any agency with jurisdiction over the surface which overlies federally-owned minerals.

SUSTAINED YIELD

The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple-use.

TANK BATTERY

A group of production tanks that store crude oil in the field.

TECTONICS

A branch of geology dealing with the broad architecture of the outer part of the Earth, that is the regional assembling of structural or deformational features, a study of their mutual relations, origin, and historical evolution.

TERRESTRIAL

Living or growing in or on the land.

THREATENED AND ENDANGERED SPECIES

Any species or significant population of that species likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Usually includes only those species that have been recognized and listed as threatened by federal and state governments, but may include species categorized as rare, very rare, or depleted.

THRUST FAULT

A fault with a dip of 45 degrees or less over much of its extent, on which the hanging wall (overlying side) appears to have moved upward relative to the footwall (underlying side).

TIMING LIMITATION (SEASONAL RESTRICTION)

Prohibits surface use during specified time periods to protect identified resource values. The stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project-specific mitigation measures would be insufficient.

TOTAL DISSOLVED SOLIDS (TDS)

Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

TRAP

Any barrier to the upward movement of oil or gas, allowing either or both to accumulate. A trap includes a reservoir rock and an overlying or updip impermeable roof rock; the contact between these is concave as viewed from below. See also: definitions of types of stratigraphic traps below.

TRADITIONAL LIFEWAY VALUE

The quality of being useful in or important to the maintenance of a specified social and/or cultural group's traditional systems of (a) religious belief, (b) cultural practice, or (c) social interaction, not closely identified with definite locations. Another group's shared values are abstract, nonmaterial, ascribed ideas that one cannot know about without being told. Traditional lifeway values are taken into account through public participation during planning and environmental analysis.

TRESPASS

Any unauthorized use of public land.

TRIASSIC

The earliest of three geologic time periods of the Mesozoic Era, 237 to 67 million years ago.

UNDERSTORY

That portion of a plant community growing underneath the taller plants on the site.

UNIVERSAL SOIL LOSS EQUATION (USLE)

A formula for predicting soil loss resulting from sheet and rill erosion caused by rainfall.

UTILIZATION

The proportion of current year's forage production that was consumed or destroyed by grazing animals; usually expressed as a percentage.

VALID EXISTING RIGHTS

Legal interests that attach to a land or mineral estate that cannot be divested from the estate until that interest expires or is relinquished.

VANDALISM

Willful or malicious destruction or defacement of public property; e.g., cultural or paleontological resources.

VEGETATION TYPE

A plant community with immediately distinguishable characteristics based upon and named after the apparent dominant plant species.

VERTEBRATE

An animal having a backbone or spinal column.

VISUAL RESOURCES

The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

VISUAL RESOURCE MANAGEMENT (VRM)

The inventory and planning actions taken to identify visual resource values and to establish objectives for managing those values, and the management actions taken to achieve the visual resource management objectives.

VISUAL RESOURCE MANAGEMENT CLASSES

VRM classes identify the degree of acceptable visual change within a particular landscape. A classification is assigned to public lands based on the guidelines established for scenic quality, visual sensitivity, and visibility.

VRM CLASS I

This classification preserves the existing characteristic landscape and allows for natural ecological changes only. Includes Congressionally authorized areas (wilderness) and areas approved through the RMP where landscape modification activities should be restricted.

VRM CLASS II

This classification retains the existing characteristic landscape. The level of change in any of the basic landscape elements due (form, line, color, texture) to management activities should be low and not evident.

VRM CLASS III

This classification partially retains the existing characteristic landscape. The level of change in any of the basic landscape elements due to management activities may be moderate and evident.

VRM CLASS IV

This classification provides for major modifications of the characteristic landscape. The level of change in the basic landscape elements due to management activities can be high. Such activities may dominate the landscape and be the major focus of viewer attention.

VRM CLASS V

This classification applies to areas where the characteristic landscape has been so disturbed that rehabilitation is needed. Generally considered an interim short-term classification until rehabilitation or enhancement is completed.

VISUAL SENSITIVITY

Visual sensitivity levels are a measure of public concern for scenic quality and existing or proposed visual change.

WAIVER

Permanent exemption from a lease stipulation. The stipulation no longer applies anywhere within the leasehold.

WESTERN PLUVIAL LAKES TRADITION (WPLT)

A term referring to a particular level of technology and subsistence strategy for prehistoric populations in the Intermountain West. The WPLT occurred during a cooler, moister climate and centered around procurement of large game and marsh resources associated with now-extinct Pleistocene lakes and riverine environments. The WPLT predates the Desert Tradition and generally spans the period from the end of the Pleistocene (12,000 years ago) to about 8000 years before present.

WICKI-UP

A temporary or semi-permanent brush and log structure used by prehistoric and early historic Native Americans for shelter and living quarters.

Wicki-ups are usually constructed of several logs and/or branches placed in an upright lean-to fashion against a tree or each other to form a conical living space.

WILDCAT WELL

An exploratory well drilled in an area where there is no oil or gas production.

WILDERNESS

An area formally designated by Congress as a part of the National Wilderness Preservation System.

WILDERNESS CHARACTERISTICS

Identified by Congress in the Wilderness Act of 1964; namely, size, naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values such as geological, archaeological, historical, ecological, scenic, or other features.

WILDERNESS STUDY AREA (WSA)

A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of FLPMA and section 2(c) of the Wilderness Act of 1964 (78 stat. 891).

WITHDRAWAL

An action which restricts the use of public land and segregates the land from the operation of some or all of the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other federal agencies.

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