

APPENDIX A

Criteria for meeting "Acceptable Plan" in Oil and Gas Lease Terms Desolation Flats Natural Gas Project

The following criteria are provided as guidance for preparing mitigative plans for any surface disturbing activity proposed in the Rock Springs portion of the DFPA. The Rock Springs portion of the DFPA lies within Class II visual resource management area and the area known as the Monument Valley Management Area. These criteria are not all inclusive but are identified as points that should be considered when developing such mitigative plans.

Disturbance Areas

1. Disturbance to pad locations and associated roads should be kept to the minimum needed to safely conducted operations.
2. Use of pad drilling (multiple wells at one surface site) when possible.

Transportation Planning

1. Keep miles of roads/trails to a minimum.
2. All roads should be designed by a professional engineer.
3. Roads should be engineered to avoid concentrating overland flow of water. Roads should be designed and placed to avoid drainage areas. If drainage areas cannot be avoided, then engineered with appropriate spacing of crossings with energy dispersion structures (i.e, armored low-water crossings).
4. Reduce cut and fill areas.
5. Reduce road standards when feasible (i.e., width).
6. Require durable surfacing (i.e, gravel). Gravel according to the transportation plan and Manual 9113 road standards.
7. Layout location of main roads (during transportation planning).
8. Maintenance including surveys of channel conditions below engineered portions of culvert discharges. Timely repair of problems when found.

Visual Resource Management (VRM) - VRM Class II

1. All disturbance would need to meet the Class II VRM objectives. The objective for Class II is to retain the existing character of the landscape. Level of change should be low. Activities may be seen but should not detract the attention of the casual observer. Any change must repeat the basic elements (line, form, color, texture) found in the predominant natural features of the characteristic landscape (Manual 8410-1).

APPENDIX A - ACCEPTABLE PLAN CRITERIA

2. Roads should be designed to avoid straight lines to protect the visual integrity of the Class II viewshed.
3. Pad locations should be hidden by topographical features.
4. Develop "key observation points" for individual actions and require visibility analysis modeling and/or photographic simulations.
5. Centralize production facilities whenever possible.
6. Screen locations where possible.
7. Reduce production facility dimensions (height, width, minimum needed to operate).
8. Use low contrast, non-reflective paint for production facilities.
9. Reduce contrast of base material color and texture (i.e., use of native gravel if available).
10. Follow topographic features (line, form) in order to reduce visibility of disturbance.

Reclamation

1. Reclamation will be done as soon as possible after disturbance and will be in accordance with the approved reclamation plan (as outlined in the EIS).
2. All actions will require an Erosion Control, Revegetation, and Restoration Plan (ERRP) and will conform to the Wyoming policy on reclamation.
3. Protect existing native vegetation.
4. Minimize disturbance of existing environment.
5. Soil stabilization via establishment of ground cover.
6. Establishment of native vegetation /site stabilization (3-5 years). Monitoring of reclamation success.
7. Use of native, certified weed-free seed.
8. Prompt treatment of noxious weed infestations.
9. Restore original contours on pad and road construction.
10. Leave surface as rough as possible.

Paleontological Resources

1. On-the-ground surveys will be required prior to any surface disturbing activity.

APPENDIX A - ACCEPTABLE PLAN CRITERIA

Cultural Resources

1. Follow BLM protocol for implementation of the Nationwide Programmatic Agreement.
2. Consultation with Native American groups should certain features be found (e.g. rock art, stone circles, burials, cairns, flat-top mesas.)

Geological Formations/Hazards (lease term)

1. Avoid slopes in excess of 25 percent
2. Avoid highly erosive areas.

Wildlife

1. Seasonal restriction for mule deer and antelope crucial winter range (11/15-4/30).
2. Avoid raptor concentration areas and seasonal restriction for individual raptor nests (2/1-7/31 nesting and 11/15 - 4/30 for winter concentration areas).
3. Mountain plover aggregation areas will be surveyed in accordance with the FWS's requirements for mountain plovers.
4. Prairie dog town/complexes where possible and if not avoided then cleared for black-footed ferrets.
5. Protection of migratory birds (pit netting).

Soils/Watershed

1. Construction with frozen material or during periods when the soil is saturated or when watershed damage is likely to occur is prohibited.
2. Avoid disturbance within 100 ft of inner gorge of intermittent or ephemeral drainages.
3. Require an erosion control plan.
4. Salvage and the subsequent replacement of topsoil whenever possible (topsoil depth to be determined case-by-case).
5. Avoid erosive soils when possible, otherwise design and construction should be done in such a manner to reduce erosion.
6. Construction across ephemeral drainages would be restricted until after spring runoff.
7. Reserve pits should not be located in areas where groundwater is less than 50 ft and soil permeability is greater than 10(-7) cm/hr.
8. Lining of pits should be decided on a case-by-case basis.

APPENDIX A - ACCEPTABLE PLAN CRITERIA

9. Seeding of borrow areas.
10. No surface disposal of produced water or surface discharge from water wells.
11. Pipeline placement will be determined based on site-specific conditions. Any surface pipelines crossing roads or trails will be buried. When buried pipelines are proposed, they will follow and be placed on the edge of roadways.

Scientific Values (RMP)

1. Protect integrity of paleontological and cultural values.

Other

1. Use of remote sensing devices to reduce number of well visits.

APPENDIX B

STANDARD MITIGATION GUIDELINES

TABLE OF CONTENTS

1.0 SURFACE DISTURBANCE MITIGATION GUIDELINE	B-1
1.1 Guidance	B-1
2.0 WILDLIFE MITIGATION GUIDELINE	B-1
2.1 Guidance	B-2
3.0 CULTURAL RESOURCE MITIGATION GUIDELINE	B-3
3.1 Guidance	B-3
4.0 SPECIAL RESOURCE MITIGATION GUIDELINE	B-4
4.1 Example Resource Categories	B-4
4.2 Guidance	B-4
5.0 NO SURFACE OCCUPANCY GUIDELINE	B-5
5.1 Example Resource Categories	B-5
5.2 Guidance	B-5

APPENDIX B

STANDARD MITIGATION GUIDELINES

1.0 SURFACE DISTURBANCE MITIGATION GUIDELINE

Surface disturbance will be prohibited in any of the following areas or conditions. Exception, waiver, or modification of this limitation may be approved in writing, including documented supporting analysis, by the AO.

- a. Slopes in excess of 25 percent.
- b. Within important scenic areas (Class I and II Visual Resource Management Areas).
- c. Within 500 feet of surface water and/or riparian areas.
- d. Within either one-quarter mile or the visual horizon (whichever is closer) of historic trails.
- e. Construction with frozen material or during periods when the soil material is saturated or when watershed damage is likely to occur.

1.1 Guidance

The intent of the SURFACE DISTURBANCE MITIGATION GUIDELINE is to inform interested parties (potential lessees, permittees, or operators) that when one or more of the five (1a through 1e) conditions exist, surface-disturbing activities will be prohibited unless or until a permittee or his designated representative and the surface management agency (SMA) arrive at an acceptable plan for mitigation of anticipated impacts. This negotiation will occur prior to development.

Specific criteria (e.g., 500 feet from water) have been established based upon the best information available. However, such items as geographical areas and seasons must be delineated at the field level.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

2.0 WILDLIFE MITIGATION GUIDELINE

- a. To protect important big game winter habitat, activities or surface use will not be allowed from November 15 to April 30 within certain areas encompassed by the authorization. The same criteria apply to defined big game birthing areas from May 1 to June 30.

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the AO.

APPENDIX B: STANDARD MITIGATION GUIDELINES

b. To protect important raptor and/or sage and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain areas encompassed by the authorization. The same criteria apply to defined raptor and game bird winter concentration areas from November 15 to April 30.

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operation or production aspects.

Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the AO.

c. No activities or surface use will be allowed on that portion of the authorization area identified within (*legal description*) for the purpose of protecting (e.g., sage/sharp-tailed grouse breeding grounds, and/or other species/activities) habitat.

Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the AO

d. Portions of the authorized use area legally described as (*legal description*), are known or suspected to be essential habitat for (*name*) which is a threatened or endangered species. Prior to conducting any onsite activities, the lessee/permittee will be required to conduct inventories or studies in accordance with BLM and U.S. Fish and Wildlife Service guidelines to verify the presence or absence of this species. In the event that (*name*) occurrence is identified, the lessee/permittee will be required to modify operational plans to include the protection requirements of this species and its habitat (e.g., *seasonal use restrictions, occupancy limitations, facility design modifications that apply*).

2.1 Guidance

The WILDLIFE MITIGATION GUIDELINE is intended to provide two basic types of protection: 1) seasonal restriction (2a and 2b), and 2) prohibition of activities or surface use (2c). Item 2d is specific to situations involving threatened or endangered species. Legal descriptions will ultimately be required and should be measurable and legally definable. There are no minimum subdivision requirements at this time. The area delineated can and should be defined as necessary, based upon current biological data, prior to the time of processing an application and issuing the use authorization. The legal description must eventually become a part of the condition for approval of the permit, plan of development, and/or other use authorization.

The seasonal restriction section identifies three example groups of species and delineates three similar time frame restrictions. The big game species including elk, moose, deer, antelope, and bighorn sheep; all require protection of crucial winter range between November 15 and April 30. Elk and bighorn sheep also require protection from disturbance from May 1 to June 30, when they typically occupy distinct calving and lambing areas. Raptors include eagles, accipiters, falcons, (peregrine, prairie, and merlin), kestrels, buteos (ferruginous and Swainson's hawks), osprey, burrowing owls, and short-eared owls. The raptors and sage and sharp-tailed grouse require nesting protection between February 1 and July 31. The same birds often require protection from disturbance from November 15 through April 30 while they occupy winter concentration areas.

APPENDIX B: STANDARD MITIGATION GUIDELINES

Item 2c, the prohibition of activity or surface use, is intended for the protection of specific wildlife habitat areas or values within the use area that cannot be protected by using seasonal restrictions. These areas or values must be factors that limit life-cycle activities (e.g., *sage grouse strutting grounds, known threatened and endangered species habitat*).

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

3.0 CULTURAL RESOURCE MITIGATION GUIDELINE

When a proposed discretionary land use has potential for affecting the characteristics which qualify a cultural property for the National Register of Historic Places (National Register), mitigation will be considered. In accordance with Section 106 of the Historic Preservation Act, procedures specified in 36 CFR 800 will be used in consultation with the Wyoming State Historic Preservation Officer and the Advisory Council on Historic Preservation in arriving at determinations regarding the need and type of mitigation required.

3.1 Guidance

The preferred strategy for treating potential adverse effects on cultural properties is "avoidance." If avoidance involves project relocation, the new project area may also require cultural resource inventory. If avoidance is imprudent or unfeasible, appropriate mitigation may include excavation (data recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative measures.

Reports documenting results of cultural resource inventory, evaluation, and the establishment of mitigation alternatives (if necessary) shall be written according to standards contained in BLM Manuals, the cultural resource permit stipulations, and in other policies issued by the BLM. These reports must provide sufficient information for Section 106 consultation. Reports shall be reviewed for adequacy by the appropriate BLM cultural resource specialist. If cultural properties on, or eligible for, the National Register are located within these areas of potential impact and cannot be avoided, the AO shall begin the Section 106 consultation process in accordance with the procedures contained in 36 CFR 800.

Mitigation measures shall be implemented according to the mitigation plan approved by the BLM AO. Such plans are usually prepared by the land use applicant according to BLM specifications. Mitigation plans will be reviewed as part of Section 106 consultation for National Register eligible or listed properties. The extent and nature of recommended mitigation shall be commensurate with the significance of the cultural resource involved and the anticipated extent of damage. Reasonable costs for mitigation will be borne by the land use applicant. Mitigation must be cost effective and realistic. It must consider project requirements and limitations, input from concerned parties, and be BLM-approved or BLM-formulated.

Mitigation of paleontological and natural history sites will be treated on a case-by-case basis. Factors such as site significance, economics, safety, and project urgency must be taken into account when making a decision to mitigate. Authority to protect (through mitigation) such values

APPENDIX B: STANDARD MITIGATION GUIDELINES

is provided for in Federal Land Policy Management Act (FLPMA)(1976), Section 102(a)(8). When avoidance is not possible, appropriate mitigation may include excavation (date recovery), stabilization, monitoring, protection barriers and signs, or other physical and administrative protection measures.

4.0 SPECIAL RESOURCE MITIGATION GUIDELINE

To protect (*resource value*), activities or surface use will not be allowed (i.e., *within a specific distance of the resource value or between date to date*) in (*legal description*).

Application of this limitation to operation and maintenance of a developed project must be based on environmental analysis of the operational or production aspects.

Exception, waiver, or modification of this limitation in any year may be approved in writing, including documented supporting analysis, by the AO.

4.1 Example Resource Categories (*Select or identify category and specific resource value*):

- a. Recreation areas.
- b. Special natural history or paleontological features.
- c. Special management areas.
- d. Sections of major rivers.
- e. Prior existing rights-of-way.
- f. Occupied dwellings.
- g. Other (specify).

4.2 Guidance

The SPECIAL RESOURCE MITIGATION GUIDELINE is intended for use only in site-specific situations where one of the first three general mitigation guidelines will not adequately address the concern. The resource value, location, and specific restrictions must be clearly identified. A detailed plan addressing specific mitigation and special restrictions will be required prior to disturbance or development and will become a condition for approval of the permit, plan of development, or other use authorization.

Exception, waiver, or modification of requirements developed from this guideline must be based upon environmental analysis of proposals (e.g., activity plans, plans of development, plans of operation, applications for permit to drill) and, if necessary, must allow for other mitigation to be applied on a site-specific basis.

APPENDIX B: STANDARD MITIGATION GUIDELINES

5.0 NO SURFACE OCCUPANCY GUIDELINE

No Surface Occupancy (NSO) will be allowed on the following described lands (*legal description*) because of (*resource value*).

5.1 Example Resource Categories (*Select or identify category and specific resource value*):

- a. Recreation areas (e.g., campgrounds, historic trails, national, monuments).
- b. Major reservoirs/dams.
- c. Special management areas (e.g., areas of critical environmental concern, known threatened or endangered species habitat, wild and scenic rivers).
- d. Other (specify).

5.2 Guidance

The NO SURFACE OCCUPANCY (NSO) MITIGATION GUIDELINE is intended for use only when other mitigation is determined insufficient to adequately protect the public interest and is the only alternative to "no development" or "no leasing." The legal description and resource value of concern must be identified and be tied to an NSO land use planning decision.

Waiver of, or exception(s) to, the NSO requirement will be subject to the same test used to initially justify its imposition. If, upon evaluation of a site-specific proposal, it is found that less restrictive mitigation would adequately protect the public interest or value of concern, then a waiver or exception to the NSO requirement is possible. The record must show that because conditions or uses have changed, less restrictive requirements will protect the public interest. An environmental analysis must be conducted and documented (e.g., environmental assessment, environmental impact statement, etc., as necessary) in order to provide the basis for a waiver or exception to an NSO planning decision. Modification of the NSO requirement will pertain only to refinement or correction of the location(s) to which it applied. If the waiver, exception, or modification is found to be consistent with the intent of the planning decision, it may be granted. If found inconsistent with the intent of the planning decision, a plan amendment would be required before the waiver, exception, or modification could be granted.

When considering the "no development" or "no leasing" option, a rigorous test must be met and fully documented in the record. This test must be based upon stringent standards described in the land use planning document. Since rejection of all development rights is more severe than the most restrictive mitigation requirement, the record must show that consideration was given to development subject to reasonable mitigation, including "no surface occupancy." The record must also show that other mitigation was determined to be insufficient to adequately protect the public interest, a "no development" or "no leasing" decision should not be made solely because it appears that conventional methods of development would be unfeasible, especially where an NSO restriction may be acceptable to a potential permittee. In such cases, the potential permittee should have the opportunity to decide whether or not to go ahead with the proposal (or accept the use authorization), recognizing that an NSO restriction is involved.

APPENDIX C

RECLAMATION PLAN

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	C-1
2.0 OBJECTIVES	C-2
3.0 PERFORMANCE STANDARDS	C-3
4.0 METHODS	C-4
4.1 Drill Site, Access Road, and Pipeline Right-of-Way Clearing and Topsoil Removal and Storage	C-4
4.2 Drill Site, Access Road, and Pipeline Right-of-Way Construction	C-5
4.2.1 Upland Areas	C-5
4.2.2 Drainage Channel Crossings	C-6
4.2.3 Wetlands	C-6
4.3 Surface Runoff and Erosion Control	C-6
4.3.1 Drill Site, Access Road, and Pipeline Right-of-Way	C-6
4.3.1.1 Temporary Reclamation	C-6
4.3.1.2 Final Reclamation	C-7
4.3.1.2.1 Upland Areas	C-7
4.3.1.2.2 Wetlands and Drainage Channel Crossings	C-9
4.4 Final Reclamation	C-10
4.4.1 Topsoil Respreading and Seedbed Preparation	C-10
4.4.2 Seed Application	C-10
4.4.3 Mulching	C-11
4.4.4 Livestock Control	C-16
4.4.5 Off-Road Vehicle Control	C-16
4.4.6 Fugitive Dust Control	C-16
4.5 Monitoring and Maintenance	C-16
4.5.1 General	C-16
4.5.2 Reclamation Success Monitoring	C-17
4.5.3 Wetland and Drainage Channel Crossings	C-18
4.5.4 Photomonitoring	C-18

APPENDIX C

TABLE OF CONTENTS, Continued

LIST OF TABLES

	<u>Page</u>
Table C-1. Water Bar Intervals According to Slope Gradient.	C-9
Table C-2. Seed Mixture #1 - Mixed Desert Shrub, Badlands, and Juniper Woodland Community Types	C-12
Table C-3. Seed Mixture #2 - Moist Alkaline Areas in the Mixed Desert Shrub Community Type.	C-13
Table C-4. Seed Mixture #3 - Greasewood-Dominated Valley Bottoms and Bluffs.	C-14
Table C-5. Seed Mixture #4 - Wet Meadow Community Types.	C-15

LIST OF FIGURES

Figure C-1. Water Bar Construction and Silt Fence Construction.	C-8
---	-----

APPENDIX C

RECLAMATION PLAN

1.0 INTRODUCTION

The following erosion control, revegetation, mitigation measures, and management measures are designed to attain successful rehabilitation of disturbed areas associated with the DFPA Natural Gas Production project. These measures are designed to establish the feasibility of reclaiming disturbances associated with this project. The measures were developed based on 1) Bureau of Land Management (BLM) Wyoming State Office reclamation policy (USDI-BLM 1990b); 2) management directives presented in the Great Divide RMP (USDI-BLM 1988a, 1990a) and Green River RMP (USDI-BLM 1996a, 1997); 3) impacts identified in the Environmental Consequences chapter (Chapter 4) of this environmental impact statement (EIS); 4) coordination with BLM staff; and 5) issues identified during the scoping process. The extent of possible disturbed areas to be reclaimed include the drill sites, access road, pipeline ROW's, and staging areas. The following measures apply to the Proposed Action and to Alternatives A and B unless identified for a specific alternative. The measures presented in this plan are designed to allow the project to be constructed without significant impacts to natural resources. Because of the large geographic area covered by the project and the lack of site-specific locations of project facilities, these measures are presented in a general, non-specific manner. Final selection of the measures to be applied at any given location, and modifications of these measures, will be identified by the BLM in coordination the Operators.

This reclamation plan outlines measures that will be taken to effectively reclaim areas disturbed during construction of the DFPA Natural Gas Production Project. These measures will be followed unless exceptions are granted or actions are modified by agreement between the BLM and the Operators. These measures describe how natural gas development activities should be managed to assure compliance with the resource management goals and objectives for the general area, applicable lease and unit area stipulations, and resource limitations identified during interdisciplinary (ID) team analyses. Initial monitoring for compliance and successful implementation of the mitigation measures will be under the direction of the Operators. Final approval and release will be under the direction of the BLM.

Reclamation measures covered in this plan fall into two general categories: temporary and final reclamation. Temporary reclamation refers to measures applied to stabilize disturbed areas and to control runoff and erosion during time periods when application of final reclamation measures is not feasible or practicable. Final reclamation refers to measures that should be applied concurrently with completion of drilling and pipeline installation.

Reclamation potential may be limited by salinity, alkalinity, steep slopes, shallow soils, depth to bedrock, low precipitation, stoniness, high wind and water erosion, periodic flooding, short growing season, seasonably high water tables, and strong winds. Special intensive land-use practices may be necessary to mitigate salt and sediment loading caused by surface-disturbing activities within the project area. Activity plans (e.g., applications for permit to drill [APD's]) should address site-specific problems, including monitoring for salt and sediment loading (USDI-BLM 1990b).

In general, temporary reclamation measures should be applied to all areas not promptly reclaimed to final conditions within a specified time period whether due to adverse weather conditions, inability to secure needed materials, and/or seasonal constraints, etc. Temporary reclamation measures should be applied only as needed; as in most cases, final reclamation measures should be applied concurrently as sections of the project are completed. Temporary reclamation measures may be

APPENDIX C: RECLAMATION RECOMMENDATIONS

applied more rigorously to sensitive areas such as drainage channel crossings, steep slopes, and areas prone to high wind and water erosion. Temporary reclamation measures should include regrading the disturbed area to near pre-disturbance contour, re-spreading salvaged topsoil, mulching, and placing runoff and erosion control structures.

Final reclamation measures, in general, involve regrading the disturbed area to near pre-disturbance contour, re-spreading salvaged topsoil, applying soil amendments (if necessary), applying a prescribed seed mixture, mulching, and placing runoff and erosion control structures such as water bars and silt fences. The duration of the resultant impacts to the various vegetation community types depends in part on the success of implementation of the reclamation measures prescribed in this appendix and the time required for natural succession to return disturbed areas to pre-disturbance conditions after project completion.

Because wetlands are "waters of the U.S." and are therefore protected under the federal Clean Water Act (CWA), discharge of dredge or fill material into, and/or excavation of wetlands could require administrative coordination with the U.S. Army Corps of Engineers (COE) pursuant to the CWA and may require a Section 404 permit. The COE, based on the exact nature of the disturbance activity should determine the type of permit (Individual, Regional, or Nationwide) required according to the rules and regulations presented in the Federal Register (1986). Avoidance of waters of the U.S. and wetlands should be the highest priority. A suitable wetland mitigation plan should be developed for the areas of wetlands directly impacted due to project activities where avoidance is not practicable. Impact minimization should include reducing the area of disturbance in wetland areas as well as utilizing procedures specified by authorizing agencies to cross intermittent and ephemeral drainage channels and wetland areas.

Although intermittent and ephemeral drainage channels are not considered wetlands, the same requirements apply to the discharge of dredge and fill into them as for discharge into wetlands. Residual wetland impacts that could occur after maximum avoidance and/or impact minimization has been demonstrated should be mitigated according to the following order of priority: 1) avoidance; 2) impact minimization; 3) mitigation in-kind, on-site; 4) mitigation in-kind, off-site; 5) mitigation out-of-kind, on-site; and 6) mitigation out-of-kind, off-site. In addition, the following modes of mitigation could be implemented for wetland mitigation if avoidance and impact minimization were not feasible: 1) wetlands restoration; 2) wetlands creation; and 3) wetlands enhancement. The wetlands mitigation plan should be designed to replace the area of impact and functional values associated with the disturbed area.

Appropriate BLM and Natural Resources Conservation Service (NRCS) range conservationists were contacted to determine agency-specific seeding recommendations at drill sites and along access road and pipeline ROW's. The recommended seed mixtures in this plan were developed with input from these land management agencies. The reclamation measures in this report assume that baseline data would be collected in various areas along the access road and pipeline ROW's and at drill sites prior to construction activities by an authorized reclamation scientist.

2.0 OBJECTIVES

This plan is designed to meet the following objectives for reclamation of the access road/pipeline ROW's and the drill sites:

APPENDIX C: RECLAMATION RECOMMENDATIONS

Short-Term (Temporary) Reclamation:

- Immediately stabilize the disturbed areas by mulching (if needed), providing runoff and erosion control, and through the establishment of new vegetation (required for problem areas; may be optional for other areas depending on consultation with the BLM).
- Control and minimize surface runoff, erosion, and sedimentation through the use of diversion and water treatment structures.

Long-Term (Final) Reclamation:

- Immediately stabilize the disturbed soil surface by mulching (if needed and as directed by the BLM), runoff and erosion control, and through the establishment of new vegetation. Adequate surface roughness should exist to reduce runoff and to capture rainfall and snow melt.
- Control and minimize surface runoff, erosion, and sedimentation through the use of diversion and water treatment structures.
- Restore primary productivity of the site and establish vegetation that will provide for natural plant and community succession.
- Establish a vigorous stand of desirable plant species that will limit or preclude invasion of undesirable species, including invasive, non-native species.
- Revegetate the disturbed areas with native plant species useful to wildlife and livestock.
- Enhance aesthetic values. In the long-term, reclaimed landscapes should have characteristics that approximate the visual quality of adjacent areas, including location, scale, shape, color, and orientation of major landscape undisturbed features.

3.0 PERFORMANCE STANDARDS

The following performance standards should be used to determine the attainment of successful revegetation:

All Years:

- Protective cover. With the exception of active work areas, all disturbed highly erosive or sensitive areas to be left bare, unprotected, or unreclaimed for more than one month will have at least a 50 percent cover of protective material in the form of mulch, matting, or vegetative growth. All disturbed areas should have at least a 50 percent cover of protective material within six months after reclamation.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Second Year (Final Reclamation):

- Seedling density. The density and abundance of desirable species is at least three to four seedlings per linear foot of drill row (if drilled) or transect (if broadcast). Vegetative transects will be established on a permanent basis so that transects can be measured annually through the five year monitoring period.
- Percent cover. Total vegetal cover will be at least 50 percent of predisturbance vegetal cover as measured along the reference transect for establishing baseline conditions.

By the Fifth Year (Final Reclamation):

- Percent cover. Total vegetal cover will be at least 80 percent of predisturbance vegetal cover as measured along the reference transect for establishing baseline conditions.
- Dominant species. Ninety percent of the revegetation consists of species included in the seed mix and/or occurs in the surrounding natural vegetation, or as deemed desirable by the BLM as measured along the reference transect for establishing baseline conditions.
- Erosion condition/soil surface factor. Erosion condition of the reclaimed areas is equal to or in better condition than that measured for the reference transect for establishing baseline conditions.

4.0 METHODS

4.1 **Drill Site, Access Road, and Pipeline Right-of-Way Clearing and Topsoil Removal and Storage**

Topsoil should be handled separately from subsoil materials. At all construction sites, topsoil should be stripped to provide for sufficient quantities to be respread to a depth of at least four to six inches over the disturbed areas to be reclaimed. In areas where deep soils exist (such as floodplains and drainage channel terraces), at least 12 inches of topsoil should be salvaged. Where soils are shallow or where subsoil is stony, as much topsoil should be salvaged as possible. Topsoil should be stockpiled separately from subsoil materials. Topsoil salvaged from drill sites and stored for more than one year should be bladed to a specified location at these areas, seeded with a prescribed seed mixture, and covered with mulch for protection from wind and water erosion and to discourage the invasion of weeds. Topsoil stockpiles should not exceed a depth of 2-feet. Topsoil should be stockpiled separately from other earth materials to preclude contamination or mixing and should be marked with signs and identified on Construction and Design plans. Runoff should be diverted around topsoil stockpiles to minimize erosion of topsoil materials. In most cases, disturbances will be reclaimed within one year. Therefore, it is unlikely that topsoil stockpiling for more than one year will be required. Salvaged topsoil from roads and drill sites will be respread over cut-and-fill surfaces not actively used during the production phase. Upon final reclamation at the end of the project life, topsoil spread on these surfaces will be used for the overall reclamation effort.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Operators are finding out that it is not always necessary to remove all vegetation and strip all topsoil within a pipeline ROW. In many areas, such as with deep soils on relatively flat smooth slopes with low gradients, it is possible to crush in-place rather than clear vegetation and leave topsoil in-place rather than blade and stockpile. This technique would reduce the magnitude and severity of disturbance impacts and hasten successful reclamation.

In federal jurisdictional wetland areas, vegetation should be cut off only to the ground level, leaving existing root systems intact. Cut vegetation should be removed from wetland areas for disposal. Grading activities should be limited to directly over pipeline trenches and access roads. At least 12 inches of topsoil should be salvaged and replaced except in areas with standing water or saturated soils. Use of construction equipment in wetland areas should be limited. Dirt, rockfill, or brush riprap should not be used to stabilize pipeline ROW's. If standing water or saturated soils are present, wide-track or balloon-tire construction equipment should be used or normal construction equipment should be operated on equipment pads or geotextile fabric overlain with gravel fill. Equipment pads etc., should be removed immediately upon completion of construction activities. Trench spoil should be placed at least 10 feet away from drainage channel banks for all minor and major drainage channel crossings.

4.2 Drill Site, Access Road, and Pipeline Right-of-Way Construction

4.2.1 Upland Areas

Uplands include all areas away from wetlands and alluvial bottomlands or other areas that have excess soil moisture for prolonged periods or have shallow water tables. Construction should be accomplished following site-specific Construction and Design plans and applicable agency specifications. At drill sites, and along the areas of access road or pipeline ROW traversing steep slopes, slope angles should be minimized to enhance retention of topsoil, and reduce erosion as well as facilitate revegetation, and subsequent reclamation success. Slope stabilizing revetment structures may be necessary in areas where the substrata materials are unconsolidated and loose and cannot be stabilized with revegetation and mulch.

Surface runoff should be controlled at all well sites through the use of interception ditches and berms. A berm approximately 18 inches high should be constructed around fill portions of these well sites to control and contain all surface runoff generated or fuel or petroleum product spills on the pad surface. Water contained on the drill pads should be treated in a detention pond prior to discharge into undisturbed areas in the same manner as discussed previously. This system should also serve to capture fuel and chemical spills, should they occur.

Erosion and sedimentation control measures and structures should be installed on all disturbed areas. Soil erosion control should be accomplished on sites in highly erosive soils and steep areas with mulching, netting, tackifiers, hydromulch, matting, and excelsior. The type of control measure should depend on slope gradients and the susceptibility of soil to wind and water erosion. Silt fences should be placed at the base of all steep fill slopes and sensitive disturbed areas. All runoff and erosion control structures should be inspected periodically, cleaned out, and maintained in functional condition throughout the duration of construction and drilling. Water bars should be constructed on cut-and-fill slopes exceeding 25 feet long and 10 percent gradient using the water bar spacing guidelines and procedures specified for access road and pipeline ROW runoff and erosion control (BLM Manual 9113).

APPENDIX C: RECLAMATION RECOMMENDATIONS

Runoff and erosion control along access road/pipeline ROW'S should be accomplished by implementing standard cross drain, culvert, road ditch, and turnout design as well as timely mulching and revegetation of exposed cut, fill, and road shoulders. All culverts should be constructed with riprapped entrances and exits and with energy dissipaters or other scour-reducing techniques where appropriate. Water discharged from culverts, cross drains, road ditches and turnouts should be directed into undisturbed vegetation away from all natural drainages. Erosion and sedimentation control measures and structures should be installed across all cut-and-fill slopes within 100 feet of drainage channels. All runoff and erosion control structures should be inspected after major runoff events and at a regular schedule. If found to be sub-standard, these structures should be cleaned out and maintained in functional condition throughout the life of the project.

4.2.2 Drainage Channel Crossings

Construction of drainage channel crossings should minimize the disturbance to drainage channels and wetlands to the extent practicable and should occur during the low runoff period (June 15 through March 1). Staging areas should be limited in size to the minimum necessary and should be located at least 50 feet from drainage channel bottoms, where topographic conditions permit. Hazardous materials should not be stored and equipment should not be refueled within 100 feet of drainage channels. Drainage channel crossings should be constructed as perpendicular to the axis of the drainage channel and at the narrowest positions as engineering and routing conditions permit. Clean gravel should be used for the upper one foot of fill over the backfilled pipeline trenches within drainage channel crossings.

4.2.3 Wetlands

Access roads and pipelines should be rerouted, and drill sites located, to avoid wetland areas to the maximum extent practicable. The size of staging areas should be limited to the minimum necessary and all staging areas should be located at least 50 feet from the edge of federally delineated wetland areas, where topographic conditions permit. The width of the access road and pipeline construction ROW should be limited to no more than 50 feet. Hazardous materials should not be stored and equipment should not be refueled within 100 feet of wetland boundaries.

Appropriate permits should be secured from the COE prior to any construction activities in federal jurisdictional wetland areas.

4.3 Surface Runoff and Erosion Control

4.3.1 Drill Site, Access Road, and Pipeline Right-of-Way

4.3.1.1 Temporary Reclamation

Temporary erosion control measures may include application of mulch and netting of biodegradable erosion control blankets stapled firmly to the soil surface, respreading scalped vegetation, or construction of water bars. See Final Reclamation measures (Section 4.4) for specific information pertaining to mulching.

The actual distance of a pipeline/road ROW requiring stabilization on each side of a drainage channel should be determined on a site-specific basis. To minimize sedimentation of drainage channels and wetlands during the interim period between construction activity and final reclamation,

APPENDIX C: RECLAMATION RECOMMENDATIONS

temporary erosion and sediment control measures should be applied. Silt fences or other sediment filtering devices such as weed-free straw bales should be installed along drainage channel banks where sedimentation is excessive and at the base of all slopes adjacent to wetlands. Figure C-1 presents schematics of water bar and silt fence construction. Sediment filtering devices should be cleaned out and maintained in functional condition throughout the life of the project. To avoid the possibility of mulching materials entering waterways, loose mulch (i.e., mulch not crimped into the soil surface, tackified, or incorporated into erosion control blankets) should not be applied to drainage channel banks.

If construction is completed more than 30 days prior to the specified seeding season for perennial vegetation, areas adjacent to the larger drainage channels should be covered with jute matting for a minimum of 50 feet on either side of the drainage channel. In addition, to protect soil from raindrop impact and subsequent erosion, 2.0 tons/acre of a weed-free straw mulch should be applied to all slopes greater than 10 percent. Temporary erosion control measures may include leaving the ROW in a roughened condition, respreading scalped vegetation, or applying mulch. As indicated by several operators and the BLM, weed-free straw mulch is difficult to obtain in quantities and at costs suitable for all reclamation applications. Although this circumstance could reduce the application of the measure, the effectiveness of mulch in protecting the exposed soil from raindrop impact, erosion, and off-site sedimentation should not be ignored. In addition to its effectiveness in erosion control, mulching also benefits the soil as a plant growth medium in many cases. Therefore, effective mulching is fundamental to reducing soil erosion to acceptable, non-significant levels.

Trench breakers should be used for pipeline construction in certain areas to prevent the flow of water in either a trench that has been backfilled or temporarily left open. Trench breakers are particularly important in wetland areas to minimize subsurface drainage. Trench breakers should be constructed such that the bottom of one breaker is at the same elevation as the top of the next breaker down slope, or every 50 feet, whichever is greater. Factors that control the application of trench breakers include the proximity to drainage channels and wetland areas, slope gradient, proximity of areas to shallow groundwater, and surface runoff source areas that can discharge water into the trench. Trench breakers should be installed, where necessary. Topsoil should not be used to construct trench breakers.

If a pipeline crosses roads at the base of slopes, vegetative strips should be maintained. If vegetation is disturbed within these limits, temporary sediment barriers such as silt fences and/or staked weed-free straw bales should be installed at the base of the slope adjacent to the road crossing. Temporary sediment barriers should remain in-place until permanent revegetation measures have been judged successful.

4.3.1.2 Final Reclamation

4.3.1.2.1 Upland Areas

Runoff and erosion control along all ROW'S should be accomplished by constructing sediment trapping devices (e.g., silt fences and straw bales) and water bars, as well as by timely mulching and revegetation of exposed disturbed areas. Runoff discharged from water bars should be directed into undisturbed vegetation away from all natural drainages. Erosion and sedimentation control measures and structures should be installed across all cut-and-fill slopes. All runoff and erosion control structures should be inspected after major runoff events and on a regular schedule.

APPENDIX C: RECLAMATION RECOMMENDATIONS

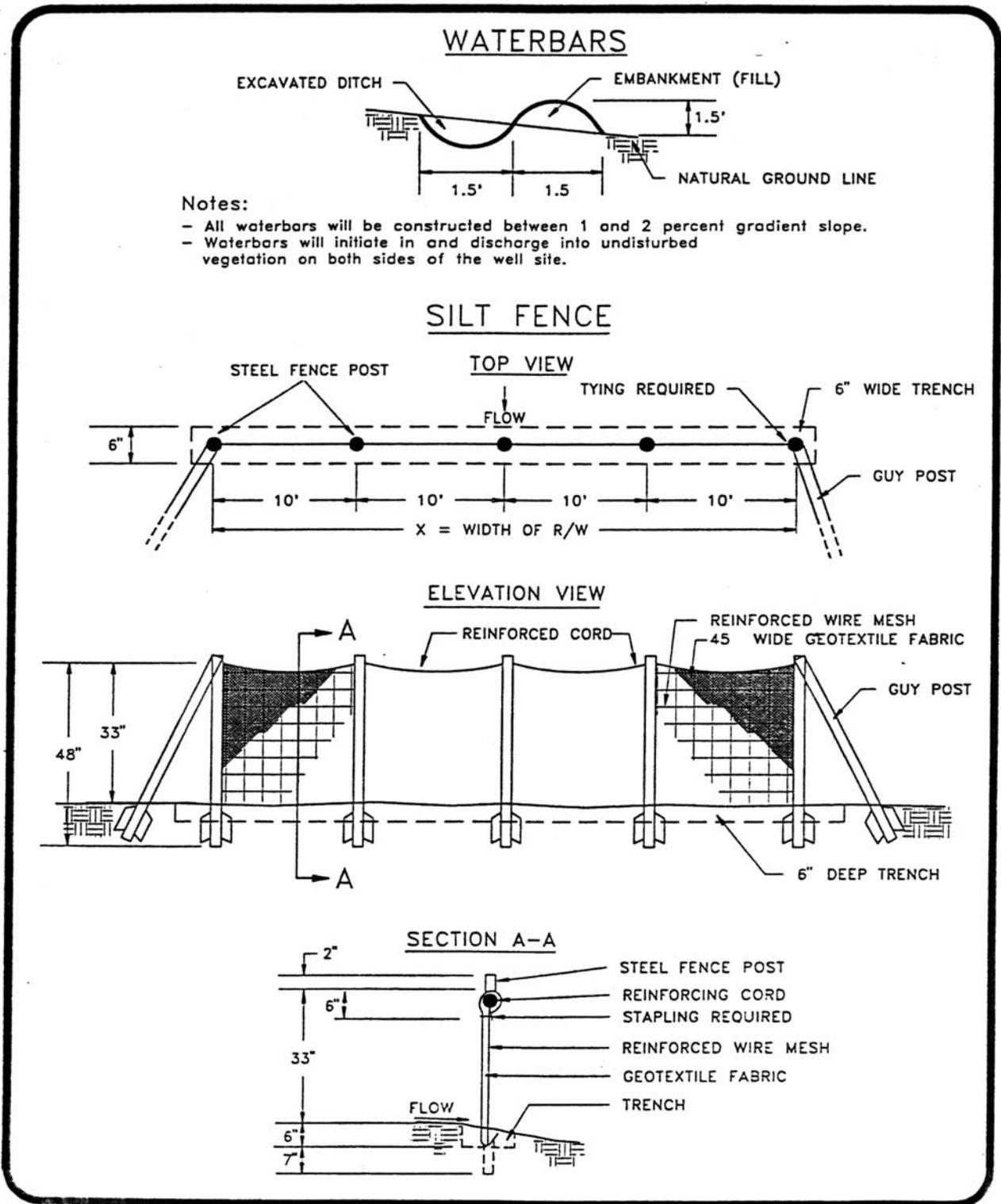


Figure C-1. Water Bar Construction and Silt Fence Construction.

APPENDIX C: RECLAMATION RECOMMENDATIONS

If found to be substandard or ineffective, these structures should be cleaned out and maintained in functional condition until successful revegetation and soil stability is attained.

Water bars should be constructed across sideslopes at appropriate intervals according to slope gradient immediately following recontouring of the disturbed areas. The spacing should depend on whether mulching is applied in conjunction with placement of water bars. Water bars should be maintained in functional condition throughout the life of the project. Should the integrity of the water bar system be disrupted during seeding, water bars should be repaired and broadcast seeded with the seed raked into the soil. Water bars should be constructed according to hillslope topography at the slope gradient intervals as shown in Table C-1.

Water bars should be constructed 12 to 18 inches deep by digging a small trench and casting the soil material to the downhill side in a row. Each water bar should initiate in undisturbed vegetation upslope, traverse the disturbed area perpendicular to the ROW at a gradient between one and two percent, and discharge water into undisturbed vegetation on the lower side of the disturbed area.

Table C-1. Water Bar Intervals According to Slope Gradient¹.

With Mulching		Without Mulching	
Slope Gradient (percent)	Interval (feet)	Slope Gradient (percent)	Interval (feet)
10	150	10	100
15	100	15	75
20	50	20	45
30	40	30	40
40	35	40	35
50	30	50	30
>50	30	>50	30

¹ Based on Grah (1989).

4.3.1.2.2 Wetlands and Drainage Channel Crossings

Disturbance to the ephemeral and intermittent drainage channels should be avoided and/or minimized. All channel crossings not maintained for access roads should be restored to near predisturbance conditions. Drainage channel bank slope gradients should be regraded to conform with adjacent slope gradients. Channel crossings should be designed to minimize changes in channel geometry and subsequent changes in flow hydraulics. Culverts should be installed for ephemeral and intermittent drainage channel crossings. All drainage channel crossing structures should be designed to carry the 25- to 50-year discharge event as directed by the BLM. Silt fences should be constructed at the base of slopes at all drainage channel crossings. Minor routing variations should be implemented during access road, pipeline, and drill site layout to avoid washes. The area of disturbance in the vicinity of washes should be minimized. Per the Great Divide Resource Area Resource Management Plan (RMP), a 500-foot-wide buffer strip of natural vegetation should be maintained between all construction activities and drainage channels.

Trench plugs should be employed at non-flumed drainage crossings to prevent diversion of drainage channel flows into upland portions of pipeline trenches during construction. Application of riprap should be limited to areas where flow conditions prevent vegetative stabilization; riprap

APPENDIX C: RECLAMATION RECOMMENDATIONS

activities must comply with COE permit requirements. Pipeline trenches should be dewatered in such a manner that no silt laden water flows into active drainage channels (i.e., prior to discharge the water should be filtered through a silt fence, weed-free straw bales, or allowed to settle in a sediment detention pond).

4.4 Final Reclamation

4.4.1 Topsoil Respreading and Seedbed Preparation

In preparation for seeding, topsoil that was initially removed should be evenly spread over the pipeline ROW, staging areas, cut-and-fill surfaces, and all areas of other sites not required for production purposes.

Soil compaction could result from heavy equipment working on disturbed soils prior to revegetation. Therefore, compaction is likely to occur under most situations. Soil compaction can inhibit adequate revegetation of disturbance areas. Therefore, all disturbances to be revegetated will be ripped to reduce the adverse effect of compaction. All disturbed areas should be ripped on 18- to 26-inch spacing and 12 to 16 inches deep. A spring tooth harrow equipped with utility or seedbed teeth, or ripper-teeth equipment mounted behind a large crawler tractor or patrol should be used to loosen the subsoil. The subsoil surface should be left rough. After topsoil has been respread and if it is loose, it should be compacted with a cultipacker or similar implement to provide a firm seedbed. On steep slopes (greater than 40 percent and highly erosive), it may be difficult or impossible to replace topsoil and adequately prepare the seedbed. The disturbed areas on steep slopes should be ripped as described above. These areas should then be mulched with a hydromulch/seed/tackifier mix. Erosion control blankets with seed incorporated into the matting should be installed per manufacturer's specifications to enhance soil stabilization.

4.4.2 Seed Application

Upon completion of final grading, soil surfaces should either be seeded, or erosion control measures should be used until the site is seeded. Late fall is typically a good time of year to seed, however timing of seeding should be adjusted depending upon weather, soil moisture conditions and the plant species being used. The seedbed should be prepared to a depth of three to four inches where possible to provide a firm seedbed. If hydroseeding or broadcast seeding is employed, the seedbed should be scarified to ensure good seed-soil contact. After completion of seedbed preparation, the seed mixtures presented in Tables C-2 through C-5, or a similar mix should be applied according to the pure live seed (PLS) rates and drilling depths specified, to areas along the road and pipeline ROW, staging areas, and unused areas of drill sites that have been retopsoiled.

Seed should be used within 12 months of viability testing. Legume species purchased commercially must have been properly inoculated with nitrogen-fixing bacteria. Seed should be planted in the fall (after September 31) or no later than late fall (mid-November) prior to snow accumulation to avoid seed germination and breaking of dormancy and to prevent seedling frost damage; or in early Spring (prior to May 15). Seed should preferably be planted with drill-type equipment such as a rangeland drill or billion seeder. Where the microtopography of the disturbed areas does not allow drill-type equipment, seed should be broadcast applied at twice the application rate of drilled seed. A spike-toothed harrow or similar equipment should be used where ripping has been insufficient to provide cover for the broadcast seed.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Any soil disturbance that occurs outside the recommended permanent seeding season, or any bare soil left unstabilized by revegetation, should be treated as a winter-construction problem and mulching should be considered, or the site stabilized.

The seed mixtures presented in Tables C-2 through C-5, or similar mixtures should be applied according to specific areas identified to be homogeneous in terms of overall ecosystem similarities such as precipitation zones, elevational zones, dominant species herbaceous cover, soil types, and inherent limitations in reclamation success potential. Specifically, Seed Mixture #1 (Table C-2) should be applied to disturbances in the sagebrush-dominated mixed desert shrub and juniper woodland community types. Seed Mixture #2 (Table C-3) should be applied to disturbances in the more moist alkaline mixed desert shrub community types. Seed Mixture #3 (Table C-4) should be applied to greasewood-dominated mixed desert shrub communities in alkaline valley bottoms and bluffs. Seed Mixture #4 (Table C-5) should be applied to disturbances in wet meadow community types. These seed mixes were developed based on the following criteria: 1) site-specific conditions of the analysis area; 2) usefulness of species in rapid site stabilization; 3) species success in revegetation efforts; and 4) current seed costs and availability. Native plant species should be used, and final seed mixes applied in the revegetation effort should be designed in coordination with the BLM.

Final determination of the appropriate seed mixture should be developed on a site-specific basis at the time of field review of the facility. Seeding rates may be varied to enhance the probability for maintaining the natural balance of species. Watershed protection must be emphasized when reclaiming disturbed areas. The composition of rare and native species, if encountered, should be taken into consideration at the time of seeding; however, appropriate measures must be taken to ensure that an adequate protection of the soil surface is maintained. Areas not exhibiting successful revegetation throughout the entire area disturbed by the project should be re-seeded until an adequate cover of vegetation is established. Private and agricultural lands should be seeded with similar seed mixes unless the landowner requests different mixes.

4.4.3 Mulching

In sensitive sites where significant erosion (e.g., large areas of disturbance or areas with high erosion rates) is most likely to occur, the seeded access road/pipeline ROW, staging areas, and the portion of the drill pads not needed for production purposes should be mulched following seeding to protect the soil from wind and water erosion, raindrop impact, surface runoff, and invasive, non-native species invasion, and to hold the seed in place. The exposed surface of disturbed areas, including topsoil stockpiles, may be protected by placing crimped straw mulch, hydromulch, biodegradable plastic netting and matting, or biodegradable erosion control blankets.

All sensitive disturbed areas should be mulched immediately following seeding with 1.5 to 2.0 tons/acre of a weed-free straw mulch. Mulching materials should be free of invasive, non-native species and undesirable plant species as defined by state or county lists. Hay mulch may be used, but it should be applied only if cost-competitive and if crimped into the soil. Straw mulch is more desirable than hay mulch because it is generally less palatable to wild horses, wildlife, and livestock. Additionally, there tends to be a higher risk of introducing undesirable species and invasive, non-native species with a hay mulch such as smooth brome, timothy, orchardgrass and other minor species. The lessee should maintain all disturbances relatively weed-free for the life of the project through implementation of an invasive, non-native species monitoring and eradication program.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Table C-2. Seed Mixture¹ #1 - Mixed Desert Shrub, Badlands, and Juniper Woodland Community Types.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Western wheatgrass (<i>Agropyron smithii</i>)	Rosanna	2.0	0.5
Bluebunch wheatgrass (<i>Agropyron spicatum</i>)	Secar	2.0	0.5
Bottlebrush squirreltail (<i>Sitanion hystrix</i>)	-	2.0	0.5
Indian ricegrass (<i>Oryzopsis hymenoides</i>)	Nezpar	2.0	0.5
Needle-and-Thread (<i>Stipa comata</i>)	-	2.0	0.5
Forbs			
Gooseberryleaf globemallow (<i>Sphaeralcea grossulariaefolia</i>)	-	1.0	0.5
Cicer milkvetch (<i>Astragalus cicer</i>)	Monarch	1.0	0.5
Shrubs			
Wyoming big sagebrush (<i>Artemisia tridentata</i>)	-	0.5	0.25
Antelope bitterbrush (<i>Purshia tridentata</i>)	-	1.0	0.5
Fourwing saltbush (<i>Atriplex canescens</i>)	-	1.0	0.5
TOTAL		14.5	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Table C-3. Seed Mixture¹ #2 - Moist Alkaline Areas in the Mixed Desert Shrub Community Type.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Spike Muhly (<i>Muhlenbergia wrightii</i>)	El Vado	2.0	0.5
Alkaligrass (<i>Puccinellia distans</i>)	Fults	5.0	0.5
Alkali sacaton (<i>Sporobolus airoides</i>)	Salado	3.0	0.5
Forbs			
Strawberry clover (<i>Trifolium fragiferum</i>)	O'Connors, Salina	2.0	0.5
Shrubs			
Fourwing saltbush (<i>Atriplex canescens</i>)	-	1.0	0.5
Shadscale (<i>Atriplex confertifolia</i>)	-	1.0	0.5
TOTAL		14.0	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Table C-4. Seed Mixture¹ #3 - Greasewood-Dominated Valley Bottoms and Bluffs.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Western wheatgrass (<i>Agropyron smithii</i>)	Rosanna	3.0	0.5
Pubescent wheatgrass (<i>Agropyron tricophorum</i>)	Luna	2.0	0.5
Alkali sacaton (<i>Sporobolus airoides</i>)	-	2.0	0.25
Russian wildrye (<i>Elymus junceus</i>)	Vinall	2.0	0.25
Forbs			
Cicer milkvetch (<i>Astragalus cicer</i>)	Monarch	3.0	0.5
Shrubs			
Fourwing saltbush (<i>Atriplex canescens</i>)	-	1.0	0.5
Gardner saltbush (<i>Atriplex gardneri</i>)	-	1.0	0.5
Winterfat (<i>Ceratoides lanata</i>)	-	1.0	0.5
TOTAL		15.0	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

APPENDIX C: RECLAMATION RECOMMENDATIONS

Table C-5. Seed Mixture¹ #4 - Wet Meadow Community Types.

Species	Cultivar or Variety	Seed Application Drilled Rate (pls ² lbs/ac)	Planting Depth (if drilled) (inches)
Grasses			
Spike muhly (<i>Muhlenbergia wrightii</i>)	El Vado	2.0	0.5
Redtop (<i>Agrostis stolonifera</i>)	-	1.0	0.5
Tufted hairgrass (<i>Deschampsia cespitosa</i>)	-	4.0	0.25
Forbs			
Red clover (<i>Trifolium pratense</i>)	Kenland	2.0	0.5
Strawberry clover (<i>Trifolium fragiferum</i>)	O'Connors, Salina	2.0	0.5
TOTAL		13.0	

¹ Seed mix based on adaptation to the site conditions of the project, usefulness of species for rapid site stabilization, species success in revegetation efforts, and current seed availability and cost.

² PLS = pure live seed.

Wherever utilized, mulch should be spread uniformly so that at least 75 percent of the soil surface is covered. If a mulch blower is used, the straw strands should not be shredded less than eight inches in length to allow effective anchoring. On slopes less than 30 percent, straw mulch should be applied by a mechanical mulch blower at a rate of 2.0 tons/acre after seeding. The mulch should be crimped into the soil surface using a serrated disc crimper. Where broadcast straw mulch is applied on windswept slopes, a biodegradable plastic netting should be staked firmly to the soil surface over the mulch following the manufacturer's specifications. On slopes in excess of 40 percent or on slopes exceeding the operating capabilities of machinery, hydromulch or biodegradable erosion control blankets with seed incorporated into the netting should be applied and staked firmly to the soil surface.

Where utilized, hydromulch and tackifier should be applied at a rate of 1,500 lbs/acre. In general, erosion control and soil stabilization are directly related to the amount of mulch applied. Under certain conditions where degradation processes are slow (e.g., in extremely hot or cold dry climates), a trade-off between the degree of effectiveness of mulch and long-term degradation should be considered. In extremely dry areas where mulch degradation may be slow, mulching rates should be reduced to 1.0 to 1.5 tons/acre. Special measures may need to be implemented in areas with sandy soils.

APPENDIX C: RECLAMATION RECOMMENDATIONS

On steeper slopes with highly erodible, shallow, rocky soils and/or on windswept areas with loose, unconsolidated materials, the above recommended measures may not be sufficient to reduce erosion to non-significant levels. The following measure should be considered by the operator and the BLM to stabilize such sites: incorporating a custom blend of seed into erosion control blankets. This method has proven cost-effective in many cases, with 98 percent of the cost being the blanket itself. The additional cost of incorporating seed into the blanket will average \$1.00 to \$1.50 per blanket, depending upon current seed costs. In most cases, this additional cost should offset the repeated efforts of broadcast seeding, manual raking of seeds into the soil, and mobilizing a labor force. The final measure(s) to be implemented in such areas should be determined by agreement between the BLM and Operators.

4.4.4 Livestock Control

Livestock grazing should be monitored on and along all drill sites, access road, and pipeline ROW's. Should grazing negatively impact revegetation success, measures should be taken to immediately remove livestock from the newly reclaimed areas. Depending upon site-specific evaluations, it may be necessary to temporarily fence off certain riparian areas and wetlands to prevent excessive livestock grazing and trampling to enhance drainage channel bank stabilization and overall revegetation success. Existing livestock control structures such as fences and cattle guards should be maintained in functional condition during all phases of the project. Where access requires the disruption of an existing fence, a cattle guard should be installed at the junction.

4.4.5 Off-Road Vehicle Control

Off-road vehicle control measures should be installed and maintained following the completion of seeding. Examples of practicable measures include a locking, heavy steel gate with fencing extending a reasonable distance to prevent bypassing the gate, with appropriate signs posted; a slash and timber barrier; a pipe barrier; a line of boulders; or signs posted at all points of access at intervals not to exceed 2,000 feet indicating "This Area Seeded for Wildlife Benefits and Erosion Control."

4.4.6 Fugitive Dust Control

Should fugitive dust generated during construction of the drill sites, access road/pipeline ROW'S, or staging areas become a problem, dust abatement measures should be implemented. Such procedures could include applying water or water with additives (e.g., magnesium chloride) to the construction area at regular intervals.

4.5 Monitoring and Maintenance

4.5.1 General

A designated official or responsible party should annually inspect and review the condition of all drill sites, access road/pipeline ROW'S, and any other disturbed areas associated with the project. This official should assess the success of and prognosis for all runoff and erosion control and revegetation efforts, evaluate fugitive dust control needs, and recommend remediation measures, if necessary. In addition, monitoring should take place following each major runoff event. Photographs should be taken at drill sites and along access roads at specific areas each year to document the progress of the reclamation program at established photomonitoring points.

APPENDIX C: RECLAMATION RECOMMENDATIONS

The following specific items should be monitored during inspections:

- revegetation success;
- sheet and rill erosion, gullies, slumping, and subsidence;
- soundness and effectiveness of erosion control measures;
- sediment filtering devices along all active ephemeral and intermittent drainage channels;
- water quality and quantity;
- invasive, non-native species invasion;
- degree of rodent damage on seed and seedlings;
- locations of unauthorized off-highway vehicle (OHV) access;
- soundness and effectiveness of OHV control structures;
- evidence of livestock or wildlife grazing; and
- overgrazing/trampling of riparian and wetland areas.

4.5.2 Reclamation Success Monitoring

Reclamation success should be based upon the objectives specified in this plan; therefore, monitoring should be tied to these objectives. The actual monitoring procedures for quantitative and qualitative evaluations of reclamation success should be implemented as specified by the BLM or other authorizing agencies.

Reclamation success should be monitored both in the short term (temporary reclamation) and in the long term (final reclamation). Monitoring of temporary reclamation measures should include visual observations of soil stability, condition, and effectiveness of mulching and runoff and erosion control measures and a quantitative and qualitative evaluation of revegetation success, where appropriate. Long-term reclamation monitoring should include visual observations of soil stability, condition of the effectiveness of mulching and runoff and erosion control measures, and a quantitative and qualitative evaluation of revegetation success.

Revegetation success should be determined through monitoring and evaluation of percent ground cover to include a measure of vegetal cover (by species), litter/mulch, rock/gravel, and bare ground. Ground cover should be documented at each 1-foot interval along a 100-foot line intercept transect. Seedling density and relative abundance should be determined by selection of plots at the 20-, 40-, 60-, and 80-foot marks on the transect. Grazing impacts should be assessed as an ocular estimate of the percent utilization along the transect.

Soil stability should be measured using an erosion condition class/soil surface factor rating method to numerically rate soil movement, surface litter, surface rock, pedestalling, flow patterns, and rill-

APPENDIX C: RECLAMATION RECOMMENDATIONS

gully formation. Information obtained through this rating system represents an expression of current erosion activity and can be used to reflect revegetation success as a function of soil stability.

The access road boundaries, pipelines, and unused portions of the drill sites should be monitored until attainment of 80 percent of predisturbance vegetative cover within five years of seeding. This standard should include 90 percent of the vegetative cover being comprised of desirable species and the erosion condition of the reclaimed area being equal to or in better condition than predisturbance conditions as prescribed under the Performance Standard section of this plan.

4.5.3 Wetland and Drainage Channel Crossings

Wetland areas and natural drainage channel crossings should be monitored for a minimum of three years for invasive, non-native species invasion and establishment of undesirable species. Invasive, non-native species should not be allowed to establish at any time. If found in a reclaimed wetland or drainage channel crossing, the invasive, non-native species should be removed. Undesirable species should not be allowed to establish. At the third year of monitoring, presence of undesirable species should be negligible. The lessee should maintain wetland areas and drainage channel crossings according to this standard throughout the development of an invasive, non-native species and undesirable species monitoring and eradication program.

4.5.4 Photomonitoring

Permanent photomonitoring points should be established at appropriate vantage locations that provide adequate visual access to drill sites, along pipeline and access road rights-of-way, and to ancillary facilities. Each photomonitoring point should be permanently marked with re-bar and identified on a topographic map of the area. The location of each point should be described in detail to assist in relocation from year to year. Photos should be taken at each photomonitoring point prior to initiation of construction. Photos, framing the same scene as previously taken, should be taken each year until reclamation standards have been met.

APPENDIX D

HAZARDOUS MATERIALS MANAGEMENT PLAN

TABLE OF CONTENTS

1.0 INTRODUCTION	D-1
2.0 HAZARDOUS MATERIALS	D-2
2.1 Production Products	D-2
2.1.1 Natural Gas	D-2
2.1.2 Condensates	D-3
2.1.3 Produced Water	D-4
2.2 Construction, Drilling, Production, and Reclamation	D-4
2.2.1 Fuels	D-4
2.2.1.1 Gasoline	D-7
2.2.1.2 Diesel Fuel	D-7
2.2.1.3 Natural Gas	D-7
2.2.2 Lubricants	D-7
2.2.3 Coolant/Antifreeze and Heat Transfer Agents	D-8
2.2.4 Drilling Fluids	D-8
2.2.5 Fracturing Fluids	D-9
2.2.6 Cement and Additives	D-9
2.2.7 Miscellaneous Materials	D-10
2.3 Combustion Emissions	D-10
3.0 MANAGEMENT POLICY AND PROCEDURE	D-11

APPENDIX D

HAZARDOUS MATERIALS MANAGEMENT PLAN

1.0 INTRODUCTION

The Desolation Flats Project Area (DFPA) natural gas producing operators, including Marathon Oil Company, Yates Petroleum, AEC Oil & Gas (USA) Inc., EOG Resources, Inc, Tom Brown, Inc., Basin Exploration, Inc., Questar Exploration and Production Company, Merit Energy Company, and Devon SFS Operating, Inc., (hereafter referred to as "the Operators"), propose to explore and develop natural gas reserves in the Desolation Flats Area of Carbon and Sweetwater Counties, Wyoming. The Bureau of Land Management (BLM) has prepared an Environmental Impact Statement (EIS) for the proposed project, and this Hazardous Material Management Summary (HMMS), which is included as an appendix to the EIS, provides further specific information regarding the types and quantities of hazardous and extremely hazardous materials that are expected to be produced or used for the proposed project. Detailed descriptions of the proposed action and alternatives, the potential environmental consequences, and proposed mitigation and monitoring measures are provided in the EIS.

This HMMS is provided pursuant to BLM Instruction Memoranda Numbers WO-93-344 and WY-94-059, which require that all National Environmental Policy Act (NEPA) documents list and describe any hazardous and/or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. Hazardous materials, as defined herein, are those substances listed in the Environmental Protection Agency's (EPA's) *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, and extremely hazardous materials are those identified in the EPA's *List of Extremely Hazardous Substances* (40 Code of Federal Regulations [CFR] 355). Materials identified on either of these lists that are expected to be used or produced by the proposed project are discussed herein.

A list of hazardous and extremely hazardous materials that are expected to be produced, used, stored, transported, or disposed of as a result of the Desolation Flats Project was obtained from DFPA operators, along with Material Safety Data Sheets (MSDS) for all chemicals, compounds, and/or substances which may be used during the construction, drilling, completion, and production operations of the proposed project. The Operators have reviewed the aforementioned EPA lists, as amended, and all materials included on either of these two lists that would be used or produced by the proposed project were identified.

Some potentially hazardous materials that may be used in small, unquantifiable amounts have been excluded from this HMMS. These materials may include: wastes, as defined by the Solid Waste Disposal Act; wood products' manufactured items and articles which do not release or otherwise result in exposure to a hazardous material under normal conditions of use (i.e., steel structures, automobiles, tires, etc.); food, drugs, tobacco products, and other miscellaneous substances (i.e., WD-40, gasket sealants, glues, etc.). No unauthorized use or disposal of these materials by project personnel would occur during project implementation, and all project personnel would be directed to properly dispose of these materials in an appropriate manner. Solid wastes generated at well locations would be collected in approved waste facilities (e.g., dumpsters), and each well location would be provided with one or more such facilities during drilling and completion operations. Solid wastes would be regularly removed from well locations and transported off the DFPA to approved disposal facilities.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

2.0 HAZARDOUS MATERIALS

A listing of all relevant known hazardous and extremely hazardous materials that are expected to be used, produced, stored, transported, or disposed of during project implementation is provided herein. Where possible, the quantities of these materials have been estimated on a per-well basis and their use, storage, transport, and disposal methods described.

2.1 PRODUCTION PRODUCTS

The purpose of the proposed project is to extract natural gas from the Mesaverde/Lewis and Wasatch Formations and other formations underlying the DFPA Area. Water would also be produced as a by-product of gas and oil extraction operations. Table D-1 lists and quantifies, where possible, the hazardous and extremely hazardous materials that may be found in these production products.

2.1.1 Natural Gas

Natural gas, primarily containing methane, ethane, and carbon dioxide, would be produced from approximately 250 wells at rates averaging 0.4 million cubic feet per day (mmcf/d) per well. No extremely hazardous materials are anticipated to be produced with the gas stream; however, the hazardous material hexane (CAS Number 110-54-3) would be present in the gas stream at volumes ranging from approximately 4 to 24 thousand cubic feet per day (mcf/d) per well (Table D-1). In addition, the gas would also likely contain small amounts of potentially hazardous polycyclic organic matter and polynuclear aromatic hydrocarbons. No other hazardous materials are known to occur within the natural gas stream.

The majority of gas produced from Desolation Flats wells would be transported from each location through newly constructed pipelines linking well locations to existing or newly constructed gas processing facilities. The natural gas would eventually be delivered to consumers for combustion. Small quantities of natural gas may be vented or flared at certain well locations during well testing operations. During testing, produced gas would be vented or flared into a flare pit pursuant to BLM/Wyoming Oil and Gas conservation Commission (WOGCC) rules and regulations (Notice to Lessees [NTL]-4A). BLM and WOGCC approval would be obtained prior to flaring or venting operations. No natural gas storage is anticipated under the proposed project.

Industry standard pipeline equipment, materials, techniques, and procedures in conformance with all applicable regulatory requirements would be employed during construction, testing, operation, and maintenance of the project to ensure pipeline safety and efficiency. All necessary authorizing actions for natural gas pipelines would be addressed prior to installation. These actions include:

- Carbon and Sweetwater County special use permits,
- BLM rights-of-way (ROWs) applications,
- conformance with U.S. Department of Transportation (DOT) pipeline regulations (49 CFR 191-192), and
- Wyoming Public Service commission Certificates to act as common carrier for natural gas.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Table D-1. Hazardous and Extremely Hazardous Materials Potentially Produced by the DFPA Natural Gas Project, Carbon and Sweetwater Counties, Wyoming, 2001.

Production Product	Hazardous Constituents ¹	Extremely Hazardous Constituents ²	Approximate Quantity Produced per Well ³
Natural Gas	-- Hexane PAHs ⁴ POM ⁵	None	0.4 mmcf 4-24 mcf
Condensates	-- PAHs POM	None	252 gpd
Produced Water	-- Lead Cadmium Chromium Radium 226 Uranium	None	168 gpd

¹ The hazardous constituents listed are, to the best of our present knowledge, those that are or may be present in the production products and are listed under the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended.

² Extremely hazardous materials are those defined in 40 CFR 355.

³ mmcf = million cubic feet per day.
mcf = thousand cubic feet per day.
gpd = gallons per day.

⁴ PAHs = polynuclear aromatic hydrocarbons.

⁵ POM = polycyclic organic matter.

2.1.2 Condensates

Condensates would be produced with the gas stream at most of the proposed wells. Condensates primarily consist of long chain hydrocarbon liquids (e.g., octanes), but may also contain variable quantities of the following hazardous materials: polycyclic organic matter and polynuclear aromatic hydrocarbons. No other hazardous or extremely hazardous materials are known to be present in the condensates. The volume of condensate produced from Desolation Flats wells is anticipated to be approximately 252 gallons per day (gpd) from most wells (Table D-1).

Condensates would be stored in tanks at well locations and centralized facilities, and all tanks would be fenced and bermed to contain the entire storage capacity of the largest tank plus one foot of freeboard as mandated by the BLM. Condensates would be periodically removed from storage tanks and transported by truck, in adherence to DOT rules and regulations, off the DFPA. All necessary authorizing actions for the production, storage, and transport of condensates, including the Oil Pollution Act of 1990 (storage of >1,000,000 gal) as necessary, would be addressed prior to the initiation of condensate production activities.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

2.1.3 Produced Water

Produced water from Desolation Flats wells is anticipated to range in volume from 0 to 630 gpd, and would average approximately 168 gpd for most wells (Table D-1). Produced water quality from wells within the DFPA is variable and would be monitored periodically. Based on WOGCC-required water quality analyses of produced water samples from several DFPA wells, no hazardous or extremely hazardous materials are known to occur. Water from the Wasatch and Mesaverde/Lewis Mesa Verde Formations at locations in the Washakie and Great Divide Basins is known to contain the following hazardous materials: lead (CAS 7439-92-1), cadmium (CAS 7440-43-9), chromium (CAS 7440-47-3), radium 226, and uranium. However, water quality analyses of gross radiation for existing wells on the DFPA indicated only background radiation levels. No other hazardous or extremely hazardous materials are known to be present in the produced water.

Produced water would be stored in tanks at well locations and centralized facilities and would periodically be removed and transported by truck to the existing Wyoming Department of Environmental Quality (WDEQ) permitted disposal well facility. Where applicable, National Pollutant Discharge Elimination System (NPDES) permits would be obtained from the WDEQ, and produced water that meets applicable standards would be discharged to the surface at appropriate locations. All necessary authorizing actions would be met prior to the disposal of produced water including:

- BLM approval of disposal methodologies,
- RCRA compliance as necessary,
- WDEQ Water Quality Division (WDEQ-WQD) approval of wastewater disposal,
- WOGCC evaporation pond permits, and
- Wyoming State Engineer's Office (WSEO) dewatering permits (Form U.W. 5).

2.2 CONSTRUCTION, DRILLING, PRODUCTION, AND RECLAMATION

Known hazardous and extremely hazardous materials planned for use during typical construction, drilling, production, and reclamation operations for the proposed project are listed in Table D-2 and are described in detail below. Hazardous and extremely hazardous materials planned for use during project implementation fall into the following categories:

- fuels,
- lubricants,
- coolant/antifreeze and heat transfer agents,
- drilling fluids,
- fracturing fluids,
- cement and additives, and
- miscellaneous materials.

2.2.1 Fuels

Gasoline (CAS 8006-61-9), diesel fuel (CAS 68476-30-2), and natural gas are the fuels proposed for use on the project, and all contain materials classified as hazardous. Gasoline would be used to power vehicles providing transportation to and from South Baggs; diesel fuel would be used to power transport vehicles, drilling rigs, and construction equipment, and as a component of fracturing fluids (see Section 2.2.5); and natural gas would be used to power pipeline compressor stations.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Table D-2. Hazardous and Extremely Hazardous Materials Potentially Utilized During Construction, Drilling, Production, and Reclamation Operations by the Desolation Flats Natural Gas Project, Carbon and Sweetwater Counties, Wyoming.

Source	Hazardous Constituents ¹	Extremely Hazardous Constituents ²	Approximate Quantity Used Per Well ³
Fuel			
Gasoline	-- Benzene Toluene Ethylbenzene p-xylene m-xylene PAHs ⁴ POM ⁵ Tetraethyllead	-- Tetraethyllead	24,940 gal
Diesel Fuel	-- Benzene Toluene Ethylbenzene p-xylene m-xylene o-xylene Naphthalene PAHs POM	None	27,400 gal
Natural Gas	-- Hexane PAHs POM	None	
Lubricants	-- PAHs POM Lead Cadmium Manganese Barium Zinc Lithium	None	8 gal
Coolant/Antifreeze and Heat Transfer Agents	-- Ehylene glycol Triethylene glycol	None	180 gal 330 gal

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Drilling Fluid Additives			
Caustic Soda	-- Sodium hydroxide	None	650 lbs
Lime	-- Fine mineral fibers	None	3,500 lbs
Mica	-- Fine mineral fibers	None	600 lbs
Uni-Drill	-- Acrylamide	None	50 gal
Uni-Gel	-- Fine mineral fibers	None	43,500 lbs
UNIBAR	-- Barium compounds	None	8,200 lbs
Fracturing Fluid Additives			
LGC-VI w/diesel fuel	-- Benzene Toluene Ethylbenzene p-xylene m-xylene o-xylene Naphthalene PAHs POM	None	953 gal
OPTI-FLO III	-- Glycol ether	None	144 lbs
SSO-21	-- Methanol Glycol Ether	None	15 gal
CL-29	-- Formic acid Ammonium chloride Zirconium nitrate Zirconium sulfate	None	59 gal
BA-20	-- Acetic acid	None	38 gal
	-- Fine mineral fibers	Sand	2,994 lbs
Cement and Additives	-- Fine mineral fibers PAHs POM	None	>10,000 lbs

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Miscellaneous Materials	-- Methanol Corrosion inhibitors	None	3,000 gal
--------------------------------	--	------	-----------

¹ The hazardous constituents listed are, to the best of our present knowledge, those that are or may be present in the production products and are listed under the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended.

² Extremely hazardous materials are those defined in 40 CFR 355.

³ lb = pounds
gal = gallons.

⁴ PAHs = polynuclear aromatic hydrocarbons.

⁵ POM = polycyclic organic matter.

2.2.1.1 Gasoline

Gasoline would be used to power vehicles traveling to and from the DFPA. The hazardous and extremely hazardous materials likely to be found in gasoline are listed in Table D-2. The hazardous materials present in gasoline include: benzene (CAS 71-43-2), toluene (CAS 108-88-3), ethylbenzene (CAS 100-41-4), p-xylene (CAS 106-42-3), m-xylene (CAS 108-38-3), o-xylene (CAS 95-47-6), (CAS 1634-04-4), polynuclear aromatic hydrocarbons, and polycyclic organic matter. Leaded gasoline contains tetraethyllead (CAS 78-00-2), which is listed as an extremely hazardous material (Table D-2).

2.2.1.2 Diesel Fuel

Diesel fuel would be used to power transport vehicles, drilling rigs, and construction equipment. The hazardous and extremely hazardous materials likely to be found in diesel fuel are listed in Table D-2. The hazardous materials present in diesel fuel include: benzene (CAS 71-43-2), toluene (CAS 108-88-3), ethylbenzene (CAS 100-41-4), p-xylene (CAS 106-42-3), m-xylene (CAS 108-38-3), o-xylene (CAS 95-47-6), (CAS 1634-04-4), naphthalene (CAS 91-20-3), polynuclear aromatic hydrocarbons, and polycyclic organic matter.

2.2.1.3 Natural Gas

An unknown volume of natural gas would be burned to provide power for the natural gas compressor stations required for efficient pipeline function. The natural gas used to power compressor stations would be produced by the proposed project, and hazardous materials contained in this natural gas are identified in Table D-2. Further detail on the transportation of natural gas as a result of the proposed project, and relevant authorizing actions for natural gas transportation, is provided in Section 2.1.1.

2.2.2 Lubricants

Various lubricants, including: motor oils, hydraulic oils, transmission oils, compressor lube oils (8 gal/well), and greases, would be utilized for project-required vehicles, rigs, compressors, and other machinery. Some of these lubricants would likely contain polynuclear aromatic hydrocarbons and polycyclic organic matter, and some may additionally contain compounds of lead, cadmium, nickel, copper, manganese, barium, zinc, and/or lithium. No extremely hazardous materials are known to be present in the lubricants required for the proposed project.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

The quantity of each lubricant used, stored, transported, and disposed of is unknown; however, all lubricants would be used, stored, transported, and disposed of following manufacturer's guidelines. Disposal of rags contaminated with lubricants would be in accordance with local, State, and federal requirements. No unauthorized disposal of lubricants (e.g., disposal of used motor oil) would occur in the project area.

2.2.3 Coolant/Antifreeze and Heat Transfer Agents

Ethylene glycol (CAS 107-21-1) and triethylene glycol (CAS 112-27-6) would be utilized as coolant/antifreeze and heat transfer agents in association with this project (Table D-2). Ethylene glycol would be used as an engine coolant/antifreeze in automobiles, construction equipment, gas dehydrators, and drilling and workover rigs. An unspecified volume of this hazardous material would be stored and transported in engine radiators. In addition, both ethylene glycol and triethylene glycol would be used as heat transfer fluids during well completion and maintenance operations. The estimated quantity of ethylene glycol required per well for completion and maintenance operations is approximately 180 gallons for the life of the project. The quantity of triethylene glycol required would range from approximately 290 to 370 gallons/well. While the total volume of ethylene glycol to be used, stored, transported, and disposed of for the proposed project is unknown, any disposal of ethylene glycol and/or triethylene glycol would be conducted in accordance with all relevant federal and state rules and regulations.

2.2.4 Drilling Fluids

Water-based muds (drilling fluids) would be used for drilling each well. Drilling fluids consist of clays and other additives that are used in standard industry procedures. Drilling fluid additives to be utilized for the proposed project include: caustic soda (650 lbs/well), cedar fibers (200 lbs/well), lime (3,500 lbs/well), mica (600 lbs/well), Uni-Drill (50 gal/well), Uni-Gel (43,500 lbs/well), UNIBAR (8,200 lbs/well), and paper (400 lbs/well) (Table D-2). All drilling operations would be conducted in compliance with applicable BLM, WOGCC, and WDEQ rules and regulations.

All known hazardous materials present in the proposed drilling fluids and additives are listed in Table D-2. These materials are: sodium hydroxide (CAS 1310-73-2), present in caustic soda; acrylamide (CAS 79-06-1), present in Uni-Drill (partially hydrolyzed polyacrylamide); barium compounds, present in UNIBAR (barium sulfate); and fine mineral fibers, present in lime, mica, and Uni-Gel (sodium montmorillonite or barite). No hazardous materials are known to occur in sawdust or paper, and no extremely hazardous materials are known to be present in any of the drilling fluids and additives.

Drilling fluid additives would be transported to well locations during drilling operations in appropriate sacks and containers in compliance with DOT regulations. Drilling fluids, cuttings, and water would be stored in reserve pits, and pits would be fenced to protect wildlife from exposure. Netting (1 inch mesh), to protect waterfowl, other birds and bats, and pit liners, to protect shallow groundwater aquifers, would be used on all reserve pits as deemed appropriate by the BLM.

When the reserve pit is no longer required, its contents would be evaporated or solidified in place, and the pit backfilled, as approved by the BLM. All reserve pit solidification procedures using flyash or other BLM-approved materials would be approved by the WOGCC and/or WDEQ prior to implementation. If the pH of pit residue is very high following solidification, off-site disposal may be required. In this event, or if other unanticipated contamination circumstances arise, reserve pit

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

contents would be removed and disposed of at an appropriate facility in a manner commensurate with all relevant state and federal regulations.

2.2.5 Fracturing Fluids

Hydraulic fracturing is expected to be performed at some Desolation Flats wells to augment gas flow rates. Approximately 78,700 gallons of fracturing fluids, consisting primarily of fresh water, would be required per well for the proposed project. Fracturing fluid additives and their approximate volumes include: LGV-VI with diesel fuel (953 gal/well), GEL-STA (150 lbs/well), OPTI-FLO III (144 lbs/well), CLAYFIX II (157 lbs/well), SSO-21 (15 gal/well), CL-29 (59 gal/well), BA-20 (38 gal/well), SP BREAKER (27 lbs/well), GBW-30 (9 lbs/well), BE-5 microbiocide (36 lbs/well), and sand (299,400 lbs/well) (Table D-2).

The hazardous materials present in fracturing fluid components are listed in Table D-2 and include: benzene, toluene, ethylbenzene, p-xylene, m-xylene, o-xylene, naphthalene, polynuclear aromatic hydrocarbons, and polycyclic organic matter contained in LGC-VI with diesel fuel (hydrocarbon gel concentrate); glycol ether present in OPTI-FLO III and SSO-21; methanol (CAS 67-56-1) present in SSO-21; formic acid (CAS 64-18-6), ammonium chloride (CAS 12125-02-9), zirconium nitrate (CAS 13746-89-9), and zirconium sulfate (CAS 14644-61-2) present in CL-29; acetic acid (CAS 64-19-7) present in BA-20; and fine mineral fibers present in sand. No hazardous materials are known to be present in GEL-STA (sodium salt), CLAYFIX II (alkylated quaternary chloride), SP BREAKER (sodium persulfate), GBW-30 (cellulase enzyme carbohydrate), and BE-5 (5-chloro-2-methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazolin-3-one, a microbiocide). No extremely hazardous materials are known to be present in any of the fracturing fluid additives.

Fracturing fluids and additives would be transported to well locations in bulk (e.g., LGC-VI with diesel fuel, sand) or in appropriately designed and labeled containers (e.g., OPTI-FLO III in 50 lb fiber drums; SSO-21, CL-29, and BA-20 in 55 gal drums). All transportation of fracturing fluids and additives would be in adherence with DOT rules and regulations.

During fracturing, fluids are pumped under pressure down the well bore and out through perforations in the casing into the formation. The pressurized fluid enters the formation and induces hydraulic fractures. When the pressure is released at the surface, a portion of the fracturing fluids would be forced to the well bore and up into a tank. The fracturing fluids would then be transferred to lined reserve pits and evaporated, or hauled away from the location and reused or disposed of at an authorized facility. Decisions regarding the appropriate disposal of fracturing fluids would be made by the BLM on a case-by-case basis.

2.2.6 Cement and Additives

Well completion and abandonment operations would entail cementing and plugging various segments of the well bore to protect freshwater aquifers and other down-hole resources. Materials potentially used for cementing operations include: cement, calcium hydroxide, calcium chloride, pozzlans, sodium bicarbonate, potassium chloride, and insulating oil. An unknown quantity of cement and additives, which may contain the hazardous material classes of fine mineral fibers, polycyclic organic matter, and polynuclear aromatic hydrocarbons, would be transported in bulk to each well site by a qualified cement supply company. Small quantities may be transported and stored on-site in 50 pound sacks. Wells would be cased and cemented as directed and approved by the BLM (for federal minerals) and WOGCC (for state and patented minerals). No extremely

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

hazardous materials are known to be present in the cement and additives proposed for use in this project.

2.2.7 Miscellaneous Materials

Miscellaneous materials, potentially containing hazardous and/or extremely hazardous materials, that may be used for the proposed project include: methanol and corrosion inhibitors. The material would be transported to the site by qualified service and supply companies and would be used and disposed of following manufacturer's guidelines.

An unknown quantity of methanol would be used to de-ice well bores and as a hydrate deterrent during completion and natural gas transport operations. Methanol is a listed hazardous chemical and would be stored, transported, used, and disposed of in adherence with all applicable federal and state rules, regulations, and guidelines.

2.3 COMBUSTION EMISSIONS

Combustion emissions from gasoline and diesel engines, as well as flaring natural gas, will occur as a result of this project. The complete oxidation of hydrocarbon fuels yields only carbon dioxide and water as combustion products; however, complete combustion is seldom achieved. Unburned hydrocarbons, particulate matter (e.g., carbon, metallic ash), carbon monoxide, nitrogen oxides, and possibly sulfur oxides would be expected as direct exhaust contaminants. Secondary contaminants would likely include the formation of ozone from the photolysis of nitrogen oxides. A listing of the hazardous and extremely hazardous materials potentially present in combustion emissions is provided in Table D-3.

Unburned hydrocarbons may contain potentially hazardous polynuclear aromatic hydrocarbons, and particulate matter may contain metal-based particulates from lead anti-knock compounds in the fuel, metallic lubricating oil additives, and engine wear particulates (Table D-3). Hazardous materials in the particulate matter may therefore include compounds of lead, cadmium, nickel, copper, manganese, barium, zinc, and /or lithium.

Nitrogen dioxide (CAS 10102-44-0), sulfur dioxide (CAS 7446-09-5), sulfur trioxide (CAS 7446-11-9), and ozone (CAS 10028-15-6) are probable combustion emissions, all classified as extremely hazardous materials. These materials would be either directly released in minor quantities from internal combustion engines, or would be formed through photolysis (i.e. ozone). No releases of these or other materials would occur in excess of those allowed for Prevention of Significant

Deterioration Class II areas, WDEQ-Air Quality Division Implementation Plan; nor would releases occur that jeopardize National Ambient Air Quality Standards for Desolation Flats. Particulate matter emissions and larger unburned hydrocarbons would eventually settle out on the ground surface, whereas gaseous emissions would react with other air constituents as components of the nitrogen, sulfur, and carbon cycles.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Table D-3. Hazardous and Extremely Hazardous Materials Potentially Present in Combustion Emissions of the Desolation Flats Natural Gas Project, Carbon and Sweetwater Counties, Wyoming, 2001.

Emission	Hazardous Constituents ¹	Extremely Hazardous Constituents ²
Hydrocarbons	-- PAHs ³	None
Particulate Matter	-- Lead Cadmium Nickel Copper Manganese Barium Zinc Lithium	None
Gases	-- Nitrogen dioxide Sulfur dioxide Sulfur trioxide Ozone	-- Nitrogen dioxide Sulfur dioxide Sulfur trioxide Ozone

¹ The hazardous constituents listed are, to the best of our present knowledge, those that are or may be present in the production products and are listed under the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986*, as amended.

² Extremely hazardous materials are those defined in 40 CFR 355.

³ PAHs = polynuclear aromatic hydrocarbons.

3.0 MANAGEMENT POLICY AND PROCEDURE

DFPA Operators and their contractors would ensure that all production, use, storage, transport, and disposal of hazardous and extremely hazardous materials as a result of the proposed project would be in strict accordance with all applicable existing, or hereafter promulgated federal, state, and local government rules, regulations, and guidelines. All project-related activities involving the production, use, and/or disposal of hazardous or extremely hazardous materials would be conducted in such a manner as to minimize potential environmental impacts.

DFPA Operators would comply with emergency reporting requirements for releases of hazardous materials. Any release of hazardous or extremely hazardous substances in excess of the reportable quantity, as established in 40 CFR 117, would be reported as required by the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980*, as amended. The materials for which such notification must be given are the extremely hazardous substances listed under the *Emergency Planning and Community Right to Know Section 302* and the hazardous substances designated under Section 102 of CERCLA, as amended. If a reportable quantity of a hazardous or extremely hazardous substance is released, prompt notice of the release would be given to the BLM's Authorized Officer and all other appropriate federal and state agencies.

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Additionally, notice of any spill or leakage (i.e. undesirable event), as defined in BLM NTL-3A, would be given by DFPA Operators to the Authorized Officer and other such federal and state officials as required by law.

DFPA Operators have evaluated field operations in the DFPA and have or would prepare and implement multiple plans and/or policies to ensure environmental protection from hazardous and extremely hazardous materials. These plans/policies shall be available for review at the BLM Rawlins and Rock Springs field offices. These plans/policies include, where applicable:

- spill prevention and control countermeasure plans;
- oil/condensate spill response plans;
- inventories of hazardous chemical categories pursuant to Section 312 of the SARA, as amended; and
- emergency response plans.

Development operations in Desolation Flats would be in compliance with regulations promulgated under the Resource Conservation and Recovery Act (RCRA), Federal Water Pollution Control Act (Clean Water Act), Safe Drinking Water Act (SWDA), Toxic Substances Control Act (TSCA), Occupational Safety and Health Act (OSHA), and the Federal Clean Air Act (CAA). In addition, project operations would also comply with all attendant state rules and regulations relating to hazardous material reporting, transportation, management, and disposal.

Table D-4 (below) provides a generic list of hazardous chemical categories for the oil and gas exploration and production industry.

Table D-4. Generic List of Hazardous Chemical Categories for the Oil and Gas Exploration and Production Industry.

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Acetylene Gas (CAS#74-86-2)	Fire, sudden release of pressure
Acids Hydrochloric acid (<30%)(CAS#7647-01-0) Hydrofluoric acid (<12%)(CAS#7664-39-3) Sulfuric acid (CAS#7664-93-9)	Immediate (Acute)
Alkalinity and pH Control Materials Calcium hydroxide (CAS#1305-62-0) Potassium hydroxide (CAS#1310-58-3) Soda ash (CAS#497-19-8) Sodium bicarbonate (CAS#144-55-8) Sodium carbonate (CAS#497-19-8) Sodium hydroxide (CAS#1310-73-2)	Immediate (Acute)
Biocides Amines Glutaraldehyde (CAS#111-30-8) Isopropanol (CAS#67-63-0) Thiozolin	Immediate (Acute), Fire

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Breakers Ammonium persulfate (CAS#7727-54-0) Benzoic acid (CAS#65-85-0) Enzyme Sodium acetate (CAS#127-09-3) Sodium persulfate (CAS#7772-27-1)	Immediate (Acute), Fire
Buffers Sodium acetate (CAS#127-09-3) Sodium bicarbonate (CAS#144-55-8) Sodium carbonate (CAS#497-119-8) Sodium deacetate	Immediate (Acute)
Calcium Compounds Calcium bromide (CAS#71626-99-8) Calcium hypochlorite (CAS#7778-54-3) Calcium oxide (CAS#1305-78-8) Gypsum (CAS#10101-41-4) Lime (CAS#1305-78-8)	Immediate (Acute)
Cement (CAS#65997-15-1)	Immediate (Acute)
Cement Additives - Accelerators Calcium chloride (CAS#10035-04-8) Gypsum (CAS#10101-41-4) Potassium chloride Sodium chloride (CAS#7647-14-5) Sodium metasilicate	Immediate (Acute)
Cement Additives - Fluid Loss Cellulose polymer Latex	Immediate (Acute)
Cement Additives - Miscellaneous Cellulose flakes (CAS#9004-34-6) Coated aluminum Gilsomite (CAS#12002-43-6) Lime (CAS#1305-78-8) Long chain alcohols	Immediate (Acute)
Cement Additives - Retarders Cellulose polymer Lignosulfonates	Immediate (Acute)
Cement Additives - Weight Modification Barite (CAS#7727-43-7) Bentonite Diatomaceous earth (CAS#68855-54-9) Fly ash Glass beads Hematite (CAS#1317-60-8) Ilmenite Pozzolans	Immediate (Acute)

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Chloride Salts Calcium chloride Potassium chloride Sodium chloride (CAS#7647-14-5) Zinc chloride (CAS#7646-85-7)	Immediate (Acute)
Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Chlorine Gas (CAS#7782-50-5)	Immediate (Acute), Sudden release of pressure
Corrosion Inhibitors 4-4' Methylene dianiline (CAS#101-77-9) Acetylenic alcohols Amine formulations Ammonium bisulfite (CAS#10192-30-0) Basic zinc carbonate (CAS#3486-35-9) Gelatin Ironite sponge (CAS#1309-37-1) Sodium chromate (CAS#7775-11-3) Sodium dichromate (CAS#10588-01-9) Sodium polyacrylate Zinc lignosulfonate Zinc oxide (CAS#1314-13-2)	Immediate (Acute), Delayed (chronic), Fire
Crosslinkers Boron compounds Organo-metallic complexes	Immediate (Acute), Fire
Defoaming Agents Aluminum stearate Fatty acid salt formation Mixed alcohols Silicones	Immediate (Acute)
Deflocculants Acrylic polymer Calcium lignosulfonate Chrome-free lignosulfonate Chromium lignosulfonate Iron lignosulfonate Quebracho Sodium acid pyrophosphate (SAPP) Sodium hexametaphosphate (CAS#10124-56-8) Sodium phosphate (oilfos) Sodium tetraphosphate Stryene, maleaic anhydride co-polymer salt Sulfo-methylated tannin	Immediate (Acute)
Detergents/Foamers Amphoteric surfactant formulation Ethoxylated phenol Detergents	Immediate (Acute), Fire
Explosives Charged well jet perforating gun, Class C explosives Detonators, Class A explosives Explosive power device, Class B	Sudden release of pressure

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Filtration Control Agents Acrylamide AMPS copolymer Aniline formaldehyde copolymer hydrochlorite Causticized leonardite Sulfomethylated phenol formaldehyde Leonardite Partially hydrolyzed polyacrylamide Polyalkanolamine ester Polyamine acrylate Polyanionic cellulose Potassium lignite Preserved starch Sodium carboxymethyl cellulose (CAS#9004-32-4) Starch (CAS#9005-25-8) Vinylsulfonate copolymer	Immediate (Acute)
Flocculants Anionic polyacrylamide	Immediate (Acute)
Fluoride Generating Compounds Ammonium bifluoride (CAS#1341-49-7) Ammonium fluoride (CAS#12125-0108)	Immediate (Acute)
Friction Reducers Acrylamide methacrylate copolymers Sulfonates	Immediate (Acute)
Fuels Diesel (CAS#68476-34-6) Fuel oil Gasoline (CAS#8006-61-9)	Immediate (Acute), Delayed (Chronic), Fire
Gelling Agents Cellulose and guar derivatives	Immediate (Acute)
Gel Stabilizers Sulfites Thiosulfates	Immediate (Acute)
Hydrogen Sulfide (CAS#7783-06-4)	Immediate (Acute), Fire
Inert Gases Carbon dioxide (CAS#124-38-9) Nitrogen (CAS#7727-37-9)	Immediate (Acute), Sudden release of pressure
Lost Circulation Materials Cane fibers Cedar fibers Cellophane fibers Corn cob Cottonseed hulls Mica (CAS#12001-26-2) Nut shells Paper Rock wool Sawdust	Immediate (Acute)

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Lubricants, Drilling Mud Additives Graphite (CAS#7782-42-5) Mineral oil formulations Organo-fatty acid salts Vegetable oil formulations Walnut shells	Immediate (Acute)
Lubricants, Engine Motor oil Grease	Immediate (Acute)
Miscellaneous Drilling Additives Diatomaceous earth (CAS#68855-54-9) Oxalic acid (CAS#144-62-7) Potassium acetate (CAS#127-08-2) Zinc bromide (CAS#7699-45-8)	Immediate (Acute), Delayed (Chronic)
Odorants Mercaptans, aliphatic	Immediate (Acute)
Oil Based Mud Additives Amide polymer formulations Amine treated lignite Asphalt Diesel (CAS#68476-34-6) Gilsonite (CAS#12002-43-6) Mineral oil Organophilic clay Organophilic hectorite Petroleum distillate (CAS#8030-30-6) Polymerized organic acids Sulfonate surfactant	Immediate (Acute), Delayed (Chronic), Fire
Organic Acids Acetic acid (CAS#64-19-7) Acetic anhydride (CAS#108-24-7) Benzoic acid (CAS#65-85-0) Citric acid (CAS#5949-29-1) Formic acid (CAS#64-18-6) Organic acid salts	Immediate (Acute), Fire
Preservatives Dithiocarbamates Paraformaldehyde (CAS#30525-89-4) Isothiazions	Immediate (Acute)
Produced Hydrocarbons Condensate Crude oil (CAS#8002-05-9) Natural Gas	Immediate (Acute), Delayed (Chronic), Fire, Sudden release of pressure
Proppants Bauxite (CAS#1318-16-7) Resin coated sand Zirconium proppant	Immediate (Acute)
Radioactive, Special Form Cesium 137 (encapsulated) logging tool	Delayed (Chronic)

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Resin and Resin Solutions Melamine resins Phenolic resins Polyglycol resins	Immediate (Acute), Fire
Salt Solutions Aluminum chloride (CAS#7446-70-0) Ammonium chloride (CAS#12125-02-9) Calcium bromide (CAS#17626-99-8) Calcium chloride (CAS#10035-04-8) Calcium sulfate (CAS#778-18-9) Ferrous sulfate (CAS#7782-63-0) Potassium chloride (CAS#7447-40-7) Sodium chloride (CAS#7647-14-5) Sodium sulfate (CAS#7757-82-6) Zinc bromide (CAS#7699-45-8) Zinc chloride (CAS#7646-85-7) Zinc sulfate	Immediate (Acute)
Scale Inhibitors Ethylenediaminetetraacetic acid (EDTA) (CAS#60-00-4) Inorganic phosphates Isopropanol (CAS#67-63-0) Nitritotriacetic acid (NTA) (CAS#139-13-9) Organic phosphates Polyacrylate Polyphosphates	Immediate (Acute), Fire
Shale Control Additives Hydrolyzed polyacrylamide polymer Organo-aluminum complex Polyacrylate polymer Sulfonated asphaltic residuum	Immediate (Acute)
Silica	Immediate (Acute), Delayed (Chronic)
Solvents 1,1,1-Trichloroethane (CAS#71-55-6) Acetone (CAS#67-64-1) Aliphatic hydrocarbons Aromatic naphtha (CAS#8032-32-4) Carbon tetrachloride (CAS#56-23-5) Diacetone alcohol Ethylene glycol monobutyl ether (CAS#111-76-2) Kerosene (CAS#8008-20-6) Isopropanol (CAS#67-63-0) Methyl ethyl ketone (MEK) (CAS#78-93-3) Methyl isobutyl ketone (MIBK) (CAS#108-10-1) Methanol (CAS#67-56-1) t-Butyl alcohol (CAS#75-65-0) Toluene (CAS#108-88-3) Turpentine (CAS#8006-64-2) Xylene (CAS#1330-20-7)	Immediate (Acute), Delayed (Chronic), Fire

APPENDIX D: HAZARDOUS MATERIALS MANAGEMENT PLAN

Hazardous Chemical Category (With Examples of Representative Chemicals)	Physical and Health Hazards
Spotting Fluids Nonoil base spotting fluid Oil base spotting fluid (diesel oil base) Oil base spotting fluid (mineral oil base) Sulfonated vegetable ester	Immediate (Acute), Fire
Surfactants - Corrosive Alcohol ether sulfates Amines Quarternary polyamine Sulfonic acids	Immediate (Acute)
Surfactants - Flammable Amines Ammonium salts Fatty alcohols Isopropanol (CAS#67-56-1) Oxyalkylated phenols Petroleum naphtha (CAS#8030-30-6) Sulfonates	Immediate (Acute), Fire
Surfactants - Miscellaneous Amine salts Glycols Phosphonates	Immediate (Acute)
Temporary Blocking Agents Benzoic acid (CAS#65-85-0) Naphthalene (CAS#91-20-3) Petroleum wax polymers Sodium chloride (CAS#7647-14-5)	Immediate (Acute)
Viscosifiers Attapulgate Bentonite Guar gum (CAS#9000-30-0) Sepiolite Xanthan gum	Immediate (Acute)
Weight Materials Barite (CAS#7727-43-7) Calcium carbonate (CAS#1317-65-3) Galena Hematite (CAS#1317-60-8) Siderite	Immediate (Acute)

APPENDIX E

VEGETATION

Table E-1. Classification of Small, Non-Linear Wetland Areas Identified on NWI Maps within the Project Area.			
Legal Description	Classification	No. Of Sites	Reservoir Name
Powder Mt. Quad			
S6 T13N R96W	PUSC	2	Unnamed
S4 T13N R96W	PUSC	1	Unnamed
S7 T13N R96W	PUSC	1	Unnamed
S8 T13N R96W	PUSC	1	Unnamed
S9 T13N R96W	PUSC	2	Unnamed
S18 T13N R96W	PUSC	6	Unnamed
S17 T13N R96W	PUSC	1	Unnamed
S16 T13N R96W	PUSC	1	Unnamed
S15 T13N R96W	PUSC	3	Unnamed
S15 T13N R96W	PUSCh	1	Unnamed
S33 T13N R96W	PUSAh	1	North Reservoir
S36 T13N R96W	PUSAh	1	Unnamed
S31 T13N R95W	PUSAh	1	Unnamed
S6 T13N R96W	PUBFx	2	Unnamed
S18 T13N R95W	PABFh	1	Grindstone Spring
S15 T13N R96W	PABF	1	Flowing Well
S20 T13N R96W	PABFh	1	Carson Reservoir
Rotten Springs Quad			
S5 T13N R94W	PABFh	1	Unnamed
S8 T13N R95W	PUBFx	1	Unnamed
S12 T13N R95W	PABFh	1	Unnamed
S14 T13N R95W	PABFh	1	Unnamed

APPENDIX E: VEGETATION

S14 T13N R95W	PEMC	1	Unnamed
S22 T13N R95W	PUSAh	1	Unnamed
S24 T13N R95W	PABFh	1	Unnamed
S28 T13N R95W	PUSCh	1	Chimney Reservoir
S28 T13N R95W	PEMC	1	Unnamed
S29 T13N R94W	PABFh	1	Spring Draw Reservoir
S35 T13N R95W	PUSAx	1	Drill Hole
S31 T13N R94W	PABFh	1	Cherokee Reservoir
S32 T13N R94W	PUSCh	1	Flat Draw Reservoir
McPherson Springs Quad			
S3 T13N R94W	PEMA	1	Unnamed
S12 T13N R94W	PABFh	2	Unnamed by Flowing Well
S12 T13N R94W	PEMA	4	Unnamed
S16 T13N R94W	PEMAh	1	Unnamed
S23 T13N R94W	PABFh	1	Unnamed by McPherson Springs
S26 T13N R94W	PUBFx	1	Unnamed
S25 T13N R94W	PSSA	1	Unnamed
S24 T13N R94W	PUSC	1	Unnamed
Prehistoric Rim Quad			
S31 T15N R95W	PUSC	1	Unnamed
S35 T15N R96W	PUSC	3	Unnamed
S2 T14N R96W	PEMA	1	Unnamed
S2 T14N R96W	PUSC	2	Unnamed
S1 T14N R96W	PUSC	4	Unnamed
S11 T14N R96W	PUSC	1	Unnamed
S12 T14N R96W	PUSC	3	Unnamed
S7 T14N R95W	PUSC	1	Unnamed

APPENDIX E: VEGETATION

S15 T14N R96W	PUSC	1	Unnamed
S14 T14N R96W	PUSC	3	Unnamed (one of these is partially on S13)
S13 T14N R96W	PUSC	2	Unnamed
S18 T14N R95W	PUSC	1	Unnamed
S22 T14N R96W	PUSC	2	Unnamed
S22 T14N R96W	PUSA	2	Unnamed
S22 T14N R96W	PUSC	7	Unnamed
S26 T14N R96W	PUSC	2	Unnamed
S30 T14N R95W	PUSC	3	Unnamed
S30 T14N R95W	PUSA	1	Unnamed
S32 T14N R96W	PUSC	2	Unnamed
S33 T14N R96W	PUSC	2	Unnamed
S35 T14N R96W	PUSC	1	Unnamed
S36 T14N R96W	PABFh	1	Unnamed
S31 T14N R95W	PABFh	1	Unnamed
S4 T14N R96W	PUSC	1	Unnamed
Powder Mt. NE Quad			
S27 T15N R95W	PUSC	1	Unnamed
S30 T15N R94W	PABFh	1	Unnamed
S12 T15N R95W	PUSC	1	Unnamed
S20 T14N R95W	PUSC	1	Sand Creek Lake
S20 T14N R95W	PUSC	3	Unnamed
S29/S28 T14N R95W	PUSC	1	Unnamed
S27 T14N R95W	PUBFh	1	Unnamed
S33 T14N R95W	PUSC _x	1	Unnamed
S31 T14N R94W	PUSC	1	Unnamed
S5 T13N R95W	PUSC _x	1	Unnamed

APPENDIX E: VEGETATION

S5 T13N R95W	PUBFx	1	Unnamed
S4 T13N R95W	PABFh	1	Sandy Butte Reservoir
Dripping Rock Quad			
S27 T15N R94W	PABFh	1	Unnamed
S27 T15N R94W	PUSAh	1	Unnamed
S29/S28 T15N R93W	PUSCh	1	Unnamed (On section line)
S32 T15N R94W	PABFh	1	Unnamed
S34 T15N R94W	PABFh	1	Continental Reservoir No. 2
S35 T15N R94W	PUSAh	1	Unnamed
S36 T15N R94W	PUSCh	1	Unnamed
S36 T15N R94W	PUSAh	1	Unnamed
S31 T15N R93W	PUSAh	1	Unnamed
S32 T15N R93W	PUSCh	1	Snow Bank Reservoir
S4 T14N R94W	PABFh	1	Continental Reservoir No. 1
S4 T14N R94W	PUSCh	1	Unnamed
S4 T14N R94W	PUSAh	1	Unnamed
S5 T14N R93W	PEMAh	1	Unnamed
S10 T14N R94W	PABFh	1	Horse Trap Reservoir
S7 T14N R93W	PUSCh	1	Dripping Rock Reservoir
S8 T14N R93W	No Designation	1	Dripping Rock Spring
S7 T14N R93W	PABFh	1	Dripping Rock Pit #2
S16 T14N R94W	PABFh	1	Unnamed
S13 T14N R94W	PUSCh	1	Brush Reservoir
S13 T14N R94W	PUSCh	1	Row Reservoir
S17 T14N R93W	PABFh	1	Unnamed
S19 T14N R93W	PUSAh/PABFh	1	Big Ridge Reservoir
S26 T14N R94W	PUSCh	1	Unnamed

APPENDIX E: VEGETATION

S28 T14N R93W	PUSAh	1	Unnamed
Flat Top Mt. Quad			
S33 T15N R93W	PUSAh	1	Unnamed
S3 T14N R93W	PUSAh	1	Unnamed
S10 T14N R93W	PEMAh	1	Unnamed
S15 T14N R93W	PUSCh	1	Unnamed
Barrel Spring Quad			
S34 T16N R96W	PUSCh	1	N-T Reservoir
S36 T16N R96W	PUSC	1	Unnamed
S31 T16N R95W	PABFh	1	Unnamed
Salazar Butte Quad			
S22 T16N R95W	PUSC	1	Unnamed
S19 T16N R94W	PUSAh	1	Unnamed
S27 T16N R95W	PUSCh	1	Unnamed
S25 T16N R95W	PUSCh	1	Unnamed
S32 T16N R95W	PUSC	1	Unnamed
S5 T15N R95W	PUSC	3	Unnamed
S16 15N R95W	PUSCh	1	Unnamed
S16 15N R95W	PUSC	1	Unnamed
S15 T15N R95W	PABFh	1	Salazar Reservoir
S22 T15N R95W	PUSC	1	Unnamed
South Barrel Springs Quad			
S28 T16N R94W	PUSCh	1	Unnamed
S27 T16N R94W	PABFh	1	Unnamed
S4 T15N R94W	PUSCh	1	Unnamed
S4 T15N R94W	PABFh	1	Unnamed (on riser)
S13 T15N R94W	PABFh	1	Dad Dail Reservoir

APPENDIX E: VEGETATION

S13 T15N R94W	PEMCh	1	Unnamed
S18 T15N R93W	PUSCh	1	Unnamed
S23 T15N R94W	PUSAh	1	Unnamed
S20 T15N R93W	PUSAh	1	Unnamed
S20 T15N R93W	PABFh	1	Unnamed
Mexican Flats Quad			
S33 T16N R93W/ S4 T15N R93W	PUSC	1	Unnamed (on line)
S16 T15N R93W	PEMCh	1	Unnamed
S16 T15N R93W	PABFh	1	Unnamed
S21 T15N R93W	PEMCh	1	Unnamed
S21 T15N R93W	PEMCh	2	Unnamed
S21 T15N R93W	PABFh	1	Unnamed

APPENDIX E: VEGETATION

Table E-2. Classification of Linear Wetland Areas Identified on NWI Maps within the Project Area.			
DRAINAGE NAME	PRIMARY TRIBUTARY TO:	SECONDARY TRIBUTARY TO:	CLASSIFICATION
Sand Creek	Little Snake River		R4SBA with scattered
Unnamed Tributaries	Sand Creek	Little Snake River	R4SBA
Reader Cabin Draw	Sand Creek	Little Snake River	R4SBA
Unnamed Tributaries	Reader Cabin Draw	Sand Creek	R4SBA
Grindstone Wash	Sand Creek	Little Snake River	R4SBA with spots of R4SBC
Haystack Wash	West Haystack Wash (outside)	Sand Creek	R4SBA with many
East Haystack Wash	West Haystack Wash(outside)	Sand Creek	R4SBA
Willow Creek	Sand Creek	Little Snake River	R4SBA with limited spots
West Branch of Willow Creek	Willow Creek	Sand Creek	R4ABA
Shallow Creek	West Branch of Willow Creek	Willow Creek	R4SBA
Tributary of Shallow Creek	Shallow Creek	West Branch of Willow Creek	R4SBA
Tributaries of West	West Branch of Willow Creek	Willow Creek	R4SBA
East Branch of Willow Creek	Willow Creek	Sand Creek	R4SBA with scattered R4SBC
Tributaries of East	East Branch of Willow Creek	Willow Creek	R4SBA
North Prong of Red Creek	Sand Creek	Little Snake River	R4SBA

APPENDIX E: VEGETATION

Tributary of North Prong	North Prong of Red Creek	Sand Creek	R4SBA
Hangout Wash	Sand Creek	Little Snake River	R4SBA
Tributaries of Hangout Wash	Hangout Wash	Sand Creek	R4SBA
Hartt Cabin Draw	Sand Creek	Little Snake River	R4SBA
Tributaries of Hartt Cabin Draw	Hartt Cabin Draw	Sand Creek	R4SBA
Cedar Breaks Draw	Sand Creek	Little Snake River	R4SBA
Tributaries of Cedar Breaks Draw	Cedar Breaks Draw	Sand Creek	R4SBA
Colloid Draw	Sand Creek	Little Snake River	R4SBA
Windmill Draw	Windmill Draw Wash (outside)	Red Wash (outside)	R4SBA
Tributaries of Windmill	Windmill Draw	Windmill Draw Wash	R4SBA
South Barrel Springs	Windmill Draw Wash (outside)	Red Wash (outside)	R4SBA
Tributaries to South	South Barrel Springs Draw	Windmill Draw Wash	R4SBA
East Fork Cherokee Creek	Unnamed	Little Snake River	R4SBA

APPENDIX E: VEGETATION

Desolation Flats Wetlands Legend

R4SBC = Riverine, Intermittent, Streambed, Seasonally Flooded.

R4SBA = Riverine, Intermittent, Streambed, Temporarily Flooded

PABFh = Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded

PUSAh = Palustrine, Unconsolidated Shore, Temporarily Flooded, Diked/Impounded

PUSA = Palustrine, Unconsolidated Shore, Temporarily Flooded

PUSAx = Palustrine, Unconsolidated Shore, Temporarily Flooded, Excavated

PEMAh = Palustrine, Emergent, Temporarily Flooded, Diked/Impounded

PEMA = Palustrine, Emergent, Temporarily Flooded

PEMCh = Palustrine, Emergent, Seasonally Flooded, Diked/Impounded

PEMC = Palustrine, Emergent, Seasonally Flooded

PUSCh = Palustrine, Unconsolidated Shore, Seasonally Flooded, Diked/Impounded

PUSC = Palustrine, Unconsolidated Shore, Seasonally Flooded

PUBF = Palustrine, Unconsolidated Bottom, Semipermanently Flooded

PUBFh = Palustrine, Unconsolidated Bottom, Semipermanently Flooded,
Diked/Impounded

PUBFx = Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Excavated

PSSA = Palustrine, Scrub-Shrub, Temporarily Flooded

APPENDIX E: VEGETATION

Wyoming Natural Diversity Database

15 February 2002

Plant Species of Concern In T13-16N and R93-96W and one township buffer For Melody Smith, BKS Environmental.

Citations for Tracked Species

***PENSTEMON GIBBENSII
EOCODE: PDSCR1L6U0*001*WY

Fertig, W. and M.L. Neighbours. 1996. Status report on PENSTEMON GIBBENSII in south-central Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office and Rawlins District by the Wyoming Natural Diversity Database, 31 January 1996. XX pp. (U96FER01WYUS)

Fertig, Walter. Botanist. Wyoming Natural Diversity Database, University of Wyoming, PO Box 3381, Laramie, Wyoming 82071. (307) 766-3020. (PNDFER01WYUS)

Neighbours, M. L. Data manager, Wyoming Natural Diversity Database, 1604 Grand Ave., Suite #2, Laramie, WY 82070. (307) 745-5026. (PNDNEI01WYUS)

Dorn, R.D. 1989. Report on the status of Penstemon gibbensii, a candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, Wyoming. (U89DOR09WYUS)

Marriott, Hollis J. Former Heritage Botanist, WYNDD, and former Public Lands Coordinator, The Nature Conservancy. 655 N. Cedar, Laramie, WY 82070. (307) 721-4909. (PNDMAR01WYUS)

United States Department of the Interior, Bureau of Land Management. 1988. Proposed resource management plan and final environmental impact statement for the Great Divide Resource Area, Rawlins District, WY. (N88UNI01WYUS)

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

Warren, A. 1992. Monitoring/evaluation report on PENSTEMON GIBBENSII. Bureau of Land Management Great Divide Resource Area Memorandum, dated 16 January 1992. (F92WAR01WYUS)

Dorn, R.D. 1982. A new species of PENSTEMON (Scrophulariaceae) from Wyoming. Brittonia 34 (3): 334-335. (A82DOR01WYUS)

Marriott, H. and Dueholm, K. 1987. Field forms for Penstemon gibbensii/Cherokee Basin visit of June 16, 1987 by Wyoming Natural Diversity Database. Special plant survey form and site survey form. (F87MAR01WYUS)

APPENDIX E: VEGETATION

*****CHRYSOTHAMNUS GREENEI**

EOCODE: PDAST2C030*001*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****DESCURAINIA PINNATA SSP PAYSONII**

EOCODE: PDBRAOX03K*006*WY

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

*****ASTRAGALUS NELSONIANUS**

EOCODE: PDFABOF5V0*007*WY

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

Nelson, B.E. (Ernie), Manager, Rocky Mountain Herbarium, Dept. of Botany, P.O. Box 3165, University of Wyoming, Laramie, WY 82071. (307) 766-2236 (PNDNEL01WYUS)

*****ERIGERON COMPACTUS VAR. CONSIMILIS**

EOCODE: PDAST3M550*002*WY

Lichvar, Robert W. [Former botanist with the Wyoming Heritage Program, Wyoming Department of Environmental Quality in Cheyenne]. (PNDLIC01WYUS)

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****ANDROSTEPHIUM BREVIFLORUM**

EOCODE: PMLIL06010*004*WY

Warren, Andy. (PNDWAR01WYUS)

*****SENECIO SPARTIOIDES VAR MULTICAPITATUS**

EOCODE: PDAST8H250*002*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

APPENDIX E: VEGETATION

*****PHACELIA GLANDULOSA VAR DESERTA**
EOCODE: PDHYDOC1S1*003*WY

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

Fertig, W. 1999. Status report on desert glandular phacelia (PHACELIA GLANDULOSA VAR DESERTA) in southwest Wyoming. Report prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, Laramie, Wyoming. (U99FER04WYUS)

*****BOECHERA SELBYI**
EOCODE: PDBRA061T0*003*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****ASTRAGALUS BISULCATUS VAR HAYDENIANUS**
EOCODE: PDFAB0F1B2*002*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****ERIGERON COMPACTUS VAR. CONSIMILIS**
EOCODE: PDAST3M550*004*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****ANDROSTEPHIUM BREVIFLORUM**
EOCODE: PMLIL06010*002*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****POPULUS DELTOIDES VAR WISLIZENII**
EOCODE: PDSAL01043*002*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****SENECIO SPARTIOIDES VAR MULTICAPITATUS**
EOCODE: PDAST8H250*004*WY

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

APPENDIX E: VEGETATION

*****ANDROSTEPHIUM BREVIFLORUM**

EOCODE: PMLIL06010*003*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****GILA ROBUSTA**

EOCODE: AFCJB13150*023*WY

Wheeler, C.A. 1997. Current distributions and distributional changes of fish in Wyoming west of the Continental Divide. M.S. thesis. University of Wyoming, Laramie, WY. (U97WHE01WYUS)

*****ANDROSTEPHIUM BREVIFLORUM**

EOCODE: PMLIL06010*001*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****POPULUS DELTOIDES VAR WISLIZENII**

EOCODE: PDSAL01043*003*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****OPUNTIA POLYACANTHA VAR RUFISPINA**

EOCODE: PDCACOD103*003*WY

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

*****PENSTEMON GIBBENSII**

EOCODE: PDSCR1L6U0*003*WY

Fertig, W. and M.L. Neighbours. 1996. Status report on PENSTEMON GIBBENSII in south-central Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office and Rawlins District by the Wyoming Natural Diversity Database, 31 January 1996. XX pp. (U96FER01WYUS)

Dorn, R.D. 1989. Report on the status of Penstemon gibbensii, a candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, Wyoming. (U89DOR09WYUS)

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

Fertig, Walter. Botanist. Wyoming Natural Diversity Database, University of Wyoming, PO Box 3381, Laramie, Wyoming 82071. (307) 766-3020. (PNDFER01WYUS)

APPENDIX E: VEGETATION

Neighbours, M. L. Data manager, Wyoming Natural Diversity Database, 1604 Grand Ave., Suite #2, Laramie, WY 82070. (307) 745-5026. (PNDNEI01WYUS)

*****POPULUS DELTOIDES VAR WISLIZENII**

EPCODE: PDSAL01043*001*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****GALIUM COLORADOENSE**

EPCODE: PDRUBON010*002*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****DESCURAINIA PINNATA SSP PAYSONII**

EPCODE: PDBRA0X03K*001*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****ERIGERON COMPACTUS VAR. CONSIMILIS**

EPCODE: PDAST3M550*006*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****PENSTEMON GIBBENSII**

EPCODE: PDSCR1L6U0*002*WY

Fertig, W. and M.L. Neighbours. 1996. Status report on PENSTEMON GIBBENSII in south-central Wyoming. Unpublished report prepared for the Bureau of Land Management Wyoming State Office and Rawlins District by the Wyoming Natural Diversity Database, 31 January 1996. XX pp. (U96FER01WYUS)

Dorn, R.D. 1989. Report on the status of Penstemon gibbensii, a candidate Threatened species. Unpublished report prepared for the US Fish and Wildlife Service by Mountain West Environmental Services, Cheyenne, Wyoming. (U89DOR09WYUS)

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

Fertig, Walter. Botanist. Wyoming Natural Diversity Database, University of Wyoming, PO Box 3381, Laramie, Wyoming 82071. (307) 766-3020. (PNDFER01WYUS)

APPENDIX E: VEGETATION

*****SENECIO SPARTIOIDES VAR MULTICAPITATUS**

EOCODE: PDAST8H250*003*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****GALIUM COLORADOENSE**

EOCODE: PDRUBON0L0*004*WY

Dorn, Robert D. Botanical Consultant, Mountain West Environmental Services, Box 1471, Cheyenne, WY 82003. (307) 634-6328. (PNDDOR01WYUS)

*****BOECHERA CRANDALLII**

EOCODE: PDBRA060A0*001*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

*****OPUNTIA POLYACANTHA VAR RUFISPINA**

EOCODE: PDCACOD103*005*WY

Ward, B., B.E. Nelson, and R.L. Hartman. 1998. Final report on the general floristic inventory of south-central Wyoming. Report prepared for the Bureau of Land Management Rawlins and Rock Springs districts by the Rocky Mountain Herbarium, University of Wyoming. 18 pp. + app. (U98WAR01WYUS)

*****PHACELIA TETRAMERA**

EOCODE: PDHYDOC4K0*001*WY

Rocky Mountain Herbarium, University of Wyoming, Department of Botany, P.O. Box 3165 University Station, Laramie, WY 82071. (307) 766-2236. (ONDRMH01WYUS)

APPENDIX E: VEGETATION

Wyoming Natural Diversity Database

15 February 2002

Plant Species of Concern In T13-16N and R93-96W and one township buffer For Melody Smith, BKS Environmental.

Tracked Species

Scientific Name	Common Name	Federal Status	Management Status	Global Rank/ State Rank	Tracked by WYND07	Wyoming Distribution Note	Number of Occurrences in Area
ANDROSTEPHIUM BREVIFLORUM	PURPLE FUNNEL-LILY			G5/S1	Y	PERIPHERAL	4
ASTRAGALUS BISULCATUS VAR. HAYDENIANUS	HAYDEN'S MILKVETCH			G5T47/S1	Y	REGIONAL ENDEMIC	1
ASTRAGALUS NELSONIANUS	NELSON'S MILKVETCH		WY BLM SSL	G2/S2	Y	REGIONAL ENDEMIC	1
ATRIPLEX WOLFII	WOLF'S ORACHE			G3G4/S1	Y	REGIONAL ENDEMIC	2
BOECHERA CRANDALLII	CRANDALL'S ROCKCRESS			G2/S1	Y	REGIONAL ENDEMIC	1
BOECHERA SELBYI	SELBY ROCKCRESS			G4TQ/S1	Y	PERIPHERAL	1
CHRYSOTHAMNUS GREENEI	GREENE RABBITBRUSH			G5/S1?	Y	PERIPHERAL	1
DESCURAINIA PINNATA SSP. PAYSONII	PAYSON'S TANSYHUSTARD			G5T37/S2	Y	PERIPHERAL?	2
ERIGERON COMPACTUS VAR. CONSIDIILIS	SAN RAFAEL DAISY			G4G5/S1	Y	REGIONAL ENDEMIC	3
GALIUM COLORADOENSE	COLORADO BEDSTRAW			G4/S1	Y	PERIPHERAL	2
OPUNTIA POLYACANTHA VAR. RUFISPINA	RUFIOUS-SPINE PRICKLY-PEAR			G5T5/S2	Y	PERIPHERAL	2
FENESTRON GIBBENSII	GIBBENS' BEARDTONGUE		WY BLM SSL	G1/S1	Y	REGIONAL ENDEMIC	3
PHACELIA GLANDULOSA VAR. DESERTA	DESERT GLANDULAR PHACELIA			G4T1T2/S1?	Y		1
PHACELIA TETRAMERA	TINY PHACELIA			G4/S1	Y	PERIPHERAL	1
POPULUS DELTOIDES VAR. WISLIZENII	FREMONT COTTONWOOD			G5T7/S1	Y	PERIPHERAL	3
SENECIO SPARTIODES VAR. MULTICAPITATUS	MANY-HEADED BROOM GROUNDSEL			G4/S1	Y	PERIPHERAL	3

APPENDIX E: VEGETATION

Wyoming Natural Diversity Database

15 February 2002

Plant Species of Concern In T13-16N and R93-96W and one township buffer For Melody Smith, BKS Environmental.

This list is sorted by Township and Range.

Section	Scientific Name (Common Name)	Occurrence Number	Occurrence Type	Occurrence Date
*** Township and Range				
*** T12N R92W				
04	ANDROSTEPHIUM BREVIFLORUM (PURPLE FUNNEL-LILY)	001	SPECIMEN	1968-07-27
05	BOECHERA CRANDALLII (CRANDALL'S ROCKCRESS)	001	SPECIMEN	1968-06-08
*** T12N R93W				
01	ANDROSTEPHIUM BREVIFLORUM (PURPLE FUNNEL-LILY)	002	SPECIMEN	1979-05-25
03-04, 08-09	PENSTEMON GIBBENSII (GIBBENS' BEARDTONGUE)	002	SURVEY	1995-07-11
04	ATRIPLEX WOLFII (WOLF'S GRACHE)	004	SPECIMEN	1970-08-14
SENSITIVE DATA				
	POPULUS DELTOIDES VAR WISLIZENII (FREMONT COTTONWOOD)	001	SPECIMEN	1987-09-23
*** T12N R94W				
06, 16-17	ERIGERON COMPACTUS VAR. CONSIMILIS (SAN RAFAEL DAISY)	002	SPECIMEN	1997-06-17
08	POPULUS DELTOIDES VAR WISLIZENII (FREMONT COTTONWOOD)	003	SPECIMEN	1994-05-30
10	PENSTEMON GIBBENSII (GIBBENS' BEARDTONGUE)	001	SURVEY	1999-06-21
*** T12N R95W				
02, 12	ERIGERON COMPACTUS VAR. CONSIMILIS (SAN RAFAEL DAISY)	002	SPECIMEN	1997-06-17
24	ANDROSTEPHIUM BREVIFLORUM (PURPLE FUNNEL-LILY)	003	SPECIMEN	1993-05-30

APPENDIX E: VEGETATION

<u>***Township and Range</u>				
Section	Scientific Name (Common Name)	Occurrence Number	Occurrence Type	Occurrence Date
*** T12N R96W				
05	ERIGERON COMPACTUS VAR. CONSIMILIS (SAN RAFAEL DAISY)	004	SPECIMEN	1980-07-01
18	BOECHERA SELBYI (SELBY ROCKCRESS)	003	SPECIMEN	1994-05-30
*** T13N R94W				
23	ATRIPLEX WOLFII (WOLF'S ORACHE)	003	SPECIMEN	1967-08-07
30	GALIUM COLORADOENSE (COLORADO BEDSTRAM)	002	SPECIMEN	1970-09-28
*** T13N R95W				
35-36	ERIGERON COMPACTUS VAR. CONSIMILIS (SAN RAFAEL DAISY)	002	SPECIMEN	1997-06-17
*** T13N R96W				
15	POPULUS DELTOIDES VAR WISLIZENII (FREMONT COTTONWOOD)	002	SPECIMEN	1987-08-29
32	ERIGERON COMPACTUS VAR. CONSIMILIS (SAN RAFAEL DAISY)	006	SPECIMEN	1980-06-12
*** T13N R97W				
16	SENECIO SPARTIOIDES VAR MULTICAPITATUS (MANY-HEADED BROOM GROUNDSEL)	002	SPECIMEN	1987-08-29
32	CHRYSOTHAMNUS GREENEI (GREENE RABBITBRUSH)	001	SPECIMEN	1987-08-29
*** T14N R93W				
03,10	PENSTEMON GIBBENSII (GIBBENS' BEARDTONGUE)	003	SURVEY	1995-08-24

APPENDIX E: VEGETATION

<u>***Township and Range</u>				
<u>Section</u>	<u>Scientific Name (Common Name)</u>	<u>Occurrence Number</u>	<u>Occurrence Type</u>	<u>Occurrence Date</u>
*** T14N R94W				
01	OPUNTIA POLYACANTHA VAR RUFISPINA (RUFOUS-SPINE PRICKLY-PEAR)	003	SPECIMEN	1996-07-10
31	GALIUM COLORADOENSE (COLORADO BEDSTRAW)	004	SPECIMEN	1991-06-28
*** T15N R93W				
16	ANDROSTEPHIUM BREVIFLORUM (PURPLE	004	SPECIMEN	1983-06-08
*** T15N R94W				
04	PHACELIA GLANDULOSA VAR DESERTA (DESERT GLANDULAR PHACELIA)	003	SPECIMEN	1996-07-10
31	OPUNTIA POLYACANTHA VAR RUFISPINA (RUFOUS-SPINE PRICKLY-PEAR)	005	SPECIMEN	1996-07-20
*** T15N R97W				
28	DESCURAINIA PINNATA SSP PAYSONII (PAYSON'S TANSYMUSTARD)	001	SPECIMEN	1984-06-20
*** T16N R95W				
22, 27	SENECIO SPARTIOIDES VAR MULTICAPITATUS (MANY-HEADED BROOM GROUNDSEL)	004	SPECIMEN	1996-08-15

APPENDIX E: VEGETATION

<u>***Township and Range</u>				
Section	Scientific Name (Common Name)	Occurrence Number	Occurrence Type	Occurrence Date
*** T16N R97W				
18	DESCURAINIA PINNATA SSP PAYSONII (PAYSON'S TANSYMUSTARD)	006	SPECIMEN	1996-06-12
28	SENECIO SPARTIOIDES VAR MULTICAPITATUS (MANY-HEADED BROOM GROUNDSEL)	003	SPECIMEN	1980-08-08
*** T17N R92W				
33	ASTRAGALUS BISULCATUS VAR HAYDENIANUS (HAYDEN'S MILKVETCH)	002	SPECIMEN	1945-07-05
*** T17N R94W				
06	ASTRAGALUS NELSONIANUS (NELSON'S MILKVETCH)	007	SPECIMEN	1996-06-07
*** T17N R96W				
28	PHACELIA TETRAMERA (TINY PHACELIA)	001	SPECIMEN	1983-06-24
*** T18N R95W				
34	ASTRAGALUS NELSONIANUS (NELSON'S MILKVETCH)	007	SPECIMEN	1996-06-07

APPENDIX E: VEGETATION

Botanical Comments on Sweetwater/Carbon counties
T13-16N R93-96W
For Melody Smith, BKS Environmental

There are no federally Threatened or Endangered plant species known or suspected from the project area. However, 3 of the 4 known occurrences of Gibben's beardtongue are present. It is a Wyoming BLM sensitive species and regional endemic of south-central Wyoming and immediately adjacent northwestern Colorado, and northeastern Utah, ranked "G1" (critically imperiled throughout its range). Gibbens' beardtongue is found primarily on barren shale or sandstone slopes of the Browns Park Formation or Laney member of the Green River shale. Populations typically are found in sparsely vegetated grasslands of *Elymus spicatus*, *Oryzopsis hymenoides*, and *Stipa comata* with scattered shrubs. A status survey for the species was conducted in the project area by Walter Fertig (Fertig 1996) and the results of this study are summarized in the state species abstract ("WYNDD summary".)

The only other Wyoming plant species of special concern that is a regional endemic is Crandall's rockcress (*Boechera crandallii*; syn.: *Arabis crandallii*). It is a regional endemic of southwest Colorado (Gunnison, Hinsdale, and Montrose counties) and southwest Wyoming (Carbon and Sweetwater counties) and ranked "G2" (imperiled throughout its range.) It is found in sagebrush scrub and Utah juniper/mountain mahogany communities on shaley slopes or sandstone ridges and ledges.

There are six other Wyoming plant species of special concern in the project area. The project area contains at least half of the known occurrences in the state for two that are at the northern limits of their range here, including Purple funnel-lily (*Androstephium breviflorum*) and Fremont cottonwood (*Populus deltoides* var. *wislizeni*).

Additional information on these state plant species of special concern in the project area are provided on the WYNDD homepage (<http://www.uwyo.edu/wyndd>).

-Bonnie Heidel, bheidel@uwyo.edu; 8 April 2002

APPENDIX E: VEGETATION

APPENDIX F

WILDLIFE

Table 1. Wildlife and fish species observed or that may potentially occur on or near the Desolation Flats Project Area.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYND	HWA	BLM	FW
MAMMALS							
Badger	<i>Taxidea taxus</i>	y	y		y		
Beaver	<i>Castor canadensis</i>	y	y				
Big-brown bat	<i>Eptesicus fuscus</i>		y				
Bison	<i>Bison bison</i>	y	y				
Black bear	<i>Ursus americanus</i>	y	y				
Black-footed ferret	<i>Mustela nigripes</i>		y				
Bobcat	<i>Felis rufus</i>	y	y				
Bushy-tailed wood rat	<i>Neotoma cinerea</i>	y	y				
Cliff chipmunk	<i>Tamias dorsalis</i>	y	y				
Coyote	<i>Canis latrans</i>	y	y		y		
Deer mouse	<i>Peromyscus maniculatus</i>	y	y				
Desert cottontail	<i>Sylvilagus auduboni</i>	y	y				
Dusky shrew	<i>Sorex monticolus</i>		y				
Dwarf shrew	<i>Sorex nanus</i>		y			y	
Eastern cottontail	<i>Sciurus carolinensis</i>	y					
Eastern red bat	<i>Lasiurus borealis</i>		y				
Eastern fox squirrel	<i>Sciurus niger</i>		y				
Elk	<i>Cervus elaphus</i>	y	y				
Fringed myotis	<i>Myotis thysanodes</i>					y	
Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>	y	y				
Great Basin pocket mouse	<i>Perognathus parvus</i>		y				
Grizzly bear	<i>Ursus arctos</i>		y				
Hoary bat	<i>Lasiurus cinereus</i>		y				
Idaho pocket gopher	<i>Thomomys idahoensis</i>					y	
Least chipmunk	<i>Tamias minimus</i>	y	y				
Little brown myotis	<i>Myotis lucifugus</i>		y				
Long-eared myotis	<i>Myotis evotis</i>		y			y	
Long-legged myotis	<i>Myotis volans</i>		y				
Long-tailed vole	<i>Microtus longicaudus</i>		y				
Long-tailed weasel	<i>Mustela frenata</i>	y	y		y		
Marten	<i>Martes americana</i>		y				
Masked shrew	<i>Sorex cinereus</i>		y				
Meadow jumping mouse	<i>Zapus hudsonius</i>		y				
Meadow vole	<i>Microtus pennsylvanicus</i>		y				
Merriam's shrew	<i>Sorex merriami</i>		y				
Mink	<i>Mustela vison</i>		y				
Montane vole	<i>Microtus montanus</i>		y				
Moose	<i>Alces alces shirasi</i>	y	y				
Mountain (Nuttall's) cottontail	<i>Sylvilagus nuttalli</i>	y	y				
Mountain lion	<i>Felis concolor</i>	y	y				
Mule deer	<i>Odocoileus hemionus</i>	y	y				
Muskrat	<i>Ondatra zibethicus</i>	y	y				
Northern grasshopper mouse	<i>Onychomys leucogaster</i>	y	y				
Northern pocket gopher	<i>Thomomys talpoides</i>		y				
Olive-backed pocket mouse	<i>Perognathus fasciatus</i>	y	y				
Ord's kangaroo rat	<i>Dipodomys ordii</i>	y	y				

APPENDIX F: WILDLIFE

Table 1 Continued.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYNDD	HWA	BLM	FOW
Pika	<i>Ochotona princeps</i>		Y				
Pinyon mouse	<i>Peromyscus truei</i>	Y	Y				
Porcupine	<i>Erethizon dorsatum</i>		Y				
Pronghorn antelope	<i>Antilocapra americana</i>	Y	Y				
Pygmy rabbit	<i>Brachylagus idahoensis</i>		Y			Y	
Raccoon	<i>Procyon lotor</i>	Y	Y				
Red fox	<i>Vulpes vulpes</i>	Y	Y				
Red squirrel	<i>Tamiasciurus hudsonicus</i>		Y				
Sagebrush vole	<i>Lemmiscus curtatus</i>		Y				
Short-tailed (ermine) weasel	<i>Mustela erminea</i>		Y				
Silky pocket mouse	<i>Perognathus flavus</i>	Y	Y				
Silver-haired bat	<i>Lasiorycteris noctivagans</i>		Y				
Snowshoe hare	<i>Lepus americanus</i>		Y				
Southern red-backed vole	<i>Clethrionomys gapperi</i>		Y				
Spotted bat	<i>Euderma maculatum</i>					Y	
Spotted ground squirrel	<i>Spermophilus tridecemlineatus</i>		Y				
Striped skunk	<i>Mephitis mephitis</i>	Y	Y				
Swift fox	<i>Vulpes velox</i>		Y			Y	
Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>	Y	Y				
Townsend's big-eared bat	<i>Plecotus townsendii</i>					Y	
Uinta chipmunk	<i>Tamius umbrinus</i>		Y				
Uinta ground squirrel	<i>Spermophilus armatus</i>		Y				
Water shrew	<i>Sorex palustris</i>		Y				
Western heather vole	<i>Phenacomys intermedius</i>		Y				
Western jumping mouse	<i>Zapus princeps</i>	Y	Y				
Western small-footed myotis	<i>Myotis californicus</i>	Y	Y				
White-tailed deer	<i>Odocoileus virginianus</i>	Y	Y				
White-tailed jackrabbit	<i>Lepus townsendii</i>	Y	Y				
White-tailed prairie dog	<i>Cynomys leucurus</i>	Y	Y			Y	
Wild horse	<i>Equus caballus</i>	Y					
Wyoming ground squirrel	<i>Spermophilus elegans</i>		Y				
Wyoming pocket gopher	<i>Thomomys clusius</i>		Y			Y	
Yellow-bellied marmot	<i>Marmota flaviventris</i>		Y				
Yellow-pine chipmunk	<i>Tamius amoenus</i>		Y				
BIRDS							
Acorn woodpecker	<i>Meianerpes formicivorus</i>		Y				
American avocet	<i>Recurvirostra americana</i>	Y	Y				
American bittern	<i>Botaurus lentiginosus</i>		Y				
American coot	<i>Fulica americana</i>	Y	Y				
American crow	<i>Corvus brachyrhynchos</i>		Y				
American dipper	<i>Cinclus mexicanus</i>		Y				
American goldfinch	<i>Carduelis tristis</i>		Y				
American kestrel	<i>Falco sparverius</i>	Y	Y			Y	
American pipit	<i>Anthus rubescens</i>		Y				
American redstart	<i>Setophaga ruticilla</i>		Y				
American robin	<i>Turdus migratorius</i>	Y	Y				
American tree sparrow	<i>Spizella arborea</i>		Y				
American white pelican	<i>Pelecanus erythrorhynchos</i>		Y				
American wigeon	<i>Anas americana</i>	Y	Y				
Anna's hummingbird	<i>Calypte anna</i>	Y					
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>	Y	Y				

APPENDIX F: WILDLIFE

Table 1 Continued.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYNDD	HWA	BLM	FOW
Baird's sandpiper	<i>Calidris bairdi</i>		Y				
Baird's sparrow	<i>Ammodramus bairdi</i>					Y	
Bald eagle	<i>Haliaeetus leucocephalus</i>	Y	Y		Y		
Bank swallow	<i>Riparia riparia</i>	Y	Y		Y		
Barn owl	<i>Tyto alba</i>		Y				
Barn swallow	<i>Hirundo rustica</i>	Y	Y				
Barrow's goldeneye	<i>Bucephala islandica</i>		Y				
Belted kingfisher	<i>Ceryle alcyon</i>	Y	Y				
Bewick's wren	<i>Thryomanes bewickii</i>	Y	Y				
Black rosy-finch	<i>Leucosticte atrata</i>		Y				
Black tern	<i>Chlidonias niger</i>		Y				
Black-and-white warbler	<i>Mniotilta varia</i>		Y				
Black-bellied plover	<i>Pluvialis dominicus</i>		Y				
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>		Y				
Black-billed magpie	<i>Pica pica</i>	Y	Y				
Black-capped chickadee	<i>Parus atricapillus</i>		Y				
Black-crowned night heron	<i>Nycticorax nycticorax</i>		Y				
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>		Y				
Black-necked stilt	<i>Himantopus mexicanus</i>		Y				
Black-throated gray warbler	<i>Dendroica caerulescens</i>	Y	Y				
Black-throated sparrow	<i>Amphispiza bilineata</i>		Y				
Blue grosbeak	<i>Guiraca caerulea</i>		Y				
Blue grouse	<i>Dendragapus obscurus</i>		Y				
Blue jay	<i>Cyanocitta cristata</i>		Y				
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	Y	Y				
Blue-winged teal	<i>Anas discors</i>	Y	Y				
Bobolink	<i>Dolichonyx oryzivorus</i>		Y				
Bohemian waxwing	<i>Bombycilla garrulus</i>		Y				
Bonaparte's gull	<i>Spizella breweri</i>	Y	Y				
Brewer's sparrow	<i>Euphagus cyanocephalus</i>	Y	Y				Y
Brewer's blackbird	<i>Selasphorus platycercus</i>	Y	Y				
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>		Y				
Broad-winged hawk	<i>Buteo platypterus</i>		Y				
Brown creeper	<i>Certhia americana</i>		Y				
Brown thrasher	<i>Taxostoma rufum</i>		Y				
Brown-capped rosy-finch	<i>Leucosticte australis</i>		Y				
Brown-headed cowbird	<i>Molothrus ater</i>	Y	Y				
Buff-breasted sandpiper	<i>Tryngites subruficollis</i>		Y				
Bufflehead	<i>Bucephala albeola</i>	Y	Y				
Burrowing owl	<i>Athene cucularia</i>	Y	Y	Y	Y	Y	
Bush-tit	<i>Psaltiriparus minimus</i>	Y	Y				
California gull	<i>Larus californicus</i>		Y				
Calliope hummingbird	<i>Stellula calliope</i>		Y				
Canada goose	<i>Branta canadensis</i>	Y	Y				
Canvasback	<i>Aythya valisineria</i>		Y				
Canyon wren	<i>Catherpes mexicanus</i>	Y	Y				
Caspian tern	<i>Sterna caspia</i>		Y				
Cassin's finch	<i>Carpodacus cassinii</i>		Y				
Cattle egret	<i>Bubulcus ibis</i>		Y				
Cedar waxwing	<i>Bombycilla cedrorum</i>		Y				
Chestnut-collared longspur	<i>Calcarius ornatus</i>		Y				

APPENDIX F: WILDLIFE

Table 1 Continued.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYND	HWA	BLM	FOW
Chipping sparrow	<i>Spizella passerina</i>	y	y				
Cinnamon teal	<i>Anas cyanoptera</i>	y	y				
Clark's grebe	<i>Aechmophorus clarkii</i>		y				
Clark's nutcracker	<i>Nucifraga columbiana</i>	y	y				
Clay-colored sparrow	<i>Spizella pallida</i>		y				
Cliff swallow	<i>Hirundo pyrrhonota</i>	y	y		y		
Columbian sharp-tailed grouse	<i>Tympanuchus phasianellus columbianus</i>		y			y	
Common goldeneye	<i>Bucephala clangula</i>		y				
Common grackle	<i>Quiscalus quiscula</i>		y				
Common merganser	<i>Mergus merganser</i>	y	y				
Common nighthawk	<i>Chordeiles minor</i>	y	y		y		
Common poorwill	<i>Phalaenoptilus nuttallii</i>	y	y				
Common raven	<i>Corvus corax</i>		y				
Common redpoll	<i>Carduelis flammea</i>		y				
Common snipe	<i>Gallinago gallinago</i>		y				
Common tern	<i>Sterna hirundo</i>		y				
Common yellowthroat	<i>Geothlypis trichas</i>		y		y		
Common loon	<i>Gavia immer</i>		y				
Cooper's hawk	<i>Accipiter cooperii</i>	y	y		y		
Cordilleran fly catcher	<i>Empidonax occidentalis</i>		y				
Dark-eyed junco	<i>Junco hyemalis</i>	y	y				
Double-crested cormorant	<i>Phalacrocorax auritus</i>		y				
Downy woodpecker	<i>Picoides pubescens</i>	y	y				
Dunlin	<i>Calidris alpina</i>		y				
Dusky flycatcher	<i>Empidonax oberholseri</i>	y	y				
Eared grebe	<i>Podiceps nigricollis</i>	y	y				
Eastern kingbird	<i>Tyrannus tyrannus</i>		y				
European starling	<i>Sturnus vulgaris</i>		y				
Evening grosbeak	<i>Coccothraustes vespertinus</i>		y				
Ferruginous hawk	<i>Buteo regalis</i>	y	y		y	y	
Forster's tern	<i>Sterna forsteri</i>		y				
Fox sparrow	<i>Passerella iliaca</i>		y				
Franklin's gull	<i>Larus pipixcan</i>	y	y				
Gadwall	<i>Anas strepera</i>	y	y				
Golden eagle	<i>Aquila chrysaetos</i>	y	y		y		
Golden-crowned kinglet	<i>Regulus satrapa</i>		y				
Gray catbird	<i>Dumetella carolinensis</i>		y				
Gray flycatcher	<i>Empidonax wrightii</i>	y	y				
Gray jay	<i>Perisoreus canadensis</i>		y				
Gray-crowned rosy-finch	<i>Leucosticte tephrocotis</i>		y				
Great-blue heron	<i>Ardea herodias</i>	y	y				
Greater prairie chicken	<i>Tympanuchus cupido</i>	y					
Greater yellowlegs	<i>Tringa melanoleuca</i>	y	y				
Great horned owl	<i>Bubo virginianus</i>	y	y				
Green heron	<i>Butorides virescens</i>	y	y				
Green-tailed towhee	<i>Pipilo chlorurus</i>	y	y				
Green-winged teal	<i>Anas crecca</i>	y	y				
Hairy woodpecker	<i>Picoides villosus</i>		y				
Hammond's flycatcher	<i>Empidonax hammondi</i>		y				
Hermit thrush	<i>Catharus guttatus</i>		y				
Herring gull	<i>Larus argentatus</i>		y				

APPENDIX F: WILDLIFE

Table 1 Continued.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYNDD	HWA	BLM	FOW
Hooded merganser	<i>Lophodytes cucullatus</i>		y				
Horned grebe	<i>Podiceps auritus</i>		y				
Horned lark	<i>Eremophila alpestris</i>	y	y		y		
House finch	<i>Carpodacus mexicanus</i>	y	y				
House sparrow	<i>Passer domesticus</i>		y				
House wren	<i>Troglodytes aedon</i>	y	y				
Indigo bunting	<i>Passerina cyanea</i>		y				
Killdeer	<i>Charadrius vociferus</i>	y	y		y		
Lark bunting	<i>Calamospiza melanocorys</i>	y	y		y		
Lark sparrow	<i>Chondestes grammacus</i>	y	y				
Lazuli bunting	<i>Passerina amoena</i>		y				
Least flycatcher	<i>Empidonax minimus</i>		y				
Least sandpiper	<i>Calidris minutilla</i>		y				
Lesser scaup	<i>Aythya affinis</i>	y	y				
Lesser yellowlegs	<i>Tringa flavipes</i>		y				
Lewis' woodpecker	<i>Melanerpes lewis</i>		y				
Lincoln's sparrow	<i>Melospiza lincolni</i>		y				
Loggerhead shrike	<i>Lanius ludovicianus</i>	y	y		y	y	
Long-billed curlew	<i>Numenius americanus</i>	y	y				y
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>	y	y				
Long-eared owl	<i>Asio otus</i>	y	y				
Macgillivray's warbler	<i>Oporornis tolmiei</i>		y				
Mallard	<i>Anas platyrhynchos</i>	y	y				
Marbled godwit	<i>Limosa fedora</i>		y				
Marsh wren	<i>Cistothorus palustris</i>		y				
McCown's longspur	<i>Calcarius mccownii</i>		y				
Merlin	<i>Falco columbarius</i>		y				
Mountain bluebird	<i>Sialia cumucoides</i>	y	y		y		
Mountain chickadee	<i>Parus gambeli</i>	y	y				
Mountain plover	<i>Charadrius montanus</i>	y	y	y	y		
Mourning dove	<i>Zenaidura macroura</i>	y	y		y		
Nashville warbler	<i>Vermivora ruficapilla</i>	y	y				
Northern (Bullock's) oriole	<i>Icterus bullockii</i>	y					
Northern flicker	<i>Colaptes auratus</i>	y	y		y		
Northern goshawk	<i>Accipiter gentilis</i>	y	y				y
Northern harrier	<i>Circus cyaneus</i>	y	y		y		
Northern mockingbird	<i>Mimus polyglottos</i>		y				
Northern pintail	<i>Anas acuta</i>		y				
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>		y				
Northern saw-whet owl	<i>Aegolius acadicus</i>		y				
Northern shoveler	<i>Anas clypeata</i>	y	y				
Northern shrike	<i>Lanius excubitor</i>	y	y				
Northern waterthrush	<i>Seiurus noveboracensis</i>		y				
Oldsquaw	<i>Clangula hyemalis</i>		y				
Olive-sided flycatcher	<i>Contopus borealis</i>		y				
Orange-crowned warbler	<i>Vermivora celata</i>		y				
Ovenbird	<i>Seiurus aurocapillus</i>		y				
Pacific loon	<i>Gavia pacifica</i>		y				
Pectoral sandpiper	<i>Calidris melanotos</i>		y				
Peregrine falcon	<i>Falco peregrinus</i>		y				y
Pied billed grebe	<i>Podilymbus podiceps</i>		y				

APPENDIX F: WILDLIFE

Table 1 Continued.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYNDD	HWA	BLM	FOW
Pine grosbeak	<i>Pinicola enucleator</i>		Y				
Pine siskin	<i>Carduelis pinus</i>	Y	Y				
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	Y	Y				
Plain titmouse	<i>Baeolophus griseus</i>	Y					
Prairie falcon	<i>Falco mexicanus</i>	Y	Y		Y		
Red crossbill	<i>Loxia curvirostra</i>		Y				
Red knot	<i>Calidris canutus</i>		Y				
Red phalarope	<i>Phalaropus fulicaria</i>		Y				
Red-breasted merganser	<i>Mergus serrator</i>		Y				
Red-breasted nuthatch	<i>Sitta canadensis</i>	Y	Y				
Red-eyed vireo	<i>Vireo olivaceus</i>		Y				
Redhead	<i>Aythya americana</i>	Y	Y				
Red-headed woodpecker	<i>Meianerpes erythrocephalus</i>		Y				
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>		Y				
Red-necked grebe	<i>Podiceps grisegena</i>		Y				
Red-necked phalarope	<i>Phalaropus lobatus</i>	Y	Y				
Red-tailed hawk	<i>Buteo jamaicensis</i>	Y	Y		Y		
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Y	Y				
Ring-billed gull	<i>Larus delawarensis</i>		Y				
Ring-necked duck	<i>Aythya collaris</i>	Y	Y				
Rock dove	<i>Columba livia</i>		Y				
Rock wren	<i>Salpinctes obsoletus</i>	Y	Y				
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>		Y				
Ross' goose	<i>Chen rossii</i>		Y				
Rough-legged hawk	<i>Buteo lagopus</i>	Y	Y				
Ruby-crowned kinglet	<i>Regulus calendula</i>	Y	Y				
Ruddy duck	<i>Oxyura jamaicensis</i>	Y	Y				
Ruddy turnstone	<i>Arenaria interpres</i>		Y				
Rufous hummingbird	<i>Selasphorus rufus</i>		Y				
Sabine's gull	<i>Xema sabini</i>		Y				
Sage grouse, greater	<i>Centrocercus urophasianus</i>	Y	Y		Y	Y	
Sage sparrow	<i>Amphispiza belli</i>	Y	Y			Y	
Sage thrasher	<i>Oreoscoptes montanus</i>	Y	Y		Y	Y	
Sanderling	<i>Calidris alba</i>		Y				
Sandhill crane	<i>Grus canadensis</i>	Y	Y				
Savannah sparrow	<i>Passerculus sandwichensis</i>		Y				
Say's phoebe	<i>Sayornis saya</i>	Y	Y		Y		
Scott's oriole	<i>Icterus parisorum</i>	Y	Y	Y			
Semipalmated plover	<i>Charadrius semipalmatus</i>		Y				
Semipalmated sandpiper	<i>Calidris pusilla</i>		Y				
Sharp-shinned hawk	<i>Accipiter striatus</i>	Y	Y				
Short eared owl	<i>Asio flammeus</i>	Y	Y				
Short-billed dowitcher	<i>Limnodromus griseus</i>		Y				
Snow bunting	<i>Plectrophenax nivalis</i>		Y				
Snow goose	<i>Chen caerulescens</i>		Y				
Snowy egret	<i>Egretta thula</i>		Y				
Snowy owl	<i>Nyctea scandiaca</i>		Y				
Snowy plover	<i>Charadrius alexandrinus</i>		Y	Y			
Sora	<i>Porzana carolina</i>		Y				
Solitary sandpiper	<i>Tringa solitaria</i>		Y				
Solitary vireo	<i>Vireo solitarius</i>		Y				

APPENDIX F: WILDLIFE

Table 1 Continued.

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYNDD	HWA	BLM	FOW
Song sparrow	<i>Melospiza melodia</i>		y				
Spotted sandpiper	<i>Actitis macularia</i>		y				
Spotted towhee	<i>Pipilo maculatus</i>		y				
Steller's jay	<i>Cyanocitta stelleri</i>		y				
Stilt sandpiper	<i>Calidris himantopus</i>		y				
Surf scoter	<i>Melanitta perspicillata</i>		y				
Swainson's hawk	<i>Buteo swainsoni</i>	y	y		y		
Swainson's thrush	<i>Catharus ustulatus</i>	y	y				
Swamp sparrow	<i>Melospiza georgiana</i>		y				
Tennessee warbler	<i>Vermivora peregrina</i>		y				
Three-toed woodpecker	<i>Picoides tridactylus</i>	y	y				
Townsend's solitaire	<i>Myadestes townsendii</i>		y				
Townsend's warbler	<i>Dendroica townsendii</i>		y				
Tree swallow	<i>Tachycineta bicolor</i>		y				
Trumpeter swan	<i>Cygnus buccinator</i>	y	y				y
Tundra swan	<i>Cygnus columbianus</i>		y				
Turkey vulture	<i>Cathartes aura</i>	y	y		y		
Veery	<i>Catharus fuscescens</i>		y				
Vesper sparrow	<i>Poocetes gramineus</i>	y	y		y		
Violet-green swallow	<i>Tachycineta thalassina</i>	y	y				
Virginia rail	<i>Rallus limicola</i>		y				
Virginia's warbler	<i>Vermivora virginiae</i>		y				
Warbling vireo	<i>Vireo gilvus</i>		y				
Western bluebird	<i>Sialia mexicana</i>		y		y		
Western grebe	<i>Aechmophorus occidentalis</i>		y				
Western kingbird	<i>Tyrannus verticalis</i>	y	y		y		
Western meadowlark	<i>Sturnella neglecta</i>	y	y		y		
Western sandpiper	<i>Calidris mauri</i>		y				
Western scrub-jay	<i>Apheloma californica</i>	y	y				
Western tanager	<i>Piranga ludoviciana</i>	y	y				
Western wood-peewee	<i>Cantopus sordidulus</i>		y				
Whimbrel	<i>Numerius phaeopus</i>		y				
White-breasted nuthatch	<i>Sitta carolinensis</i>		y				
White-crowned sparrow	<i>Zonotrichia leucophrys</i>		y				
White-faced ibis	<i>Plegadis chihi</i>	y	y				y
White-throated swift	<i>Aeronautes saxatalis</i>	y	y				
White-winged crossbill	<i>Loxia leucoptera</i>		y				
White-winged scoter	<i>Melanitta fusca</i>		y				
Willet	<i>Catoptrophorus semipalmatus</i>	y	y				
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>		y				
Willow flycatcher	<i>Empidonax traillii</i>		y				
Wilson's phalarope	<i>Phalaropus tricolor</i>	y	y				
Wilson's warbler	<i>Wilsonia pusilla</i>	y	y				
Wood duck	<i>Aix sponsa</i>		y				
Yellow warbler	<i>Dendroica petechia</i>		y				
Yellow-billed cuckoo	<i>Coccyzus americanus</i>						y
Yellow-breasted chat	<i>Icteria virens</i>		y				
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>		y				
Yellow-rumped warbler	<i>Dendroica coronata</i>		y				

APPENDIX F: WILDLIFE

Common Name	Scientific Name	Data Sources*					
		WOS	ATLAS	WYND	HWA	BLM	FOW
AMPHIBIANS							
Boreal chorus frog	<i>Pseudacris triseriata maculata</i>		y				
Boreal toad	<i>Bufo boreas boreas</i>		y	y		y	
Great Basin spadefoot toad	<i>Scaphiopus intermontanus</i>	y	y			y	
Northern leopard frog	<i>Rana pipiens</i>		y	y		y	
Plains spadefoot toad	<i>Scaphiopus bombifrons</i>	y					
Spotted frog	<i>Rana pretiosa</i>					y	
Tiger salamander	<i>Ambystoma tigrinum</i>	y	y				
REPTILES							
Eastern short horned lizard	<i>Phrynosoma douglassi brevirostre</i>		y				
Great Basin gopher snake	<i>Pituophis melanoleucas deserticola</i>		y	y			
Many-lined skink	<i>Eumeces multivirgatus</i>		y				
Midget-faded rattlesnake	<i>Crotalus viridis concolor</i>					y	
Northern sagebrush lizard	<i>Sceloporus graciosus graciosus</i>		y				
Ornate box turtle	<i>Terrapene ornata ornata</i>		y				
Pale milk snake	<i>Lampropeltis triangulum multistrata</i>		y				
Prairie rattlesnake	<i>Crotalus viridis viridis</i>	y	y		y		
Wandering garter snake	<i>Thamnophis elegans vagrans</i>		y				
Western plains garter snake	<i>Thamnophis radix haydeni</i>		y				
Western smooth green snake	<i>Opheodrys vernalis blanchardi</i>		y	y			
Fish							
Bluehead sucker	<i>Catostomus discobolus</i>			y		y	
Bonytail	<i>Gila elegans</i>			y		y	
Brook trout	<i>Salvelinus fontinalis</i>					y	
Brown trout	<i>Salmo trutta</i>					y	
Channel catfish	<i>Ictalurus punctatus</i>					y	
Colorado pikeminnow	<i>Ptychocheilus lucius</i>			y		y	
Colorado River cutthroat trout	<i>Oncorhynchus clarki pleuriticus</i>			y		y	
Common carp	<i>Cyprinus carpio</i>					y	
Creek chub	<i>Semotilus atromaculatus</i>					y	
Flannelmouth sucker	<i>Catostomus latipinnis</i>			y		y	
Humpback chub	<i>Gila cypha</i>			y		y	
Leatherside chub	<i>Gila copei</i>					y	
Mottled sculpin	<i>Cottus bairdi</i>					y	
Mountain sucker	<i>Catostomus platyrhynchus</i>					y	
Mountain whitefish	<i>Prosopium williamsoni</i>					y	
Rainbow trout	<i>Oncorhynchus mykiss</i>					y	
Razorback sucker	<i>Xyrauchen texanus</i>			y		y	
Redside shiner	<i>Richardsonius balteatus</i>					y	
Roundtail chub	<i>Gila robusta</i>			y		y	
Speckled dace	<i>Rhinichthys osculus</i>					y	
White sucker	<i>Catostomus commersoni</i>					y	

***Data Sources**

- WGFD Wildlife Observation System (2000a)
- Atlas of Birds, Mammals, Reptiles and Amphibians in Wyoming (WGFD 1999)
- Wyoming Natural Diversity Database (2000)
- Hayden-Wing Associates Field Surveys During 2000, 2001
- BLM Wyoming Sensitive Species List (USDI-BLM 2001)
- Fishes of Wyoming (Baxter and Stone 1995)

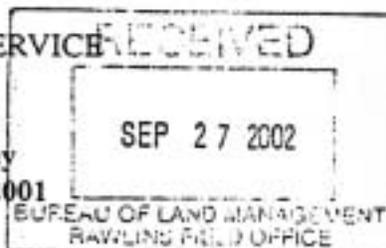
APPENDIX F: WILDLIFE



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4000 Airport Parkway
Cheyenne, Wyoming 82001



ES-61411
at/W.02/wy6207.at

September 23, 2002

Memorandum:

To: Kurt Kotter, Field Manager, Bureau of Land Management, Rawlins Field Office.
Rawlins, Wyoming

From: Mike Long, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field
Office, Cheyenne, Wyoming *Mike Long*

Subject: Updated Species for the Desolation Flats Natural Gas Development Project

Thank you for the request for an updated species list for the Desolation Flats Natural Gas Development Project in Carbon and Sweetwater counties, Wyoming.

In accordance with section 7(c) of the Endangered Species Act of 1973, as amended (Act), my staff has determined that the following threatened or endangered species, or species proposed for listing under the Act, may be present in the project area.

LISTED AND PROPOSED SPECIES

<u>Species</u>	<u>Status</u>	<u>Expected Occurrence</u>
Black-footed ferret (<i>Mustela nigripes</i>)	Endangered	Potential resident in prairie dog (<i>Cynomys</i> sp.) colonies.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Threatened	Nesting. Winter resident. Migrant.
Mountain plover (<i>Charadrius montanus</i>)	Proposed	Grasslands statewide
Ute ladies'-tresses (<i>Spiranthes diluvialis</i>)	Threatened	Seasonally moist soils and wet meadows of drainages below 6500 feet elevation.
Canada lynx (<i>Lynx canadensis</i>)	Threatened	Resident of forested areas

APPENDIX F: WILDLIFE

Kurt Kotter

2

Black-footed ferret

Black-footed ferrets may be affected if prairie dog colonies are impacted. If white-tailed prairie dog colonies or complexes greater than 200 acres will be disturbed, surveys for ferrets should be conducted even if only a portion of the colony or complex will be disturbed. If a field check indicates that prairie dog towns may be affected, you should contact this office for guidance on ferret surveys.

Bald eagle

Bald eagles are known to nest near the project area, in the vicinity of the Little Snake River. The Service recommends the project area be surveyed for nesting eagles and roost areas. If any active nests or roost areas are identified within 1 mile of the proposed project, we recommend avoiding work in the area between February 15 and August 15 (nesting), and November 15 and March 15 (winter roosting) to avoid impacts to any nests and roost areas. If timing and/or location of the work cannot be modified to avoid possible impacts you should contact this office to discuss consultation requirements pursuant to the Act.

Mountain plover

In the Federal Register dated February 16, 1999, the U.S. Fish and Wildlife Service (Service) gave notice of a proposal to list the mountain plover as a threatened species pursuant to the Act. A final listing decision is expected in the near future. The mountain plover is a small bird associated with shortgrass prairie and shrub-steppe landscapes. Mountain plover breeding habitats are known to include grasslands, mixed grassland areas and short-grass prairie, shrub-steppe, plains, alkali flats, agricultural lands, cultivated lands, sod farms, and prairie dog towns. Plovers may nest on sites where vegetation is sparse or absent, or near closely cropped areas, manure piles or rocky areas. Mountain plovers are rarely found near water and show a preference for previously disturbed areas or modified habitat. We have information that the mountain plover or its habitat occurs near the project area. If the mountain plover is listed prior to the completion of your project, unnecessary delays may be avoided by considering project impacts to this species now.

Ute ladies'-tresses

Ute ladies'-tresses is a perennial, terrestrial orchid, endemic to moist soils near wetland meadows, springs, lakes, and perennial streams. It occurs generally in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows at elevations from 4,200 to 7,000 feet. The orchid colonizes early successional riparian habitats such as point bars, sand bars, and low lying gravelly, sandy, or cobbly edges, persisting in those areas where the hydrology provides continual dampness in the root zone through the growing season. Recent discoveries of orchid colonies in Wyoming and Montana indicate that surveys for and inventories of orchid occurrences continue to be an important part of orchid recovery planning and implementation.

Canada lynx

In Wyoming, the lynx lives in subalpine/coniferous forests of mixed age and structural classes. Mature forests with downed logs and windfalls provide cover for denning sites, escape, and

APPENDIX F: WILDLIFE

Kurt Kotter

3

protection from severe weather. Early successional forest stages provide habitat for the lynx's primary prey, the snowshoe hare. The home range of a lynx can be 5 to 94 square miles. They are capable of moving extremely long distances in search of food. Lynx are highly dependent on snowshoe hare, but when hare populations drop they also prey on other small mammals and birds. The U.S. Fish and Wildlife Service (Service) published a final rule in the Federal Register on March 24, 2000, listing the North American lynx population in the contiguous United States as threatened, pursuant to the Endangered Species Act. The Service identified that significant threats to the lynx were (1) loss and/or modification of habitat; (2) past commercial harvest (trapping), which is partially responsible for the extremely small lynx population; (3) inadequate regulatory mechanisms to protect lynx and their habitat; and (4) other factors such as increased human access into suitable habitat and human-induced changes in habitat allowing other species (e.g., bobcats and coyotes) to move into lynx habitat and compete with them.

Federal agencies are also encouraged to consider sensitive species or species at risk in project review. Your consideration of these species is important in preventing their inclusion on the Endangered Species List. The Wyoming Natural Diversity Database maintains the most current information on sensitive plants in Wyoming.

Colorado River water depletions

If the proposed action will lead to water depletion (consumption) in the Colorado River System, impacts to the following species should be included in the evaluation:

Bonytail (<i>Gila elegans</i>)	Endangered	Downstream resident of Green River System.	
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Endangered	"	"
Humpback chub (<i>Gila cypha</i>)	Endangered	"	"
Razorback sucker (<i>Xyrauchen texanus</i>)	Endangered	"	"

Please keep this office informed of any decisions or developments concerning this project. If you have any further questions please contact Audrey Taylor of my staff at the letterhead address or phone (307) 772-2374, extension 37.

cc: Statewide Habitat Protection, WGFD, Cheyenne, WY

APPENDIX G: WILDLIFE RESOURCES

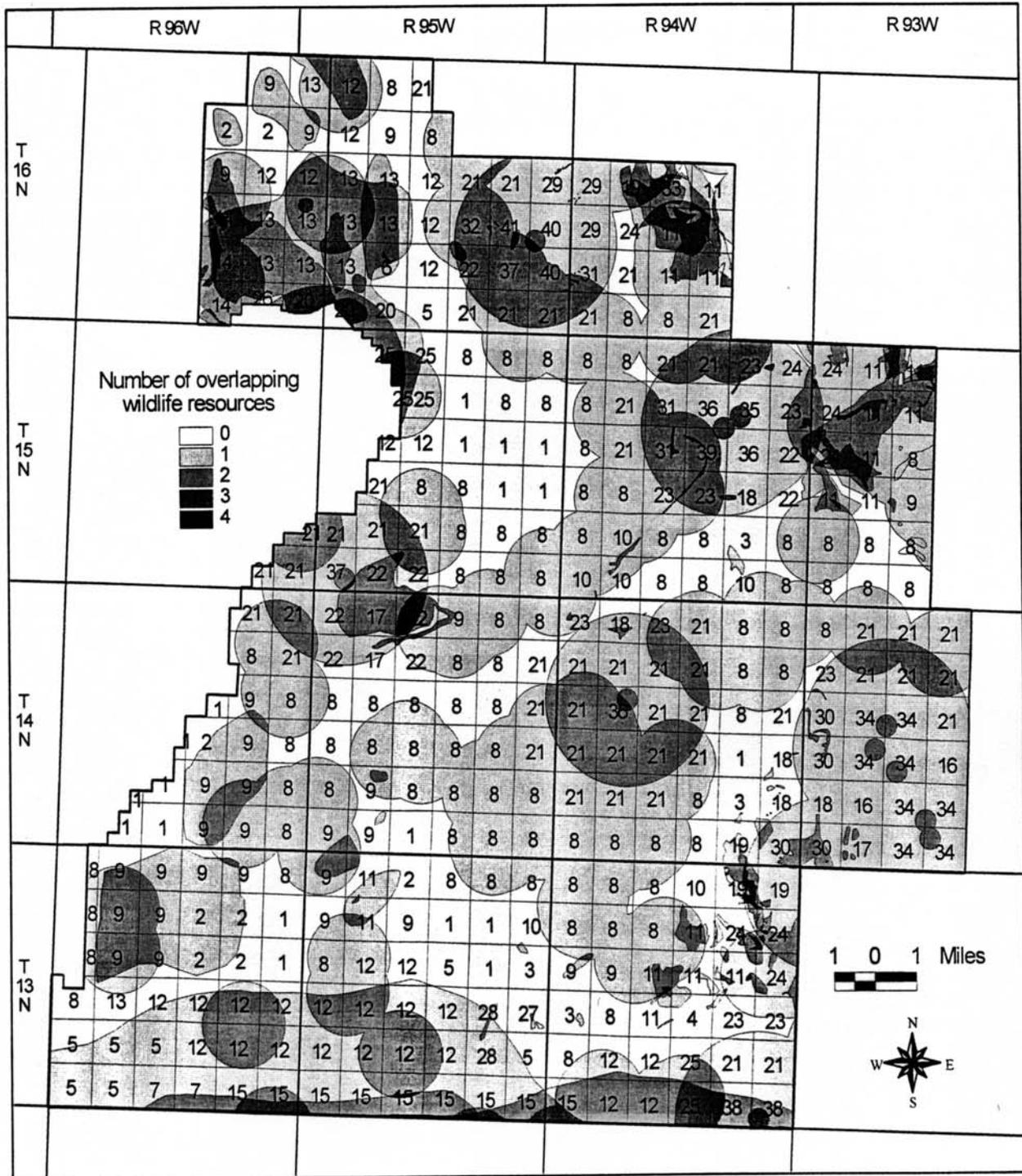


Figure G-1. Locations and types of wildlife resources that could potentially be impacted within each section of the DFWA. Numbers in sections are resource codes listed in Table G-1 and describe the combinations of wildlife resources present. The physical distribution and overlap of wildlife resources is depicted by levels of shading. Wildlife resource include: big game (elk, mule deer, pronghorn) crucial winter range; greater sage grouse leks (1/4 mi. buffer), nesting habitat (2-mile buffer around leks), and severe winter relief habitat; potential mountain plover habitat; raptor nest 1-mile buffers; and prairie dog colonies.

APPENDIX G: WILDLIFE RESOURCES

Table G-1. Wildlife Resource Code Definitions. Potential resources included in this summary are: Big game crucial winter range habitat, overlapping big game crucial winter range, prairie dog colonies, potential mountain plover habitat, raptor nests, sage grouse leks (1/4 mi. buffer), sage grouse nesting habitat (2-mile lek buffer), and sage grouse severe winter relief habitat.

Resource Code	Definition of code	Number of Resources	Number of Sections
1	None of the resources present	0	19
2	Mountain plover habitat	1	8
3	Prairie Dog colony	1	4
4	Mountain plover habitat and prairie dog colony	2	1
5	Big game CWR only	1	8
6	Big game CWR, prairie dog colony, and mountain plover habitat	3	1
7	Overlapping big game CWR	1	2
8	Raptor nest	1	92
9	Raptor nest and mountain plover habitat	2	28
10	Raptor nest and prairie dog colony	2	6
11	Raptor nest, prairie dog colony, and mountain plover habitat	3	19
12	Raptor nest and big game CWR	2	30
13	Raptor nest, big game CWR and mountain plover habitat	3	11
14	Raptor nest, big game CWR, mountain plover habitat, and prairie dog colony	4	3
15	Raptor nest and overlapping big game CWR	2	9
16	Sage grouse nesting	1	2
17	Sage grouse nesting and mountain plover habitat	2	3
18	Sage grouse nesting and prairie dog colony	2	5
19	Sage grouse nesting, prairie dog colony, and mountain plover habitat	3	4
20	Sage grouse nesting, big game CWR, and mountain plover habitat	3	3
21	Sage grouse nesting and raptor nest	2	51
22	Sage grouse nesting, raptor nest, and mountain plover habitat	3	9
23	Sage grouse nesting, raptor nest, and prairie dog colony	3	9
24	Sage grouse nesting, raptor nest, mountain plover habitat, and prairie dog colony	4	8
25	Sage grouse nesting, raptor nest, and big game CWR	3	6
26	Sage grouse nesting, raptor nest, big game CWR, and mountain plover habitat	4	1
27	Sage grouse SWR habitat	1	1
28	Sage grouse SWR and big game CWR	2	2
29	Sage grouse SWR and nesting	2	3
30	Sage grouse SWR and nesting and prairie dog colony	3	4
31	Sage grouse SWR and nesting and raptor nest	3	3
32	Sage grouse SWR and nesting, raptor nest, and mountain plover habitat	4	1
33	Sage grouse SWR and nesting, raptor nest, mountain plover habitat, and prairie dog colony	5	1
34	Sage grouse lek and nesting	2	8
35	Sage grouse lek and nesting and prairie dog colony	3	1
36	Sage grouse lek and nesting and raptor nest	3	3
37	Sage grouse lek and nesting, raptor nest, and mountain plover	4	2
38	Sage grouse lek and nesting, raptor nest, and big game CWR	4	2
39	Sage grouse SWR, lek, and nesting, and prairie dog colony	4	1
40	Sage grouse SWR, lek and nesting and raptor nest	4	2
41	Sage grouse SWR, lek, and nesting, raptor nest, and mountain plover habitat	5	1

CWR = Crucial Winter Range

SWR = Severe Winter Relief Habitat

APPENDIX G: WILDLIFE RESOURCES

Table G-2. Continued.

Township	Section	Resource Code ^a									
T15N R94W	1	24	T15N R93W	4	11	T14N R96W	1	21	T14N R95W	1	8
	2	23		5	11		2	21		2	8
	3	21		6	24		11	8		3	9
	4	21		7	24		12	21		4	22
	5	8		8	11		13	8		5	17
	6	8		11	11		14	9		6	22
	7	8		8	16		8	1		7	22
	8	21		11	17		11	1		8	17
	9	31		24	18		24	2		9	22
	10	36		11	19		11	9		10	8
	11	35		11	20		11	8		11	8
	12	23		9	21		9	8		12	21
	13	22		8	28		8	9		13	21
	14	36		8	29		8	9		14	8
	15	39		8	30		8	1		15	8
	16	31		8	31		8	1		16	8
	17	21		8	32		8	1		17	8
	18	8		8	33		8	1		18	8
	19	8		8				9		19	8
	20	8		8				9		20	8
	21	23		23				9		21	8
	22	23		23				8		22	8
	23	18		18						23	8
	24	22		22						24	21
	25	8		8						25	8
	26	3		3						26	8
	27	8		8						27	8
	28	8		8						28	8
	29	10		10						29	9
	30	8		8						30	8
	31	10		10						31	9
	32	10		10						32	9
	33	8		8						33	1
	34	8	8					34		8	
	35	10	10					35		8	
	36	8	8					36		8	

APPENDIX G: WILDLIFE RESOURCES

Table G-2. Continued.

Township	Section	Resource Code ^a	Township	Section	Resource Code ^a	Township	Section	Resource Code ^a
T14N R94W	1	8	T14N R93W	3	21	T13N R96W	1	8
	2	8		4	21		2	9
	3	21		5	21		3	9
	4	23		6	8		4	9
	5	18		7	23		5	9
	6	23		8	21		6	8
	7	21		9	21		7	8
	8	21		10	21		8	9
	9	21		15	21		9	9
	10	21		16	34		10	2
	11	8		17	34		11	2
	12	8		18	30		12	1
	13	21		19	30		13	1
	14	8		20	34		14	2
	15	21		21	34		15	2
	16	21		22	16		16	9
	17	36		27	34		17	9
	18	21		28	34		18	8
	19	21		29	16		19	8
	20	21		30	18		20	13
	21	21		31	30		21	12
	22	21		32	17		22	12
	23	1		33	34		23	12
	24	18		34	34		24	12
	25	18					25	12
	26	3					26	12
	27	8					27	12
	28	21					28	5
	29	21					29	5
	30	21					30	5
	31	8					31	5
	32	8					32	5
	33	8					33	7
	34	8					34	7
	35	19					35	15
	36	30					36	15

APPENDIX G: WILDLIFE RESOURCES

Table G-2. Continued.

Township	Section	Resource Code ^a	Township	Section	Resource Code ^a
T13N R95W	1	8	T13N R94W	1	19
	2	8		2	19
	3	8		3	10
	4	2		4	8
	5	11		5	8
	6	9		6	8
	7	9		7	8
	8	11		8	8
	9	9		9	8
	10	1		10	11
	11	1		11	24
	12	10		12	24
	13	3		13	24
	14	1		14	11
	15	5		15	11
	16	12		16	11
	17	12		17	9
	18	8		18	9
	19	12		19	3
	20	12		20	8
	21	12		21	11
	22	12		22	4
	23	28		23	23
	24	27		24	23
	25	5		25	21
	26	28		26	21
	27	12		27	25
	28	12		28	12
	29	12		29	12
	30	12		30	8
	31	15		31	15
	32	15		32	12
	33	15		33	12
	34	15		34	25
	35	15		35	38
	36	15		36	38

APPENDIX H

WILDLIFE MONITORING/PROTECTION PLAN DESOLATION FLATS NATURAL GAS DEVELOPMENT PROJECT

Prepared for:

U.S. Bureau of Land Management
Rawlins Field Office
Rawlins, Wyoming

and

U.S. Bureau of Land Management
Rock Springs Field Office
Rock Springs, Wyoming

By:

Mary Read, BLM-RFO Wildlife Biologist
DFPA Review Team

APPENDIX H

WILDLIFE MONITORING/PROTECTION PLAN

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	H-1
2.0 IMPLEMENTATION PROTOCOL	H-1
2.1 ANNUAL REPORTS AND MEETINGS	H-2
2.2 ANNUAL INVENTORY AND MONITORING	H-4
2.2.1 Raptors	H-4
2.2.2 Big Game Species	H-6
2.2.3 Threatened, Endangered, Proposed, and Candidate Species	H-6
2.2.3.1 Black-footed Ferret	H-8
2.2.3.2 Bald Eagle	H-10
2.2.3.3 Colorado Pikeminnow, Bonytail, Humpback Chub, and Razorback Sucker	H-10
2.2.3.4 Mountain Plover	H-10
2.2.3.5 Yellow-billed Cuckoo	H-10
2.2.4 BLM Wyoming State Director's Sensitive Species	H-10
2.2.4.1 Greater Sage-grouse	H-12
2.2.4.2 Ferruginous Hawk, Peregrine Falcon, and Burrowing Owl ..	H-16
2.2.5 Other Inventory and Monitoring Measures	H-16
2.2.6 General Wildlife	H-16
2.3 PROTECTION MEASURES	H-16
2.3.1 Raptors	H-16
2.3.2 Big Game Species	H-19
2.3.3 Threatened, Endangered, Proposed, and Candidate Species	H-20
2.3.3.1 Black-footed Ferret	H-20
2.3.3.2 Bald Eagle	H-20
2.3.3.3 Colorado Pikeminnow, Bonytail, Humpback Chub, and Razorback Sucker	H-20
2.3.3.4 Mountain Plover	H-21
2.3.3.5 Yellow-billed Cuckoo	H-21
2.3.4 BLM Wyoming State Director's Sensitive Species	H-21
2.3.4.1 Greater Sage-grouse	H-22
2.3.4.2 Ferruginous Hawk, Peregrine Falcon, and Burrowing Owl ..	H-22
2.3.5 General Wildlife	H-22
3.0 LITERATURE CITED	H-24
ADDENDUM H-1: EXAMPLE DATA SUMMARY TABLES AND FORMS	
ADDENDUM H-2 : MOUNTAIN PLOVER ADDITIONAL STIPULATIONS	
ADDENDUM H-3: WYOMING BLM STATE DIRECTOR'S SENSITIVE SPECIES LIST AND INSTRUCTION MEMORANDUM	

APPENDIX H

TABLE OF CONTENTS, Continued

LIST OF TABLES

	<u>Page</u>
Table H-1: Summary of General Wildlife Reporting, Inventory, and Monitoring, Desolation Flats Natural Gas Development Project, Sweetwater and Carbon Counties, Wyoming, 2002	H-3
Table H-2: Additional Wildlife Inventory and Monitoring Measures on and Adjacent to Areas with High Levels of Development (4 Locations/Section), Desolation Flats Project Area, Sweetwater and Carbon Counties, Wyoming, 2002	H-5
Table H-3: Threatened, Endangered, Proposed, and Candidate Species Documented or Potentially Occurring on or in the Vicinity of the Desolation Flats Project Area, 2002	H-8
Table H-4: BLM Wyoming State Director's Sensitive Species Documented or Potentially Occurring on or in the Vicinity of the Desolation Flats Project Area, 2002 . .	H-14
Table H-5: Summary of General APD/ROW Application Stage Survey/Protection Measures, Desolation Flats Project Area, Sweetwater and Carbon Counties, Wyoming, 2002	H-18

LIST OF MAPS

Map H-1: Big game crucial winter ranges located within the Desolation Flats Project Area	H-7
Map H-2: Potential black-footed ferret habitat (i.e. white-tailed prairie dog colonies and complexes) in relation to the Desolation Flats Project Area	H-9
Map H-3: Areas identified as potential mountain plover habitat and mountain plover sightings on and proximal to the Desolation Flats Project Area	H-11
Map H-4: Greater sage-grouse leks, buffer zones, and severe winter relief habitats located within and near the Desolation Flats Project Area	H-13

APPENDIX H

TABLE OF CONTENTS, Continued

ABBREVIATIONS AND ACRONYMS

ANS	Artificial Nesting Structure
APD	Application for Permit to Drill
APLIC	Avian Powerline Interaction Committee
BA	Biological Assessment
BLM	Bureau of Land Management
BO	Biological Opinion
CSU	Controlled Surface Use
DFPA	Desolation Flats Project Area
EIS	Environmental Impact Statement
GIS	Geographic Information System
LOP	Life-of-Project
RFO	Rawlins Field Office
ROW	Right-of-Way
RSFO	Rock Springs Field Office
TEP&C	Threatened, Endangered, Proposed, and Candidate Species
USFWS	U.S. Fish and Wildlife Service
WGFD	Wyoming Game and Fish Department
WYNDD	Wyoming Natural Diversity Database

APPENDIX H: WILDLIFE MONITORING PLAN

1.0 INTRODUCTION

The Wildlife Monitoring/Protection Plan was prepared in conjunction with the Environmental Impact Statement (EIS) for the Desolation Flats Natural Gas Development Project, Sweetwater and Carbon counties, Wyoming. The goal of the plan is to avoid and/or minimize adverse impacts to wildlife that may be present on project-affected areas by monitoring and protecting wildlife populations and associated habitat on the Desolation Flats Project Area (DFPA) during the course of project development and operations and by developing appropriate mitigative actions. Implementation of the plan will allow managers and project personnel opportunities to achieve and maintain desired levels of wildlife productivity and populations on the DFPA (e.g., at pre-project levels) by minimizing and/or avoiding potential adverse impacts to wildlife species. In addition, the implementation of this plan will facilitate the maintenance of a diverse assemblage of wildlife populations on the DFPA simultaneously with the development of natural gas reserves. A Review Team (Review Team), comprised of personnel from the U.S. Bureau of Land Management (BLM) Rawlins Field Office (RFO) and Rock Springs Field Office (RSFO), the U.S. Fish and Wildlife Service (USFWS), the Wyoming Game and Fish Department (WGFD), and Industry (Operators), has been identified to determine wildlife monitoring and protection requirements and needs on an annual basis within the DFPA (USDI-BLM 2000).

The Proposed Action for the Desolation Flats Natural Gas Development Project involves the development of a maximum of 385 new wells at 361 well locations and associated facilities (roads, pipelines, compressor stations) on the DFPA over the next 15-20 years. The proposed life-of-project (LOP) is estimated to be from 30 to 50 years. Alternative development strategies also have been proposed (i.e., Increased Development Alternative, No Action Alternative). A complete description of the proposed project and alternatives is provided in Chapter 2.0 of the EIS.

Proposed inventory, monitoring, and protection measures will be implemented under each potential development scenario (i.e., alternative), unless information revealed in the coordinated review of annual wildlife reports (see Section 2.1) indicates these measures are unnecessary for wildlife protection. The wildlife monitoring / protection plan will not be implemented under the No Action Alternative.

Implementation of the plan will begin in 2003, and it is estimated that the implementation will continue for a maximum of 20 years; however, the plan may be terminated at the end of any year when there is sufficient evidence that wildlife populations and productivity in the DFPA have been successfully protected. The plan will receive a major review for effectiveness every five to six years, or as determined by the Review Team.

2.0 IMPLEMENTATION PROTOCOL

This section provides a preliminary wildlife inventory, monitoring, and protection protocol for the DFPA. A summary of primary protocol components is provided in Table H-1. Inventory and monitoring requirements are included in this table. In areas where development may reach 4 well locations per section, then additional inventory, monitoring, and protection measures are provided, unless otherwise agreed to by the Review Team, and are located in Table H-2. Standard protocol for Application for Permit to Drill (APD) and right-of-way (ROW) application field reviews are provided in Table H-5. Alternative protocols likely will be developed in the future in response to

APPENDIX H: WILDLIFE MONITORING PLAN

specific needs identified in annual wildlife reports (see Section 2.1). Methods are provided for each wildlife species and/or category, and additional species and/or categories may be added based on needs identified in annual wildlife reports. The wildlife species and/or categories for which specific inventory, monitoring, and protection procedures will be applied were developed based on management agency (i.e., RFO and RSFO, USFWS, and WGFD) and individual concerns identified during the preparation of the EIS.

Considerable efforts will be required by agency and Operator (e.g., Marathon, EOG, Tom Brown, Questar, etc.) personnel for plan implementation. Many of the annually proposed agency data collection activities are consistent with current agency activities. Additionally, during annual planning and throughout project implementation, all efforts will be made to accommodate agency personnel schedules and responsibilities, and further agency cost-sharing approaches will be considered such that public demands and statutory directives are achieved (USDI-BLM 2000).

2.1 ANNUAL REPORTS AND MEETINGS

During project development (i.e., 15-20 years), Operators will provide an updated inventory and description of all existing project features (i.e., locations, size, and associated human activity at each feature), as well as those tentatively proposed for development during the next 12 months. This inventory will be submitted to the BLM by the Operators no later than October 15 of each year. These data will be coupled with annual wildlife inventory, monitoring, and protection data obtained from the previous year and included in annual reports. Annual reports will be prepared by the BLM. When annual wildlife inventory, monitoring, and protection data are gathered by parties other than the BLM, those parties (e.g., Operators, WGFD) will be requested to provide the data to the BLM by October 15 of each year. Upon receipt of these data, annual reports will be completed in draft form by the BLM and submitted to Operators, USFWS, and other interested parties no later than December 15 of each year. A one-day meeting of the Review Team will be organized by the BLM and held in January/February of the following year to discuss and modify, as necessary, proposed wildlife inventory, monitoring, and protection protocol for the subsequent field season.

Decisions regarding annual Operator-specific financing and personnel requirements will be made at these meetings. A protocol regarding how to accommodate previously unidentified development sites will also be determined during the annual meeting. Final decisions will be made by the BLM based on the input from the Review Team and all affected parties.

A final annual report will be issued by the BLM to all potentially affected individuals and groups by February/March of each year. Annual reports will summarize annual wildlife inventory and monitoring results, note any trends across years (if available), identify and assess protection measures implemented during past years, specify monitoring and protection measures proposed for the upcoming year, and recommend modifications to the existing wildlife monitoring/protection plan based on the success, and/or failures of past years (e.g., identification of additional species and/or categories to be monitored).

Where possible, the data presented in reports will be used to identify potential correlations between development and wildlife productivity and/or abundance. Addendum H-1 provides examples for the tabular presentation of data within annual reports; however, it should be noted that the final report format will be determined by the BLM. The BLM's Geographic Information System (GIS) will

APPENDIX H: WILDLIFE MONITORING PLAN

Table H-1: Summary of General Wildlife Reporting, Inventory, and Monitoring, Desolation Flats Natural Gas Development Project Sweetwater and Carbon Counties, Wyoming, 2002.

REPORTING		
Action	Dates	Responsible Entity¹
Annual area wide tentative plan of development showing locations of existing and newly proposed development features.	Annually by October 15.	Operators
Annual reports summarizing findings and presenting protection actions.	Annually by: Draft - December Review Team Meeting - January/February Final - February/March	BLM with reviews by Operators, USFWS, WGFD, and other interested parties.
Meetings to finalize future years' inventory, monitoring, and protection measures.	Early December/January and as necessary.	BLM with participation by USFWS, Operators, WGFD, and other interested parties.
INVENTORY AND MONITORING		
Action	Dates	Responsible Entity
Raptor nest inventories (DFPA plus one mile buffer).	Every 5 years during April-May.	BLM; Operator-provided financial assistance for aircraft rental.
Raptor productivity monitoring (on the DFPA plus a one-mile buffer).	Every 5 years during March to mid-July.	BLM with Operator-provided financial assistance for aircraft rental as necessary.
Aerial greater sage-grouse lek inventories (DFPA plus a two-mile buffer).	Every 5 years during March-April.	BLM; Operator-provide financial assistance for aircraft rental.
Greater sage-grouse lek attendance monitoring on and within two-miles of the DFPA.	Annually during March to mid-May.	Selected leks will be visited at least once by the BLM and/or WGFD, such that all known leks are visited every three years.
Greater sage-grouse winter habitat inventory and monitoring within and adjacent to the DFPA.	As required during December-February.	BLM, in coordination with WGFD; Operator-provided financial assistance for aircraft rental.
Big game crucial winter range use monitoring (crucial winter range on the DFPA plus a one-mile buffer, or as determined by the Review Team).	As required and/or available.	BLM, in coordination with WGFD; Operator-provided financial assistance for aircraft rental.

¹With Operator assistance, it is anticipated that agency obligations will not greatly exceed currently approved personnel or financial commitments.

be used for information storage, retrieval, and planning, and annual GIS data updates will be conducted. Raw data collected each year also will be provided to other management agencies (e.g., WGFD, USFWS, Wyoming Natural Diversity Database[WYNDD]) at the request of those

APPENDIX H: WILDLIFE MONITORING PLAN

agencies. In addition, sources of potential disturbance to wildlife will be identified, where practical (e.g., development activities, weather conditions, etc.).

Additional reports may be prepared in any year, as necessary, to comply with other relevant wildlife laws, rules, and regulations (e.g., black-footed ferret survey reports, raptor reports).

Additional meetings will be held as necessary in any given year by the BLM, Operators, and/or USFWS in Rawlins to inform and update Operator personnel on the findings of the annual reports (USDI-BLM 2000).

2.2 ANNUAL INVENTORY AND MONITORING

The inventory and monitoring protocol will be as identified below for each wildlife species and/or category. This protocol will be unchanged across development alternatives, except as authorized by the BLM or specified in this plan. Additional wildlife species and/or categories and associated surveys may be added or omitted in future years, pending the coordinated review of annual wildlife reports. Opportunistic wildlife observations may be made throughout the year by agency and Operator personnel present in the DFPA.

The frequency of inventory and monitoring will be dependent upon the level of development in the DFPA (see Tables H-1 and H-2). In general, inventory and monitoring frequency will increase with increased levels of development. Inventory and monitoring results may identify the need for further scientific studies. The Review Team and/or BLM will identify the level of effort required by this wildlife plan, subject to the standards stated in the following paragraphs. Site- and species-specific surveys will continue to be conducted in association with APD and ROW application field reviews (see Table H-5).

2.2.1 Raptors

Raptor inventories of potentially affected areas were conducted in early May 2000 and will continue to be conducted every five years thereafter for the LOP to determine the location of raptor nests/territories and their activity status by the BLM (Table H-1). At this time, no raptor concentration areas are known to exist. Approximate raptor nest locations on and adjacent to the DFPA have been identified and are presented in the Wildlife and Fisheries Technical Report for the Desolation Flats Natural Gas Development Project (HWA 2002). These surveys may be implemented aerially (e.g. via helicopter) or from the ground with operator-provided financial assistance. Data collected during surveys will be recorded on Raptor Nesting Record, Raptor Observation Data Sheets, or other similar data forms (Addendum H-1).

Nest productivity monitoring will be conducted by the BLM at active nests that are located within the project area (DFPA plus one-mile buffer) every five years. Nest productivity monitoring will occur between March 1 and mid-July to determine nesting success (i.e., number of nestlings/fledglings). These surveys generally will be conducted from the ground, and attempts will be made to determine the cause of any documented nest failure. Operators may provide financial assistance for aircraft rental, as necessary.

APPENDIX H: WILDLIFE MONITORING PLAN

Additional raptor nest activity and productivity monitoring measures will be applied in areas with high levels of development (i.e., areas with 4 locations/section) on and within one mile of the DFPA (see Table H-2). Inventory and monitoring efforts in these areas, as well as selected undeveloped comparison areas, will be conducted annually during April and May, followed by nest productivity monitoring. Site- and species -specific raptor nest analyses will be conducted in association with all APD and ROW application field reviews (see Table H-5).

Table H-2: *Additional Wildlife Inventory and Monitoring Measures On and Adjacent to Areas with High Levels of Development (4 Locations/Section), Desolation Flats Project Area, Sweetwater and Carbon Counties, Wyoming, 2002.*

Action	Dates	Responsible Entity¹
Raptor nest inventory/monitoring on areas with 4 locations/section plus a one-mile buffer and selected undeveloped comparison areas.	Annually during April and May.	BLM surveyor with Operator-provided financial assistance for aircraft rental.
Raptor productivity monitoring on areas with 4 locations/section plus a one-mile buffer and selected undeveloped comparison areas.	Annually during March-July.	BLM surveyor with Operator-provided financial assistance for BLM seasonal support.
Selected sensitive species inventory/monitoring on suitable habitats in areas with 4 locations/section plus a one-mile buffer and selected undeveloped comparison areas.	Annually during spring and summer.	BLM, Operators in coordination with USFWS; Operator-provided financial assistance, not to exceed \$5,000 per operator in any given year.
Aerial greater sage-grouse lek inventory on areas with 4 locations/section plus a two-mile buffer and selected undeveloped comparison areas.	Annually during March-April.	BLM surveyor with operator-provided financial assistance for aircraft rental.
Greater sage-grouse lek attendance monitoring on areas with 4 locations/section plus a two-mile buffer and selected undeveloped comparison areas.	Annually during March to mid-May.	Each known lek will be visited at least once annually by the BLM and/or WGFD; subsequent visits will occur in BLM/WGFD-selected leks by the BLM in coordination with the WGFD.
Greater sage-grouse winter habitat inventory and monitoring in areas with 4 locations/section and undeveloped comparison areas.	Available years.	BLM surveyor in coordination with the WGFD; Operator-provided financial assistance.
Other studies on areas with 4 locations/section and selected undeveloped comparison areas.	Year-long and in any year as deemed necessary by BLM and/or USFWS.	BLM in coordination with USFWS and WGFD; Operator-provided financial assistance, not to exceed \$5,000 per Operator in any given year.

¹With Operator assistance, it is anticipated that agency obligations will not greatly exceed currently approved personnel or financial commitments.

All raptor nest/productivity surveys will be conducted using procedures that minimize potential adverse effects to nesting raptors. Specific survey measures for reducing detrimental effects are listed in Grier and Fyfe (1987) and Call (1978) and include the following:

APPENDIX H: WILDLIFE MONITORING PLAN

- (1) Nest visits will be delayed for as long as possible in the nesting season.
- (2) Nests will be approached cautiously, and their status (i.e., number of nestlings/fledglings) will be determined from a distance with binoculars or a spotting scope.
- (3) Nests will be approached tangentially and in an obvious manner to avoid startling adults.
- (4) Nests will not be visited during adverse weather conditions (e.g., extreme cold, precipitation events, windy periods, hottest part of the day).
- (5) Visits will be kept as brief as possible.
- (6) All inventories will be coordinated by the BLM.
- (7) The number of nest visits in any year will be kept to a minimum.
- (8) All raptor nest location data will be considered confidential (USDI-BLM 2000).

These actions may reduce impacts to nesting raptors. It should be noted that the RFO, in coordination with the USFWS, monitors active/inactive raptor nests within the project area and may band raptors, specifically ferruginous hawks, during June and July. The RFO wildlife biologists have a USFWS permit to proceed with banding.

2.2.2 Big Game Species

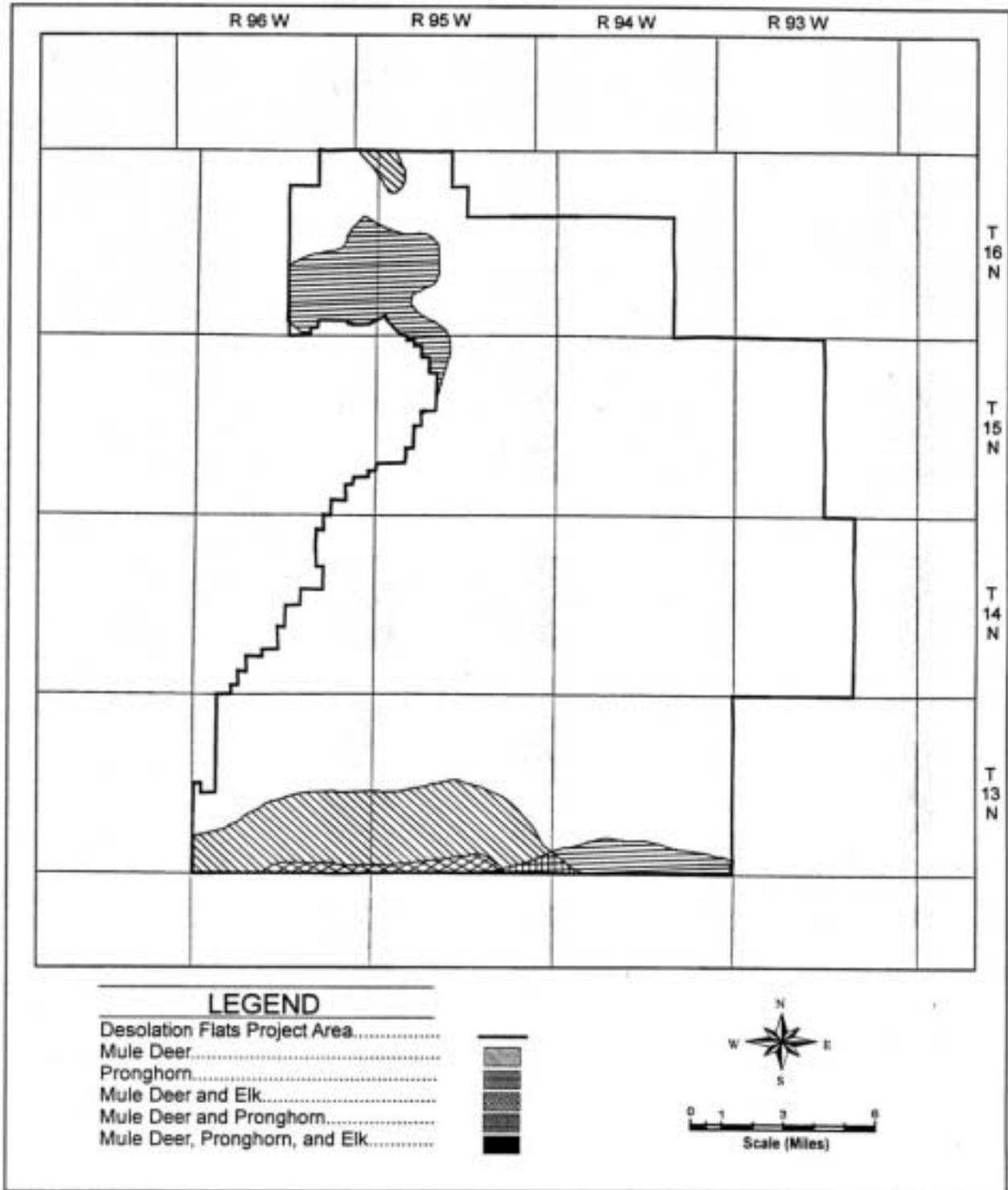
To determine the need for application of crucial winter range seasonal stipulations and assess potential impacts to big game species occurring on the DFPA, data on big game use of crucial winter ranges on the DFPA and an adjacent one-mile buffer will be requested annually by the BLM from the WGFD, as deemed necessary by the BLM (see Table H-1). Big game crucial winter ranges are shown in Map H-1. If data indicates further study is needed, then the BLM will be responsible for the data collection, in coordination with the WGFD (USDI-BLM 2000).

Migration corridors and transitional ranges have been identified to some degree within and adjacent to the DFPA. There may be a need to identify these areas in more detail if impacts to big game movement are identified during these critical time periods. Big game migration corridors and transitional zones are broader in scope and may require additional studies/monitoring if the BLM, WGFD, and/or Review Team determine this need.

2.2.3 Threatened, Endangered, Proposed, and Candidate Species

The level of inventory and monitoring required for threatened, endangered, proposed, and candidate species (TEP&C) will be commensurate with established protocol for the potentially affected species. Survey protocol developed in conjunction with the Biological Assessment (BA) for this project will be conducted as a component of this wildlife protection plan. Methodologies and results of these surveys will be included in annual reports or provided in separate supplemental reports. A preliminary list of TEP&C species proposed for management and known to occur, or potentially to occur, in the vicinity of the DFPA is shown in Table H-3. As TEP&C species are added to or withdrawn from the USFWS list, appropriate modifications will be incorporated to this plan and specified in annual reports. Additional species of concern known to occur, or potentially occur, in the vicinity of the DFPA are shown in Table H-4 (BLM Wyoming State Sensitive Species).

APPENDIX H: WILDLIFE MONITORING PLAN



Map H-1. Big game crucial winter ranges located within the Desolation Flats Project Area.

APPENDIX H: WILDLIFE MONITORING PLAN

TEP&C species data collected during the surveys described below will be considered confidential and will be provided only as necessary to those requiring the data for specific management and/or project development needs. Site- and species-specific TEP&C species surveys will continue to be conducted as necessary in association with all APD and ROW application field reviews (see Table H-5). Data will be collected on appropriate General Wildlife Observation Data Sheets or similar forms (see Addendum H-1). Alternate/additional forms may be used as specified by the BLM (USDI-BLM 2000).

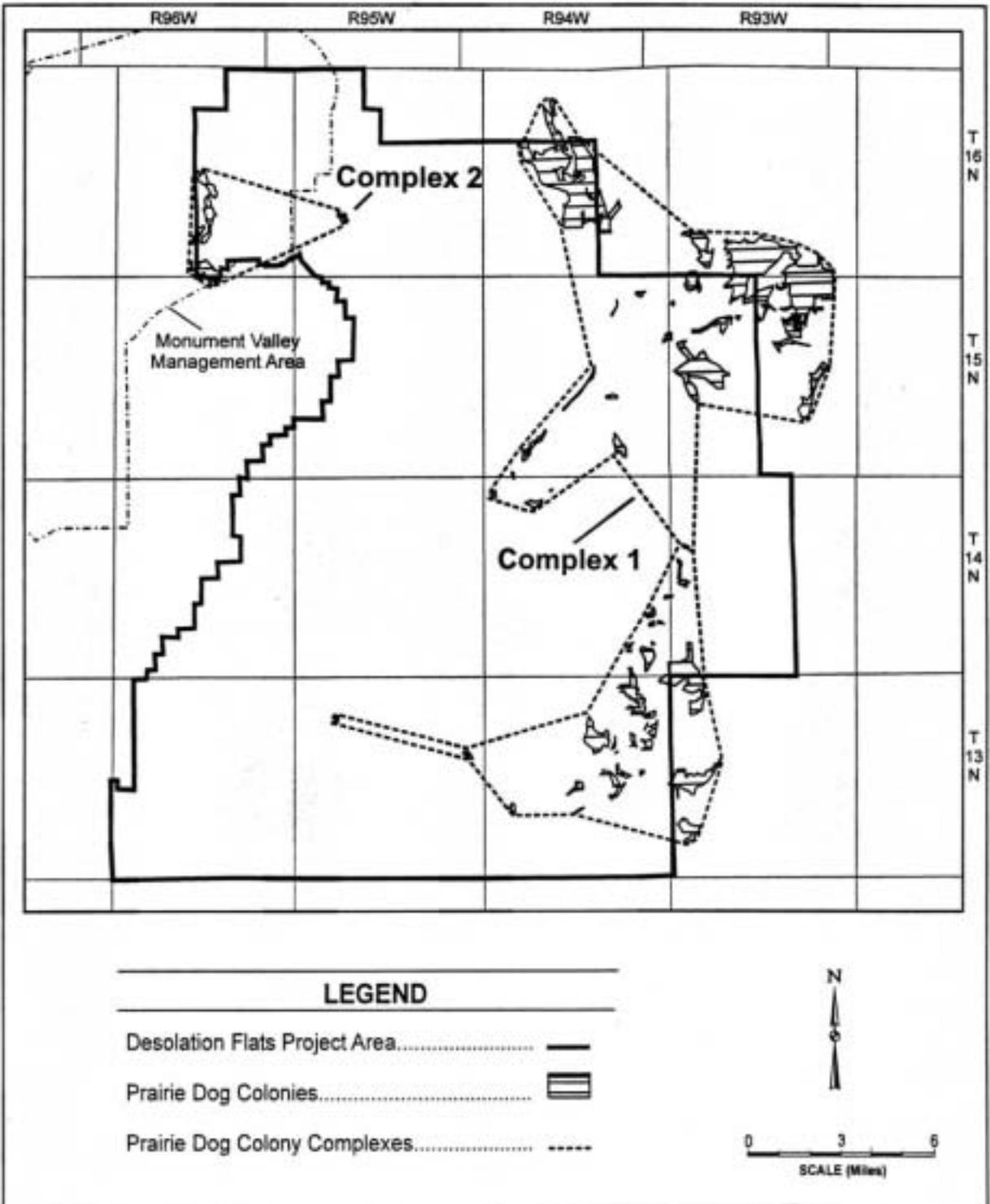
Table H-3: *Threatened, Endangered, Proposed, and Candidate Species Documented or Potentially Occurring on or in the Vicinity of the Desolation Flats Project Area, 2002.*

Species	Scientific Name	Status	Distribution
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened (proposed for de-listing)	Nesting, winter resident, migrant, statewide
Black-footed Ferret	<i>Mustela nigripes</i>	Endangered	Possible resident in prairie dog colonies
Canada Lynx	<i>Lynx Canadensis</i>	Threatened	Resident of forested areas, may travel through
Ute Ladies' Tresses	<i>Spiranthes diluvialis</i>	Threatened	Possible statewide, suitable habitat < 6,500 feet
Bonytail	<i>Gila elegans</i>	Endangered	Downstream resident of Green River
Colorado Pikeminnow	<i>Ptychocheilus lucius</i>	Endangered	Downstream resident of Green River
Humpback Chub	<i>Gila cypha</i>	Endangered	Downstream resident of Green River
Razorback Sucker	<i>Xyrauchen texanus</i>	Endangered	Downstream resident of Green River
Mountain Plover	<i>Charadrius montanus</i>	Proposed Threatened	Grasslands statewide
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Candidate	Riparian areas west of the Continental Divide

2.2.3.1 Black-footed Ferret

BLM biologists will determine the presence/absence of prairie dog colonies at each proposed development site during APD and ROW application field revisions (see Table H-5). Prairie dog colonies (i.e., potential black-footed ferret habitat) on the area were mapped in April 2000 and burrow densities determined. White-tailed prairie dog colonies located on the DFPA are shown on Map H-2. Colonies that meet USFWS criteria as potential black-footed ferret habitat, per the USFWS 1989 Guidelines, will be surveyed for black-footed ferrets by either the BLM or USFWS-certified, Operator-financed, and BLM-approved biologist prior to BLM authorizing disturbance of these colonies. Surveys will only be conducted as deemed necessary during consultation between the BLM and USFWS. Black-footed ferret surveys will be conducted in accordance with the USFWS guidelines (USFWS 1989) and approved by the BLM and USFWS and will be conducted on a site-specific basis, depending on the areas proposed for disturbance in a given year as specified in the annual report.

APPENDIX H: WILDLIFE MONITORING PLAN



Map H-2. Potential black-footed ferret habitat, (i.e. white-tailed prairie dog colonies and complexes) in relation to the Desolation Flats Project Area.

APPENDIX H: WILDLIFE MONITORING PLAN

2.2.3.2 Bald Eagle

The inventory and monitoring protocol for the bald eagle will be as described for raptor species (Section 2.2.1).

2.2.3.3 Colorado Pikeminnow, Bonytail, Humpback Chub, and Razorback Sucker

There are four endangered fish species that inhabit areas within the Colorado River system. These four species are downstream residents of the Green River, located within the Colorado River system. If there are any proposed projects that will lead to water depletions (consumption) in the Colorado River system, then formal consultation with the USFWS will occur to reduce impacts to these species.

2.2.3.4 Mountain Plover

The Desolation Flats Project Area was mapped in June 2000 to determine if suitable mountain plover habitat existed (Map H-3). There was suitable habitat identified and individual projects will be assessed to determine if suitable mountain plover habitat (i.e., areas with flat topography and vegetation less than four inches high) exists within ¼-mile of each project site. Mountain plover surveys will be completed each field season to identify occupied habitat within the DFPA. Projects that are located in occupied mountain plover habitat, and include well pads, access roads, reserve pits, and ponds >40 acres in size, will have additional stipulations attached (see Addendum H-2). The Mountain Plover Survey Guidelines (USFWS 2002) will be followed for large scale/long term projects and short-term, linear projects. The guidelines identify surveys required to determine the presence and absence of mountain plover as well as density of nesting plovers. A copy of these guidelines will be attached to the Biological Assessment (BA).

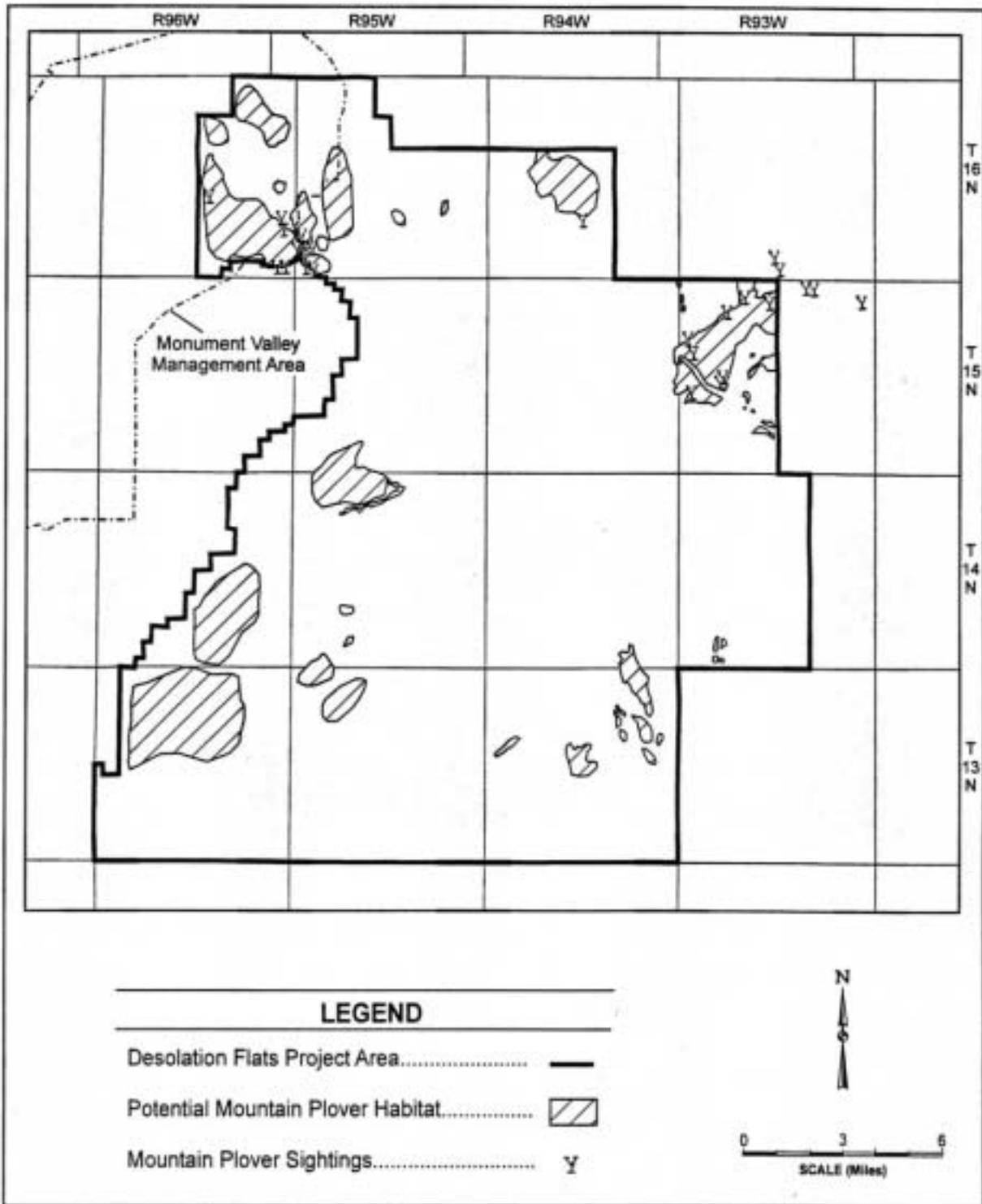
2.2.3.5 Yellow-billed Cuckoo

The Yellow-billed cuckoo inhabits areas that contain open woodlands, stream-side willow, and alder groves. These birds are located west of the Continental Divide. There are not many riparian systems located within the DFPA; therefore, the chance of having these birds within the project area is minimal. Site-specific surveys will be conducted in association with all APD/ROW application field reviews.

2.2.4 BLM Wyoming State Director's Sensitive Species

Many wildlife and plant species are experiencing population declines; therefore, the Wyoming BLM has developed a sensitive species list to better manage these species and their habitats. The goal is to ensure that any actions on public lands consider the overall welfare of these species and do not contribute to their decline. The BLM policy on these species is implemented to ensure actions authorized, funded, or carried out by BLM do not contribute to the need for any species to become listed as a candidate, or for any candidate species to become listed as threatened or endangered. This list is meant to be dynamic, which means it could change as new information for species is accumulated (USDI-BLM 2001). The entire BLM Wyoming State Director's Sensitive Species list and BLM Instruction Memorandum No. WY-2001-040, dated April 9, 2001, are attached in Addendum H-3.

APPENDIX H: WILDLIFE MONITORING PLAN



Map H-3. Areas identified as potential mountain plover habitat and mountain plover Sightings on and proximal to the Desolation Flats Project Area.

APPENDIX H: WILDLIFE MONITORING PLAN

Surveys for BLM Wyoming Sensitive Species (sensitive species) will be conducted by the BLM or a BLM-approved Operator-financed biologist in areas of potential habitat. Table H-4 describes the species that are considered sensitive species by the BLM and either are known to occur, or have the potential to occur, within the DFPA. The surveys for these species may be implemented in conjunction with surveys for other species or as components of the APD/ROW application.

In addition, in areas where four well locations are developed (or in the case where more than four wells are drilled) the entire section plus a one mile buffer, as well as selected undeveloped comparison areas, will be surveyed annually during spring and summer by the BLM and/or BLM-approved Operator-financed biologists for selected sensitive species (see Table H-2). The Review Team may revise the distance of the survey area based on biological requirements and the number of surveys required for each species. If any sensitive species are observed, the observations will be noted on the appropriate data forms (see Addendum H-1). In addition, when and if sensitive species are observed, efforts will be made to determine their activities (e.g., breeding, nesting, foraging, hunting, etc.). If any management agency (e.g., BLM, USFWS) identifies a potential concern regarding any of these species, additional inventory and monitoring may be implemented as specified in annual reports (USDI-BLM 2000).

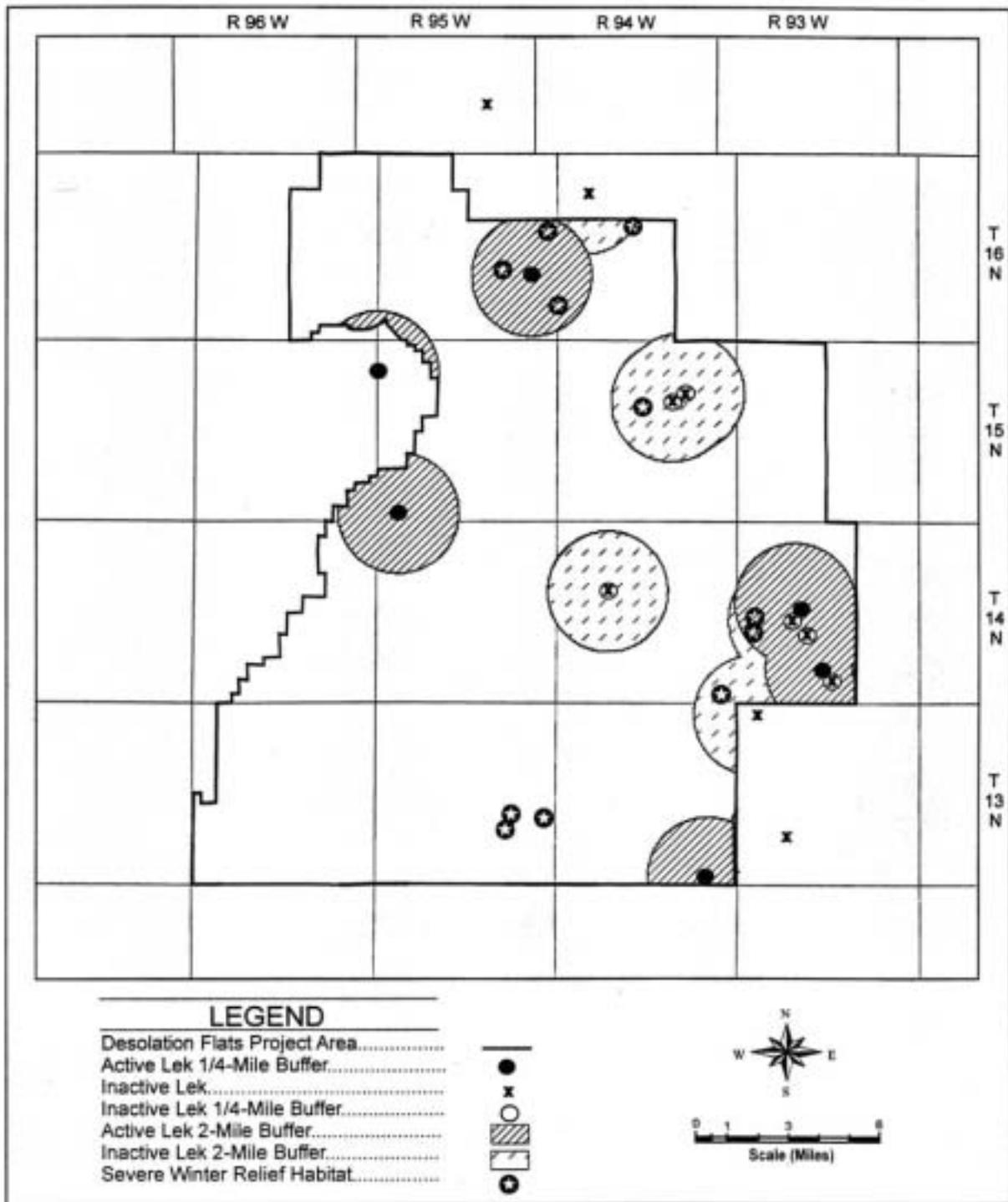
2.2.4.1 Greater Sage-grouse

Baseline data of greater sage-grouse lek locations, (both aerial and ground searches), were collected throughout the DFPA and 2-mile buffer in April of 2000 (Map H-4). In general, greater sage-grouse lek inventories will be conducted on the DFPA and a 2-mile buffer to determine lek locations every five years; however, the Review Team and/or BLM may recommend that monitoring may occur on an annual basis, or earlier than every five years (see Table H-1). Inventories will be conducted by the BLM during March and April every fifth year of this plan, or as deemed necessary by the Review Team. Surveys may be conducted aerially, which will include Operator-provided financial assistance for aircraft rental, or on the ground, as deemed appropriate by the BLM; aerial surveys will be used only to determine lek locations. In areas with four well locations per section, aerial inventories will be conducted annually on affected sections, a 2-mile buffer of disturbance areas, and selected undeveloped comparison areas (see Table H-2).

Selected leks within 2 miles of existing and proposed disturbance areas will be monitored annually by the BLM in coordination with the WGFD between March 1 and May 15, to determine lek attendance such that all leks on these areas are monitored at least once every three years (see Table H-1). Data collected during these surveys will be provided on Greater Sage-Grouse Lek Records or other suitable forms (see Addendum H-1) (USDI-BLM 2000). Map H-4 shows the greater sage-grouse leks that have been identified within the DFPA and a two-mile buffer; these leks include both known active and inactive leks.

Greater sage-grouse winter habitat surveys within the DFPA will be conducted when weather conditions permit to determine the use of these areas and/or any changes that may have occurred to this habitat within the project area (see Table H-1). Winter habitat surveys can only be completed during specific weather conditions, where there is adequate snow cover to determine actual winter use areas. In years when this snow cover is not available, then surveys should not be completed. Map H-4 shows known winter greater sage-grouse habitat that was identified during the 2001/2002 winter time period.

APPENDIX H: WILDLIFE MONITORING PLAN



Map H-4. Greater Sage-Grouse Leks, buffer zones, and severe winter relief habitats located within and near the Desolation Flats Project Area.

APPENDIX H: WILDLIFE MONITORING PLAN

Table H-4: BLM Wyoming State Director's Sensitive Species Documented or Potentially Occurring on or in the Vicinity of the Desolation Flats Project Area, 2002 (RFO = Rawlins Field Office, RSFO = Rock Springs Field Office).

Species	Scientific Name	RFO	RSFO	Habitat
Birds				
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	X	X	Basin-prairie shrub, mountain foothill shrub
Peregrine Falcon	<i>Falco peregrinus</i>	X	X	Tall cliffs
Northern Goshawk	<i>Accipiter gentilis</i>	X	X	Conifer and deciduous forests
Ferruginous Hawk	<i>Buteo regalis</i>	X	X	Basin-prairie shrub, grassland, rock outcrops
Western Burrowing Owl	<i>Athene cunicularia</i>	X	X	Grasslands, basin-prairie shrub
Loggerhead Shrike	<i>Lanius ludovicianus</i>	X	X	Basin-prairie shrub, mountain-foothill shrub
Sage Thrasher	<i>Oreoscoptes montanus</i>	X	X	Basin-prairie shrub, mountain-foothill shrub
Sage Sparrow	<i>Amphispiza billineata</i>	X	X	Basin-prairie shrub, mountain-foothill shrub
Brewer's Sparrow	<i>Spizella breweri</i>	X	X	Basin-prairie shrub
Columbian sharp-tailed grouse	<i>Tympanuchus phasianellus columbianus</i>	X		Grasslands
Mammals				
White-tailed Prairie Dog	<i>Cynomys leucurus</i>	X	X	Basin-prairie shrub, grasslands
Dwarf Shrew	<i>Sorex nanus</i>	X	X	Mountain foothill shrub, grasslands
Swift Fox	<i>Vulpes velox</i>	X	X	Grasslands
Pygmy Rabbit	<i>Brachylagus idahoensis</i>		X	Basin-prairie and riparian shrub
Wyoming Pocket Gopher	<i>Thomomys clusius</i>	X	X	Meadows with loose soil
Long-eared Myotis	<i>Myotis evotis</i>	X	X	Conifer and deciduous forests, caves and mines
Fringed Myotis	<i>Myotis thysanodes</i>	X	X	Conifer forests, woodland-chapparral, caves and mines
Townsend's Big-Eared Bat	<i>Corynorhinus townsendii</i>	X	X	Forests, basin-prairie shrub, caves and mines
Spotted Bat	<i>Euderma maculatum</i>		X	Cliffs over perennial water, basin-prairie shrub
Amphibians				
Northern Leopard Frog	<i>Rana pipiens</i>	X	X	Beaver ponds, permanent water in plains and foothills
Great Basin Spadefoot	<i>Spea intermontana</i>	X	X	Spring seeps, permanent and temporary waters

APPENDIX H: WILDLIFE MONITORING PLAN

Table H-4: Continued.

Species	Scientific Name	RFO	RSFO	Habitat
Reptiles				
Midget Faded Rattlesnake	<i>Crotalus viridis concolor</i>		X	Mountain foothills shrub, rock outcrop
Fish				
Leatherside Chub	<i>Gila copei</i>		X	Bear, Snake, and Green River drainages, clear, cool, streams and pools
Roundtail Chub	<i>Gila robusta</i>	X	X	Colorado River drainage, mostly large rivers, also streams and lakes
Bluehead Sucker	<i>Catostomus discobolus</i>	X	X	Bear, Snake, and Green River drainages, all waters.
Flannelmouth Sucker	<i>Catostomus latipinnis</i>	X	X	Colorado River drainage, large rivers, streams, and lakes
Colorado River Cutthroat Trout	<i>Oncorhynchus clarki pleuriticus</i>	X	X	Colorado River drainage, clear mountain streams
Plants				
Nelson's Milkvetch	<i>Astragalus nelsonianus</i> - or - <i>stragalus pectinatus</i> var. <i>platyphyllus</i>	X	X	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, & cushion plant communities at 5,200-7,600
Wyoming Tansymustard	<i>Descurainia torulosa</i>		X	Sparsely vegetated sandy slopes at base of cliffs of volcanic breccia or sandstone 8,300-10,000
Large-fruited Bladderpod	<i>Lesquerella macrocarpa</i>		X	Gypsum-clay hills & benches, clay flats, & barren hills 7,200-7,700
Stemless Beardtongue	<i>Penstemon accaulis</i> var. <i>acaulis</i>		X	Cushion plant or Black sage grassland communities on semi-barren rocky ridges, knolls, & slopes at 5,900-8,200
Mystery Wormwood	<i>Artemisia biennis</i> var. <i>diffusa</i>		X	Clay flats and playas 6,500
Cedar Rim Thistle	<i>Cirsium aridum</i>	X	X	Barren, chalky hills, gravelly slopes, & fine textured, sandy-shaley draws, 6,700-7,200
Ownbe's Thistle	<i>Cirsium ownbeyi</i>		X	Sparsely vegetated shaley slopes in sage & juniper communities 6,440-8,400
Green River Greenthread	<i>Thelesperma caespitosum</i>		X	White shale slopes & ridges of Green River Formation 6,300
Uinta Greenthread	<i>Thelesperma pubescens</i>		X	Sparsely vegetated benches & ridges on coarse, cobbly soils of Bishop Conglomerate
Cedar Mountain Easter Daisy	<i>Townsendia microcephala</i>		X	Rocky slopes of Bishop Conglomerate
Gibben's Beardtongue	<i>Penstemon gibbensii</i>	X		Sparsely vegetated shale or sandy-clay slopes 5,500-7,700

APPENDIX H: WILDLIFE MONITORING PLAN

2.2.4.2 Ferruginous Hawks, Peregrine Falcon, and Burrowing Owl

The inventory and monitoring protocol for these species is described in the raptor section (see Section 2.2.1).

2.2.5 Other Inventory and Monitoring Measures

Additional inventory and monitoring measures may be applied as specified in annual reports.

2.2.6 General Wildlife

BLM staff will be responsible for keeping records of selected wildlife species observed during the course of their activities on the DFPA and interested Operator personnel may also provide data on wildlife observations, and are encouraged to do so. The information provided will include observations of wildlife species, their numbers, location, activity, and other pertinent data as applicable and identified on the General Wildlife Observation Data Sheet presented in Addendum H-1 of this plan (USDI-BLM 2000).

2.3 PROTECTION MEASURES

The wildlife protection measures proposed herein have been developed from past measures identified for oil and gas developments in Wyoming (USDI-BLM 2000). Additional measures may be included and/or existing measures may be modified in any given year as allowable and as deemed appropriate by BLM in consultation with Operators and other interested parties, and these measures will be specified in annual reports. It is assumed that as the wildlife issues within the DFPA are further described and impacts identified, some protection measures will be removed, whereas others may be added. Protection measures will be implemented by Operators with assistance from and/or in consultation with the BLM. In addition, these measures may be modified on a site-specific basis as deemed appropriate by the BLM after completion of APD and ROW application field reviews.

The principle protection measures for most wildlife species will be avoidance of sensitive/crucial habitats (e.g. big game crucial winter range, raptor nests, greater sage-grouse leks, etc.), where possible. However, numerous species- and project-specific measures may be implemented. Additionally, general wildlife protection measures (see Table H-5) will likely benefit the majority of wildlife species found on and adjacent to the DFPA.

2.3.1 Raptors

The primary protection measure for raptor species on the DFPA will be avoidance of active/inactive nest locations during the breeding season. Active nests are defined as any raptor nest that has been used within the last three years. Depending on the timing of proposed construction and drilling activities, all surface-disturbing activities will be restricted from February 1 through July 31 within a 0.5 to 1.0 mile radius (depending upon species and site-specific conditions) of active, or occupied, as well as inactive, raptor nests and/or nesting territories (i.e., seasonal nest avoidance).

APPENDIX H: WILDLIFE MONITORING PLAN

Exceptions to the timing stipulation may be made, based on field investigations of the nest at the time the exception was requested. In addition, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be constructed within 825 feet of active raptor nests, except ferruginous hawk, where the restriction will be 1,200 feet. The seasonal buffer distance and exclusion dates may vary, depending on factors, such as nest activity status, species, prey availability, natural topographic barriers, and line-of-sight distances. Actual nest buffers for each raptor nest will be established in annual reports.

Operators will notify the BLM immediately if raptors are found nesting on or within 1,200 feet of project facilities, and Operators will assist the BLM as necessary in erecting artificial nesting structures (ANS's), as appropriate. The use of ANS's will be considered as a last resort for raptor protection. If nest manipulation or a situation requiring a "taking" of a raptor nest becomes necessary, a special permit will be obtained from the Denver USFWS office, Permit Section. Permit acquisition will be coordinated with the USFWS Office in Cheyenne, Wyoming and will be initiated with sufficient lead time to allow for development of mitigation. Required corresponding permits will be obtained from the WGFD in Cheyenne. Consultation and coordination with the USFWS and the WGFD will be conducted for all protection activities relating to raptors.

If the Review Team determines that project activities could potentially affect raptor nesting on or adjacent to the DFPA as determined from decreased raptor productivity or nesting or documented nest abandonment or failure, ANS's may be constructed at a rate of one to two ANS's for one impacted nest, or existing degraded raptor nests may be upgraded/reinforced to minimize potential impacts. The BLM wildlife biologist will determine the number of required nests, up to two per project, based on site specific conditions and requirements. This focuses on the overall decline of raptor nesting success and will occur if the Review Team determines that projects may be the cause for this decline. The location, design, and other pertinent data regarding ANS's or nests proposed for upgrading will be identified in annual reports, and these ANS's will be located within the nesting territory of potentially affected raptor pairs and outside of the line-of-sight or nest buffer of actively nesting pairs, where possible. Operators will be responsible for the annual maintenance of ANS's throughout the LOP. Annual ANS maintenance activities will be completed after August 1 and prior to October 15 each year, as necessary. ANS's will be placed within the nesting territories of potentially affected raptor pairs at sites sufficiently removed from development activities to minimize or avoid potential adverse effects. All ANS's on public lands will become the property of the BLM upon completion of the project.

In cases where existing project features (e.g., well locations) are located within the nest buffers of active raptor nests, no maintenance activities requiring a work-over rig, unless an exception has been approved, will be allowed during critical periods (i.e., approximately early March through mid-June). The exact dates of exclusion will be determined by the BLM and will likely vary between nests and from year to year, depending on the species present and variations in weather, nesting chronology, and other factors.

No above-ground power line construction is expected with the proposed project, however, if any power lines are built, construction will follow recommendations of the Avian Power Line Interaction committee (APLIC) (1994, 1996) and Olendorff et al. (1981) to avoid collision and/or electrocution of raptors.

APPENDIX H: WILDLIFE MONITORING PLAN

Table H-5: Summary of General APD/ROW Application Stage Survey/Protection Measures, Desolation Flats Project Area, Sweetwater and Carbon Counties, Wyoming, 2002.

Protection Measure	Dates	Responsible Entity
APD-stage general raptor nest analysis within 0.75 to 1.0 mile of proposed disturbance.	Year-long	BLM, Operators
APD-stage seasonal raptor nest avoidance within 0.5 to 1.0 mile of active nests.	February 1-July 31 (depending on species and/or site-specific conditions)	Operators, BLM
APD-stage general raptor nest avoidance within 825 feet of active nests (1,200 feet for active ferruginous hawk nest).	Year-long (Controlled Surface Use [CSU]) generally excluding surface disturbance.	Operators, BLM
APD-stage sensitive species surveys (within 0.25 - 0.5 miles of proposed disturbance sites).	As necessary	<i>BLM or Operators</i>
APD-stage TE P& C habitat avoidance.	As necessary.	Operators, BLM
APD-stage prairie dog colony mapping and burrow density determination.	As necessary.	Operators, BLM
Black-footed ferret habitat (i.e., prairie dog colony) avoidance.	As necessary.	Operators, BLM
Black-footed ferret surveys where suitable habitat must be disturbed.	Where required, in appropriate season and no more than one-year prior to disturbance.	BLM, Operator-financed USFWS-approved biologist
APD-stage mountain plover surveys (within 0.25 mile of proposed project)	As necessary between April and July.	BLM, Operator-financed BLM-approved biologist
Mountain plover nest/brood avoidance.	April 10 - July 10	Operators, BLM
APD-stage western burrowing owl surveys (within 0.5 mile of proposed disturbance sites).	As necessary during June-August	BLM, Operator-financed BLM-approved biologist
Western burrowing owl nest avoidance.	As necessary.	Operators, BLM

APPENDIX H: WILDLIFE MONITORING PLAN

Table H-5: Continued.

Protection Measure	Dates	Responsible Entity
APD-stage greater sage-grouse lek surveys on suitable habitats within 2.0 miles of proposed disturbance sites.	March 1 - mid-May.	Operators, BLM
APD-stage greater sage-grouse lek avoidance on areas within 2.0 miles of a lek.	March 1 - June 30.	Operators, BLM
APD-stage greater sage-grouse lek avoidance on areas within 0.25 mile of a lek.	Year-long.	Operators, BLM
APD-stage greater sage-grouse nest avoidance.	As necessary.	Operators, BLM
APD-stage greater sage-grouse winter habitat avoidance.	As necessary, in appropriate season December-February with adequate snow cover.	Operators, BLM
APD-stage general wildlife avoidance/protection	As necessary.	Operators, BLM, USFWS, WGFD
Big game crucial winter range avoidance.	November 15-April 30.	Operators, BLM

In the event that winter concentration habitat(s) are identified, then construction, drilling, and other activities disruptive to wintering raptors are prohibited during the period of November 15 to April 30 for the protection of winter concentration areas. At this point, winter concentration areas of bald eagles have not been identified; however, this stipulation will apply in the event that an area is identified (USDI-BLM 2000).

2.3.2 Big Game Species

No surface disturbing activities will occur within big game crucial winter range on the DFPA during critical winter periods (November 15 - April 30). No road or pipeline ROW fencing is proposed for the project; however, if ROW fencing is required, it will be kept to a minimum, and the fences will meet BLM/WGFD standards for facilitating wildlife movement. Wildlife proof fencing will be used only to enclose reclaimed areas where it is determined that wildlife species are impeding successful vegetation establishment. Snow-fences, if used, will be limited to segments of 0.25 mile or less. Project personnel will also be advised to minimize stopping and exiting their vehicles in big game winter habitat while there is snow on the ground. In addition, escape openings will be provided along roads in big game crucial winter ranges as designated by the BLM to facilitate exit of big game animals from snow-plowed roads. Additional habitat protection/improvement measures may

APPENDIX H: WILDLIFE MONITORING PLAN

also be applied in any given year as directed by the BLM, in consultation with operators and other agencies, and specified in annual wildlife reports.

Increased human access within the DFPA may lead to increased poaching of big game animals. Potential increases in poaching may be reduced through employee and contractor awareness/education regarding wildlife laws. If violations are discovered on the DFPA Operators will immediately notify the WGFD, and if the violation is committed by an employee or contractor, said employee or contractor will be disciplined and may be dismissed by the Operator and/or prosecuted by the WGFD and/or USFWS (USDI-BLM 2000).

2.3.3 Threatened, Endangered, Proposed, and Candidate Species

USFWS consultation and coordination will be conducted for all protection activities relating to TEP&C species and their habitats, as needed. Where possible, these actions will be specified in advance in the annual reports. The terms and conditions of the Biological Opinion (BO) will be followed.

2.3.3.1 Black-footed Ferret

In general, all prairie dog colonies on the DFPA will be avoided, where practical. If prairie dog colonies of sufficient size and burrow density for black-footed ferrets are scheduled to be disturbed, then black-footed ferret surveys of those colonies will be conducted pursuant to BLM and/or USFWS decisions made during informal consultations. Survey protocol will adhere to USFWS guidelines as established by the USFWS (1989) in consultation with the BLM, and will be conducted by the BLM or a USFWS-qualified, BLM-approved biologist, a maximum of one year in advance of the proposed disturbance. Reports identifying survey methods and results will be prepared and submitted to the BLM in accordance with Section 7 of the Endangered Species Act of 1973, as amended, and the Interagency Cooperation Regulations. Surveys will be financed by Operators.

If black-footed ferrets are found on the DFPA, the BLM will be notified immediately and consultation with the USFWS will be initiated to develop strategies that ensure no adverse effects to the species occur. At this point, all activities will be stopped and before ground-disturbing activities are re-initiated in black-footed ferret habitat, authorization to proceed must be received from the BLM, in consultation with the USFWS (USDI-BLM 2000).

2.3.3.2 Bald Eagle

No surface disturbing activities are permitted between February 1 and July 31 within 1 mile of bald eagle nests (see section 2.3.1). Although there are not any identified bald eagle nests located within the DFPA, or a 1-mile buffer, the timing stipulation applies to all raptor nests and in the event that a bald eagle nest is identified in the project area, then it would be protected.

2.3.3.3 Colorado Pikeminnow, Bonytail, Humpback Chub, and Razorback Sucker

If any proposed development will lead to water depletions (consumption) in the Colorado River system, then formal consultation with the USFWS will occur to reduce impacts to these species.

APPENDIX H: WILDLIFE MONITORING PLAN

2.3.3.4 Mountain Plover

Mountain plover habitats (e.g., cushion plant communities, playa lakes, flat areas with vegetation <4 inches in height) will be avoided where practical, and where these habitats will be disturbed, reclamation will utilize procedures designed to reestablish suitable plover habitat. No surface disturbing activities will be conducted within suitable mountain plover habitat on the DFPA during the breeding and nesting periods between April 10 and July 10. Additional protection measures listed in Addendum H-2 will be attached to individual APD's and ROW's, for those projects that include well pads, access roads, and reserve pits that occur in occupied habitat areas.

Exceptions to construct during the timing stipulation period may be granted provided that the *Mountain Plover Survey Guidelines U.S. Fish and Wildlife Service March 2002* are followed. If an active mountain plover nest is observed within survey areas, planned development activities will be delayed at least 37 days or one week post-hatching. If a brood of flightless chicks is discovered, planned activities will be delayed at least seven days.

2.3.3.5 Yellow-billed Cuckoo

There have not been any yellow-billed cuckoos inventoried and/or monitored within the DFPA at this time. The species basically inhabits riparian zones west of the Continental Divide, and, apart from Sand Creek during high flows, there are not any perennial streams located within the DFPA. It is highly unlikely that this species is present within this project area; however, if information shows that the birds may be present then the Review Team may make recommendations to the BLM, and/or the BLM may identify potential mitigation that may be required to protect this species. Standard operating procedures prohibit the construction of well sites, access roads, and pipelines within 500 feet of surface water and/or riparian areas. This would protect any existing yellow-billed cuckoo habitat.

2.3.4 BLM Wyoming State Director's Sensitive Species

The BLM's management authority for sensitive species is not as specifically structured as for proposed, listed, threatened, or endangered species. The management mandate is less regulatory, and more administrative and generic for sensitive species, than for proposed or listed species in the sense that the BLM is **NOT** required to:

1. Participate in the development of formal recovery plans or critical habitat designations for sensitive species, although the BLM can participate in conservation plans/agreements.
2. Enter into ESA Section 7 consultation in Federal actions, although the BLM can request technical assistance from the USFWS, or other entities.
3. Be concerned with the "take" provisions of biological opinions, or the prohibition of Section 9 of the ESA.

The BLM's posture toward management of sensitive species will be more collaborative and derived, and less directive than for proposed or listed species. The management of these species should be viewed as an opportunity to practice proactive conservation; however, the management of these

APPENDIX H: WILDLIFE MONITORING PLAN

species should not be onerous or a “show-stopper” of other legitimate, multiple use activities (USDI-BLM, 2001).

If, during surveys of areas where proposed projects are identified, nests or other crucial habitat for any sensitive species identified in Table H-4 are found, avoidance of these features will be accomplished in consultation and coordination with the BLM and USFWS. Construction activities in these areas will be curtailed until there is concurrence between the BLM and USFWS on what activities can be authorized. Activities will, in most cases, will be delayed until such time that no adverse effects will occur (e.g., after fledging). It is assumed that the protocol specified for general wildlife will likely benefit sensitive species as well. If any agency (i.e., BLM, WGFD, USFWS) identifies a potential for impacts to any sensitive species, additional measures may be implemented as specified in annual reports.

2.3.4.1 Greater Sage-grouse

An NSO (no surface occupancy) restriction will apply within 0.25 miles of greater sage-grouse leks. In addition, powerlines will not be constructed within 0.6 miles of any lek, as necessary to protect leks from raptor predation. To protect nesting greater sage-grouse, operators will restrict construction activities between March 1 and June 30 within a two mile radius of an identified greater sage-grouse lek and associated nesting habitat. In addition, construction, drilling, and other activities potentially disruptive to wintering greater sage-grouse are prohibited during the period of November 15 to April 30 for the protection of winter concentration areas (USDI-BLM 2000).

2.3.4.2 Ferruginous Hawk, Peregrine Falcon, and Burrowing Owl

The protection protocol generally will be as described for raptors (see Section 2.3.1). Additional measures will be applied on a species- or site-specific basis, as deemed appropriate by the USFWS and/or BLM and specified in conditions of approval for individual APD's/ROW's. To protect nesting and brood rearing burrowing owls, construction, drilling, and other activities will be restricted between February 1 and July 31, or until young are fully fledged.

2.3.5 General Wildlife

Unless otherwise indicated, the following protection measures will be applied for all wildlife species. Additional measures primarily designed to minimize impacts to other DFPA resources (e.g., vegetation and surface water resources, including wetlands, steep slopes, etc.) are identified in the EIS and these measures may provide additional protection for area wildlife. Additional actions may be applied in any given year to further minimize potential impacts to wildlife. These actions will be specified in annual reports.

All roads on and adjacent to the DFPA that are required for the proposed project will be appropriately constructed, improved, maintained, and signed to minimize potential wildlife/vehicle collisions and facilitate wildlife (most notably big game) movement through the DFPA. Appropriate speed limits will be adhered to on all DFPA roads, and Operators will advise employees and contractors regarding these speed limits.

APPENDIX H: WILDLIFE MONITORING PLAN

To protect important habitat in areas with sagebrush greater than three feet tall, projects will be placed to avoid this habitat where possible. Additional non-species specific wildlife mitigation includes the following:

1. Reserve, work-over, and flare pits and other locations potentially hazardous to wildlife will be adequately protected by netting and/or fencing as directed by the BLM to prohibit wildlife access.
2. No surface water or shallow ground water in connection with surface water will be utilized for the proposed project.
3. If dead or injured raptors, big game, migratory birds, or unusual wildlife are observed on the DFPA, Operator personnel will contact the appropriate BLM and WGFD offices. Under no circumstances will dead or injured wildlife be approached or handled by Operator personnel.
4. Operators will implement policies designed to control poaching and littering and will notify all employees (contract and company) that conviction of a major violation could result in disciplinary action. Contractors will be informed that any intentional game law violation or littering within the DFPA could result in dismissal.

Additional project- and site-specific measures may be added in future years as specified in annual reports.

APPENDIX H: WILDLIFE MONITORING PLAN

3.0 LITERATURE CITED

- Avian Power Line Interaction Committee (APLIC). 1994. *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*. Edison Electric Institute, Washington, D.C. 78 pp. + append.
- _____. (APLIC). 1996. *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*. Edison Electric Institute/Raptor Research Foundation, Washington, D.C. 125 pp. + append.
- Call, M.W. 1978. *Nesting Habitats and Surveying Techniques for Common Western Raptors*. U.S. Department of the Interior, Bureau of Land Management, technical Note No. 316. 115 pp.
- Grier, J.W., and R. W. Fyfe. 1987. *Preventing Research and Management Disturbance*. Pages 173-182 In B.A.G. Pendleton, B.A. Milsap, K.W. Cline, and D.M. Bird, editors. *Raptor Management Techniques*. Institute of Wildlife Research, National Wildlife Federation, Scientific and Technical Series No. 10 420 pp.
- Hayden-Wing Associates. 2002. *Wildlife and Fisheries Technical Report, Desolation Flats Natural Gas Development Project*. Laramie, Wyoming.
- Olendorff, R.R., A.D. Miller, and R.M. Lehman. 1981. *Suggested Practices for Raptor Protection On Power Lines: The State of the Art in 1981*. Raptor Research Report No. 4, Raptor Research Foundation, Inc. University of Minnesota, St. Paul. 111 pp.
- U. S. Department of the Interior. Bureau of Land Management. May 2000. *Record of Decision Environmental Impact Statement Continental Divide/Wamsutter II Natural Gas Project, Sweetwater and Carbon Counties, Wyoming*. Rawlins and Rock Springs Field Offices. Rawlins and Rock Springs, Wyoming. BLM/WY/PL-00/018+1310.
- _____. April 9, 2001. *Issuance of BLM (Wyoming) Sensitive Species Policy and List*. Instruction Memorandum No. WY-2001-040. Expires 9/30/2002.
- U. S. Department of the Interior. Fish and Wildlife Service. 1989. *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act*. U.S. Department of the Interior, Fish and Wildlife Service, Denver, CO and Albuquerque, NM. 15pp.
- _____. 2002. *Mountain Plover Survey Guidelines*. U.S. Fish and Wildlife Service, Cheyenne, Wyoming. 7 pp.

APPENDIX H: WILDLIFE MONITORING PLAN

ADDENDUM H-1

EXAMPLE DATA SUMMARY TABLES AND FORMS

APPENDIX H: WILDLIFE MONITORING PLAN

RAPTOR NEST DESCRIPTION DFPA

Species _____ Nest ID _____

Legal Location: T _____ N : R _____ W Sec _____ 1/4 of _____ 1/4 of _____ 1/4

GPS Coordinate: E _____ N _____ (UTM NAD 27)

Nest:

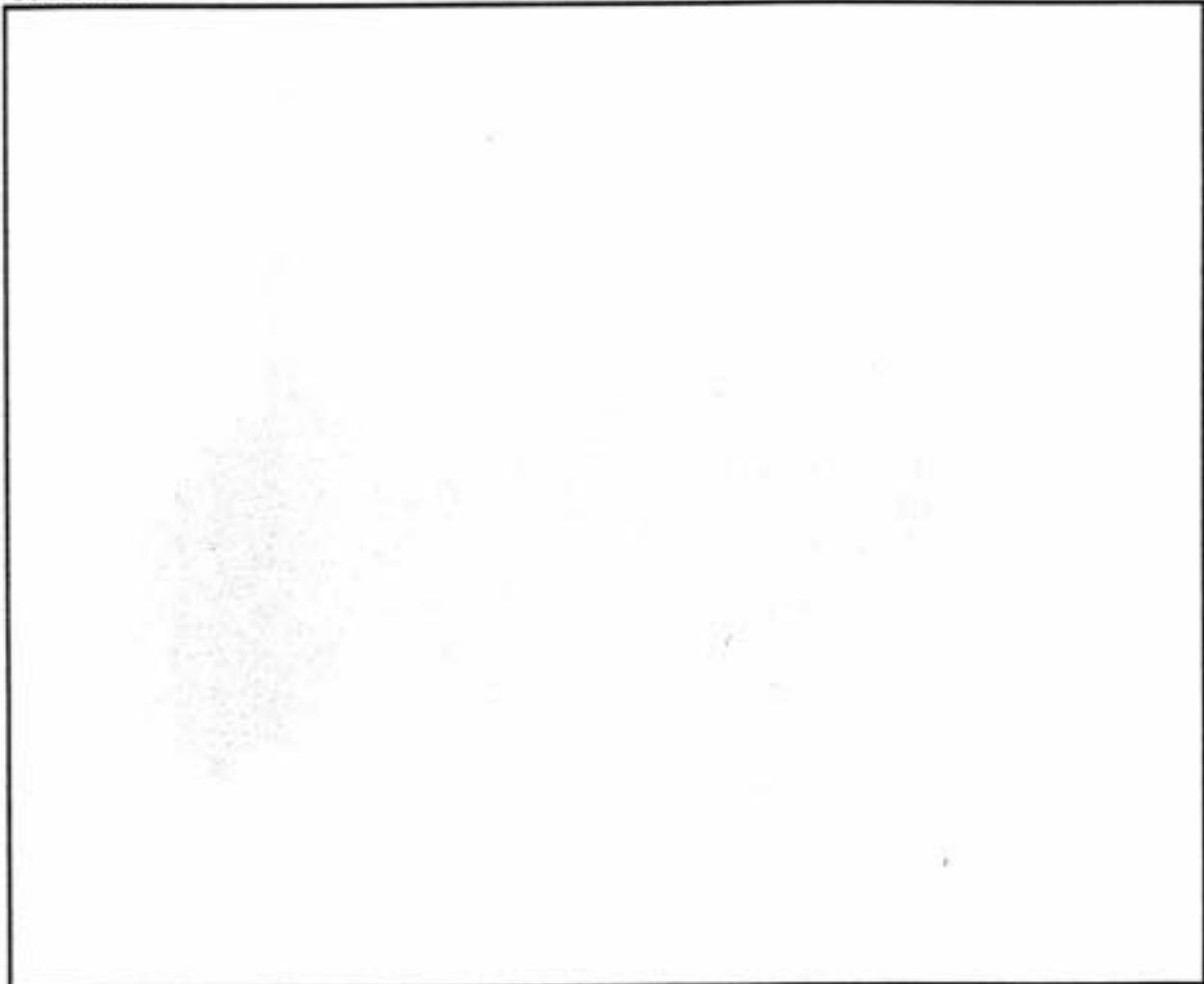
Substrate _____ Aspect of Substrate/Nest _____

Height of Sustrate _____ Height of Nest Above Ground _____

Elevation _____

Habitat Description/Comments _____

USGS Quad



APPENDIX H: WILDLIFE MONITORING PLAN

Black-Footed Ferret Nocturnal Survey

DFPA

Project _____ Survey No. _____ of _____
 Observers _____ Date _____ 20____
 Survey Method _____ Prairie Dog Town Number(s) _____
 Legal Location: Township _____ N Range _____ W Sec(s) _____
 Prairie Dog Species _____ Start End
 Length of Survey Route (miles) _____ Time _____
 Area Searched (acres) _____ Temperature _____
 No. of Runs _____ Length of Run (hrs) _____ Wind _____
 USGS Quad(s) _____ % Cloud Cover _____

Ferret Observations: (Include detailed location/GPS coordinates for each)

Ferret Sighting _____
 Ferret Sign _____
 Sign Collected _____
 Unidentified Green Eye-Shine _____
 Photos Taken/Comments _____

<u>Potential Prey Species</u>	<u>Number Observed (circle each run)</u>	<u>Other Sign</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

<u>Other Predator Species</u>	<u>Number Observed (circle each run)</u>	<u>Other Sign</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

<u>Other Wildlife Species</u>	<u>Number Observed (circle each run)</u>	<u>Other Sign</u>
_____	_____	_____
_____	_____	_____

Daylight Burrow Inspection: Time: _____ - _____ Area Searched (acres) _____
 Location Searched _____ No. of Burrows Inspected: _____
 Comments: _____

APPENDIX H: WILDLIFE MONITORING PLAN

SAGE GROUSE LEK DESCRIPTION DFPA

Lek ID _____

Legal Location: T _____ N : R _____ W Sec _____ 1/4 of _____ 1/4 of _____ 1/4

GPS Coordinate: E _____ N _____ (UTM NAD 27)

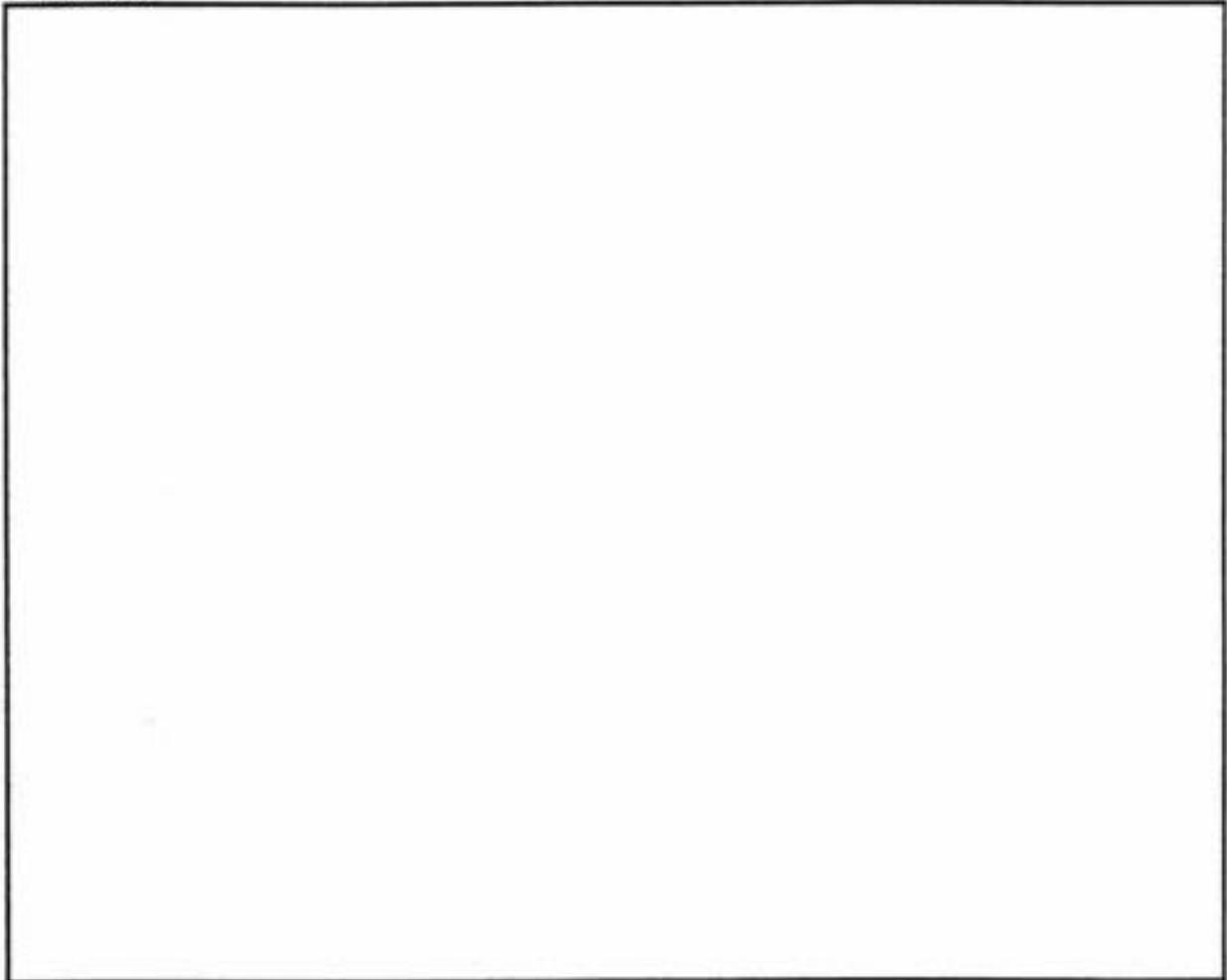
Site Description:

Habitat Type _____ Slope _____

Topography _____ Elevation _____

Comments _____

USGS Quad



ADDENDUM H-2
MOUNTAIN PLOVER ADDITIONAL STIPULATIONS

APPENDIX H: WILDLIFE MONITORING PLAN

ADDENDUM H-2

Some of the following mountain plover protection measures may be implemented if mountain plover “occupied habitat areas” are disturbed:

1. To protect the identified mountain plover occupied habitat area, the proposed activity would not be allowed as proposed. An alternative such as moving the facility, directional drilling, piping and storage of condensate off the identified mountain plover occupied habitat area to a centralized facility, or other technique for the minimization of ground disturbance and habitat degradation would be required.
2. To protect the identified mountain plover occupied habitat area, the proposed facility would be moved ½ mile from the identified occupied habitat area.
3. To protect the identified mountain plover occupied habitat area and because mountain plover adults and broods may forage along roads during the night, traffic speed and traffic volume would be limited during night-time hours from April 10 to July 10.
4. Within ½ mile of the identified mountain plover occupied habitat area, speed limits would be posted at 25 mph on resource roads and 35 mph on local roads during the brood rearing period (June 1 - July 10).
5. The access road would be realigned to avoid the identified mountain plover occupied habitat area.
6. To protect the identified mountain plover occupied habitat area, traffic would be minimized from June 1 - July 10 by car-pooling and organizing work activities to minimize trips on roads within ½ mile of the mountain plover occupied habitat area.
7. To protect the identified mountain plover occupied habitat area, work schedules and shift changes would be modified from June 1 - July 10 to avoid the periods of activity from ½ hour after sunset to ½ hour before sunrise.
8. To protect the identified mountain plover occupied habitat area, fences, storage tanks, and other elevated structures would be either constructed as low as possible and/or would incorporate perch-inhibitors into their design.
9. Road-killed animals would be promptly removed from areas within ½ mile of the identified mountain plover occupied habitat area.
10. To protect the identified mountain plover occupied habitat area, seed mixes and application rates for reclamation would be designed to produce stands of sparse, low-growing vegetation suitable for plover nesting.
11. To minimize destruction of nests and disturbance to breeding mountain plovers, no reclamation activities or other ground-disturbing activities would occur from April 10 - July 10 unless surveys consistent with the Plover Guidelines or other FWS approved method find that no plovers are nesting in the area.

APPENDIX H: WILDLIFE MONITORING PLAN

12. A plugged and abandoned well within ½ mile of the identified mountain plover occupied habitat area would be identified with a marker 4 feet tall with a perch inhibitor on the top of the marker.

ADDENDUM H-3

**WYOMING BLM STATE DIRECTOR'S SENSITIVE SPECIES LIST
AND INSTRUCTION MEMORANDUM**

APPENDIX H: WILDLIFE MONITORING PLAN

BLM Wyoming Sensitive Species Policy and List

April 9, 2001

Introduction

The USDI Bureau of Land Management (BLM) Wyoming has prepared this list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. Many species are not on this list due to the lack of status, distribution and habitat requirement information which prohibits any management attention.

The goals of this sensitive species policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems.
- Ensure sensitive species are considered in land management decisions.
- Prevent a need for species listing under the Endangered Species Act.
- Prioritize needed conservation work with an emphasis on habitat.

Authority

The authority for this policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A., General Program Delegation, Director, Bureau of Land Management.

Bureau of Land Management (BLM) Manual 6840 establishes Special Status Species (SSS) policy for plant and animal species and the habitat on which they depend. This SSS policy refers not only to species protected under the Endangered Species Act (ESA), but also to those designated by the State Director as Sensitive. The manual states “ *Sec. 06D - Sensitive Species: State Directors, usually in cooperation with the State wildlife agency, may designate sensitive species. By definition the sensitive species designation includes species that could easily become endangered or extinct in the state. Therefore, if sensitive species are designated by the State Director, **the protection provided by the policy for candidate species shall be used as the minimum level of protection.*** ”

Criteria set forth in the Glossary of Terms section of the 6840 Manual for designating sensitive species are:

1. under status review by the FWS/National Marine and Fisheries Service(NMFS); or
2. whose numbers are declining so rapidly that Federal listing may become necessary; or
3. with typically small or widely dispersed populations; or
4. those inhabiting ecological refugia or other specialized or unique habitats.

The intent of the sensitive species designation is to ensure actions on BLM administered

APPENDIX H: WILDLIFE MONITORING PLAN

lands consider the welfare of these species and do not contribute to the need to list any other Special Status Species under the provisions of the ESA. Management requirements that apply to the species on the BLM Wyoming Sensitive Species List are to avoid or minimize adverse impacts and maximize potential benefits to species whose viability has been identified as a concern by reviewing programs and activities to determine their potential effect on sensitive species. Requesting technical assistance from the FWS, and any other qualified source, on actions that may affect a sensitive species is recommended. It is not the intent of this list to track species rangewide or even statewide as this is done by other entities (WYNDD, WGFD, FWS, GAP, etc.) rather our (BLM) obligation is to determine distribution and manage habitats. It is also the intent of this list to emphasize planning, management, and monitoring of these species.

Guidance

BLM Washington Office Instruction Memorandum IM 97-118 Guidance on Special Status Species Management (6840 Manual) was issued on April 30, 1997 in response to the February 28, 1996 Fish and Wildlife Service (FWS) "Notice of Review of Plant and Animal Taxa That Are Candidates For Listing as Endangered or Threatened" (61 FR 7595). It states: *"The new candidate list eliminated the separate categories of candidates (Category-1 and Category-2) and redefined candidates to include only species for which the FWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but for which issuance of the proposed rule is precluded by higher listing priorities. The December 5, 1996, notice made this decision to eliminate the Category-2 candidate (C2) list final. In a separate "Notice of Candidate Taxa Reclassification" (61 FR 7457), FWS reclassified 96 former Category-1 (C1) candidates to non-candidate status. Consequently, the list provided in 61 FR 7595 consists of a new candidate list which is an updated list of approximately one-half of the former C1 species, plus those species currently proposed for listing as threatened or endangered. It is, in effect, the list of proposed species and the backlog of listing proposals."*

IM 97-118 continues by reiterating BLM policy to ensure actions authorized, funded, or carried out by BLM do not contribute to the need for any species to become listed as a candidate, or for any candidate species to become listed as threatened or endangered. Early identification of BLM sensitive species is advised in efforts to prevent species endangerment, and State Directors are encouraged to collect information on species of concern to determine if BLM sensitive species designation and special management are needed. It then urges evaluation of former C1 and C2 species to determine their vulnerability to ESA listing and therefore their designation by BLM as a sensitive species, and further urges states without a sensitive species list to institute one comprised of the former C1 and C2 species that meet the 6840 Manual criteria.

BLM WY Approach

In March 1990, an Umbrella Memorandum Of Understanding (MOU) between the

APPENDIX H: WILDLIFE MONITORING PLAN

Wyoming Game and Fish Department (WGFD) and USDI BLM Wyoming for Management of the Fish and Wildlife Resources on the Public Lands was signed. The purpose of the MOU was for the two agencies to work together to benefit all wildlife in Wyoming by cooperating in planning, and sharing data among other efforts. Six Appendices were planned for Specific Areas of Cooperation, one of which was titled Ecosystem Management and included the subtitle State Sensitive Species. This appendix has yet to be written although the WGFD has a Native Species Status (NSS) matrix (formerly called Species of Special Concern) identifying sensitive species, and under BLM Manual 6840 the Bureau is charged with using other agency's lists when BLM does not have a designated sensitive species list of its own.

The current status of BLM Sensitive Species lists in some adjacent states, and lists from other Federal and State agencies in Wyoming, were reviewed for this effort. BLM in Idaho listed 100 species of animals and 169 species of plants on their Sensitive Species List in 1996. In addition, they list 31 species on a Watch List for species whose populations and range appear to be restricted, but information is lacking as to the cause or if the species is headed for extinction and in need of management action to remove or reduce threats. Colorado and Arizona used the criteria from 6840 to update their lists (1998 and 2000 respectively). Arizona issued a list of 109 species, including 10 invertebrate species, in an Instruction Memorandum (IM) and Colorado updated their list to a total of 112 species in an Information Bulletin (IB). The Montana State Office issued an IM in May, 1994, listing 34 Special Status Species and 61 "Candidates" that includes the C1, 2, and 3 and proposed species. Their list has not been updated since the FWS Federal Register Notices in 1996. They have however started collecting information for Habitat Accounts that cover life histories, specific habitat requirements and a literature review for each sensitive species. BLM Utah (1997) lists a total of 178 mammal, bird, fish, reptile and amphibian species with 108 species of plants. The mammal and plant species listed by BLM Oregon/Washington numbered over 1000 species in February 2000 in 3 categories of Bureau Status: Bureau Sensitive - using the 6840 criteria; Bureau Assessment - species may need protection and are included in NEPA analyses; and Bureau Tracking - species for which more information is needed to determine status.

The Wyoming Natural Diversity Database (WYNDD) maintains a list of Wyoming Plant and Animal Species of Special Concern. It provides information on global and State abundance, legal status, and State distribution about rare species. Their Species of Special Concern criteria are: if species are vulnerable to extirpation at the global or State level due to inherent rarity; if there is a significant loss of habitat; or if the species is sensitive to human-caused mortality or habitat disturbances. This information can be found on the internet at: <http://uwadmnweb.uwyo.edu/wyndd/WYNDD/SpeciesofConcern.htm>

The Wyoming Game and Fish Department's Species of Special Concern (SSC) list in the 1996 Nongame Bird and Mammal Plan ranks 47 species using a matrix of population

variables and habitat variables. The codes of SSC1, SSC2, and SSC3 refer to each species' level of sensitivity and all are considered "sensitive." In 1998 the name of the matrix was

APPENDIX H: WILDLIFE MONITORING PLAN

changed to Native Species Status. The mammal list was revised in spring 2000 to reflect the addition of 12 species for a total of 35 mammals. The Department is actively involved in the Partner's in Flight effort to prioritize bird species of concern and develop a bird conservation plan. In November, 1999, the Habitat Protection Program (WGFD Cheyenne Office) produced a Species Watch List using State, Federal, and University of Wyoming Cooperative Fish and Wildlife Research Unit sources to develop a list of 150 species that may need management attention.

Two Forest Service (USFS) Regions cover Wyoming: Region 2 (Rocky Mountain Region) in the eastern part of the State (Bighorn, Black Hills, Medicine Bow, and Shoshone National Forests and Thunder Basin National Grassland) and Region 4 (Intermountain Region) in the western part of Wyoming (Ashley, Bridger-Teton, Caribou, Targhee, Wasatch-Cache National Forests and Flaming Gorge National Recreation Area). The original list of Vertebrate Sensitive Species for Region 4, issued in August, 1990, listed 29 vertebrates. Their January, 1999, updated list includes 222 species of plants, mammals, birds, fish, amphibians and reptiles, the majority (200) of which are plants. Another update of the Region 4 list is planned for this fall. Region 2 is in the process of updating their 1994 list of 165 species of plants, mammals, birds, fish, amphibians and reptiles, and invertebrates. Thunder Basin National Grassland lists 8 plant and 33 vertebrate species on their Species of Concern list.

BLM resource specialists statewide were polled in March 2000 concerning development of the BLM Wyoming Sensitive Species list. Suggestions and concerns heard from the field were: the species on the sensitive species list should have declining populations throughout all or part of its range; that species are experiencing declining habitat conditions; that the species and their habitats had to be manageable; and that the list should have a limited number of species to meet the objective of focusing management attention. The population and habitat criteria expressed largely correspond with the 6840 criteria. The manageability of the species, their habitats and the list size have guided the development of this list. Also requested were management guidelines, which are not included at this time, but are seen as likely extension of this effort. General habitat requirements are provided in the table as well as statewide distribution by Field Office.

Evaluation/Monitoring/Review Process

The BLM Sensitive Species List is meant to be dynamic. The State Office wildlife and botany staff will annually review the list and solicit recommendations from BLM and non-BLM appropriate authorities for additions and deletions. If biological information shows that a species needs to be included, or removed, the appropriate Field Manager or the State Office can make a nomination for an addition or deletion with sufficient scientific justification and supporting data concerning the above-listed criteria. Under this scenario, if

such a species occurs in more than one Field Office, consensus will be sought from the other Field Offices before action is taken.

APPENDIX H: WILDLIFE MONITORING PLAN

Any Federally de-listed threatened or endangered species will automatically be designated BLM Wyoming Sensitive for the 5 year monitoring period required by the ESA. Species that were evaluated in a FWS 12 month finding but were found to be “not warranted,” both petitioned species and species given candidate status after 1996 will initially be included on the BLM Wyoming Sensitive Species List.

The List

Using the criteria set forth in Manual 6840 (see page 1 above), BLM Wyoming is designating the following list of plants and animals to be Sensitive Species. While using these criteria, the process of including species on the list is still subjective. This list does not include those species already formally designated by the FWS as Federally endangered, threatened, proposed, and/or candidate.

Many species are not included on the list because their status is largely unknown and basic inventory is needed. It is the BLM Wyoming’s intent that the WYNDD’s and WGFD’s lists should be regularly consulted by field personnel to develop inventory projects designed to gather information on population size, trend, and distribution for these poorly known species. They should also be the target for budgetary funding for inventory purposes.

APPENDIX H: WILDLIFE MONITORING PLAN

BLM WYOMING STATE DIRECTOR'S SENSITIVE SPECIES LIST (ANIMALS AND PLANTS)

April, 2001

Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: WY Natural Heritage Programs, Forest Service (FS) Regions 2 and 4; Wyoming Game and Fish (NWS), BLM states and others ¹	Occurrence by BLM Field Office ²										
				WFO	CYFD	RFO	RSFO	LFO	CFO	HFO	NFO	KFO	PFO	
MAMMALS														
Shrew, Dwarf	<i>Sorex nanus</i>	Mountains foothill shrub, grasslands	G4/S253, FSR2, NSS3, UT	X	X	X	X	X	X	X	X	X	X	X
Myotis, Long-eared	<i>Myotis evotis</i>	Conifer and deciduous forests, caves and mines	G3/S1B, S17N, NSS2, ID, OR/WA, AZ	X	X	X	X	X	X	X	X	X	X	X
Myotis, Fringed	<i>Myotis thomasi</i>	Conifer forests, woodland-chaparral, caves and mine	G3/S1B, S1H, FSR2, TBNG, NSS2, ID, UT, MT, OR/WA, AZ			X	X	X	X	X	X			
Bat, Spotted	<i>Eptesicus maculatus</i>	Cliffs over perennial water, basin-prairie shrub	G4/S1B, S27N FSR2, FSR4, NSS2, ID, CO, UT, MT, OR/WA, AZ	X	X		X	X	X	X	X			
Bat, Townsend's Big-eared	<i>Corynorhinus townsendii</i>	Forests, basin prairie shrub, caves and mines	G4/S1B, S2N, FSR2, TBNG, FSR4, NSS2, ID, CO, UT, MT, OR/WA	X	X	X	X	X	X	X	X			
Rabbit, Pygmy	<i>Brachylagus idahoensis</i>	Basin prairie and riparian shrub	G4/S2, NSS3, ID, MT, OR/WA, IUCN LR(m)				X						X	X
Prairie Dog, White-tailed	<i>Cynomys leucurus</i>	Basin prairie shrub, grasslands	G4/S253, NSS3, MT	X	X	X	X	X	X	X	X		X	X
Pocket Gopher, Wyoming	<i>Thomomys talpae</i>	Meadows with loose soil	G2/S152, NSS4, FSR2			X	X							
Pocket Gopher, Idaho	<i>Thomomys talpae</i>	Shallow stony soils	G4/S27, NSS3, IUCN-LR(m)				X						X	X
Fox, Swift	<i>Urocyon v. velox</i>	Grasslands	Removed from Federal Candidate list 01/08/01	X	X	X	X	X	X	X	X	X	X	X
BIRDS														

APPENDIX H: WILDLIFE MONITORING PLAN

Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: WY Natural Heritage Program, Forest Service (FS) Regions 2 and 4, Wyoming Game and Fish (NWS), BLM states and others ¹	Occurrence by BLM Field Office ¹											
				WFO	CYFO	RFO	RSFO	LFO	CFO	BFO	NFO	KFO	PFO		
Bin, White-faced	<i>Plegadis alibi</i>	Marshes, wet meadows	G5/S1B, S2N, FSR2, TBNG, NSS3, UT, MT, CO, AZ	X	X	X	X	X	X	X	X	X	X	X	X
Swan, Trumpeter	<i>Cygnus buccinator</i>	Lakes, ponds, rivers	G4/S1B, S2N, FSR2, TBNG, FSR4, NSS2, ID, MT	X	X	X	X	X	X	X	X	X	X	X	X
Godawk, Northern	<i>Accipiter gentilis</i>	Conifer and deciduous forests	G5/S23B, S4N, FSR2, TBNG, FSR4, NSS4, ID, CO, UT, MT	X	X	X	X	X	X	X	X	X	X	X	X
Hawk, Ferruginous	<i>Buteo regalis</i>	Basin-prairie shrub, grassland, rock outcrops	G4/S3B, S3N, FSR2, TBNG, NSS3, ID, CO, MT	X	X	X	X	X	X	X	X	X	X	X	X
Falcon, Peregrine	<i>Falco peregrinus</i>	Tall cliffs	G4/T3/S1B, S2N, FSR2, TBNG, NSS3, UT	X	X	X	X	X	X	X	X	X	X	X	X
Sage-grouse, Greater	<i>Centrocercus urophasianus</i>	Basin-prairie shrub, mountain-foothill shrub	G5/S3, TBNG, ID, CO, UT	X	X	X	X	X	X	X	X	X	X	X	X
Grouse, Columbian Sharp-tailed	<i>Tympanuchus phasianellus columbianus</i>	Grasslands	G4/T3/S1, FSR2, FSR4, ID, CO, UT, MT												
Curlew, Long-billed	<i>Numenius americanus</i>	Grasslands, plains, foothills, wet meadows	G5/S3B, S2N, FSR2, TBNG, NSS3, ID, CO, UT, MT	X	X	X	X	X	X	X	X	X	X	X	X
Cuckoo, Yellow-billed	<i>Coccyzus americanus</i>	Open woodlands, streamside willow and alder groves	G5/S2B, S2N, FSR2, TBNG, NSS3, UT, ID, Petitioned	X	X	X	X	X	X	X	X	X	X	X	X
Owl, Burrowing	<i>Athene cunicularia</i>	Grasslands, basin-prairie shrub	G4/S3B, S2N, FSR2, TBNG, NSS4, ID, MT, AZ	X	X	X	X	X	X	X	X	X	X	X	X
Thrasher, Sage	<i>Oreoscoptes montanus</i>	Basin-prairie shrub, mountain-foothill shrub	G5/S3B, S2N, PIF Priority	X	X	X	X	X	X	X	X	X	X	X	X
Strike, Loggerhead	<i>Lanius ludovicianus</i>	Basin-prairie shrub, mountain-foothill shrub	G5/S4B, S2N, FSR2, TBNG, ID, MT, AZ	X	X	X	X	X	X	X	X	X	X	X	X
Sparrow, Brewer's	<i>Sporafila breweri</i>	Basin-prairie shrub	G5/S3B, S2N, TBNG, PIF Priority, ID	X	X	X	X	X	X	X	X	X	X	X	X

APPENDIX H: WILDLIFE MONITORING PLAN

Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: WY Natural Heritage Program, Forest Service (FS) Regions 2 and 4, Wyoming Game and Fish (NWS), BLM status and others ^a	Occurrence by BLM Field Office ^a											
				WFO	CYFO	RFO	RSFO	LFO	CTO	HFO	NFO	KFO	PFO		
Sparrow, Sage	<i>Amphispiza bilineata</i>	Basin-prairie shrub, mountain-foothill shrub	G5/S1B, S2N, P1F Priority, ID, MT	X	X	X	X	X	X	X	X	X	X	X	X
Sparrow, Baird's	<i>Ammodramus baileyi</i>	Grasslands, weedy fields	G4/S1B, S2N, FSR2, TBNG, MT	X	X	X		X	X	X	X				
FISH															
Chub, Roundtail	<i>Gila robusta</i>	CO River drainage, mostly large rivers, also streams and lakes	G2C3/S27, NSS1, CO, UT			X	X							X	X
Chub, Leatherside	<i>Gila copei</i>	Bear, Snake and Green drainages, clear, cool streams and pools	G1G4/S2, NSS1, ID, UT				X							X	X
Sucker, Bluehead	<i>Catostomus commersoni</i>	Bear, Snake and Green drainages, all waters	G4/S1B3, NSS1, CO, UT			X	X							X	X
Sucker, Flannelmouth	<i>Catostomus commersoni</i>	CO River drainage, large rivers, streams and lakes	G1G4/S3, NSS1, CO, UT			X	X							X	X
Trout, Yellowstone Cutthroat	<i>Oncorhynchus clarki bovieri</i>	Yellowstone drainage, small mountain streams and large rivers	G4T2/S2, FSR2, NSS3, ID, MT	X	X			X		X					X
Trout, Colorado River Cutthroat	<i>Oncorhynchus clarki pleurocinctus</i>	CO River drainage, clear mountain streams	G4T7/S2, FSR2, FSR4, NSS2, CO, UT, Petitioned			X	X							X	X
Trout, Bonnevillie Cutthroat	<i>Oncorhynchus clarki webbi</i>	Bear R. drainage, clear mountain streams	G4T7/S1S2, NSS2, FSR4, ID, UT, Petitioned											X	
Trout, Fine-spotted Snake River Cutthroat	<i>Oncorhynchus clarki snyderi</i>	Snake R. drainage, clear, fast water	G4T7/S2/S1, NSS4, FSR4, Petitioned											X	X
REPTILES															
Rattlesnake, Mojave	<i>Crotalus viridis concolor</i>	Mountain foothills shrub, rock outcrop	G5T3/S1S2, CO				X								
AMPHIBIANS															
Frog, Northern Leopard	<i>Rana pipiens</i>	Beaver ponds, permanent water in plains and foothills	G5/S3, FSR2, TBNG, NSS4, CO, ID, MT	X	X	X	X	X	X	X	X	X	X	X	X
Spadefoot, Great Basin	<i>Scaphiopus holtzmani</i>	Spring seeps, permanent and temporary wetland	G5/S4, NSS4, CO			X	X	X	X	X	X	X	X	X	X

APPENDIX H: WILDLIFE MONITORING PLAN

Species Common Name	Scientific Name	Habitat	Designation and Ranking of species: WY Natural Heritage Program, Forest Service (FS) Regions 2 and 4; Wyoming Game and Fish (WGS), BLM states and others ¹	Occurrence by BLM Field Office ¹												
				WFO	CYFO	RFO	RSFO	LFO	CTO	IBFO	NFO	RFO	PFO			
Tall, Bureau (Northern Rocky Mountains population)	<i>Bufo boreas boreas</i>	Pond margins, wet meadows, riparian areas	GH4/S2, NSS2, FSR2, FSR4, UT, ID	X		X	X							X	X	
Frog - Spotted	<i>Rana pretiosa (fluviatilis)</i>	Ponds, sloughs, small streams	GH5/S23, FSR2, FSR4, NSS4, ID, UT, MT	X			X	X			X			X	X	
PLANTS																
Meadow Pusycot	<i>Antennaria arcuata</i>	Moist, hummocky meadows, seeps or springs surrounded by sage/grasslands 4,950-7,900'	G2/S2				X	X								X
Laramie Columbine	<i>Aquilegia laramiensis</i>	Crevices of granite boulders & cliffs 6,400-8,600'	G2/S2, FSR2			X				?						
Small Rock Cress	<i>Arabis pusilla</i>	Cracks/Crevices in sparsely vegetated granite/pegmatite outcrops w/in sage/grasslands 8,000-8,100'	G1/S1 (Removed from Federal Candidate list 10/25/09)				X									
Mystery Wormwood	<i>Aristida bizonia var. diffusa</i>	Clay flats & playas 6,500'	G3T1/S1													
Porter's Sagebrush	<i>Aristida porteri</i>	Sparsely vegetated badlands of silty or silty-sandstone & clay slopes 5,300-6,500'	G2/S2					X	X	X						
Dobois Milk vetch	<i>Astragalus glycyphorus var. purpureus</i>	Barren shale, badlands, limestone, & redbed slopes & ridges 6,900-8,800'	G3T2/S2							X						
Hyattville Milk vetch	<i>Astragalus jensenii var. articulatus</i>	Sparsely vegetated stony ridges & barren red clay slopes 4,900-5,900'	G3T1/S1	X												
Nelson's Milk vetch	<i>Astragalus Nelsonii var. Nelsonii</i>	Alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, & cushion plant communities at 5200-7600'	G2/S2, CO			X	X	X		X						
Triclease 's Milk vetch	<i>Astragalus racematus var. Treleasei</i>	Sparsely vegetated sagebrush communities on shale or limestone outcrops & barren clay slopes at 6500-8200'	G3T2/S1												X	X

APPENDIX H: WILDLIFE MONITORING PLAN

Species Common Name	Scientific Name	Habitat	Designation and Ranking of sites: WY Natural Heritage Program, Forest Service (FS) Regions 2 and 4; Wyoming Game and Fish (WYGF), BLM states and others ¹	Occurrence by BLM Field Office ¹													
				WFO	CYFO	RFO	RSEF	LFO	CFD	BFO	NFO	KFO	PFO				
Puccoon Milkweed	<i>Asclepias purshiana</i>	Cushion plant communities on rocky, clay soils mixed with shale on summits & slopes of white shale hills 6,800-7,200'	GI/SI				X										
Cedar Rim Thistle	<i>Cirsium arvense</i>	Barren, chalky hills, gravelly slopes, & fine textured, sandy-shaly draws 6,700-7,200'	GRQ/SI			X		X									X
Owensby's Thistle	<i>Cirsium oregoni</i>	Sparcely vegetated shaly slopes in sage & juniper communities 6,440-8,400'	GI/SI				X										
Many-stemmed Spider-flower	<i>Cleome sulcata</i>	Semi-moist, open saline banks of shallow ponds & lakes with halophytes & bulrush 5,900'	GRQ/SI							X							
Owl Creek Milner's Caudle	<i>Cryptantha subciliata</i>	Sandy-gravelly slopes & desert ridges on sandstones of the Winds River Formation 4,700-6,000'	GI/SI						X								
Evert's Water-Parasit	<i>Cymopterus evertii</i>	Coarse volcanic soils or sandstone outcrops dominated by cushion plants or sparse shrublands in openings within Rocky Mtn juniper or Limber pine woodlands at 5,900-10,500'	GRQ/SI/SI		X												
Williams' Water-Parasit	<i>Cymopterus williamsii</i>	Open ridgetops & upper slopes with exposed limestone outcrops or rockshades 6,000-8,300'	GI/SI	X						X		X					
Wyoming Tansyuntard	<i>Descurainia torulosa</i>	Sparcely vegetated sandy slopes at base of cliffs of volcanic breccia or sandstone 8,300-10,000'	GI/SI				X										
Weber's Scarlet-Gilia	<i>Ipomopsis aggregata</i> sp. weberi	Openings in coniferous forests & scrub oak woodlands 8,500-9,600'	GRQ/SI, FSR2			X											
Emire-Leaved Peppercorn	<i>Lepidium integrifolium</i> var. <i>integrifolium</i>	WY poplars occur in sparcely vegetated and seasonally wet clay flats, grasswood communities on clay limestones, and moist alkaline meadows at 6,200-6,770'	GI/SI														X

APPENDIX H: WILDLIFE MONITORING PLAN

Species Common Name	Scientific Name	Habitat	Designation and Ranking of others: WY Natural Heritage Program, Forest Service (FS) Regions 2 and 4; Wyoming Game and Fish (WGS), BLM status and others ¹	Occurrence by BLM Field Office ²												
				WFO	CYFD	RFO	RSFO	LFO	CFO	BFO	NFO	KFO	PFO			
Saddle Bladderpod	<i>Lesquerella arvensis</i> var. <i>apriliflora</i>	Dry, open rock outcrops of gravel, shale, or limestone & barren, often sclerophyllous, meadows 4,200-4,300'	G2/S1										X			
Fremont Bladderpod	<i>Lesquerella fremontii</i>	Rocky limestone slopes & ridges 7,000-9,000'	G2/S2		X											
Large-fruited Bladderpod	<i>Lesquerella macrocarpa</i>	Gypsum-clay hills & benches, clay flats, & barren hills 7,200-7,700'	G2/S2			X								X	X	
Western Bladderpod	<i>Lesquerella multiceps</i>	Dry, gravelly limestone ridges & slopes in sparse grasslands or cushion plant communities at 8,300-8,600'	G3/S1												?	
Prostrate Bladderpod	<i>Lesquerella prostrata</i>	Cushion plant or sparse sage grassland communities on slopes and rims of whitish to reddish or gray limy clays & soft sandstones with a surface layer of fine gravel at elevations of 7,200-7,700'	G3/S1												X	
Alaska Beardtongue	<i>Penstemon albobaccatus</i>	Sparsely vegetated openings on steep slopes of loose volcanic rubble or outcrops of dry andesitic volcanic rock at 5,920-10,000'	G2/S2		X											
Stemless Beardtongue	<i>Penstemon acutellus</i> var. <i>acutellus</i>	Cushion plant or Black sage grassland communities on semi-barren rocky ridges, knolls, & slopes at 5,900-8,200'	G3/S1				X									
Cary Beardtongue	<i>Penstemon caryi</i>	Calcareous rock outcrops & rocky soil w/ta sage, juniper, Doug-fir, & limber pine communities 5,200-8,500'	G3/S2, FS/R2		X					X						
Gibbens' Beardtongue	<i>Penstemon gibbensii</i>	Sparsely vegetated shale or sandy-clay slopes 5,500-7,700'	G1/S1			X										
Beaver Rim Phlox	<i>Phlox pungens</i>	Sparsely vegetated slopes on sandstone, siltstone, or limestone substrates 6,000-7,400'	G2/S2				X			X					X	X
Tufted Twistedpod	<i>Physaria condurmaria</i>	Sparsely vegetated shale slopes & ridges 6,500-7,000'	G2/S2						X						X	X

APPENDIX H: WILDLIFE MONITORING PLAN

3 Rankings

Heritage Program
 WYNDDO uses a standardized ranking system developed by The Nature Conservancy's Natural Heritage Network to assess the global and statewide conservation status of each plant and animal species, subspecies, and variety. Each taxon is ranked on a scale of 1-5, from highest conservation concern to lowest. Codes are as follows:

G Global rank: Rank refers to the rangewide status of a species.

T Tripartite rank: Rank refers to the rangewide status of a subspecies or variety.

S State rank: Rank refers to the status of the taxon (species or subspecies) in Wyoming. State ranks differ from state to state.

1 Critically imperiled because of extreme rarity (often known from 5 or fewer extant occurrences or very few remaining individuals) or because some factor of a species' life history makes it vulnerable to extinction.

2 Imperiled because of rarity (often known from 6-20 occurrences) or because of factors demonstrably making a species vulnerable to extinction.

3 Rare or local throughout its range or found locally in a restricted range (usually known from 21-100 occurrences).

4 Apparently secure, although the species may be quite rare in parts of its range, especially at the periphery.

5 Demonstrably secure, although the species may be rare in parts of its range, especially at the periphery.

H Known only from historical records. 1950 is the cutoff for plants; 1970 is the cutoff date for animals.

X Believed to be extinct.

A Accidental or vagrant: A taxon that is not known to regularly breed in the state or which appears very infrequently (typically refers to birds and bats).

B Breeding rank: A state rank modifier indicating the status of a migratory species during the breeding season (used mostly for migratory birds and bats).

N Nonbreeding rank: A state rank modifier indicating the status of a migratory species during the non-breeding season (used mostly for migratory birds and bats).

ZH or **ZB** Taxa that are not of significant concern in Wyoming during breeding (ZH) or non-breeding (ZB) seasons. Such taxa often are not encountered in the same locations from year to year.

U Possibly in peril, but status uncertain; more information is needed.

Q Questions exist regarding the taxonomic validity of a species, subspecies, or variety.

7 Questions exist regarding the assigned G, T, or S rank of a taxon.

State Status
 The Wyoming Game and Fish Department has developed a matrix of habitat and population variables to determine the conservation priority of all native, breeding bird and mammal species in the state. Six classes of Native Status Species (NSS) are recognized, of which classes 1, 2, and 3 are considered to be high priorities for conservation attention.

These species can be defined as follows:

NSS1 Includes species with on-going significant loss of habitat and with populations that are greatly restricted or declining (extirpation appears possible).

NSS2 Species in which (1) habitat is restricted or vulnerable (but no recent or significant loss has occurred) and populations are greatly restricted or declining, or (2) species with on-going significant loss of habitat and populations that are declining or restricted in numbers and distribution (but extirpation is not imminent).

NSS3 Species in which (1) habitat is not restricted, but populations are greatly restricted or declining (extirpation appears possible); or (2) habitat is restricted or vulnerable (but no recent or significant loss has occurred) and populations are declining or restricted in numbers or distribution (but extirpation is not imminent); or (3) significant habitat loss is on-going but the species is widely distributed and population trends are thought to be stable.

Forest Service
 Region 2 - Rocky Mountain Region
 Region 4 - Inermountain Region
 TBNG - Thrusler Basin National Grassland

Other BLM states
 AZ Arizona
 CO Colorado
 ID Idaho
 MT Montana
 ORWA Oregon/Washington
 UT Utah

IUCN - International Union for Conservation of Nature, Red List Specialist Group. North American Red List. **LOWER RISK (LR)** - A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:
 1. Conservation Dependent (cd). Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
 2. Near Threatened (nt). Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
 3. Least Concern (lc). Taxa which do not qualify for Conservation Dependent or Near Threatened.

PIF - Partners In Flight, a coalition of federal, state and provincial agencies, private groups, corporations and individuals dedicated to neotropical migratory bird conservation

Petitioned - Species which has been petitioned for listing under the Endangered Species Act

2 Occurrence by BLM Field Office
 WFO Worldland

APPENDIX H: WILDLIFE MONITORING PLAN

CFYO
RFO
RSFO
LFO
CFO
BFO
NFO
KFO
PFO

Cody
Rawlins
Rock Springs
Lander
Casper
Buffalo
Newcastle
Kemmerer
Pinedale

For Plants:

- P** - Indicates occurrence within BLM Field Office area on Private Land Ownership
- S** - Indicates occurrence within BLM Field Office area on State Land Ownership
- F** - Indicates occurrence within BLM Field Office area on other Federal Land Ownership
- ?** - Indicates likely occurrence within BLM Field Office area

APPENDIX I

Biological Assessment of Threatened, Endangered, and Proposed Species for the Desolation Flats Natural Gas Development Project

Prepared by

U.S. Department of the Interior
Bureau of Land Management
Rawlins Field Office
Rawlins, Wyoming

and

U.S. Department of the Interior
Bureau of Land Management
Rock Springs Field Office
Rock Springs, Wyoming

and

Hayden-Wing Associates
Environmental Consultants
Laramie, Wyoming

June, 2002

APPENDIX I
BIOLOGICAL ASSESSMENT
TABLE OF CONTENTS

	<u>Page</u>
List of Tables and Figures	I-ii
1.0 Project Description	I-1
1.1 Project Area Location	I-2
2.0 Methods	I-2
2.1 Published Literature	I-2
2.2 Unpublished Agency Reports and Data	I-2
2.3 Personal Communications	I-3
2.4 Site Inspections	I-3
2.5 Meetings	I-3
2.6 BA Preparation	I-3
3.0 Current Status, Habitat Use, and Behavior of Species	I-3
3.1 Wildlife Species	I-4
3.2 Fish Species	I-9
3.3 Plant Species	I-11
4.0 Direct and Indirect Impacts of the Proposed Project	I-11
4.1 Proposed Action	I-12
4.1.1 Wildlife Species	I-12
4.1.2 Fish Species	I-13
4.1.3 Plant Species	I-14
4.2 Alternative A	I-14
4.2.1 Wildlife Species	I-14
4.2.2 Fish Species	I-15
4.2.3 Plant Species	I-15
4.3 Alternative B - No Action	I-15
5.0 Cumulative Impacts	I-15
6.0 Coordination Measures to Avoid or Reduce Adverse Impacts	I-17
6.1 Wildlife Species	I-17
6.2 Fish Species	I-19
6.3 Plant Species	I-19
7.0 Effects of the Project on Expected Status of Species in the Future	I-19
8.0 Determination of Effects to Threatened, Endangered, and Proposed Species	I-19
References Cited	I-20

APPENDIX I

TABLE OF CONTENTS, Continued

LIST OF TABLES AND FIGURES

	<u>Page</u>
Table 3-1. Threatened, Endangered, and Proposed Wildlife Species Potentially Present on or Near the DFPA	I-4
Table 3-2. Location, Size, and Burrow Density of White-tailed Prairie Dog Colonies Located on or near the DFPA	I-5
Figure 3-1. White-tailed Prairie Dog Colonies and Complexes in Relation to the Desolation Flats Project Area	I-7
Figure 3-2. Areas Identified as Potential Mountain Plover Habitat and Mountain Plover Sightings on and proximal to the Desolation Flats Project Area	I-10

APPENDIX I: BIOLOGICAL ASSESSMENT

1.0 Project Description

Marathon Oil Company has notified the Bureau of Land Management (BLM), Rawlins and Rock Springs Field Offices, that Marathon and other cooperators, including EOG Resources, Inc.; Tom Brown, Inc.; Basin Exploration, Inc.; Yates Petroleum Corporation; Questar Exploration and Production Company; Merit Energy Company; and Santa Fe Snyder Corporation; intend to drill additional exploration and development wells in and adjacent to the Willow Reservoir, Wedge, Mulligan Draw, Powder Mountain, Desolation Flats, Ruger, Dripping Rock, Cedar Chest, Triton, and Lookout Wash Units and the surrounding areas (collectively referred to as the Desolation Flats Project Area). On the Desolation Flats Project Area (DFPA) the Almond Flats formation is currently being drilled from several active natural gas fields where well spacing is predominantly one well per section. In addition, the area contains several active Federal Units, some of which are subject to current drilling programs. The Desolation Flats Project Area has 68 active producing wells, with accompanying production-related facilities. Up to 4 well locations may be developed per section with existing development. Drilling is expected to occur over a 20-year period, with the project life of 30-50 years.

Three alternatives have been developed for the proposed project: the Proposed Action, Alternative A, and Alternative B (no action). Maximum well pad density under the alternatives could reach 4 per section (square mile). Descriptions of each alternative are discussed in detail in Chapter 2 of the Draft Environmental Impact Statement (DEIS) (USDI-BLM 2002) and are summarized below.

- The Proposed Action is to drill approximately 385 natural gas wells at 361 well locations over the next 20 years. The forecasted success rate of wells is 65 percent (250 producing wells). Drilling estimations were based on reasonably foreseeable spacing and drilling projections into areas within the project area where the planned production and development activities would occur. The drilling proposal is in addition to existing drilling and production operations. Existing disturbance within the DFPA is approximately 1,506 acres, or around 0.6 percent of the 233,542 acres comprising the project area. During the construction phase, the Proposed Action would disturb 4,923 acres. During the production phase disturbance areas within the DFPA will be reduced through the reclamation of pipeline right-of-ways (ROW), unused portions of drill pads, dry holes and ancillary facility disturbances. Under the Proposed Action, reclamation will reduce impacts to 2,139 acres for a total impact of 3,645.4 acres, or 1.6 percent of the DFPA.
- Under Alternative A, 592 natural gas wells would be drilled at 555 locations over the next 20 years. During the construction phase, Alternative A would disturb 7,582 acres. With Implementation of reclamation under Alternative A, impacts will be reduced to 3,300 acres with total impacts affecting 4,806.4 acres, or about 2.1 percent of the DFPA.
- Alternative B (no action) would allow Applications for Permit(s) to Drill (APD's) and ROW actions to be granted by the BLM on a case-by-case basis through individual project and site-specific environmental analysis. Additional natural gas development could occur on State and private lands within the project area under APD's approved by the Wyoming Oil and Gas Conservation Commission. Under Alternative B, additional surface disturbance would occur on a case-by-case basis.

This Biological Assessment (BA) discusses the potential effects of the proposed development on species that are listed as threatened, endangered, or proposed for listing under the Endangered

APPENDIX I: BIOLOGICAL ASSESSMENT

Species Act (ESA) of 1973. This BA also presents recommendations to assure that the construction and subsequent operation of the proposed project will neither jeopardize the continued existence of those species nor result in the destruction or adverse modification of their critical habitats. Analysis of effects of this proposed project on threatened, endangered and proposed species complies with the provisions of the ESA.

1.1 Project Area Location

The DFPA is located in south-central Wyoming's Carbon and Sweetwater counties, within Townships 13 through 16 North (T13-16N) and Ranges 93 through 96 West (R93-96W) of the 6th principal meridian. The project area encompasses approximately 233,542 acres. Of this total, approximately 224,742 acres are managed by the U.S. Department of the Interior (USDI) BLM, 2,320 acres are managed by the State and 6,480 acres are private lands. A detailed description of the project area location is set forth in Section 1.1 of the DEIS (USDI-BLM 2002).

2.0 Methods

The assessments and recommendations contained within this BA are based upon information obtained from several sources: (1) on-site surveys, (2) meetings with state and federal agency wildlife specialists, (3) personal and telephone interviews with concerned parties and wildlife specialists, (4) examination of pertinent data in state and federal agency files, and (5) the review of pertinent biological and management literature.

2.1 Published Literature

Published scientific documents that pertain directly to the specific circumstances and issues involved in this analysis were reviewed and incorporated into this BA. All published literature used in this assessment is appropriately cited.

2.2 Unpublished Agency Reports and Data

Unpublished documents and data sets from the files of the Wyoming Game and Fish Department (WGFD) and U.S. Fish and Wildlife Service (FWS) were reviewed, utilized, and referenced in this BA. All available information on threatened and endangered species in the project area was reviewed in the preparation of the DEIS and this document. Materials reviewed include distribution and habitat maps, progress reports, recovery plans, sighting records, management plans, and survey guidelines for threatened and endangered species.

Some information concerning historical wildlife usage of the project area was obtained through the BLM's field offices in Rawlins and Rock Springs, Wyoming and District IV biologists of the WGFD. This information was specific to current and historical locations for wildlife species. Additional information was obtained from the WGFD which maintains a computerized listing of all wildlife species reported in an area. This listing, known as the Wildlife Observation System (WOS) was accessed for information concerning all species of wildlife (birds, mammals, amphibians, and reptiles) that have been observed and recorded within the DFPA and a township buffer (T12-17N, R92-97W) as residents or seasonal migrants. The Wyoming Natural Diversity Database (WYNDD) was also queried for reports of rare or unique plant and wildlife species on and within a township buffer of the DFPA.

APPENDIX I: BIOLOGICAL ASSESSMENT

2.3 Personal Communications

Individuals interviewed during the fact-finding process, either directly or by telephone, included: Mr. Larry Apple (BLM Wildlife Biologist, Rawlins), Mr. Frank Blomquist (BLM Wildlife Biologist, Rawlins), Ms. Andrea Cerovski (WGFD Non-Game Bird Biologist, Cheyenne), Ms. Pat Deibert (FWS Biologist, Cheyenne), Mr. Jim Dunder (BLM Wildlife Biologist, Rock Springs), Mr. Walt Fertig (WYNDD Heritage Biologist, Laramie), Ms. Mary Read (BLM Wildlife Biologist, Rawlins), Mr. Andy Warren (BLM Range Conservation Officer, Rawlins), and Mr. Tim Woolley (WGFD Wildlife Biologist, Baggs).

2.4 Site Inspections

Existing special status wildlife information for the project area was supplemented through wildlife surveys conducted by Hayden-Wing Associates (HWA) during 2000 and 2001. These data collections consisted of aerial and ground surveys to determine: (1) occurrence of threatened, endangered, proposed, candidate, or sensitive species and/or habitat that may occur on the project area (USDI-FWS 2002, USDI-BLM 2001); (2) the occurrence, location, size, and burrow density of white-tailed prairie dog colonies; (3) the location and activity status of raptor nests within the project area and two-mile buffer zone; and (4) the occurrence, location, and size of mountain plover habitat and documentation of the presence/absence of mountain plovers within these habitats.

2.5 Meetings

Numerous meetings were held among state and federal wildlife specialists and Hayden-Wing Associates concerning potential impacts to wildlife that may result from the proposed project. All of the concerns raised in these meetings regarding development of the proposed project have been addressed in either this document, the DEIS (USDI-BLM 2002), or in the Wildlife and Fisheries Technical Report for the Desolation Flats Project Area (HWA 2002).

2.6 BA Preparation

Personnel who cooperated in the preparation of this BA include the following: L.D. Hayden-Wing, principal investigator of Hayden-Wing Associates and a member of the Inter-Disciplinary Team, supervised the collection of wildlife data and compilation of the overall document. T. Olson, senior wildlife biologist with HWA, assisted in the preparation of the document and data collection. S. Mullner, J. Winstead, K. Jones, and D. Knowlton, wildlife biologists with HWA, assisted in collection of field data.

3.0 Current Status, Habitat Use and Behavior of Species

The FWS has determined that eight species of wildlife and fish and one plant species, listed under the ESA as either threatened, endangered, or proposed for listing are potentially present in or near the project area (USDI-FWS 2002). The species that may occur on or adjacent to the project area, and their federal status under the ESA, are listed in Table 3-1.

APPENDIX I: BIOLOGICAL ASSESSMENT

Table 3-1. Threatened, Endangered, and Proposed Wildlife Species Potentially Present on or Near the DFPA.¹

Species	Scientific Name	Status
Mammals		
Black-footed ferret	<i>Mustela nigripes</i>	Endangered
Canada lynx	<i>Lynx canadensis</i>	Threatened
Birds		
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Mountain plover	<i>Charadrius montanus</i>	Proposed
Fish		
Bonytail	<i>Gila elegans</i>	Endangered
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Humpback chub	<i>Gila cypha</i>	Endangered
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered
Plants		
Ute ladies'-tresses	<i>Spiranthes diluvialis</i>	Threatened

¹ Source: (USDI-FWS 2002)

3.1 Wildlife Species

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies. The black-footed ferret's original distribution in North America closely corresponded to that of prairie dogs (Hall and Kelson 1959, Fagerstone 1987). In central Wyoming, white-tailed prairie dog (*Cynomys leucurus*) colonies provide essential habitat for black-footed ferrets. Ferrets depend almost exclusively on prairie dogs for food and they also use prairie dog burrows for shelter, parturition, and raising their young (Hillman and Clark 1980, Fagerstone 1987).

Aerial surveys were systematically conducted over the entire DFPA, plus a 2-mile buffer, during April 2000 to locate white-tailed prairie dog colonies. The colony locations were recorded with a Global Positioning System and then surveyed and mapped in their entirety from the ground during the summer of 2000. Fifty-nine areas containing prairie dog burrows were documented (Figure 3-1). Collectively, a total of 9,967 acres of white-tailed prairie dog colonies were identified (2.6 % of the surveyed area). A large portion of these colonies, 4,229 acres, was located outside of DFPA within the 2-mile buffer. Surveys were conducted to estimate prairie dog burrow density within each colony according to Biggins et al. (1989). Active burrow density was greater than or equal to 8 per acre in 43 colonies and less than 8 per acre in 9 colonies (Table 3-2). Seven colonies were smaller than 12 acres and burrow density surveys were not conducted. Prairie dog colony complexes were delineated by associating colonies according to Biggins et al. (1989). Prairie dog colonies within the DFPA formed two large complexes (Figure 3-1). All 59 colonies were included in the two complexes. Complex 1 encompasses 54 colonies and a total of 9,450 acres and extends just beyond the 2-mile buffer. Complex 2 encompasses 5 colonies and a total of 517 acres. A minimum of 200 acres of white-tailed prairie dog colonies and a minimum density of eight active burrows per

APPENDIX I: BIOLOGICAL ASSESSMENT

acre is required to support black-footed ferrets (USDI-FWS 1989). The size of the complexes and density of burrows indicate that ferret surveys will be necessary prior to ground disturbing activities in these areas (USDI-FWS 1989). When a black-footed ferret survey is required the entire town must be surveyed.

No confirmed black-footed ferret sightings have been reported within the DFPA (WGFD 2000, WYNDD 2000, and Jim Dunder, Wildlife Biologist, Rock Springs Field Office, personal communication). The WGFD atlas does, however, indicate that historic sightings of black-footed ferrets have been made within the project area (WGFD 1999) and an unconfirmed sighting of a black-footed ferret southwest of Monument Valley was reported in 1992 (Jim Dunder, personal communication).

Table 3-2. Location, Size, and Burrow Density of White-tailed Prairie Dog Colonies Located on or Near the DFPA.

Colony #	Location			Area (ac.)	Transects sampled	Transects with burrow density ≥ 8 per acre ^a
	Town N	Range W	Section			
1	15	93	3	3,145.5	168	47
2	15	93	6	118.6	8	2
3	16	93	31	243.0	17	2
4	15	93	6	2.5	0	NA ^b
5	15	94	2	14.8	2	1
6	15	94	11	11.4	2	2
7	15	94	12	22.5	2	0
8	15	93	8	116.0	8	2
9	15	93	9	5.5	0	NA ^b
10	15	93	13	673.3	48	3
11	15	94	22	43.2	4	0
12	16	93	22	2,396.1	157	26
13	16	96	34	178.1	13	8
14	16	96	28	52.7	4	3
15	16	96	27	156.7	13	4
16	16	96	22	112.8	7	1
17	15	94	35	84.1	6	3
18	14	94	4	1.2	1	0
19	14	94	5	42.1	3	1
20	14	94	6	9.1	1	1
21	15	94	31	3.9	1	0
22	15	94	29	59.0	4	1
23	14	93	7	9.5	2	0
24	14	93	18	35.6	4	0
25	14	94	24	5.1	1	1
26	14	94	24	17.9	2	2

APPENDIX I: BIOLOGICAL ASSESSMENT

Table 3-2. Continued.

Colony #	Location			Area (ac.)	Transects sampled	Transects with burrow density ≥ 8 per arce ^a
	Town N	Range W	Section			
27	14	94	25	4.3	1	1
28	14	94	25	8.5	1	1
29	14	94	25	0.6	0	NA ^b
30	14	94	25	0.6	0	NA ^b
31	14	94	25	0.8	0	NA ^b
32	14	94	25	0.9	0	NA ^b
33	14	94	36	114.9	5	4
34	14	94	26	13.3	3	2
35	13	94	2	241.1	15	11
36	14	93	31	620.2	39	14
37	13	94	1	18.1	2	2
38	13	94	12	40.8	4	4
39	13	94	11	2.0	5	1
40	13	94	11	27.0	1	0
41	13	94	12	45.1	3	3
42	13	94	10	254.9	15	8
43	13	94	11	11.0	3	0
44	13	94	14	0.6	0	NA ^b
45	13	94	15	56.5	4	4
46	13	94	14	36.8	2	1
47	13	94	23	33.3	4	4
48	13	94	21	44.0	4	2
49	13	94	2	8.0	1	1
50	13	93	18	370.9	20	14
51	13	93	30	135.4	9	8
52	13	94	19	20.9	2	1
53	13	95	13	20.4	3	1
54	15	93	23	221.1	15	5
55	13	94	14	7.4	2	0
56	15	94	23	21.6	2	1
57	15	93	7	0.5	1	1
100	13	95	8	8.5	1	1
101	16	95	29	17.6	3	3
Totals				9,967.6	648	208

^a A single transect having eight burrows or more per acre is adequate for the entire colony to be considered potential black-footed ferret habitat (Biggins et al. 1989).

^b NA indicates that these colonies were not assessed for burrow density because they were smaller than 12 acres.

APPENDIX I: BIOLOGICAL ASSESSMENT

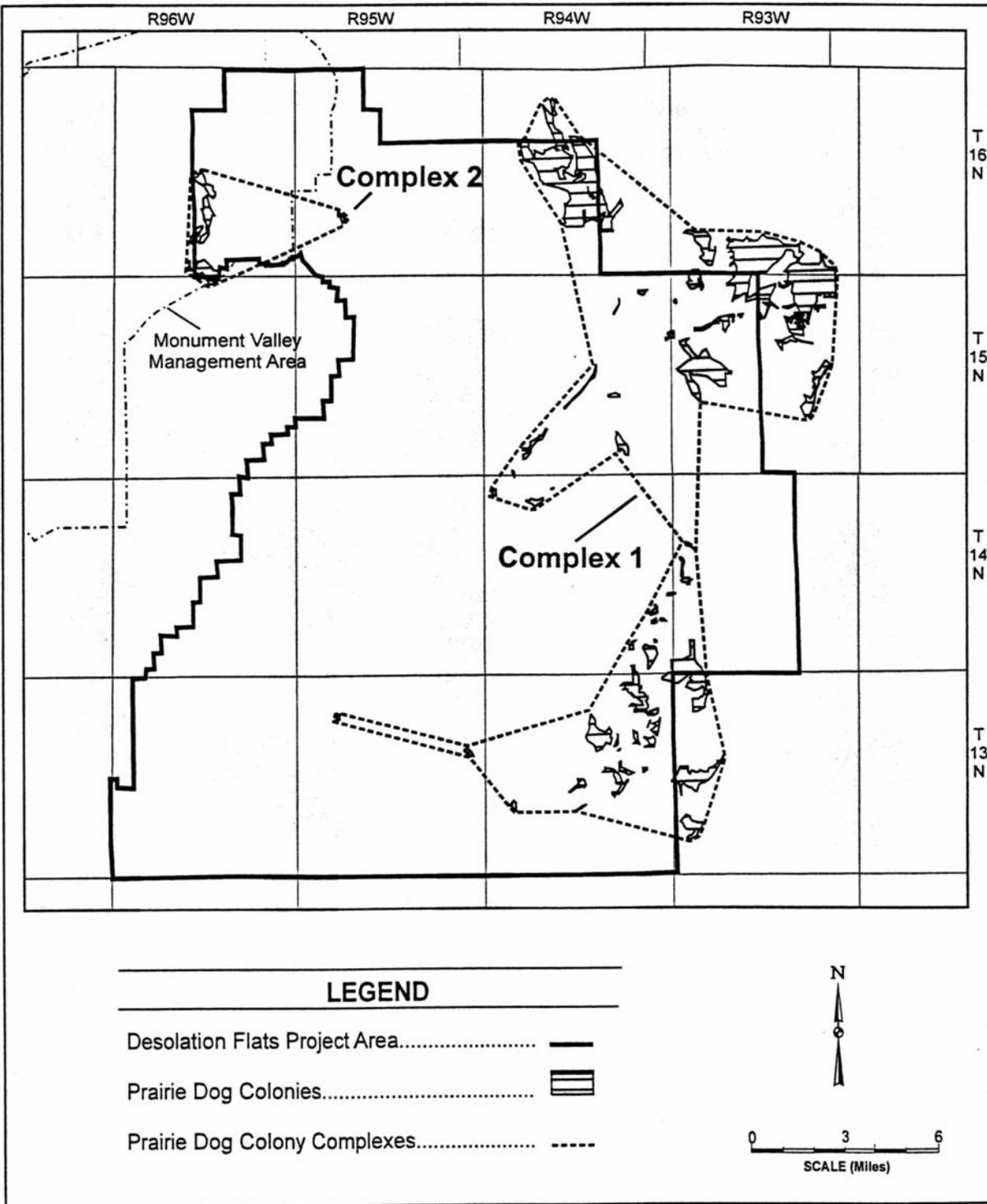


Figure 3-1. White-tailed Prairie Dog Colonies and Complexes in Relation to the Desolation Flats Project Area.

APPENDIX I: BIOLOGICAL ASSESSMENT

Canada Lynx. The Canada lynx is one of three major species of wildcats found in North America. Although Wyoming comprises part of the species' historic geographical range, no lynx sightings have been documented within a six-mile buffer of the DFPA (WGFD 2000). In a collaborative effort, the BLM, FWS, and Forest Service (FS) recently completed a map of lynx habitat in the State of Wyoming; according to the habitat map, lands within the DFPA do not provide lynx habitat (McKelvey et al. 1999).

Due to the facts that: (1) the project area does not include high elevation lodgepole pine/spruce-fir habitat types preferred by this species, (2) the project area does not support a population of snowshoe hares (WGFD 2000), (3) there are no recorded lynx sightings within a six-mile buffer in either the WOS (WGFD 2000) or the WYND (2000), and (4) the closest potential habitat is more than 20 miles to the east in the Sierra Madre Mountains, it is unlikely that lynx occur or will occur on or near the DFPA.

Bald Eagle. As of the July 12, 1995 Federal Register, the bald eagle is no longer classified as endangered and has been down-listed by the FWS to the status of threatened in the lower 48 states. Bald eagles typically build stick nests in the tops of coniferous or deciduous trees along streams, rivers, or lakes; they may also select cliffs and ledges as nest substrates (Call 1978). Selection of nest trees appears to depend, in part, on food availability early in the nesting season (Swenson et al. 1986). Primary wintering areas are typically associated with concentrations of food sources along major rivers that remain unfrozen where fish and waterfowl are available and near ungulate winter ranges that provide carrion (Montana Bald Eagle Working Group 1990). Wintering bald eagles are also known to roost in forests with large, open conifers and snags protected from winds by ridges, often near concentrations of domestic sheep and big game (Anderson and Patterson 1988).

The bald eagle winters and nests in close proximity to the project area along the Little Snake River, and numerous observations, both on and proximal to the project area, are listed in the WOS (WGFD 2000). A large number of incidental bald eagle sightings (70) have been recorded within a six-mile buffer of the project area (WGFD 2000). This six-mile buffer includes portions of the Little Snake River, which is located approximately 2.5 miles from the southern edge of the project area boundary. Most observations (91%) were documented between November and March, indicating that the area is primarily used as wintering habitat.

Several factors probably allow for seasonal and/or year-round use by bald eagles along the Little Snake River: (1) the river provides opportunities to capture prey including fish and waterfowl, (2) the river is located near crucial mule deer, elk, and pronghorn winter range, (3) domestic sheep production is present, and (4) the riparian zone along the river provides potential roosting and nesting sites. However, upland habitat use by bald eagles within the project area would probably be limited to winter hunting/scavenging forays. Very few, if any, trees large enough for eagle roosting or nesting exist on the DFPA.

Inspection of BLM and WGFD raptor nest records and results of aerial and ground raptor nest surveys during 2000 (HWA 2002) revealed that no active bald eagle nests occurred within the DFPA or a 2-mile buffer. No known winter roost sites are located within the DFPA or a 2-mile buffer.

Mountain Plover. The mountain plover nests across much of Wyoming, but preferred habitat is limited throughout its range (Oakleaf et al. 1982, Dinsmore 1983, Leachman and Osmundson 1990). This ground-nesting species is typically found in areas of short (less than four inches)

APPENDIX I: BIOLOGICAL ASSESSMENT

vegetation on slopes of less than three percent. Any short grass, very short shrub, or cushion plant community could be considered potential plover nesting habitat (Parrish et al. 1993), however, mountain plovers prefer shortgrass prairie with open, level or slightly rolling areas dominated by blue grama and buffalo grass (Graul 1975, Dinsmore 1981, Dinsmore 1983, Kantrud and Kologiski 1982, Knopf 1996). These habitats are quite often associated with prairie dog colonies, and researchers have found that plovers use prairie dog colonies more often than other areas (Knowles et al. 1982, Knowles and Knowles 1984, Olson and Edge 1985). However, mountain plovers are capable of using suitable habitats not specifically associated with prairie dog colonies.

The DFPA was surveyed for mountain plovers and mountain plover habitat in June, 2000 and again in the spring of 2001 (HWA 2002). Plover habitat evaluations were conducted in accordance with the protocol outlined in the *Final Biological and Conference Opinions for the Proposed Continental Divide/Wamsutter II Natural Gas Project* (USDI-FWS 2000). Potential plover habitats identified during 2000 were again surveyed for plovers in 2001. The project area provides approximately 25,415 acres (10.9% of the project area) of potential mountain plover habitat (Figure 3-2). Some "islands" of non-habitat such as dense sagebrush are included within the greater polygons of designated plover habitat, however plovers are capable of utilizing relatively small habitat patches within a sagebrush matrix.

Mountain plovers were observed in numerous locations in the northern half of the DFPA (Figure 3-2). There are also recorded sightings of mountain plovers within a six-mile buffer of the project area (WGFD 2000, WYNDD 2000). During 2000 and 2001 surveys, mountain plovers were observed within 9,202 acres (3.9% of the project area) of the designated potential mountain plover habitat polygons; none were observed in the remaining 16,213 acres of designated potential mountain plover habitat (Figure 3-2). Plovers with young were found on one site (Section 4, T15N:R93W) during the 2001 production survey.

3.2 Fish Species

Intermittent/ephemeral runoff generated by spring snowmelt and summer thunderstorm events flows into Sand Creek and then into the Little Snake River, a tributary of the Colorado River System. Surface water is scarce and perennial streams are not present within the DFPA. Sand Creek may flow during wet years, but not consistently over time. All of the streams in the project area are classified as Class 5 streams by the WGFD (1991).

Four federally endangered fish species may occur as downstream residents of the Colorado River System: bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*) (USDI-FWS 2002). The bonytail, Colorado pikeminnow, humpback chub, and razorback sucker share similar habitat requirements and historically have occupied the same rivers. None of these fish species are likely to be found in streams within the DFPA, nor has critical habitat been established in Wyoming for any of these species (Upper Colorado River Endangered Fish Recovery Program 1999). However, the potential for project-related impacts to waters that feed into the Colorado River System warrant their inclusion in this document.

Colorado Pikeminnow. The Colorado pikeminnow is the largest member of the minnow family and occurs in swift, warm waters of Colorado Basin rivers. The species was once abundant in the main stem of the Colorado River and most of its major tributaries throughout Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada, California, and Mexico. It was also known to occur historically in the Green River of Wyoming at least as far north as the City of Green River. In 1990, one adult

APPENDIX I: BIOLOGICAL ASSESSMENT

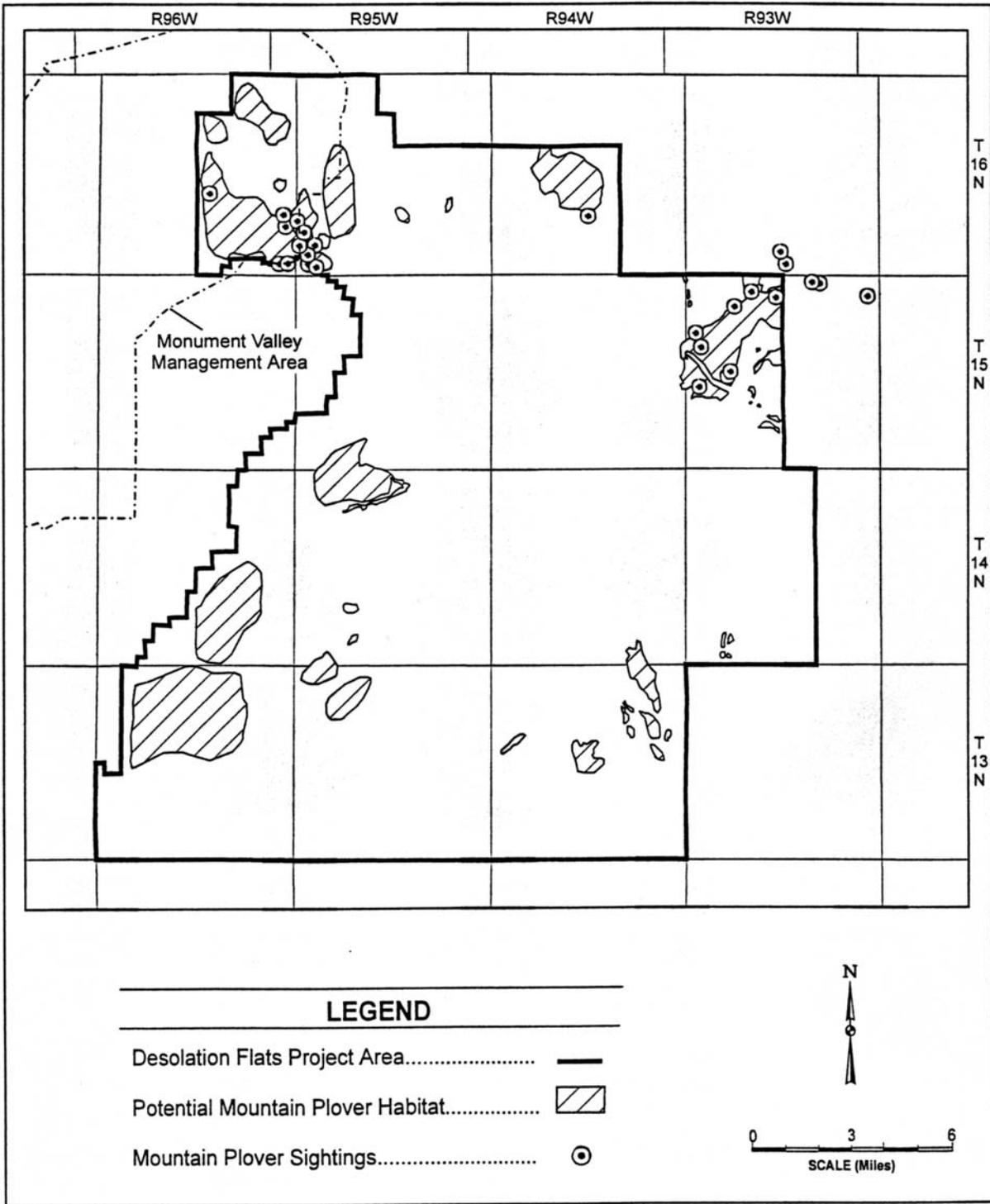


Figure 3-2. Areas identified as Potential Mountain Plover Habitat and Mountain Plover Sightings On and proximal to the Desolation Flats Project Area.

APPENDIX I: BIOLOGICAL ASSESSMENT

was collected from the Little Snake River in Carbon County, Wyoming (Baxter and Stone 1995). Subsequent survey attempts to collect Colorado pikeminnow from this area of the Little Snake River by WGFD personnel failed to yield any other specimens.

Bonytail. Habitat of the bonytail is primarily limited to narrow, deep, canyon-bound rivers with swift currents and white water areas. With no known reproducing populations in the wild today, the bonytail is thought to be the rarest of the endangered fishes in the Colorado River System.

The bonytail was historically found in portions of the upper and lower Colorado River System. Today, in the upper Colorado River System, only small, disjunct populations of bonytail are thought to exist in the Yampa River in Dinosaur National Monument, in the Green River at Desolation and Gray canyons, in the Colorado River at the Colorado/Utah border and in Cataract Canyon (Upper Colorado River Endangered Fish Recovery Program 1999).

Humpback Chub. Habitat of the humpback chub is also limited to narrow, deep, canyon-bound rivers with swift currents and white water areas (Valdez and Clemmer 1982, Archer et al. 1985, Upper Colorado River Endangered Fish Recovery Program 1999).

The humpback chub was historically found throughout the Colorado River System, and its tributaries, which are used for spawning (Valdez et al. 2000). It is estimated that the humpback chub currently occupies 68% of its original distribution, in five independent populations that are thought to be stable (Valdez et al. 2000).

Razorback Sucker. The razorback sucker, an omnivorous bottom feeder, is one of the largest fishes in the sucker family. Adult razorback sucker habitat use varies depending on season and location. This species was once widespread throughout most of the Colorado River System from Wyoming to Mexico. Today, in the upper Colorado River System, populations of razorback suckers are only found in the upper Green River in Utah, the lower Yampa River in Colorado and occasionally in the Colorado River near Grand Junction (Upper Colorado River Endangered Fish Recovery Program 1999).

3.3 Plant Species

Ute ladies'-tresses. The Ute ladies'-tresses is a perennial, terrestrial orchid, endemic to moist soils near wetland meadows, springs, lakes, and perennial streams. It occurs generally in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows at elevations from 4,200 to 7,000 feet. The orchid colonizes early successional riparian habitats such as point bars, sand bars, and low lying gravelly, sandy, or cobbly edges, persisting in those areas where the hydrology provides continual dampness in the root zone through the growing season. Recent discoveries of orchid colonies in Wyoming and Montana indicate that surveys for and inventories of orchid occurrences continue to be an important part of orchid recovery planning and implementation (USDI-FWS 2002). This species has been located in Converse, Goshen, Laramie, and Niobrara counties in Wyoming (Fertig 2000).

4.0 Direct and Indirect Impacts of the Proposed Project

The spacing of well locations within existing natural gas production fields of the DFPA varies from one to a maximum of four per section. Currently most existing fields have one well location per section with a potential of 4 well locations per section. The Operators anticipate that future development in the DFPA will likely be concentrated within and near these existing fields.

APPENDIX I: BIOLOGICAL ASSESSMENT

Additional exploration and delineation drilling would continue to occur in the DFPA where production is currently not established.

Some surface locations within the DFPA may not be feasible to occupy, either for economical (e.g., high road construction costs), physical (e.g., steep terrain), or other environmental reasons (e.g., greater sage-grouse lek). Operators may use directional drilling to access bottom-hole locations in these areas (single-well pad with multi-well, directional drilling). The multi-well single pad design provides for construction of one well location with as few as two or as many as eight wells drilled from a central location.

The precise number of additional wells, locations of the wells, and timing of drilling associated with the proposed natural gas development project would be directed by the success of development drilling and production technology and economic considerations such as the cost of development of leases within the project area with marginal profitability. Although the total acres of wildlife habitat that would be disturbed under the Proposed Action or Alternative A over the next twenty years is known, the distribution of this disturbance will not be known until actual well locations are determined. Therefore, in order to assess the direct and indirect impacts of the proposed project, it was assumed that any section of land may potentially be developed at the level of 4 locations per section under both action alternatives.

4.1 Proposed Action

Under the Proposed Action approximately 4,923 acres of wildlife habitat would be sequentially disturbed over the next 20 years. However, with concurrent reclamation of disturbed habitats the total un-reclaimed disturbance area at any given point in time would never equal the sequential total of 4,923 acres.

4.1.1 Wildlife Species

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies. Prairie dog colonies occur in portions of 67 sections within the DFPA and cover a total of 9,486 acres. All prairie dog colonies identified on the DFPA were located within 2 complexes. These complexes meet requirements for consideration as black-footed ferret habitat (Biggins et al. 1989). Development of the Proposed Action will likely result in direct disturbance of some portions of these prairie dog colonies within complexes. In order to avoid potential impacts to black-footed ferrets, surveys for the species will be conducted prior to disturbance of prairie dog colonies within the 2 complexes which meet the habitat requirements for black-footed ferrets (Biggins et al. 1989). If black-footed ferrets are found, no project related disturbance will occur within the prairie dog complex, consultation with the FWS will be initiated, and all previously authorized project related activities on-going in such towns or complexes shall be suspended immediately. The FWS will be notified within 24 hours if a black-footed ferret or their sign is observed. If the prescribed avoidance measures (listed in the *Coordination Measures* section) are applied, impacts to this species are unlikely to occur.

Canada Lynx. Canada lynx habitat is not present on the DFPA, and this species is not likely to be present. Therefore, implementation of the Proposed Action is not expected to impact the Canada lynx.

Bald Eagle. No bald eagle nests are known to occur on the project area, and WOS records (WGFD 2000) indicate that the project area is used only occasionally by this species, primarily

APPENDIX I: BIOLOGICAL ASSESSMENT

during the winter months (November through March). Winter concentration areas and/or winter night-time roosts are not known to exist on the DFPA. Suitable winter roosting habitat does not exist on the DFPA.

The southern portion of the project area, closest to the Little Snake River, has the highest potential for bald eagle occurrence. This portion of the DFPA contains crucial winter range for elk, mule deer, and pronghorn. The potential for vehicle collisions with big game would increase as a result of increased vehicular traffic associated with the presence of construction crews and activities in the project area. Because bald eagles commonly feed on carrion, particularly during the winter months, the presence of road-killed big game carcasses on and adjacent to the access roads is an attractant. Eagles feeding on these carcasses are in danger of being struck by moving vehicles. Any increase in the death rate of bald eagles from vehicular collisions will constitute a significant impact. Because the potential for an increase in the incidence of big game-vehicle-eagle encounters exists, measures to avoid and/or reduce such incidents will be taken. Such measures shall include: (1) requirement that regular drivers undergo training describing the circumstances under which vehicular collisions with bald eagles are likely to occur and the measures that can be employed to minimize them, including reduced speeds, (2) prohibition of unnecessary off-site activities of operational personnel and inform all project employees of applicable wildlife laws and penalties associated with unlawful take and harassment, (3) removal of vehicle-killed carcasses from the ROW's of access roads on the project area to eliminate the exposure of carrion-feeding eagles to the threat of being struck by vehicles, and (4) operators will internally enforce existing drug, alcohol, and firearms policies. Given the implementation of these measures, no adverse effects to bald eagles are expected.

Mountain Plover. Mountain plovers are present within the DFPA (see Figure 3-2). Potential mountain plover habitat covers approximately 25,415 acres within the DFPA. If disturbance is proposed within the mountain plover habitat located in these sections, the following measures will be taken to ensure that any potential impacts to mountain plovers are avoided. No disturbance will occur within mountain plover nesting habitat from April 10 - July 10. Mountain plovers often nest near roads, feed on or near roads, and use roads as travel corridors (USDI-FWS 1999), all of which make the species susceptible to being killed by vehicles. Thus, the operators shall warn employees about the potential for roadside and roadway use by the species. The amount of travel done at night and driving speeds will be minimized to reduce the potential for roadkill of mountain plovers in accordance to the Coordination Measures in Section 6.0. Implementation of Alternative A is not likely to jeopardize the mountain plover. However, there is a potential for impacts to individuals of this species. In the event the species is listed, formal consultation will be necessary.

4.1.2 Fish Species

Four federally endangered fish species were historically found within the Colorado River System, downstream from the DFPA: Colorado pikeminnow (*Ptychocheilus lucius*), bonytail (*Gila elegans*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*) (USDI-FWS 2002). All four of these fish species share similar habitat requirements and historically occupied the same river systems. Declines in their populations are mainly attributed to impacts of water development on natural temperature and flow regimes, creation of migration barriers, habitat fragmentation, the introduction of competitive and predatory non-native fishes, and the loss of inundated bottom lands and backwater areas (Minckley and Deacon 1991, USDI-FWS 1993). Perennial waters are not present within the DFPA, however Sand Creek may flow during wet years. This limited amount of water likely precludes potential for the occurrence of the four species of endangered fish endemic to the Colorado River System. These fish species may potentially occur in the Little Snake River,

APPENDIX I: BIOLOGICAL ASSESSMENT

a tributary of the Colorado River System, on a seasonal basis for spawning and/or rearing. Currently, critical habitat for these species has not been designated in Wyoming (Upper Colorado River Endangered Fish Recovery Program 1999), however, the potential for project-related impacts to these tributaries in the Colorado River System warrant their inclusion in this document.

The intermittent and ephemeral surface waters and shallow ground water on the DFPA could be impacted if process fluids or poor quality ground water used for industrial purposes were accidentally released. The design of facilities as closed systems and the confinement of storage tanks by berms will, however, minimize the potential for spills. Potential impacts to surface and shallow ground water would be minimized by these precautions.

The construction of roads, drill pads, and surface facilities could produce an increase in stream flow and a decrease in water quality in Sand Creek by decreasing the infiltration of water into the soil and creating the potential for increasing surface runoff, erosion, and off-site sedimentation. The stream flow and sediment load of Sand Creek are not likely to be significantly affected, however, because: (1) drainages are intermittent or ephemeral, (2) the topography of the DFPA is relatively gentle, (3) mean annual runoff is low due to the dry climate, (4) natural sediment loads are high and water quality is poor (USDI-BLM 2002), (5) all appropriate sediment and erosion control measures identified in the DEIS (USDI-BLM 2002) will be taken.

Average annual water usage with the Proposed Action is estimated at 29.1 acre-feet per year. This level of depletion is well below the level of 100 acre-feet per year that would require formal consultation with the FWS. It is not known if water used from wells within the DFPA is hydrologically linked to the Colorado River system. Regardless, water depletion will not be great enough to negatively impact the endangered fish of the Colorado River System, and formal consultation will not be required.

4.1.3 Plant Species

Ute ladies'-tresses. The Ute ladies'-tresses is not expected to occur on or near the DFPA due to the following reasons: (1) The DFPA is very arid and perennial streams are not present, (2) the elevation of the project area is near the upper limit for the species, (3) moist riparian area meadows are not present, (4) perennial streams are not present, (5) the transition from stream margins to upland vegetation is abrupt, and (6) the species has only been located in eastern and southeastern Wyoming (Fertig 2000). Therefore, implementation of the Proposed Action is not expected to impact the Ute ladies'-tresses.

4.2 Alternative A

Under Alternative A approximately 7,582 acres of wildlife habitat would be sequentially disturbed over the next 20 years. However, with concurrent reclamation of disturbed habitats the total unreclaimed disturbance area at any given point in time would never equal the sequential total of 7,582 acres.

4.2.1 Wildlife Species

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies. A greater number of sections within the DFPA with prairie dog colonies would be disturbed under Alternative A than the Proposed Action. Under both alternatives, the same measures will be applied to all areas of suitable black-footed ferret habitat that may be disturbed. The potential for impacts to black-footed

APPENDIX I: BIOLOGICAL ASSESSMENT

ferret habitat (i.e. white-tailed prairie dog colonies) will be greater under Alternative A due to the increased disturbance that will occur, but given the application of the prescribed avoidance measures (listed in the *Coordination Measures* section), impacts to this species are unlikely to occur.

Canada Lynx. The analysis for Alternative A is identical to that previously described under the Proposed Action.

Bald Eagle. The analysis for Alternative A is identical to that previously described under the Proposed Action.

Mountain Plover. A greater number of sections within the DFPA containing mountain plover habitat would be disturbed under Alternative A than the Proposed Action. Under both alternatives, the same measures will be applied to all areas of potential mountain plover habitat that may be disturbed. The potential for impacts to mountain plovers will be greater under Alternative A due to the increased disturbance that will occur. Implementation of Alternative A is not likely to jeopardize the mountain plover. However, there is a potential for impacts to individuals of this species. In the event the species is listed, formal consultation will be necessary.

4.2.2 Fish Species

The analysis for Alternative A is identical to that previously described under the Proposed Action except that water usage would be incrementally higher than under the Proposed Action, but still well below 100 acre-feet per year.

4.2.3 Plant Species

The analysis for Alternative A is identical to that previously described under the Proposed Action.

4.3 Alternative B - No Action

Under the No Action Alternative, the Proposed Action would not be implemented and further drilling would be allowed on federal lands only to the extent that it would be within the scope of existing environmental analyses. Individual APD's would be approved on a case-by-case basis. Wildlife and vegetation resources would continue to be impacted as individual APD's are granted by the BLM, and overall impacts may be similar to those described above. In terms of magnitude, such impacts would likely be less than for the Proposed Action. However, there would be an increased probability of occurrence of unexpected adverse impacts since overall field development would not happen in a well-planned and monitored manner.

5.0 Cumulative Impacts

The cumulative impact analysis (CIA) approach is used to evaluate the influences of recent, past, present, and reasonably foreseeable future human developments on the local wildlife resources. This approach examines impacts associated with a proposed project in context with all other past and future developments, whether or not they are related. It also allows the wildlife manager and land management agency to evaluate impacts on a broader scale. However, one of the inherent problems associated with CIA is that there are no definable limits as to the exact boundary or size of the geographic area to be considered. The BLM recommends evaluating cumulative impacts on a watershed basis for natural resources related to watershed function and stability. However, with

APPENDIX I: BIOLOGICAL ASSESSMENT

special concern wildlife and plant species, there are no clear, definable limits as to the most appropriate area to be considered in CIA. Moreover, complete information on the distribution, population levels, and habitats of specific species of concern is lacking and most accounts of these species are incidental in nature.

Existing disturbance within the DFPA is approximately 1,506.4 acres, or around 0.6 percent of the 233,542 acres comprising the project area. During the construction phase, the Proposed Action would disturb 4,923 acres and Alternative A would disturb 7,582 acres. Under Alternative B (No Action) additional surface disturbance would occur on a case-by-case basis. Disturbance areas within the DFPA will be reduced upon reclamation of pipeline ROW's, unused portions of the drill pad, portions of roads, and ancillary facility disturbances during the production phase for each alternative. Under the Proposed Action, reclamation will reduce impacts to 2,139 acres for a total impact of 3,645.4 acres or 1.6 percent of the DFPA. Alternative A impacts would decrease to 3,300 acres, with total impacts affecting 4,806.4 acres or about 2.1 percent of the DFPA.

Black-footed Ferret and Associated White-tailed Prairie Dog Colonies. Provided that avoidance measures outlined in this document are followed, the potential for an incremental increase in cumulative impacts due to the implementation of the Proposed Action and alternatives will be unlikely for the black-footed ferret.

Canada Lynx. Suitable habitat for the Canada lynx is not present on the DFPA, therefore implementation of the proposed project will not contribute to cumulative impacts upon the Canada lynx.

Bald Eagle. Bald eagles are not known to nest on the DFPA, but may use portions of the project area, especially during winter months when carrion is available. Provided that avoidance measures outlined in this document are followed, the potential for an incremental increase in cumulative impacts due to the implementation of the Proposed Action and alternatives will be unlikely for bald eagles.

Mountain Plover. Mountain plovers are present on the DFPA, and the surrounding areas. The incremental increase in cumulative impacts due to the implementation of the Proposed Action and alternatives may result in increased loss of mountain plover nesting habitat. However, the impacts of this potential habitat loss on mountain plover productivity and/or numbers is not currently known. It is anticipated that development associated with natural gas well pads, roads, and pipelines does not adversely impact mountain plover populations because mountain plovers prefer habitat with abundant bare ground and very low growing vegetation (Knopf 1996). Disturbed areas may actually meet these requirements for mountain plovers in the short term (Day 1994). These potential added impacts to mountain plover habitat are not expected to negatively impact the mountain plover population in the region.

Fish Species. Cumulative impacts upon the 4 endangered fish species that are downstream residents of the Colorado River System are not expected given that average annual water usage will be much lower than 100 acre-feet per year.

Plant Species. Suitable habitat for the Ute ladies'-tresses is not present on the DFPA, therefore implementation of the proposed project would not contribute to cumulative impacts upon this species.

APPENDIX I: BIOLOGICAL ASSESSMENT

6.0 Coordination Measures to Avoid or Reduce Adverse Impacts

The following procedures will be implemented to eliminate or substantially reduce potential adverse effects of the proposed project to special status species occurring in the vicinity of the DFPA.

6.1 Wildlife Species

- If disturbance of prairie dog colonies located within complexes that contain potential black-footed ferret habitat (Biggins et al. 1989) can not be avoided, black-footed ferret surveys will be conducted according to FWS guidelines (USDI-FWS 1989).
- Well pads and disturbances shall be placed (50 m) outside of prairie dog colonies where feasible.
- Should black-footed ferrets be documented in a prairie dog complex located within the project area, impact to the species or its habitat will be completely avoided, and all previously authorized project-related activities on-going in the prairie dog complex shall be suspended immediately.
- The BLM and operators shall conduct educational outreach to employees regarding the nature, hosts, and symptoms of canine distemper, and its effects on black-footed ferrets, focusing attention on why employees should not have pets on work sites during or after hours.
- All suspected observations of black-footed ferrets, their sign, or carcasses on the DFPA, however obtained, shall be promptly (within 24 hours) reported to the BLM and FWS.
- Where construction within potential mountain plover habitat is scheduled to occur between April 10 and July 10, mountain plover surveys will be conducted according to current FWS guidelines.
- Well pads and disturbances shall be placed outside of potential mountain plover habitat where feasible.
- Should mountain plovers or mountain plover nests be found within 200m of a proposed well or disturbance area, construction activities will be postponed until at least 1 week post hatching, and the site will be monitored during the following nesting season to determine whether or not the plovers return.
- All drivers shall undergo a training session describing the type of wildlife in the area that are susceptible to vehicular collisions in order to reduce the potential for vehicle-big game collisions and subsequent jeopardy to bald eagles feeding on road-killed carrion. The circumstances under which such collisions are likely to occur, and the measures that could be employed to minimize them shall be discussed. Reduced speed limits shall be implemented to reduce potential for vehicle-wildlife collisions.
- Carcasses shall be removed from access roads, shoulders, and the ROW's to minimize bald eagle exposure to vehicles.

APPENDIX I: BIOLOGICAL ASSESSMENT

In addition to those listed above, some of the following mountain plover protection measures may be implemented following consultation between the BLM, operators, and FWS if mountain plover occupied habitat areas are to be disturbed:

- To protect the identified mountain plover occupied habitat area, the proposed activity would not be allowed as proposed. An alternative such as moving the facility, directional drilling, piping and storage of condensate off the identified mountain plover occupied habitat area to a centralized facility, or other technique for the minimization of ground disturbance and habitat degradation would be required.
- To protect the identified mountain plover occupied habitat area, the proposed facility would be moved ½ mile from the identified occupied habitat area.
- To protect the identified mountain plover occupied habitat area and because mountain plover adults and broods may forage along roads during the night, traffic speed and traffic volume would be limited during night-time hours from April 10 to July 10.
- Within ½ mile of the identified mountain plover occupied habitat area, speed limits would be posted at 25 mph on resource roads and 35 mph on local roads during the brood rearing period (June 1 - July 10).
- The access road would be realigned to avoid the identified mountain plover occupied habitat area.
- To protect the identified mountain plover occupied habitat area, traffic would be minimized from June 1 - July 10 by car-pooling and organizing work activities to minimize trips on roads within ½ mile of the mountain plover occupied habitat area.
- To protect the identified mountain plover occupied habitat area, work schedules and shift changes would be modified from June 1 - July 10 to avoid the periods of activity from ½ hour after sunset to ½ hour before sunrise.
- To protect the identified mountain plover occupied habitat area, fences, storage tanks, and other elevated structures would be either constructed as low as possible and/or would incorporate perch-inhibitors into their design.
- Road-killed animals would be promptly removed from areas within ½ mile of the identified mountain plover occupied habitat area.
- To protect the identified mountain plover occupied habitat area, seed mixes and application rates for reclamation would be designed to produce stands of sparse, low-growing vegetation suitable for plover nesting.
- To minimize destruction of nests and disturbance to breeding mountain plovers, no reclamation activities or other ground-disturbing activities would occur from April 10 - July 10 unless surveys consistent with the Plover Guidelines or other FWS approved method find that no plovers are nesting in the area.

APPENDIX I: BIOLOGICAL ASSESSMENT

- A plugged and abandoned well within ½ mile of the identified mountain plover occupied habitat area would be identified with a marker 4 feet tall with a perch inhibitor on the top of the marker.

6.2 Fish Species

- All appropriate sedimentation and erosion control measures included in the Record of Decision for this project will be implemented to avoid reduction of water quality or quantity in the ephemeral streams of the DFPA that drain into the Colorado River System.
- Construction equipment fueling and servicing areas shall be located at least 150 feet from surface waters and riparian zones and away from slopes that lead to those zones.
- High construction standards and rigid safety precautions that adhere to approved design criteria to minimize the potential for an accidental spill or discharge of any chemical or petroleum product into surrounding watershed systems shall be implemented.
- As a safety measure, buffer zones of undisturbed vegetation along water courses shall be maintained to inhibit the transport of potentially contaminated runoff to surface waters.

6.3 Plant Species

- No additional measures would be required because habitat for the Ute ladies'-tresses is not present within the DFPA.

7.0 Effects of the Project on Expected Status of Species in the Future

Provided that the coordination measures described above are implemented, the proposed project is not expected to alter the current status of, or result in any decreased survival of, any of the listed species during the project or after project completion.

8.0 Determination of Effects to Threatened, Endangered, and Proposed Species

Black-footed Ferret. Based upon the analyses of the proposed project, the current and potential status of the species in the project area, other land use activities in the area, and incorporation of the coordination measures recommended in this BA, it is concluded that implementation of the Proposed Action, Alternative A, or Alternative B is not likely to adversely affect the black-footed ferret.

Canada Lynx. Based on the lack of suitable habitat in the project area it is extremely unlikely that lynx would occur on the DFPA. Therefore, the proposed project is not likely to adversely affect the Canada lynx.

Bald Eagle. Based upon the analyses of the proposed project, the current and potential status of the species in the project area, other land use activities in the area, and incorporation of the coordination measures recommended in this BA, it is concluded that implementation of the Proposed Action, Alternative A, or Alternative B is not likely to adversely affect the bald eagle.

Mountain Plover. Based upon the analyses of the proposed project, the current and potential status of the species in the project area, other land use activities in the area, and incorporation of

APPENDIX I: BIOLOGICAL ASSESSMENT

the coordination measures recommended in this BA, it is concluded that implementation of the Proposed Action, Alternative A, or Alternative B is not likely to jeopardize the mountain plover. However, there is a potential for impacts to individuals of this species. In the event the species is listed, formal consultation will be necessary.

Colorado River Fish. Based upon the analyses of the proposed project, the current status of these species in the Colorado River System, other land use activities in the area, and incorporation of the coordination measures recommended in this BA, it is concluded that implementation of the Proposed Action, Alternative A, or Alternative B is not likely to adversely affect endangered fish of the Colorado River System.

Ute ladies'-tresses. Based on the lack of suitable habitat in the project area it is extremely unlikely that Ute ladies'-tresses would occur on the DFPA. Therefore, the proposed project is not likely to adversely affect the Ute ladies'-tresses.

References Cited

- Anderson, S.H., and C.T. Patterson. 1988. Characteristics of bald eagle winter roosts in Wyoming. *Prairie Nat.* 20:147-152.
- Archer, D.L., L.R. Kaeding, B.D. Burdick, and C.W. McAda. 1985. A study of the endangered fishes of the upper Colorado River. Final report. Cooperative agreement 14-16-0006-82-959. U.S. Department of the Interior, Fish and Wildlife Service, Grand Junction, CO.
- Baxter, G.T. and M.D. Stone. 1995. *Fishes of Wyoming*. Wyoming Game and Fish Department, 290pp.
- Biggins, D.B. Miller, B. Oakleaf, A. Farmer, R. Crete, and A. Dood. 1989. A system for evaluating black-footed ferret habitat: report prepared for the interstate coordinating committee. U.S. Department of the Interior, Fish and Wildlife Service; Wyoming Game and Fish Department; and Montana Department of Fish, Wildlife and Parks.
- Call, M. W. 1978. Nesting habitats and surveying techniques for common western raptors. U.S. Department of the Interior, Bureau of Land Management Technical Note TN-316. Denver Services Center. 115pp.
- Day, K. S. 1994. Observations on mountain plover (*Charadrius montanus*) breeding in Utah. *Southwestern Naturalist* 39:298-300.
- Dinsmore, J.J. 1981. Mountain plovers, a synthesis of the literature and an annotated bibliography. 24pp.
- Dinsmore, J.J. 1983. Mountain Plover (*Charadrius montanus*). Pages 185-196 in J.S. Armburster, Editor. Impacts of coal surface mining on 25 migratory bird species of high federal interest. U.S. Department of the Interior, Fish and Wildlife Service Publication OBS-83/35, 348 pp.
- Dunder, J. 2000. Wildlife Biologist, U.S. Department of the Interior, Bureau of Land Management. Personal communication with Scott Mullner, Hayden-Wing Associates, Laramie, WY.

APPENDIX I: BIOLOGICAL ASSESSMENT

- Fagerstone, K.A. 1987. Black-footed ferret, long-tailed weasel, and least weasel. Pages 548-573 in M. Novak, J.A. Baker, M.E. Obbard, and B.Mallock, editors. Wild Furbearer Management and Conservation in North America. Ministry of Natural Resources, Ontario.
- Fertig, W. 2000. Status review of the Ute ladies'-tresses (*Spiranthes diluvialis*) in Wyoming. Report prepared for the Wyoming Cooperative Fish and Wildlife Research Unit, US Fish and Wildlife Service, and Wyoming Game and Fish Department by the Wyoming Natural Diversity Database, Laramie, Wyoming.
- Graul, W.D. 1975. Breeding biology of the mountain plover. *Wilson Bulletin* 87:6-31.
- Hall, E.R. and K.R. Kelson. 1959. The mammals of North America. The Ronald Press Company, New York. 1083pp.
- Hayden-Wing Associates. 2002. Wildlife and Fisheries Technical Report for the Desolation Flats Natural Gas Development Project. Laramie, Wyoming.
- Hillman, C.N. and T.W. Clark. 1980. *Mustela nigripes*. *Mammalian Species* No. 126. 3pp.
- Kantrud, H.A. and R. Kologiski. 1982. Effects of soils and grazing on breeding birds of uncultivated upland grasslands of the northern Great Plains. *Wildlife Research Report* 15. 9pp.
- Knopf, F. L. 1996. Mountain Plover (*Charadrius montanus*). In *The Birds of North America*, No. 211 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.
- Knowles, C.J., C.J. Stoner, and S.P. Gieb. 1982. Selective use of black-tailed prairie dog towns by mountain plovers. *Condor* 84:71-74.
- Knowles, C.J. and P.R. Knowles. 1984. Additional records of mountain plovers using prairie dog towns in Montana. *Prairie Naturalist* 16(4):183-186.
- Leachman, B. and B. Osmundson. 1990. Status of the mountain plover: a literature review. U.S. Department of the Interior, Fish and Wildlife Service, Fish and Enhancement, Golden, CO. 83pp.
- McKelvey, K.S., K.B. Aubry and Y.K. Ortega. In press 1999. History and distribution of lynx in the contiguous United States. In: Ruggiero, L.F., K.B. Aubry, S.W. Buskirk et al., tech. eds. The scientific basis for lynx conservation in the contiguous United States. Gen. Tech. Rep. RMRS-GTR-30. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Minckley, W.L. and J.E. Deacon. 1991. Battle against extinction: native fish management in the American West. University of Arizona Press.
- Montana Bald Eagle Working Group. 1990. Bald eagles of the upper Columbia basin: timber management guidelines. USDA-Forest Service, Billings, MT.
- Oakleaf, B., H. Downing, B. Raynes, M. Raynes, and O.K. Scott. 1982. Wyoming Avian Atlas. Wyoming Game and Fish Department and Bighorn Audubon Society. 87pp.

APPENDIX I: BIOLOGICAL ASSESSMENT

- Olson, S.L. and D. Edge. 1985. Nest site selection by mountain plovers in north central Montana. *Journal of Range Management* 38:280-282.
- Parrish, T.L., S.H. Anderson, and W.F. Oelklaus. 1993. Mountain plover habitat selection in the Powder River Basin, Wyoming. *Prairie Naturalist* 25(3):219-226.
- Swenson, J.E., K.L. Alt, and R.L. Eng. 1986. Ecology of bald eagles in the Greater Yellowstone Ecosystem. *Wildlife Monographs* 95:1-46.
- Upper Colorado River Endangered Fish Recovery Program. 1999. Website of the Upper Colorado River Endangered Fish Recovery Program. <http://www.r6.fws.gov/coloradoriver>.
- U.S. Department of Interior, Bureau of Land Management (USDI-BLM). 2001. BLM Wyoming sensitive species policy and list. Instruction memorandum number WY-2001-040, Issued by A. Pierson, Cheyenne, Wyoming.
- _____. (USDI-BLM). 2002. Draft environmental impact statement for the Desolation Flats Natural Gas Development Project, Sweetwater and Carbon Counties, Wyoming. Bureau of Land Management, Rawlins Field Office.
- U.S. Department of Interior, Fish and Wildlife Service (USDI-FWS). 1993. Colorado River endangered fishes critical habitat. Draft biological support document. Salt Lake City, Utah.
- _____. (USDI-FWS). 1989. Black-footed ferret survey guidelines for compliance with the Endangered Species Act. U.S. Department of the Interior, Fish and Wildlife Service, Denver, CO and Albuquerque, NM. 15pp.
- _____. (USDI-FWS). 1999. Endangered and threatened wildlife and plants: proposed threatened status for the mountain plover. 50 CFR Part 17. RIN 1018-AF35.
- _____. (USDI-FWS). 2000. Final biological and conference opinions for the proposed Continental Divide/Wamsutter II Natural Gas Project.
- _____. (USDI-FWS). 2002. Letter from Michael M. Long, State Supervisor for Wyoming, Ecological Services, Cheyenne, WY. Listed Endangered, Threatened and Candidate species potentially impacted by the proposed Marathon Oil Company gas drilling in the Desolation Flats Analysis Area, Sweetwater and Carbon Counties, WY.
- Valdez, R.A. and G.H. Clemmer. 1982. Life history and prospects for recovery of the humpback and bonytail chub. Pages 109-119 *in* Fishes of the upper Colorado River system: present and future, Miller, W.H., H.M. Tyus, and C.A. Carlson, editors. Bethesda, MD: Western Division, American Fisheries Society.
- Valdez, R.A., R. J. Ryel, S.W. Carothers, and D.A. House. 2000. Recovery goals for the humpback chub (*Gila cypha*) of the Colorado River Basin: A supplement to the humpback chub recovery plan. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Washington, D.C.
- Wyoming Game and Fish Department (WGFD). 1991. Wyoming trout stream classification map. Wyoming Game and Fish Department, Biological Services Section, Cheyenne, WY. 1pp.

APPENDIX I: BIOLOGICAL ASSESSMENT

- _____. (WGFD). 1999. Atlas of birds, mammals, reptiles and amphibians in Wyoming. Wyoming Game and Fish Department, Biological Services Section, Lander, WY. 190pp.
- _____. (WGFD). 2000. Wildlife Observation System (WOS) database printout. T12-17N: R92-97W. Wyoming Game and Fish Department, Cheyenne, WY. November 30, 2000.
- Wyoming Natural Diversity Database (WYNDD). 2000. WYNDD Wildlife Species of Concern printout and correspondence. T12-18N: R92-97W. University of Wyoming, Wyoming Natural Diversity Database, Laramie, WY, March 6, 2000.