

APPENDIX I

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

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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

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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.

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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.

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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

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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 \geq 8 per arce ^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

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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.

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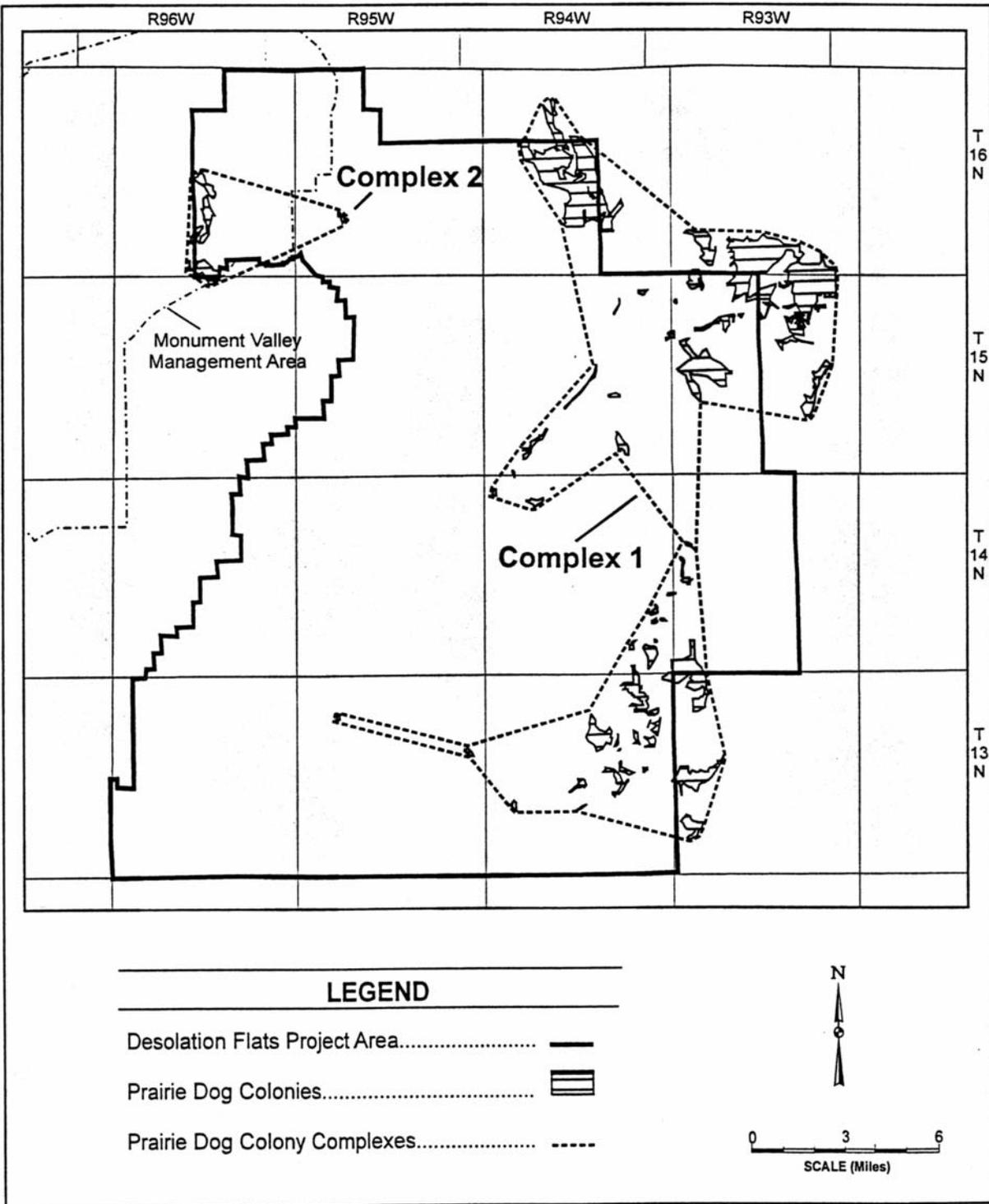


Figure 3-1. White-tailed Prairie Dog Colonies and Complexes in Relation to the Desolation Flats Project Area.

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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)

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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

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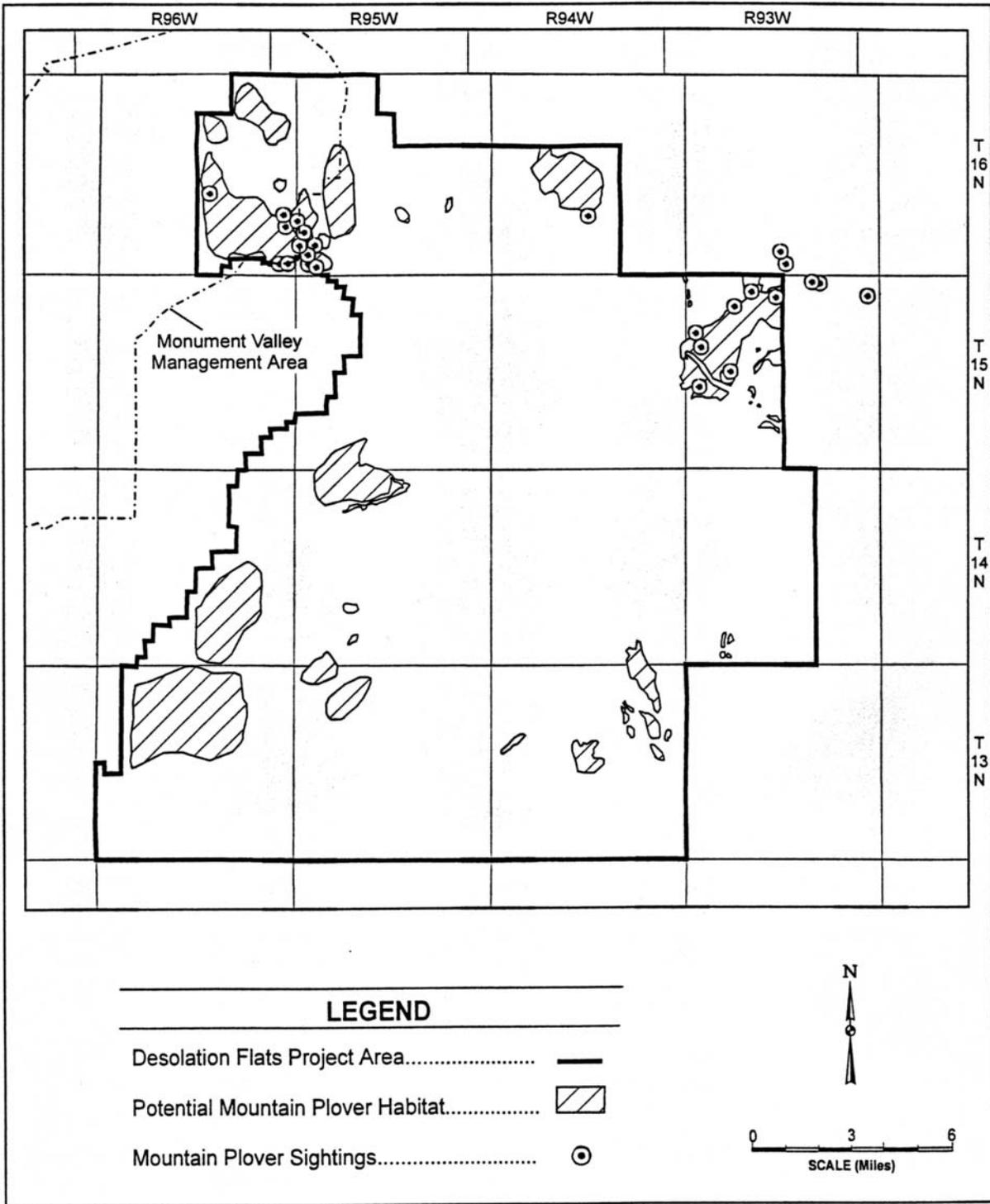


Figure 3-2. Areas identified as Potential Mountain Plover Habitat and Mountain Plover Sightings On and proximal to the Desolation Flats Project Area.

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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.

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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

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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,

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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

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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

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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.

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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.

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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.

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- 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

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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.

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