

**2001 WILDLIFE STUDIES
JONAH FIELD II
NATURAL GAS DEVELOPMENT PROJECT**

Prepared for

**U.S. Bureau of Land Management
Pinedale Field Office
Pinedale, Wyoming**

and

Jonah Field II Operators

By

**TRC Mariah Associates Inc.
Laramie, Wyoming
MAI Project 31513**

December 2001



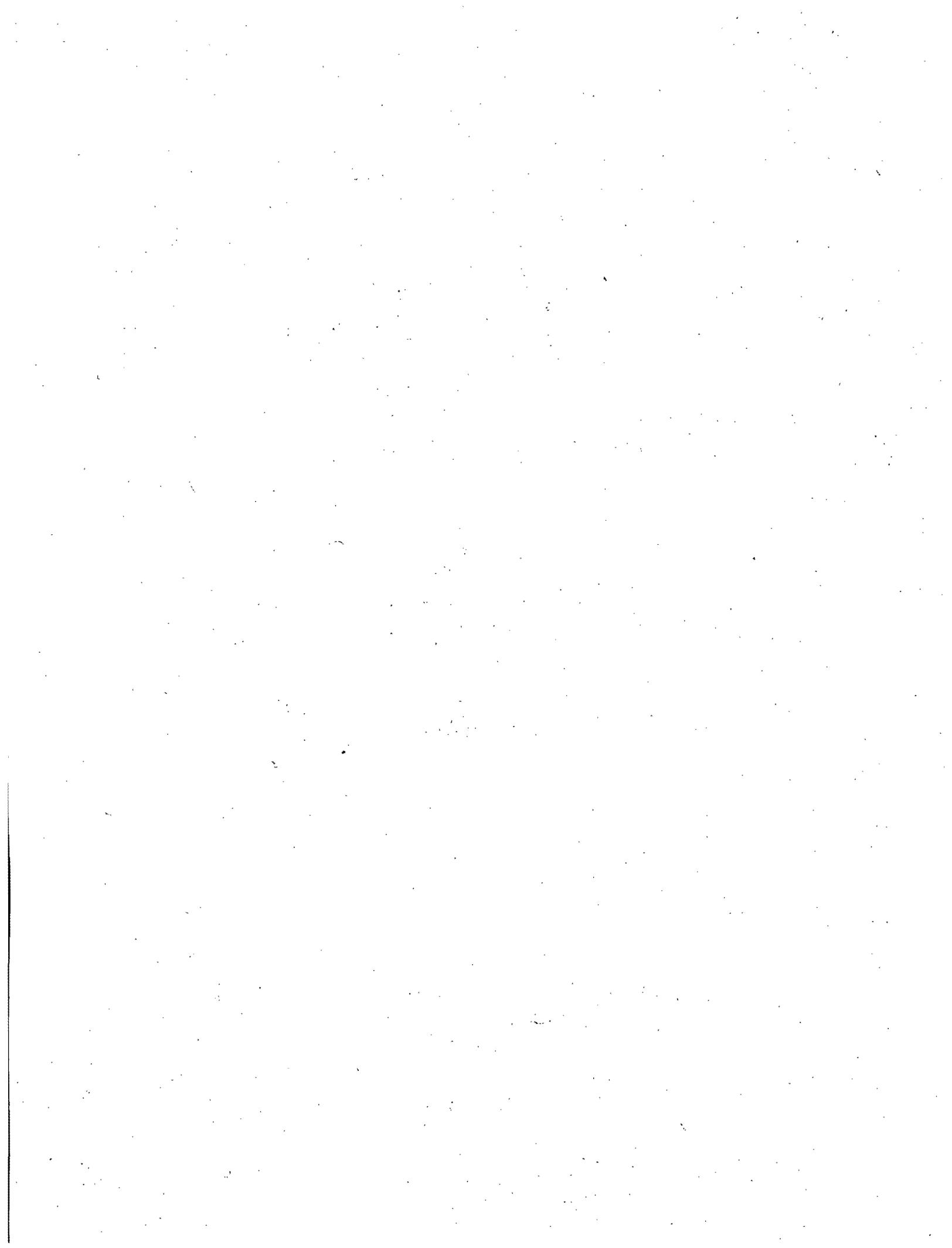


TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 METHODS	3
2.1 RAPTORS	3
2.2 SAGE GROUSE	5
2.3 THREATENED, ENDANGERED, PROPOSED, CANDIDATE, AND OTHER WYOMING SPECIES OF CONCERN	9
2.3.1 Black-footed Ferret	9
2.3.2 Bald Eagle, Ferruginous Hawk, Golden Eagle	12
2.3.3 Mountain Plover	12
2.3.4 Western Burrowing Owl	13
2.3.5 Other TEPC&WSC Species	14
2.4 GENERAL WILDLIFE	14
3.0 RESULTS AND PROPOSED MONITORING/PROTECTION MEASURES	15
3.1 RAPTORS	15
3.1.1 Results	15
3.1.2 Monitoring/Protection Measures	28
3.2 SAGE GROUSE	30
3.2.1 Results	30
3.2.2 Monitoring and Protection Measures	39
3.3 THREATENED, ENDANGERED, PROPOSED, CANDIDATE, AND WYOMING SPECIES OF CONCERN	41
3.3.1 Results	41
3.3.1.1 Black-footed Ferret	41
3.3.1.2 Bald Eagle, Ferruginous Hawk, Golden Eagle	42
3.3.1.3 Mountain Plover	42
3.3.1.4 Western Burrowing Owl	44
3.3.1.5 Other TEPC&WSC Species	44
3.3.2 Monitoring and Protection	45
3.3.2.1 Black-footed Ferret	45
3.3.2.2 Bald Eagle, Ferruginous Hawk, Golden Eagle	46
3.3.2.3 Mountain Plover	46
3.3.2.4 Western Burrowing Owl	48
3.3.2.5 Other TEPC&WSC Species	48
3.3.3 General Wildlife	49
3.3.3.1 Results	49
3.3.3.2 Monitoring and Protection	49
4.0 LITERATURE CITED	52

TABLE OF CONTENTS (CONTINUED)

APPENDIX A:	MAPS
APPENDIX B:	RAPTOR AND GENERAL WILDLIFE OBSERVATION DATA SHEETS
APPENDIX C:	RAPTOR NESTING RECORDS
APPENDIX D:	SAGE GROUSE LEK RECORDS
APPENDIX E:	NOISE MONITORING DATA SHEETS
APPENDIX F:	NOISE MONITORING SUMMARY TABLES
APPENDIX G:	MOUNTAIN PLOVER SURVEY FORMS

LIST OF FIGURES

	<u>Page</u>
Figure 1.1	Wildlife Study Area, Jonah Field II Project, 2001 2
Figure 3.1	dBA Values Along the Lumen Compressor Station-Lek 7 Transect 37
Figure 3.2	dBA Values Along the Lumen Compressor Station-1.0 Mi Transect 38

LIST OF TABLES

	<u>Page</u>
Table 2.1	BLM Wyoming Animal Species of Concern Documented or Potentially Occurring on or in the Vicinity of the Jonah II Natural Gas Project Area, 2001 10
Table 3.1	Raptor Nest Locations and Activity Status, 2001, Jonah Field II Wildlife Study Area 16
Table 3.2	Summary of Active Raptor Nests Within 1.0 Mi of Existing or Proposed Disturbance, Jonah Field II Wildlife Study Area 22

LIST OF TABLES (CONTINUED)

	<u>Page</u>
Table 3.3	1999-2001 Activity Status of Ferruginous Hawk Nesting Territories, Jonah II Wildlife Study Area 26
Table 3.4	Summary of Sage Grouse Lek Use, Potential Impacts, and Proposed Monitoring, Jonah Field II Wildlife Study Area, 2001 31
Table 3.5	Sage Grouse Trends, Jonah Field II Wildlife Study Area, 1992-2001 34
Table 3.6	Maximum Recorded dBA for Each Morning, Leks 7 and 10, Noise Monitoring Studies, 2001 36
Table 3.7	Latest Times Sage Grouse Were Observed on Leks 7 and 10, Noise Monitoring Studies, 2001 36
Table 3.8	Whitetail Prairie Dog Towns, Jonah Field II Wildlife Study Area, 2001 43

1.0 INTRODUCTION

This report was prepared by TRC Mariah Associates Inc. (TRC Mariah) for Alberta Energy Company, BP Amoco Production Company, and other natural gas operators (collectively referred to herein as the Operators), in compliance with the U.S. Bureau of Land Management (BLM) Record of Decision (ROD) for the Jonah Field II natural gas project (Appendix D in BLM 1998a) and the Decision Record (DR) for the Modified Jonah Field II project (BLM 2000a). The goals of the ROD Wildlife Monitoring/Protection Plan (WMPP) and subsequent modifications made in the DR are to monitor wildlife population trends on and adjacent to the Jonah Field II project area (J2PA) and Modified Jonah Field II project area (MJ2PA) during the course of project development and operations. Implementation of the plan, as presented in this report, provides land managers and project personnel opportunities to achieve and maintain wildlife productivity and populations in the project area by minimizing and/or avoiding potential adverse impacts to wildlife associated with project development. Wildlife monitoring was initiated in 1997 and continued through 2001.

This report presents the methods and results of 2001 wildlife studies on the Jonah wildlife study area (WSA), which includes the MJ2PA, J2PA, and adjacent areas (Map 1.1 and Appendix A). Wildlife data collected from 1997 through 2000 are presented in TRC Mariah (1999; 2001a). For this report, observational data were collected by BLM, TRC Mariah, Wyoming Game and Fish Department (WGFD), and U.S. Fish and Wildlife Service (USFWS) personnel, and trends across years are noted, where possible. Potential wildlife disturbance sources are identified, and monitoring and protection measures proposed for 2002 are presented. Monitoring and protection measures are consistent with those identified in the original ROD (BLM 1998a) and the environmental assessment (EA) for the Modified Jonah Field II project (BLM 2000b) and include additional BLM- and/or Operator-requested measures.

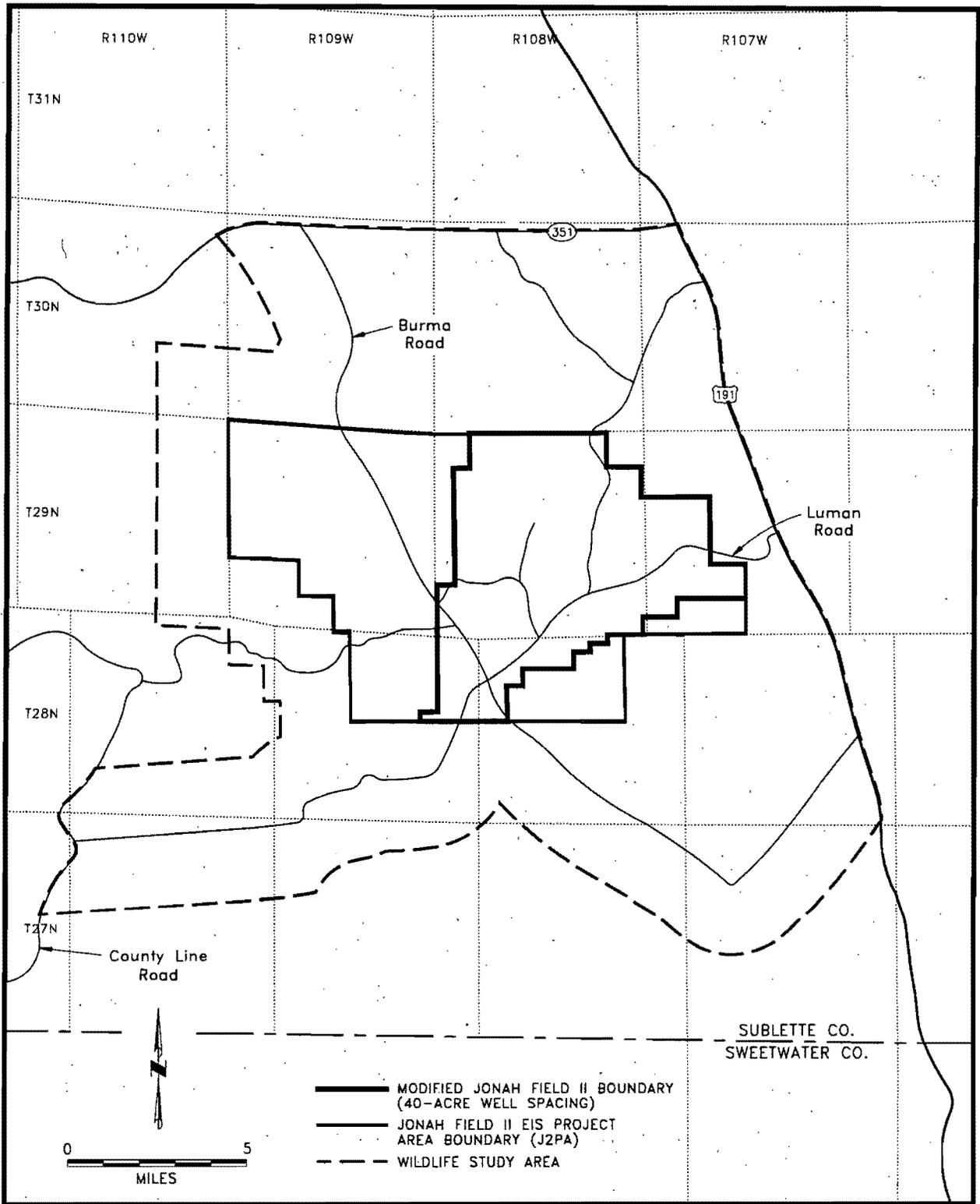


Figure 1.1 Wildlife Study Area, Jonah Field II Project, 2001.

2.0 METHODS

Inventory and monitoring protocols are identified below for each wildlife species/category. The wildlife species/categories for which specific inventory and monitoring procedures were applied were developed based on management agency (i.e., BLM, USFWS, WGFD) and individual concerns identified during the preparation of the environmental impact statement for the Jonah Field II project (BLM 1997, 1998b) and the EA for the Modified Jonah Field II Project (BLM 2000b). Specific inventory and monitoring techniques generally follow the methods presented in the WMPP for this project (Appendix D in BLM 1998a,) and additional methods identified in BLM (2000b).

2.1 RAPTORS

From 1997 through 2000, raptor nest surveys of the WSA were conducted by helicopter (1997 and 1998) or on the ground (1999 and 2000) to determine the location and activity status of raptor nests in the area (TRC Mariah 1999, 2001a). On May 4-7, 9, and 18-19, 2001, raptor nest activity status surveys were conducted by Diane Thomas and Justin Binfet of TRC Mariah on the ground using four-wheel-drive vehicles and pedestrian reconnaissance. All known nests were visited at least once during these surveys.

From June 27 to 29, 2001, raptor nest productivity surveys were conducted by Diane Thomas, TRC Mariah, using a four-wheel-drive vehicle and/or pedestrian reconnaissance. All active nest locations within 1.0 mi of existing or proposed development areas (see Appendix A) were visited, as well as any other active nests for which productivity data were easily obtained in the course of other scheduled monitoring. In the case of nest failure or abandonment, attempts were made to identify causative factors. All raptor activity/productivity surveys were conducted using procedures that minimize potential adverse effects to nesting raptors as identified in the ROD (Appendix D in BLM 1998a).

In 2001, photos were taken of nests which had not been previously photographed. In addition, some nests for which photos were available were rephotographed to provide better documentation of the nest and its location. Global positioning system (GPS) locations also were obtained or refined for a number of the known nests in the WSA. All data collected during raptor activity and productivity surveys (including GPS data and nest photographs) are recorded on maps, Raptor Nesting Records, and/or Raptor Observation Data Sheets (see Appendix A [Wildlife Map], Appendix B [Raptor Observation Data Sheets], and Appendix C [Raptor Nesting Records]).

Additional monitoring of some nests within the overlap of the Jonah Field II and Anticline WSAs may have been conducted by Mr. John Dahlke, Wyoming Wildlife Consultants, Pinedale, Wyoming (TRC Mariah In progress). Those supplemental data were not available at the time this report was prepared; however, they will be presented in the 2001 Anticline wildlife studies report, scheduled for release in January 2002. All necessary data for determining activity and productivity of nests within the Jonah WSA were gathered by TRC Mariah personnel and are presented herein.

Because common ravens often use nests previously used by raptors and vice versa, documentation of known raven nests was initiated in 2001. Raven nests were recorded on the same data forms as raptor nests (see Appendices B and C); however, only raven nests observed during the course of scheduled monitoring were recorded. No effort was made to document all raven nests in the WSA.

Nesting territory boundaries are difficult to determine, particularly if nesting activity in an area is inconsistent or if the number of years of nesting data available is limited. In past years, the boundary of each ferruginous hawk nesting territory was approximated based on the location of known nests in the area. In 2001, several ferruginous hawk territory boundaries were amended based on the location of new nests and associated topographic characteristics (see Appendix A, Wildlife Map). These territory boundaries, while helpful from a management point of view (i.e.,

to determine territory occupancy and history and to assist in locating potential sites for artificial nest structures [ANSs]), may not reflect the actual ferruginous hawk nesting territories in the Jonah WSA. No attempts were made to determine the general foraging territories for nesting pairs.

Pursuant to the 1999-2000 wildlife annual report (TRC Mariah 2001a), two ANSs (i.e., FH126 and FH128) were erected in the vicinity of ferruginous hawk territory 6 (see Appendix A, Wildlife Map) on September 18, 2001. Nest structure design was based on specifications provided by Larry Apple of the BLM Rawlins Office, and this design has been used successfully for other BLM projects in Wyoming. Each structure consisted of a 3 x 3-ft platform with a 3-ft perch extension built of 2 x 6-inch pressure-treated lumber and mounted on a 12-ft treated pole. One end of the pole was buried to a depth of 3.5 ft such that the platform height is 8.5 ft. Several sagebrush branches were wired onto the platform surface to encourage use by ferruginous hawks.

2.2 SAGE GROUSE

Sage grouse lek surveys were conducted in 2001 to locate new leks and to determine the extent of sage grouse breeding activities in the WSA (see Appendix A, Wildlife Map). Surveys were conducted by WGFD, BLM, TRC Mariah, and University of Wyoming Cooperative Wildlife Unit (COOP) personnel and included aerial flights of the WSA to identify lek locations and ground surveys to determine the extent of lek use. Data on lek attendance, lek location, and survey dates were recorded on Sage Grouse Lek Records (see Appendix D). No investigations were conducted at sage grouse leks 5, 6, 8, 11, 13, 15, 16, 20, 21, or 23: in the 1999-2000 Jonah Field II report (TRC Mariah 2001a), it was recommended that monitoring of leks 5, 6, 8, 11, 12, 13, 14, and 15 be discontinued because of the apparent lack of use in the past several years.

No surveys for sage grouse winter use of the J2PA and surrounding areas were conducted by the BLM in 2001 (personal communication, November 2, 2001, with John Westbrook, BLM, Pinedale, Wyoming).

As recommended in the 1999-2000 wildlife monitoring report (TRC Mariah 2001a), in the spring of 2001, TRC Mariah personnel conducted continuous noise monitoring studies at sage grouse leks 7 and 10 (see Appendix A, Wildlife Map) and at the Bird Canyon lek located outside the WSA (SESENW of Section 34, T27N, R111W) approximately 0.4 mi southeast of the Bird Canyon Compressor Station. Data for the noise monitoring conducted at the Bird Canyon lek are presented in TRC Mariah (2001b) and are not further discussed in this report.

Continuous noise monitoring was conducted for four mornings at leks 7 and 10 (see Appendix E). Monitoring was conducted for 4 hours beginning approximately 1.5 hours before sunrise (times varied due to the Daylight Savings time change and lengthening daylight hours). A Bruel & Kjaer Model 2260 precision integrating sound meter and octave band analyzer (for noise frequency) with a data logger was used. Prior to and after each monitoring period, the noise analyzer was calibrated with a Bruel & Kjaer Model 4231 sound level calibrator. The microphone was fitted with a windscreen to reduce wind-generated noise and was mounted upright (pointing skyward) approximately 3 ft above the ground. The analyzer was programmed to average noise measurements in 5-minute intervals throughout the 4-hour sampling period. All equipment met ANSI 51.4-1983 Type 1 sound level meter requirements. Data were measured and stored on an A-weighted decibel (dBA) scale and were downloaded daily for storage and analysis.

Noise monitoring at lek 7 was conducted to collect data on noise volume and frequency output from the Lumen compressor station (located approximately 1.25 mi west-northwest of the lek 7 perimeter) and nearby noise sources and to document sage grouse responses to those noise levels. Two noise level curves were also developed by measuring volume output levels at designated distances from the compressor station. Noise monitoring was conducted at lek 10

to collect baseline noise data to be used in the future to determine potential noise-related impacts as a result of the construction of the proposed Falcon compressor station.

Each morning, the noise analyzer was set up on the portion of the lek closest to the Lumen compressor station (lek 7) or the proposed location of the Falcon compressor station (lek 10) (the Falcon compressor station had not yet been constructed at the time of the monitoring). Because an automatic timing function was not available in the analyzer's software, the analyzer was set up approximately 10 minutes prior to initial data logging to avoid superfluous noise contribution from equipment setup and departure from the area. A 15x-45x Bushnell spotting scope and 8x50 binoculars were used to observe lek 7 for the duration of the 4-hour measurement period from a two-track road approximately 0.4 mi north of the lek. Lek 10 was observed from the top of a knoll approximately 0.5 mi southeast of the lek. From the observation points, prevailing meteorological conditions and lek attendance information were recorded. Cloud cover was recorded at the beginning of each hour. Ambient temperature was recorded at the beginning and end of each hour. Relative humidity was recorded halfway through each hour using a sling psychrometer and data obtained from the National Weather Service for the Big Piney Regional Airport. Each hour was subdivided into four 15-minute intervals. For each 15-minute interval, wind speed and direction, the minimum and maximum numbers of cocks and hens observed on the lek, and superfluous contributing noise sources (i.e., passing vehicles, airplanes, compressor station noise events) were recorded. Animal activities that might disturb the grouse (i.e., a predator in the vicinity) and anecdotal information pertaining to grouse activity (i.e., flushing events, relative levels of strutting activity) also were noted.

Volume and frequency levels for the Leq, L10, and L90 were averaged and recorded in 5-minute intervals throughout each morning. The Leq is a measure of overall noise level over a specified period of time and is an important descriptor because it includes all of the sound energy that the grouse were exposed to in a given duration, including background, contributing noise source (i.e., compressor station), and superfluous noise (i.e., vehicular traffic and aircraft overflight).

The L10 is the sound level exceeded 10% of the time and is a measurement of intrusive sounds, such as aircraft overflight. The L90 is the sound level exceeded 90 percent of the time and is generally considered the background or residual noise level. For lek 7, the L90 is an important descriptor because the Lumen compressor station produces a continuous low noise level. The L90 values exclude periodic intrusive noise sources such as vehicular traffic during the measurement period, resulting in a better characterization of the actual facility contribution to the ambient noise environment.

Frequency is defined as the number of pressure fluctuations/vibrations per second, measured in Hertz (Hz). The frequency data recorded during this study are presented in terms of Leq frequency. Leq frequency values encompass all frequencies to which the grouse were exposed, including those associated with background noise, noise output from the compressor station, vehicular traffic, and other superfluous noise sources. Leq frequency values and corresponding dBA levels are provided for nine frequency levels ranging from 31.5 Hz to 8,000 Hz. The corresponding dBA levels indicate the strength of the noise signal at each particular frequency. Humans and many animals are capable of detecting far higher frequencies than were recorded within the Leq for this study.

For the purposes of this report, the Leq, L10, and L90 data (measured in dBA) were averaged for each 15-minute interval. The Leq, L10, L90, and Leq frequency data also were averaged for each hour of each morning, for each entire morning, and for all four mornings combined. Averages are presented as the logarithmic expression of the mean power ratios (commonly and hereafter described as the logarithmic mean).

At the Lumen compressor station, two noise curves were generated using a hand-held digital noise meter to measure linear changes in noise output levels at designated distances from the compressor station. The noise meter was calibrated at 94 dBA, with a measuring range from 30-80 dBA. The first noise curve measured linear noise levels between the compressor station and lek 7. Noise measurements were recorded at 100-m intervals, beginning at the compressor

station perimeter fence and ending at the lek periphery approximately 1.25 mi to the southeast (see Appendix E). The second noise curve measured noise levels at 0.25 mi, 0.50 mi, 0.75 mi, and 1.00 mi in a direction chosen to likely have the maximum measurable noise levels for that particular measuring period (based on wind direction and topography) (see Appendix E). For each measurement on both transects, six dBA readings were recorded at 10-second intervals, from which a logarithmic mean was calculated. Minimum and maximum dBA levels also were recorded by constantly watching the noise meter for 1-2 minutes at each point to observe the full range of values measured during the period.

2.3 THREATENED, ENDANGERED, PROPOSED, CANDIDATE, AND OTHER WYOMING SPECIES OF CONCERN

Inventory and monitoring of threatened, endangered, proposed, candidate, and other Wyoming species of concern (TEPC&WSC) were conducted in conjunction with surveys for raptors and sage grouse. A list of BLM Wyoming species of concern for the WSA is provided in Table 2.1. Additional species-specific surveys were implemented by the BLM in conjunction with on-site investigations conducted as components of Application for Permit to Drill (APD) and/or right-of-way (ROW) application processes, as deemed necessary by the BLM and in compliance with the biological assessment for the project (Appendix E in BLM 1997). Data collection methods and results/clearances for TEPC&WSC species associated with APD and ROW application reviews are not included in this report, but are available from the BLM Pinedale Field Office in Pinedale, Wyoming.

2.3.1 Black-footed Ferret

During 2001, TRC Mariah personnel censused prairie dog towns (PDTs) 1, 2, 2a, 3, 3a, and 6 (see Appendix A, [Wildlife Map]) to determine overall burrow densities, define areas of high burrow density within each PDT, more accurately define the current size and location of each

Table 2.1 BLM Wyoming Animal Species of Concern Documented or Potentially Occurring on or in the Vicinity of the Jonah II Natural Gas Project Area, 2001.¹

Species			Documented on or in Vicinity of the J2PA? ³	Habitat Type(s) ⁴
Common Name	Scientific Name	Other Designation and Ranking ²		
Dwarf shrew	<i>Sorex nanus</i>	G4/S2S3, FSR2, NSS3	Yes ⁵	P/R, BS, SB
Long-eared myotis	<i>Myotis evotis</i>	G5/S1B, S1?N, NSS2	Yes	FT
Whitetail prairie dog	<i>Cynomys leucurus</i>	G4/S2S3, NSS3	Yes ⁵	UB
Idaho pocket gopher	<i>Thomomys idahoensis</i>	G4/S2?, NSS3, IUCN-LR (nt)	Yes ⁵	BS, P/R
Pygmy rabbit	<i>Brachylagus idahoensis</i>	G4/S2, NSS3, IUCN-LR (nt)	Yes ⁶	BS, P/R
White-faced ibis	<i>Plegadis chihi</i>	G5/S1B, SZN, FSR2, NSS3	Yes ⁵	FT, P/R
Trumpeter swan	<i>Cygnus buccinator</i>	G4/S1B, S2N, FSR2, FSR4, NSS2	Yes	FT
Northern goshawk	<i>Accipiter gentilis</i>	G5/S23B, S4N, FSR2, FSR4, NSS4	Yes ⁵	FT
Ferruginous hawk	<i>Buteo regalis</i>	G4/S3B, S3N, FSR2, NSS3	Yes ⁵	UB
Peregrine falcon	<i>Falco peregrinus</i>	G4/T3/S1B, S2N, FSR2, NSS4	Yes ⁵	FT
Sage grouse	<i>Centrocercus</i>	G5/S3	Yes ⁵	UB
Long-billed curlew	<i>Numenius americanus</i>	G5/S3B, SZN, FSR2, NSS3	Yes ⁵	P/R, FT
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	G5/S2B, SZN, FSR2, NSS2, Petitioned	No	FT
Burrowing owl	<i>Athene cunicularia</i>	G4/S3B, SZN, FSR2, NSS4	Yes ⁵	BS, SB, CP
Sage thrasher	<i>Oreoscoptes montanus</i>	G5/S3B, SZN, PIF	Yes ⁵	UB
Loggerhead shrike	<i>Lanius ludovicianus</i>	G5/S4B, SZN, FSR2	Yes ⁵	UB
Brewers sparrow	<i>Spizella breweri</i>	G5/S3B, SZN, PIF	Yes ⁵	UB
Sage sparrow	<i>Amphispiza billineata</i>	G5/S3B, SZN, PIF	Yes ⁵	UB
Northern leopard frog	<i>Rana pipiens</i>	G5/S3, FSR2, NSS4	Yes	P/R
Boreal toad	<i>Bufo boreas boreas</i>	G4T4/S2, FSR2, FSR4, NSS2	Yes	P/R
Spotted frog	<i>Rana pretiosa</i>	G4/S2S3, FSR2, FSR4, NSS4	Yes	P/R

¹ From Wyoming BLM State Director's Sensitive Species List (Animals and Plants), April 2001.

² Rankings:

Wyoming Natural Heritage Program

Uses a standardized system developed by The Nature Conservancy's Natural Heritage Network to assess the global and state wide 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 = Trinomial 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.

ZN = Taxa that are not of significant concern in Wyoming during non-breeding seasons.

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

Table 2.1 (Continued)

- 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.
 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 nonbreeding season (used mostly for migratory birds and bats) ZN or ZB. Taxa that are not of significant concern in Wyoming during breeding (ZB) or non-breeding (ZN) seasons. Such taxa often are not encountered in the same locations from year to year.
 ? = Questions exist regarding the assigned G, T, or S rank of a taxon.

U.S. Forest Service

- FSR2 = Region 2, Rocky Mountain Region.
 FSR4 = Region 4, Intermountain Region.

Wyoming Game and Fish Department

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 classes 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.
 NSS4 = **EITHER** Populations are either declining or restricted in number or distribution. Extirpation is not imminent. Habitat is not restricted but is vulnerable; however, no known significant loss has occurred. Species is not sensitive to human disturbance. **OR** Species is widely distributed. Population status and trends are unknown but suspected to be stable. Habitat is restricted or vulnerable, but no recent or ongoing significant loss has occurred. Species may be sensitive to human disturbance.

ICUN - International Union for Conservation of Nature Rodent Specialist Group, North American Red List

- LR = Lower Risk. 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:
 cd = Conservation Dependent. Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted toward 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 5 years.
 nt = Near Threatened. Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
 lc = Least Concern. 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.

- ³ Indicates documentation of amphibian, reptile, or bird species in Sublette County (Baxter and Stone 1980; Fertig 1997; WGFD 1999); documentation of bird species within latitude 42°, longitude 109° (Dorn and Dorn 1990; WGFD 1992, 1996, 1999); and/or documentation of mammal species within latitude 42°, longitude 109° (WGFD 1992, 1996, 1999) or within Sublette County (Fertig 1997).
⁴ BS = big sagebrush, CP = cushion plant, FT = fly through, P/R = pond/riparian, SB = saltbush, UB = ubiquitous.
⁵ Species has been documented breeding within latitude 42°, longitude 109° (Dorn and Dorn 1990; WGFD 1992; WGFD 1999).
⁶ Species occurred historically within latitude 42°, longitude 109° (WGFD 1999).

town, and determine whether the towns meet black-footed ferret habitat criteria established in the USFWS (1989) guidelines. In addition, in conjunction with the Pinedale Anticline Project, PDTs 21-25E were newly defined and censused. All open burrows with a diameter ≥ 7 cm were censused and their location marked with a GPS. Counted burrows were physically marked (i.e., with a footprint or scuff mark) to avoid duplication. In the field, the edge of the town was determined when no burrows were observed within approximately 0.25 mi of an outlying burrow. In the office, town boundaries were further refined using GIS data such that burrows along the edge of the town were within at least 200 m of other burrow(s).

2.3.2 Bald Eagle, Ferruginous Hawk, Golden Eagle

Inventory and monitoring protocols for bald eagle, ferruginous hawk, and golden eagle were implemented as described for raptors (see Section 2.1).

2.3.3 Mountain Plover

During 2001, all suitable mountain plover breeding habitat (i.e., active prairie dog colonies and/or relatively flat areas with low-growing vegetation less than 4-6 inches in height indicative of cushion plant and Gardner's saltbush communities) within the MJ2PA and a 0.5-mi buffer was surveyed to determine the presence or absence of breeding mountain plover. During the initial visit, some areas previously identified as potential or marginal mountain plover habitat were deemed unsuitable for nesting mountain plovers and were not surveyed or were only surveyed once. The remaining areas were deemed marginal plover nesting habitat and were surveyed three times in 2001.

Surveys were conducted in accordance with 2001 USFWS guidelines (USFWS 2001). Survey procedures were as follows.

- Surveys were conducted during early courtship and territory establishment.
- Surveys were conducted from sunrise to 10:00 a.m. and/or from 5:30 p.m. to sunset

- Surveys were conducted from four-wheel-drive vehicles or, where access was problematic and/or no visual observations were made from vehicles, all-terrain vehicles were used.
- Surveyors remained in or close to vehicles when scanning with binoculars.
- Suitable habitat was surveyed three times during the survey window (May 1-June 15), with each survey separated by at least 14 days.
- Surveys were not conducted in inclement weather (e.g., poor visibility).
- Surveys focused on locating displaying or calling males.
- GPS locations of nests (post-nesting) and individuals, if present, were taken; and activity, number of individuals, and other pertinent data were recorded.

All data collected during surveys, including location, weather conditions, habitat characteristics, and results, were recorded on Mountain Plover Survey Forms (see Appendix G).

Additional surveys within 0.25 mi of proposed well locations or 300 ft of proposed roads may have been investigated/cleared by the BLM prior to disturbance in association with APD and ROW application field reviews. Data from these investigations are available for review at the BLM Pinedale Field Office in Pinedale, Wyoming.

2.3.4 Western Burrowing Owl

Prairie dog colonies and other suitable burrowing owl nesting habitats on the MJ2PA were searched during late spring and summer 2001 by TRC Mariah personnel to determine the extent of burrowing owl nesting. Additional monitoring of some nests within the overlap of the Jonah and Anticline WSAs may have been conducted by Mr. John Dahlke, Wyoming Wildlife Consultants (TRC Mariah In progress); however, those data were not available at the time this report was prepared. Burrowing owl nesting surveys were conducted in association with prairie dog colony mapping, mountain plover surveys, and raptor surveys. The number and location of active nests in the area were identified and efforts were made to determine fledgling success for active nests.

2.3.5 Other TEPC&WSC Species

Formal surveys for other TEPC&WSC were not conducted during 2001. However, site-specific investigations were implemented by the BLM in areas of potential habitat within 0.5 mi of proposed disturbance sites during on-site reviews conducted in conjunction with APD and ROW application review processes. This information is available for review at the BLM Pinedale Field Office.

2.4 GENERAL WILDLIFE

Observations of general wildlife were recorded during species-specific investigations, and data are presented in Appendix B. Additional observations were made by BLM personnel during on-site investigations conducted during APD and ROW application review processes, and this information may be reviewed at the BLM Pinedale Field Office.

No formal surveys for pronghorn antelope or other species/wildlife categories were conducted during 2001.

3.0 RESULTS AND PROPOSED MONITORING/PROTECTION MEASURES

The following chapter presents the results of 2001 wildlife investigations on the WSA. Proposed monitoring/protection measures for 2002 are also identified and would be implemented by the BLM, WGFD, and/or Operators as identified below.

The proposed wildlife protection measures were developed specifically for potentially impacted wildlife resources on and adjacent to the MJ2PA and J2PA. The principal protection measure proposed for most wildlife species is avoidance of sensitive/crucial habitats (e.g., raptor nests, sage grouse leks), where practical. However, numerous other species-specific measures have been identified.

3.1 RAPTORS

3.1.1 Results

Table 3.1 provides information on the location, recent history, and activity status of known raptor/raven nests on the WSA. For the purposes of development planning, an active nest is defined as one which has been used by raptors (not ravens) in at least one of the past 3 years. An "unknown" activity status is assigned to nests for which a complete history of use over the past 3 years is not available (i.e., nest not checked or not located or the nest was newly recorded). Any nest newly recorded within the last 2 years has an unknown activity status because nest history in the past 3 years is incomplete. Information on productivity, nearby project features, and proposed protection measures at active nest sites within project-affected areas is presented in Table 3.2.

Twenty-nine raptor/raven nests were newly recorded and two artificial nest structures were newly erected in 2001. Twelve of the newly recorded nests (FH98-99, 101-104, 109-110, 112, 115, 118-119) and both of the newly erected artificial nest structures (FH126 and 128) were

Table 3.1 Raptor Nest Locations and Activity Status, 2001, Jonah Field II Wildlife Study Area.

Nest Number ^{2,3}	Activity Status ⁴	Activity by Year ¹			Most Recent, Activity	Legal Location	UTM Coordinates ⁵
		2001	2000	1999			
AK16	A	I	I	a	1999	[REDACTED]	n/a
AK17	A	I	I	a	1999	[REDACTED]	[REDACTED]
AK18	A	I	I	a	1999	[REDACTED]	[REDACTED]
AK30	A	I	a	a	2000	[REDACTED]	[REDACTED]
AK39	U	I	I	NC	1997 ⁷	[REDACTED]	n/a
AK50 ⁸	A	A	I	a ⁹	2001	[REDACTED]	[REDACTED]
AK52	I	I	I	I	1998	[REDACTED]	[REDACTED]
AK80	I	I	I	I	U	[REDACTED]	n/a
AK88	A	a	a	NR	2001	[REDACTED]	n/a
AK92	U	U	U	NR	U	[REDACTED]	[REDACTED]
AK97	U	I	U	NR	U	[REDACTED]	[REDACTED]
BO19	U	I	I	NC	1997 ⁷	[REDACTED]	n/a
BO23	U	I	I	NC	1997 ⁷	[REDACTED]	n/a
BO75	U	I	NC	NC	1998 ⁷	[REDACTED]	n/a
BO76	U	I	I	NC	1998 ⁷	[REDACTED]	n/a
BO77	A	I	A	A	2000	[REDACTED]	n/a
BO86	A	A	A	NR	2001	[REDACTED]	n/a
BO117	A	A	NR	NR	2001	[REDACTED]	[REDACTED]
BO124	A	a	NR	NR	2001	[REDACTED]	[REDACTED]
CR105	A-R	A	NR	NR	2001	[REDACTED]	n/a
CR106	A-R	A	NR	NR	2001	[REDACTED]	n/a
CR107	A-R	A	NR	NR	2001	[REDACTED]	n/a
CR108	A-R	A	A	NR	2001	[REDACTED]	n/a
CR111	A-R	A	NR	NR	2001	[REDACTED]	n/a
CR114	A-R	A	NR	NR	2001	[REDACTED]	n/a

Table 3.1 (Continued)

Nest Number ^{2,3}	Activity Status ⁴	Activity by Year ¹			Most Recent Activity	Legal Location	UTM Coordinates ⁵
		2001	2000	1999			
CR116	A-R	A	NR	NR	2001	[REDACTED]	n/a
CR125	I	I	I	I	1998	[REDACTED]	[REDACTED]
CR127	A-R	A	NR	NR	2001	[REDACTED]	n/a
FH1 (2 nests)	I	I	I	I	U	[REDACTED]	[REDACTED]
FH2 (2 nests)	I	I	I	I	U	[REDACTED]	[REDACTED]
FH4	A	I	A ¹⁰	A	2000	[REDACTED]	[REDACTED]
FH5	I	I	I	I	pre-1996	[REDACTED]	[REDACTED]
FH6	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH7	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH8	I	I	I	I	1996	[REDACTED]	[REDACTED]
FH9	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH10	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH11	I	I	I	I	pre-1996	[REDACTED]	[REDACTED]
FH12 (2 nests)	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]
FH13	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH14	A	I	I	A ¹¹	1999	[REDACTED]	[REDACTED]
FH15	A	I	I	a	1999	[REDACTED]	[REDACTED]
FH20	I	I	I	I	pre-1997	[REDACTED]	n/a
FH21	I	I	I	I	pre-1997	[REDACTED]	n/a
FH22	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH24	A	I	a	I	2000	[REDACTED]	n/a
FH25	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]

Table 3.1 (Continued)

Nest Number ^{2,3}	Activity Status ⁴	Activity by Year ¹			Most Recent Activity	Legal Location	UTM Coordinates ⁵	
		2001	2000	1999				
FH26	A	I	a	a	2000	[REDACTED]	[REDACTED]	[REDACTED]
FH28	I	I	I	I	1996 ⁷	[REDACTED]	[REDACTED]	[REDACTED]
FH37 (2 nests)	A	A ¹²	I	A	2001	[REDACTED]	[REDACTED]	[REDACTED]
FH38	A	I	A	NC	2000	[REDACTED]	[REDACTED]	[REDACTED]
FH42	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]	[REDACTED]
FH43 (2 nests)	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]	[REDACTED]
FH53	I	I	I	I	1998	[REDACTED]	[REDACTED]	[REDACTED]
FH54 (2 nests)	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]	[REDACTED]
FH55	I	I	I	I	pre-1998	[REDACTED]	n/a	[REDACTED]
FH56	I	I	I	I	pre-1997	[REDACTED]	n/a	[REDACTED]
FH57 (2 nests)	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH59 (3 nests)	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH60	I	I	I	I	pre-1997	[REDACTED]	n/a	[REDACTED]
FH62	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH64	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH65	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH66 (2 nests)	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH67	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]	[REDACTED]
FH68	I	I	I	I	pre-1997	[REDACTED]	[REDACTED]	[REDACTED]
FH69	A	I	a	I	2000	[REDACTED]	[REDACTED]	[REDACTED]

Table 3.1 (Continued)

Nest Number ^{2,3}	Activity Status ⁴	Activity by Year ¹			Most Recent Activity	Legal Location	UTM Coordinates ⁵
		2001	2000	1999			
FH70	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
FH71	I	I	I	I	1997	[REDACTED]	[REDACTED]
FH73	I	I	I	I	pre-1996	[REDACTED]	n/a
FH78	I	I	I	I	U	[REDACTED]	n/a
FH82	U	I	NC	I	U ⁵	[REDACTED]	n/a
FH83	I	I	I	I	U	[REDACTED]	n/a
FH84	I	I	I	I	U	[REDACTED]	[REDACTED]
FH85	I	I	I	I	U	[REDACTED]	n/a
FH87	U	I	I	NR	U	[REDACTED]	n/a
FH89	U	I	I	NR	U	[REDACTED]	n/a
FH90	U	I	I	NR	U	[REDACTED]	[REDACTED]
FH93	U	I	I	NR	U	[REDACTED]	[REDACTED]
FH94 ¹³	U	I	I	NR	U	[REDACTED]	[REDACTED]
FH95	U	I	I	NR	U	[REDACTED]	[REDACTED]
FH96	I	I	I	I	U	[REDACTED]	[REDACTED]
FH98	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH99	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH101	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH102	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH103 _s (2 nests)	I	I	I	I	U	[REDACTED]	[REDACTED]
FH104	I	I	I	I	U	[REDACTED]	[REDACTED]
FH109	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH110	I	I	I	I	U	[REDACTED]	[REDACTED]
FH112	U	I	NR	NR	U	[REDACTED]	n/a

Table 3.1 (Continued)

Nest Number ^{2,3}	Activity Status ⁴	Activity by Year ¹			Most Recent Activity	Legal Location	UTM Coordinates ⁵
		2001	2000	1999			
FH115	U	I	NR	NR	U	[REDACTED]	n/a
FH118	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH119	U	I	NR	NR	U	[REDACTED]	[REDACTED]
FH126 (ANS)	n/a ¹⁴	n/a ¹⁴	n/a ¹⁴	n/a ¹⁴	n/a ¹⁴	[REDACTED]	[REDACTED]
FH128 (ANS)	n/a ¹⁴	n/a ¹⁴	n/a ¹⁴	n/a ¹⁴	n/a ¹⁴	[REDACTED]	[REDACTED]
GE36	A	I	A	I	2000	[REDACTED]	[REDACTED]
GE47	A	A	A	I	2001	[REDACTED]	[REDACTED]
GE48	I	I	I	I	pre-1996	[REDACTED]	[REDACTED]
GE51	A	a	A	I	2001	[REDACTED]	[REDACTED]
GE72	I	I	I	I	pre-1998	[REDACTED]	[REDACTED]
PF27	I	I	I	I	1997 ⁷	[REDACTED]	[REDACTED]
PF41	U	I	U	U	1998 ⁷	[REDACTED]	[REDACTED]
PF61	I	I	I	I	1997	[REDACTED]	n/a
PF63	I	I	I	I	pre-1998	[REDACTED]	n/a
PF79	A	I	I	A	1999	[REDACTED]	n/a
PF81	A	I	A	a	2000	[REDACTED]	[REDACTED]
PF113	A	A	NR	NR	2001	[REDACTED]	[REDACTED]
PF123	U	I	NR	NR	U	[REDACTED]	[REDACTED]
SS100	U ¹⁵	U ¹⁵	NR	NR	U ¹⁵	[REDACTED]	[REDACTED]
SS120	U ¹⁵	U ¹⁵	NR	NR	U ¹⁵	[REDACTED]	[REDACTED]
SS121	U ¹⁵	U ¹⁵	NR	NR	U ¹⁵	[REDACTED]	[REDACTED]
SS122	U ¹⁵	U ¹⁵	NR	NR	U ¹⁵	[REDACTED]	[REDACTED]

Table 3.1 (Continued)

Nest Number ^{2,3}	Activity Status ⁴	Activity by Year ¹			Most Recent Activity	Legal Location	UTM Coordinates ⁵
		2001	2000	1999			
UN74 ¹⁶	I	I	I	I	U		

¹ A = active; a = likely active; I = inactive; NC = not checked/not located; NR = nest had not yet been recorded; U = unknown.

² AK = American kestrel; BO = burrowing owl; CR = common raven; FH = ferruginous hawk; GE = golden eagle; PF = prairie falcon; SS = sharp-shinned hawk; UN = unknown species.

³ The following nests have been removed from monitoring because detailed searches for the nests over numerous years revealed no nest or activity in the area of the nests as mapped: FH3, FH29, FH58, UN31, UN32, UN33, UN34, UN35, UN40, UN44, UN45, UN46, and UN49. FH91 is the same nest as UN74, and since its status as an FH nest is not confirmed, the FH91 nest code has been dropped and it will continue to be referred to as UN74.

⁴ Overall activity status is based on the BLM definition of an active nest as one which has been used by raptors in at least 1 of the past 3 years. For overall activity status, nests for which activity was likely, but not confirmed, were considered active (A). Nests which were assigned an unknown activity status (U) lack a conclusive activity determination for at least 1 of the past 3 years and/or were newly recorded and have not been monitored for 3 consecutive years. Nests confirmed inactive in all of the past 3 years are deemed inactive (I). Nests designated A-R were used by ravens in at least one of the past 3 years but were not used by raptors and, thus, are not considered active for planning and development purposes.

⁵ E = easting; N = northing; n/a = not available.

⁶ Nest location corrected significantly in 2001.

⁷ Date is of last confirmed activity, but activity status was unknown in at least one of the years since the last known activity; thus, more recent activity may have occurred.

⁸ Redesignated as AK from UN in 2001.

⁹ Possibly used by great horned owl or prairie falcon.

¹⁰ Used by prairie falcon.

¹¹ Used by golden eagle in 1999.

¹² Used by red-tailed hawk in 2001.

¹³ Redesignated from PF to FH in 2001.

¹⁴ Artificial nest structure erected in September 2001. No nest history exists.

¹⁵ One of the four SS nests (SS100, SS120, SS121, SS122) was active in 2001, but the exact nest was undetermined.

¹⁶ Formerly listed as both UR74 and FH91.

Table 3.2 Summary of Active Raptor Nests Within 1.0 Mi of Existing or Proposed Disturbance, Jonah Field II Wildlife Study Area.¹

Species/ Nest No. ^{2,3}	Legal Location	Nest Condition ⁴	Seasonal Buffer Radius	Nest Production ⁵			Nearby Project Features ⁶	Mitigation/Actions ⁷
				Eggs	Nestlings	Fledglings		
AK16		U, 2001	0.5 mi	U, 1999	U, 1999	U, 1999	Three existing wells and associated roads and pipelines within 0.5 mi	Continue activity status and productivity monitoring
AK17		U, 2001	0.5 mi	U, 1999	U, 1999	U, 1999	One existing and one proposed well and associated roads within 0.5 mi	Continue activity status and productivity monitoring
AK18		U, 2001	0.5 mi	U, 1999	U, 1999	U, 1999	Existing road and pipeline within 0.5 mi	Continue activity status and productivity monitoring
BO77		U, 2001	0.5 mi	U, 1999- 2000	U, 1999- 2000	1, 1999 U, 2000	Numerous existing project features and one proposed well and road within 0.5 mi	Continue activity status and productivity monitoring
BO117		U, 2001	0.5 mi	1+, 2001	1+, 2001	1+, 2001	Numerous existing and proposed project features within 0.5 mi	Continue activity status and productivity monitoring
FH4 ⁹		Fair, 2001	1.0 mi	3, 1999	2 (1 died), 1999	1 (died), 1999	Numerous existing and proposed project features within 1.0 mi	Continue activity status and productivity monitoring
FH14 ¹⁰		Good, 2001	1.0 mi	1, 1999 - egg failed	0, 1999	0, 1999	Numerous existing and proposed project features within 1.0 mi; limited alternative nest sites available in territory 5	Continue activity status and productivity monitoring; if territory 5 is inactive in 2002, potential development of ANS(s)
FH15		Poor, 2001	1.0 mi	U, 1999	U, 1999	U, 1999	Numerous existing and proposed project features within 1.0 mi; limited alternative nest sites available in territory 5	Continue activity status and productivity monitoring; if territory 5 is inactive in 2002, potential development of ANS(s)
FH24		Nest gone, 2001	1.0 mi	U, 2000	0, 2000	0, 2000	One existing well and road and numerous proposed features within 1.0 mi; limited alternative nest sites	Continue monitoring the area for new and active nests
FH69		Excellent, 2001	1.0 mi	U, 2000	U, 2000	U, 2000	Road and pipeline occur within 1.0 mi	Continue activity status and productivity monitoring

Table 3.2 (Continued)

- ¹ Active nests defined by activity or likely activity in at least one of the past three nesting seasons. Nests for which overall activity status cannot be determined because data are lacking in at least one of the past 3 years are included in the table and assigned an unknown (U) activity status. See Appendix C, Raptor Nesting Records, for further detail.
- ² See Appendix A, Wildlife Map, for nest locations.
- ³ FH = ferruginous hawk (see Table 3.3 for nesting territory); AK = American kestrel; BO = burrowing owl.
- ⁴ Most recently recorded nest condition; year is indicated. U = unknown (i.e., either not recorded, or in the case of cavity and burrow nesters, not discernable).
- ⁵ Present's number of items and year for years nest was recorded as active or likely active in the past 3 years. U = unknown.
- ⁶ See Appendix A, Project Features Map. Map was developed from best current data available from the Operators.
- ⁷ Seasonal and standard avoidance measures are not included since they would be applied as necessary for all active nests.
- ⁸ Nest location corrected significantly in 2001.
- ⁹ Used by prairie falcon in 2000.
- ¹⁰ Used by golden eagle in 1999.

designated ferruginous hawk nests. Four of the newly recorded nests (SS100, 120-122) were sharp-shinned hawk nests, two (PF113, 123) were prairie falcon nests, two (BO117, 124) were burrowing owl nests, and nine (CR105-108, 111, 114, 116, 125, 127) were common raven nests. Two nests were also redesignated in 2001: UN50 was active with American kestrels and was redesignated AK50, and PF94 was redesignated to FH94 based on nest characteristics and lack of history of use by prairie falcons.

In the Jonah Field II 1999-2000 annual report (TRC Mariah 2001a), it was recommended that 13 previously listed nests (i.e., FH3, 29, and 58; UN31-35, 40, 44-46, and 49) be removed from monitoring. Despite detailed searches for these nests over several years, no nests or nesting activity was found in the mapped vicinity of these nests. It is likely that these nests either were mismapped initially or during database transfers or that the nest(s) were destroyed as a result of wind, predation, or other natural forces. Upon review of the photographs, it was also determined that FH91 is the same structure as UN74. Because the nest has no history of activity and may not be a ferruginous hawk nest, the FH91 designation was dropped and the UN74 nest code was retained.

In 2001, 10 of 128 known raptor/common raven nest sites on and adjacent to the WSA were used by raptors. Eight additional nests were used by common ravens (see Appendices B and C). Because ravens are neither raptors nor a species of special concern, their nests were not checked for productivity in 2001 unless the nests were easily observed during the course of scheduled surveys. Several active raptor nests in the area occur at distances greater than 1 mi from existing and proposed oil and gas disturbance sites (where productivity monitoring is not required); thus, productivity data for some raptor nests may be limited (see Appendix C).

An estimated 11 ferruginous hawk nesting territories are present on the WSA, five of which have been occupied at least once during the last 3 years (1999-2001). The approximate territory boundaries are shown on the Wildlife Map in Appendix A, and their locations are briefly

described in Table 3.3. Boundaries were refined in 2001 to include newly recorded nests and to more closely depict likely boundaries.

Sixty-eight ferruginous hawk nest sites (including the two ANSs newly erected in 2001) are known to occur on and adjacent to the WSA. Of those nests, eight were determined to be active during at least 1 of the past 3 years--activity status for 16 of the nests is unknown (Table 3.1). None of the nests were occupied by ferruginous hawks in 2001; thus, no young were produced.

Project features proximal to active ferruginous hawk nests (i.e., occupied in at least 1 of the past 3 years) are identified in Table 3.2 and Appendix A (Project Features Map). Project features/developments on the MJ2PA exist and are further planned proximal to nest territories 1, 5, 6, and 7. Other activities (e.g., recreational activities/off-road vehicle use, livestock grazing, wildlife/predator interactions, climate) will continue to occur in these and other territories. Ferruginous hawk nesting territory 7 was not active during the past 3 years and all known nest sites in the territory are at suboptimal locations (i.e., on the ground surface with easy access by predators); therefore, nesting in territory 7 is unlikely to occur in all but the most active nesting years (i.e., when all other nearby nesting territories are occupied). It is also possible that nest territories 5, 6, and 7 and nest sites FH24 and FH89 will remain unused or will have limited success during the life of the Jonah II Field. Mitigation measures as defined in Section 3.1.2 are recommended for territories 5 and 6 in 2002.

Of the 11 American kestrel nest sites in the WSA, six are listed as active and activity status for an additional three is unknown. Two American kestrel nests (AK50 and 88) (>1.0 mi from project-related disturbance) were occupied in 2001, but productivity is unknown.

Eight burrowing owl nest sites occur within the WSA--four active and four with an unknown activity status. Three of the nests were occupied by burrowing owls in 2001--at least one burrowing owl fledged from BO117 in 2001 (<1.0 mi from project-related disturbance);

Table 3.3 1999-2001 Activity Status of Ferruginous Hawk Nesting Territories, Jonah II Wildlife Study Area.¹

Territory	Nests Included in Territory ²	Activity Status ³		
		1999	2000	2001
1	68-71, 99, 118	I	A (FH69) (unknown success)	I
2	62, 64-67, 84-85, 90, 96, 101-102	I	I	I
3	56-57, 60, 83	I	I	I
4	26, 28, 93-95	a (FH26) (unknown success)	a (FH26) (unknown success)	I
5	13-15	A (FH14) ⁴ (failed) a (FH15) (unknown success)	I	I
6	2-12; 78, 115, 126, 128	A (FH4) (failed)	A (FH4) ⁵ (unknown success)	I
7	20-21, 73, 98	I	I	I
8	53-55, 82, 109-110	I	U	U
9	42-43	I	I	I
10	37-38	A (FH37) (unknown success)	A (FH38) ⁵ (unknown success)	A (FH37) ⁶ (failed)
11	59, 103-104	I	I	I

¹ See Appendix A, Wildlife Map, for locations.

² No nesting territory is established for nests FH 1, 22, 24, 25, 87, and 89. Nests FH3, 29, 58, and 91 were removed from monitoring in 2001 (see Section 3.1.1).

³ Further detail is provided in Appendix C, Raptor Nesting Records; I = inactive; a = likely active; A = active; U = unknown (not all nests in the territory were checked for activity in the year indicated). Numbers in parentheses indicate which nest in the territory was active.

⁴ Used by golden eagle.

⁵ Used by prairie falcon.

⁶ Used by red-tailed hawk.

additional burrowing owl young may have fledged from BO86 and/or BO124 (both <1.0 mi from disturbance). Burrowing owls are discussed further in Section 3.3.1.4.

Five golden eagle nests (three active and two inactive) are recorded within the WSA. Two of the nests (both >1.0 mi from project-related disturbance) were occupied by golden eagles in 2001. One golden eagle fledged from GE47, whereas GE51 apparently failed.

Eight prairie falcon nest sites (three active, two with an unknown activity status) occur within the WSA. Only one of the nests (PF113) was occupied in 2001, with 2+ young produced. The nest is located >1.0 mi from project-related disturbance.

Four sharp-shinned hawk nests (SS100 and 120-122) were newly recorded in 2001, one of which was occupied. The exact nest structure used was not determined; however, given the vigorous and consistent defense of the area by both adult birds during the early May and late June visits, it is likely that at least one sharp-shinned hawk chick fledged. All four nests are >1.0 mi from project-related disturbance.

No red-tailed hawk nests were recorded in the WSA prior to the 2001 survey; however, FH37 (>1.0 mi from project-related disturbance) was used by red-tailed hawks in 2001. No adults or young were observed during the productivity check, and the nest apparently failed.

One nest of an unknown species (inactive over the past 3 years) is known to occur within the WSA. The nest was not occupied in 2001.

Nine common raven nests (not used by raptors in the past 3 years and, thus, not active) are recorded within the WSA, eight of which were newly recorded in 2001. All eight newly recorded nests were within 1.0 mi of project-related disturbance and were occupied by ravens during 2001. Although no attempt was made to determine productivity unless the nests were easily checked during the course of other survey activities, at least five young are known to have

fledged from the nests. Six of the nests are built on project facilities (i.e., well tanks, well tank stairs and catwalks) and two of the nests are associated with old ranch buildings/sites. One nest is built on a rock.

3.1.2 Monitoring/Protection Measures

The primary mitigation measure for raptor species in the WSA is avoidance of active nest locations during the breeding season. Active nests are defined as nests that have been used by raptors within the last 3 years. Unless excepted by the BLM during APD and ROW application reviews, all surface-disturbing activities will be restricted from February 1 through July 31 within a 0.5-mi radius of active raptor nests, except ferruginous hawk nests, for which the seasonal buffer is 1.0 mi (see Table 3.2). The seasonal buffer distance and exclusion dates may vary depending on factors such as nest activity status, raptor species, prey availability, natural topographic barriers, and line-of-sight distances. In addition, well locations, roads, ancillary facilities, and other surface structures requiring repeated human presence will not be constructed within 825 ft of active raptor nests (2,000 ft for bald eagles), where practical (BLM 1998a). Facility construction in these areas will require specific approval from the BLM.

Nest activity status and productivity monitoring will continue in 2002 as identified in the ROD (BLM 1998a [Appendix E], 2000b). Nest activity status will be monitored from the ground. In 2002, nest/nest area photos will be taken of the remaining nest locations for which photos are lacking (i.e., BO23, BO76, and CR107), and GPS locations will be obtained, if possible, for those nests which lack GPS locational data (see Appendix C, Raptor Nesting Records).

Operators will notify the BLM immediately if raptors are found nesting on project facilities. 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 Wyoming State USFWS Office in Cheyenne and will be initiated with sufficient lead time to allow for development of mitigation measures. Required corresponding permits will be obtained from the WGFD in Cheyenne. Consultation and

coordination with the USFWS and WGFD will be conducted for all mitigation activities relating to raptors.

Because project development continues on and adjacent to active ferruginous hawk territories 5 and 6, two ANSs were established within territory 6 in 2001. It is recommended that two additional ANSs be erected in the vicinity of ferruginous hawk territory 5 (see Appendix A, Wildlife Map) if that territory remains inactive in 2002. Annual monitoring in future years will determine whether the ANSs attract activity in the territories. Operators will be responsible for the construction and annual maintenance of ANSs throughout the life-of-project, and all ANSs on public lands will become the property of the BLM upon completion of the project. ANS construction and maintenance activities (if necessary) will be completed between August 1 and September 15 of each year (Appendix D in BLM 1997). Additional mitigations for nesting raptors may be designed on a site-specific basis, as necessary, in consultation with the BLM, USFWS, and WGFD.

In future years, additional ANSs may be constructed (up to two ANSs for each impacted nest) or existing degraded raptor nests may be upgraded/reinforced to mitigate potential impacts (BLM 1997, 2000a, 2000b). The location of ANSs or nests proposed for upgrading will be identified in annual reports. ANSs will be located within or proximal to potentially affected nesting territories, outside of the line-of-sight or nest buffer of actively nesting raptor pairs, and at sites sufficiently removed from proposed development activities to minimize or avoid potential adverse effects.

In places where existing project features (e.g., well locations) are located within the buffer areas for active raptor nests, no extensive maintenance activities (e.g., workovers) will be allowed between February 1 and July 31 without prior BLM notification and approval (BLM 2000a, 2000b). The seasonal buffer distance and applicable exclusion dates will be determined by the BLM and specified in Conditions of Approval for APD, ROW applications, and/or Sundry Notices and may vary among nests and from year to year depending upon the potentially affected raptor species and variations in weather, nesting chronology, and other factors.

3.2 SAGE GROUSE

3.2.1 Results

Table 3.4 presents a summary of sage grouse lek activity on the WSA over the past 3 years, as well as nearby project features and proposed monitoring and other actions (see Appendix D, Sage Grouse Lek Records, for further detail). Table 3.5 presents information on lek use from 1992 through 2001. Lek 16 was not surveyed during the period; therefore, no data on lek use are available. Leks 23 and 24 are adjacent to, but outside the WSA. Lek 23 is shown on the Wildlife Map (Appendix A), but Lek 24 is outside the mapped area. Available data for these leks are included in Table 3.5. Legal locations for all leks are provided in Table 3.4 and in the Sage Grouse Lek Records (Appendix D).

Of the 22 known leks within the WSA, leks 1, 2, 3, 7, 9, 10, 17, 18, 19, 21, and 22 have shown considerable use during years for which monitoring data are available, and no notable declines in use were identified (Table 3.5 and Appendix D, Sage Grouse Lek Records). Decreasing attendance has been observed at lek 4, with maximum male attendance down from 16 in 1994 to one in 2000 and 2001. Due to the extent of nearby project development, this lek may continue to have low use or no use throughout the remainder of project development. No males were observed at leks 5, 6, 8, 11, 12, 13, 14, or 15 in the last 3 to 4 years (Table 3.5), and these leks also may continue to be unused for the remainder of project development. No new leks were located during 2001.

No sage grouse winter use studies were conducted by the BLM in 2001 (personal communication, October 2001, with John Westbrook, Pinedale BLM field office).

Removal of water development structures proximal to lek 4 (Clay Hill lek) was recommended in 2001 (TRC Mariah 2001a). However, as of October 2001, these structures remained in place (personal communication, October 2001, with John Westbrook, Pinedale BLM field office).

The results of the 2001 continuous noise monitoring study conducted at leks 7 and 10 are presented in terms of Leq, L90, and L10 as measured in dBA. Noise data are summarized in

Table 3.4 Summary of Sage Grouse Lek Use, Potential Impacts, and Proposed Monitoring, Jonah Field II Wildlife Study Area, 2001.¹

Lek No. ²	Approximate Location	Status ³	Use	Nearby Project Features ⁴	Monitoring/Other Actions ⁵
1	[REDACTED]	A	Consistent use; active all 7 years surveyed since 1992	Numerous existing and two proposed wells and roads within 1.0 mi	Monitor attendance three times in 2002
2	[REDACTED]	A	Consistent use; active all 7 years surveyed since 1992	Existing pipeline within 0.25 mi; numerous existing and proposed wells and roads within 1.0 mi	Monitor attendance three times in 2002; ensure proposed wells and roads are outside 0.25-mi buffer
3	[REDACTED]	A	Consistent use; active 5 of the 6 years surveyed since 1992	Proposed road within 0.25 mi; one existing and five proposed wells and road within 1.0 mi	Monitor attendance three times in 2002; move proposed road to outside 0.25-mi buffer
4	[REDACTED]	A	Decreasing maximum male attendance since 1996	Two existing and one proposed wells and roads within 0.25 mi; numerous proposed and existing wells, pipelines, and roads within 1.0 mi	Monitor attendance three times in 2002; move proposed well and road to outside 0.25-mi buffer
5	[REDACTED]	U ⁶	No known use since 1996	Existing well, pipelines, and roads within 0.25 mi; one new well proposed within 0.25 mi; proposed and existing wells, pipelines, and roads within 1.0 mi	Discontinue monitoring ?; move proposed well to outside 0.25-mi buffer
6	[REDACTED]	U ⁶	No known use since 1996	Existing road at lek	Discontinue monitoring
7	[REDACTED]	A	Consistent use; active 6 of the 7 years surveyed since 1992	Existing pipeline within 1.0 mi	Monitor attendance three times in 2002
8	[REDACTED]	U ⁶	No known use since 1996	Existing pipeline and road within 1.0 mi	Discontinue monitoring
9	[REDACTED]	A	Consistent use; active all 5 years surveyed since 1992	Proposed well within 1.0 mi	Monitor attendance three times in 2002; GPS lek perimeter in 2002
10	[REDACTED]	A	Consistent use; active all 5 years surveyed since 1992	Existing and proposed wells and roads and the Falcon compressor station site within 1.0 mi	Monitor attendance three times in 2002

Table 3.4 (Continued)

Lek No. ²	Approximate Location	Status ³	Use	Nearby Project Features ⁴	Monitoring/Other Actions ⁵
11	[REDACTED]	U ⁶	No known use from 1992 to 2001	Proposed road within 0.25 mi; proposed wells and roads within 1.0 mi	Discontinue monitoring in 2002; move proposed road to outside 0.25-mi buffer?
12	[REDACTED]	a	Limited use 1992-2001	Existing well and roads within 1.0 mi	Discontinue monitoring in 2002?
13	[REDACTED]	U ⁶	No known use from 1992 to 2001	Existing road within 1.0 mi	Discontinue monitoring?
14	[REDACTED]	U ⁶	No known use 1992 to 2001	Existing road within 1.0 mi	Discontinue monitoring?
15	[REDACTED]	U ⁶	No known use since 1996	Existing and proposed wells, pipelines, and roads within 0.25 mi	Discontinue monitoring?; move proposed wells and roads to outside 0.25 mi buffer
16	[REDACTED]	U	Not surveyed since before 1992	Existing roads within 0.25 mi	Monitor attendance three times in 2002?
17	[REDACTED]	A	Consistent limited use since first recorded in 1999	Two existing wells and numerous proposed roads and wells within 1.0 mi	Monitor attendance three times in 2002; GPS lek perimeter in 2002
18	[REDACTED]	A	Consistent heavy use since first located in 1999	Existing road within 0.25 mi; proposed well and road within 1.0 mi	Monitor attendance three times in 2002
19	[REDACTED]	A	First located in 2000; active both years surveyed.	None	Monitor attendance three times in 2002; GPS lek perimeter in 2002
20	[REDACTED]	U	Unknown; only surveyed 2 years since 1992; no birds observed during those surveys	Existing road within 0.25 mi	Monitor attendance three times in 2002; GPS lek perimeter in 2002
21	[REDACTED]	A	First located in 2000	Proposed well and road within 1.0 mi	Monitor attendance three times in 2002
22	[REDACTED]	A	First located in 2000	Proposed wells and roads within 1.0 mi	Monitor attendance three times in 2002
23	[REDACTED]	U	No data since before 1992	--	--

Table 3.4 (Continued)

Lek No. ²	Approximate Location	Status ³	Use	Nearby Project Features ⁴	Monitoring/Other Actions ⁵
24	[REDACTED]	A	Active in the 3 years surveyed since 1992	--	--

¹ See Appendix A, Wildlife Map and Appendix D, Sage Grouse Lek Records, for additional information.

² See Table 3.5 for alternate names.

³ A = active (at least once during last 3 years); I = inactive; U = unknown; a = likely active--unclassified birds observed on lek, but presence of males unconfirmed.

⁴ See Appendix A, Project Features Map.

⁵ Seasonal and standard avoidance measures are not included since they would be applied as necessary for all leks; ? = monitoring action not necessarily required.

⁶ In 2000, it was recommended that these leks no longer be regularly monitored because of apparent lack of use/abandonment in recent years.

Table 3.5 Sage Grouse Trends, Jonah Field II Wildlife Study Area, 1992-2001.¹

Lek No.	Lek Name(s)	History ²									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	4-2	NS	NS	9	NS	26	6	31	25	22	12
2	4-6	NS	NS	2	NS	2	17	12	7	14	16
3	Sand Draw Reservoir	NS	NS	NS	NS	16	0	36	26	22	27
4	Clay Hill	NS	NS	16	NS	15	4	4	0	1	1
5	4-8	NS	NS	NS	NS	1	0	0	0	NS	NS ³
6	4-9	NS	NS	NS	NS	3	0	0	0	0	NS ³
7	4-7	NS	NS	36	NS	0	16	17	11	9	6
8	4-10	NS	NS	NS	NS	2	0	0	0	0	NS ³
9	Alkali Draw	NS	NS	NS	NS	NS	50	26	62	47	45
10	The Rocks	NS	NS	NS	NS	NS	60	53	79	64	62
11	4-5	NS	NS	0	NS	0	NS	0	0	0	NS ³
12	3-8	1	0	0	0	1	4	0	0+	0	NL ³
13	3-6	NS	NS	NS	NS	0	0	0	0	0	NS ³
14	3-7	0	0	0	0	0	0	0	0	0	NL ³
15	Sand Draw	NS	NS	NS	NS	1	0	0	0	0	NS ³
16	Long Draw	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
17	Buckhorn Well #1	NS	NS	NS	NS	NS	NS	NS	5	3	3
18	Shelter Cabin Reservoir	NS	NS	NS	NS	NS	NS	NS	50+	90	73
19	Prairie Dog Town 5	NS	NS	NS	NS	NS	NS	NS	NS	9	22
20	Upper Alkali Creek	NS	NS	0	NS	0	NS	NS	NS	NS	NS
21	South Rocks	NS	NS	NS	NS	NS	NS	NS	NS	10	NS
22	Antelope State	NS	NS	NS	NS	NS	NS	NS	NS	9	NL
23	Drill Pad	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
24	Little Fred Satellite	UNK	UNK	UNK	UNK	UNK	UNK	4	≥1	NS	5

¹ Further detail is provided in Appendix D, Sage Grouse Lek Records.

² Numbers refer to maximum male attendance observed; NS = not surveyed; NL = not located- survey was attempted but no birds were observed and exact location of lek could not be confirmed; UNK = unknown; + = unclassified birds observed but not included.

³ In the 1999-2000 Jonah Wildlife Studies report (TRC Mariah 2001a), it was recommended that monitoring of these leks be discontinued because of apparent lack of use/abandonment in recent years.

Appendices E and F. Appendix E provides data sheets with notes on noise occurrences, sage grouse activity, and associated noise measurements in 15-minute intervals for the two leks, as well as data sheets for the noise curves developed for the Lumen compressor station near lek 7. Tables F.1-F.3 in Appendix F summarize noise levels and lek attendance data for each lek by the hour, by the day, and over the entire four-day noise monitoring period, respectively. The entire data set for each morning, captured in 5-minute intervals (including frequency information for the L10 and L90), has been provided to the BLM Pinedale Field Office.

Throughout the noise monitoring study, 15-minute averaged Leq values ranged from 20.4 to 45.1 dBA at lek 7 and 24.3 to 57.9 dBA at lek 10; 15-minute averaged L10 values ranged from 23.2 to 48.3 dBA at lek 7 and from 25.3 to 47.9 dBA at lek 10; and 15-minute averaged L90 values ranged from <20.0 to 37.9 dBA at lek 7 and from 20.1 to 43.7 dBA at lek 10 (see Appendix F, Table F.1). The maximum recorded noise level was 86.5 dBA at lek 7 and 102.8 dBA at lek 10 (Table 3.6). No baseline noise data for the vicinity of lek 7 prior to construction of the Lumen compressor are available for comparison.

During the noise monitoring studies, increases in noise output (from the Lumen compressor station or superfluous noise) did not appear to correlate with decreases in activity or attendance of sage grouse on a lek. Disturbances to grouse on the leks were generally associated with the presence of predators (see Appendix E). The maximum lek attendance recorded during the noise monitoring study was 6 cocks and 3 hens at lek 7 and 62 cocks and 17 hens at lek 10 (see Appendix F, Table F.3). The latest times grouse were observed on the lek (a.m.) ranged from 8:09 to 8:57 at lek 7 and from 8:40 to after 9:05 at lek 10 (Table 3.7).

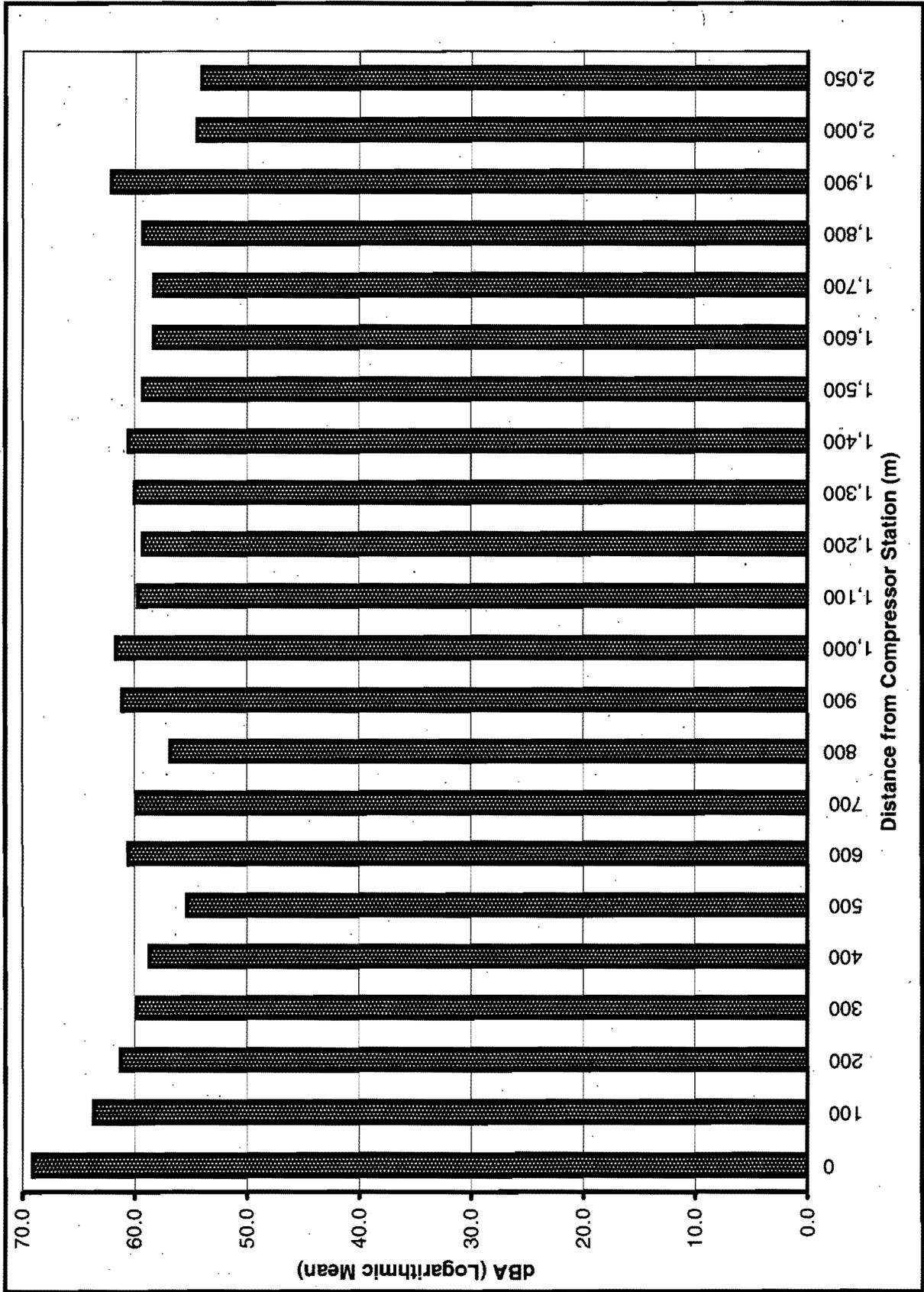
The results of the two noise curves conducted at the Lumen compressor station are presented in Figures 3.1 and 3.2 and in Appendix E. Noise levels along the compressor station-lek noise curve transect ranged from a logarithmic mean of 69.1 dBA (at the compressor station) to 54.1 dBA (at the lek 7 periphery). Logarithmic mean dBA values for the compressor station-1.0 mi noise curve transect ranged from 67.0 (at the compressor station) to 37.3 (0.75 mi from the compressor). Consistent with other averaged noise values presented in this report, mean values are a logarithmic expression of the average power ratio, commonly referred to as logarithmic means.

Table 3.6 Maximum Recorded dBA for Each Morning, Leks 7 and 10, Noise Monitoring Studies, 2001.

Date	Peak dBA	Time of Peak dBA
Lek 7		
25-Mar	77.9	6:25-6:30 a.m.
29-Mar	86.5	7:05-7:10 a.m.
12-Apr	81.9	8:00-8:05 a.m.
15-Apr	69.5	6:15-6:20 a.m.
Lek 10		
23-Mar	79.6	5:00-5:05 a.m.
28-Mar	102.8	5:35-5:40 a.m.
11-Apr	79.7	7:00-7:05 a.m.
14-Apr	82.0	6:15-6:20 a.m.

Table 3.7 Latest Times Sage Grouse Were Observed on Leks 7 and 10, Noise Monitoring Studies, 2001.

Lek	Date	Time	Comments
7	25-Mar	8:09 a.m.	
	29-Mar	8:26 a.m.	
	12-Apr	8:47 a.m.	
	15-Apr	8:57 a.m.	
10	23-Mar	8:40 a.m.	
	28-Mar	9:05 a.m.	A minimum of 35 cocks and 7 hens flushed from on and around the lek when the noise analyzer was retrieved.
	11-Apr	8:44 a.m.	
	14-Apr	9:01 a.m.	



31513\wildlife.rpt\Figs

Figure 3.1 dBA Values Along the Lumen Compressor Station-Lek 7 Transect.

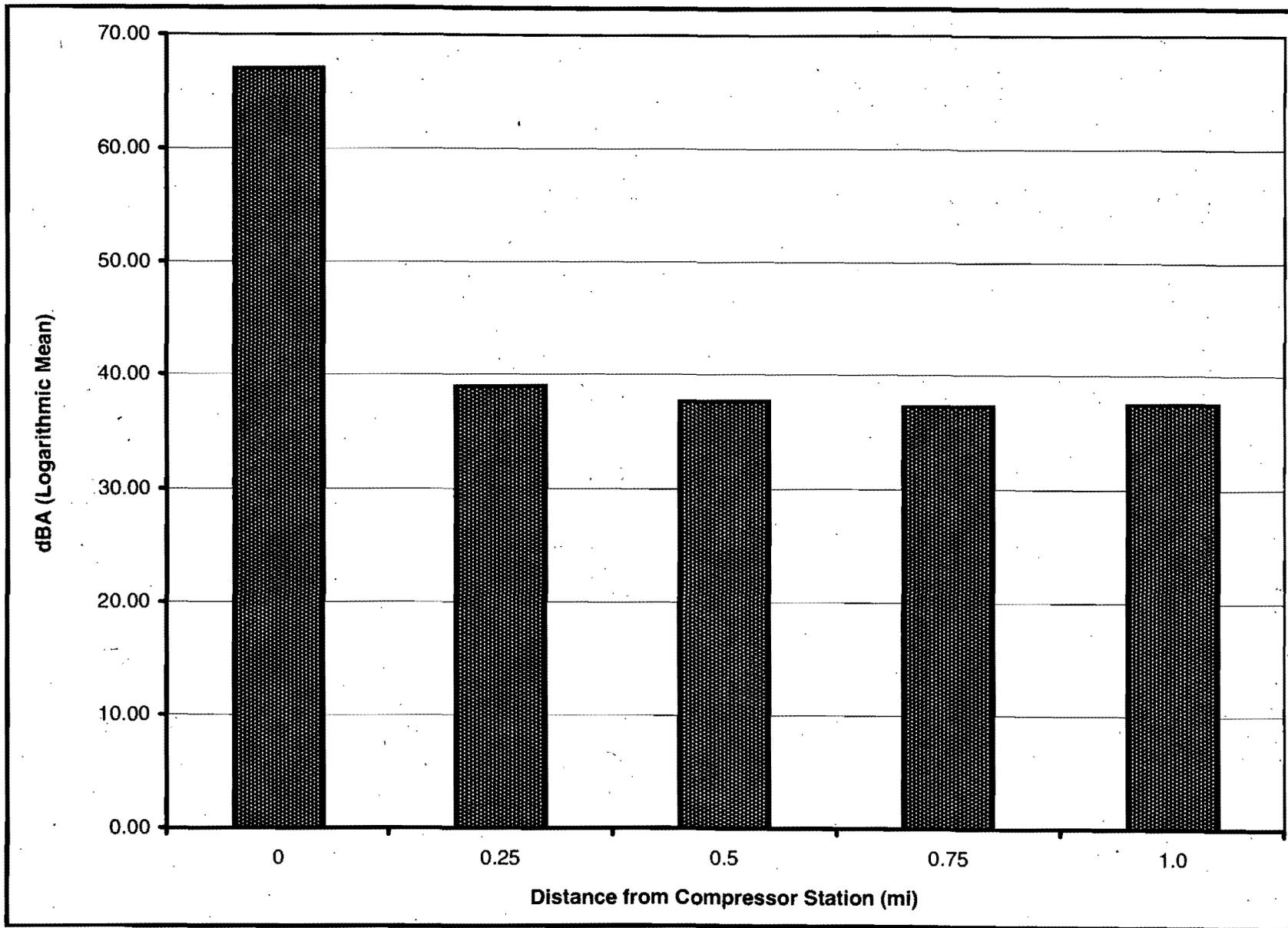


Figure 3.2 dBA Values Along the Lumen Compressor Station-1.0 Mi Transect.

3.2.2 Monitoring and Protection Measures

Monitoring and identification of sage grouse leks on the WSA will continue in 2002 as specified in the WMPP (Appendix E in BLM 1998a) and the EA for the Modified Jonah Field II Project (BLM 2000b).

It is recommended that the WGFD or BLM continue to implement aerial (fixed wing) sage grouse lek inventories of the WSA in 2002 to provide further lek locational data and to identify any new or previously undiscovered leks or lek satellites. Aerial surveys will be implemented during March/April. The absence/decreased use of leks 4, 5, 6, 8, 11, 12, 13, 14, and 15 may indicate that alternate lek sites are being used; therefore, it is recommended that observations continue to be made in 2002 in the vicinity of these leks to locate any new unmapped leks.

Due to the apparent lack of use over the last few years at leks 5, 6, 8, 11, 12, 13, 14, and 15, it was recommended in 2000 that lek attendance monitoring at these leks be discontinued. If time allows, these leks may be monitored, but it is recommended that they receive lower priority than those for which historical data are lacking or past use has been consistent (i.e., leks 1-4, 7, 9-10, and 16-24). Attendance monitoring at these leks may be re-initiated once field development is complete. Attendance monitoring of other known sage grouse leks in the area by WGFD and/or BLM personnel will continue in 2002 as specified in the ROD (Appendix E in BLM 1998a) and deemed necessary by the BLM and WGFD. Monitoring efforts by BLM and WGFD should be coordinated so that lek activity at each lek is monitored. This will ensure that historical lek data are available in future years. Because lek 4 has exhibited a significant decrease in attendance since 1996, this lek should be closely monitored for activity in 2002 to determine whether the trend in declining attendance is continuing. In 2002, WGFD and/or BLM also will determine lek perimeters at leks 9, 17, 19, and 20 using a GPS.

As with raptors, the principal protection for sage grouse is avoidance of leks during the breeding season and the avoidance of probable nesting areas during the nesting season. In accordance with the Modified Jonah Field II DR and EA (BLM 2000a, 2000b), the following protection measures will be adhered to unless exempted by the BLM on a case-by-case basis.

All surface-disturbing activities, including pipeline construction, will be avoided within 0.25 mi of active sage grouse leks, and no permanent high profile structures such as buildings and storage tanks which are suitable raptor perches will be constructed within 0.25 mi of any lek (BLM 2000b) and within up to 0.5 mi from areas within the line-of-sight of leks as deemed necessary by BLM on a case-by-case basis (BLM 2000a). A 300-ft disturbance buffer on either side of Sand Draw, Alkali Draw, and Granite Wash (see Appendix A, Habitat Map) will also be maintained (BLM 2000b). If natural gas reserves beneath the 300-ft no-disturbance buffer or the 0.25-mi active sage grouse lek buffer are deemed suitable for development, Operators may utilize directional drilling to access these resources. Operators will maintain a 0.5-mi disturbance-free buffer around leks 7 and 8 south of the MJ2PA (BLM 2000b) (see Appendix A, Wildlife Maps). Therefore, proposed project features (i.e., well locations, roads, pipelines) proximal to leks 3, 4, 5, 11, and 15 may require relocation to sites greater than 0.25 mi from the lek centers. Well location and road and pipeline construction within 0.25 mi of leks 5, 11, and 15 may be permitted in 2002 (as authorized by BLM) since these leks have exhibited little or no use during monitoring and are considered inactive.

All construction and drilling activity will be avoided during the strutting period (March 1-May 15) within 1.0 mi of active leks. In addition, prior to the start of surface-disturbing activities during the nesting season (April 1-July 31) in potential sage grouse nesting habitat within 2.0 mi of an active lek, on-site reviews will be required by the BLM and conducted by a qualified biologist to determine if the area is occupied by nesting sage grouse. If the area is deemed unoccupied, the BLM may grant permission to proceed with surface-disturbing activities in the area. However, if nesting sage grouse are located, surface-disturbing activities will be delayed until July 31 or until nesting is completed.

While Operators have committed to avoiding optimal sage grouse nesting habitat during the nesting period, where practical (BLM 2000b), no optimal habitat (as defined in Table 2.1 of TRC Mariah [2001a]) has been identified in the MJ2PA. However, since sage grouse nesting and brood-rearing is known to occur in the sagebrush-dominated habitats on the area, it is recommended that no disturbance (other than linear crossings) be authorized within the basin sagebrush type (this type is currently protected by a 600-ft buffer [i.e., 300 ft on either side of

the drainage]) and that new surface disturbance within the dense sagebrush type be avoided during the nesting period where practical (see Appendix A, Habitat Map). Several proposed wells appear to be within the 600-ft basin sage buffer, as mapped. It is recommended that those wells and roads be relocated, if necessary, to avoid the buffer area.

It is recommended that the BLM implement formal sage grouse winter use investigations on the J2PA and a 0.5-mi buffer during late winter (January/February) 2002 to identify potential sage grouse wintering areas (TRC Mariah 2001a). These surveys may be conducted aerially or on the ground, and all data collected should be provided on General Wildlife Observation Data Sheets or other suitable forms (see Appendix B). Operators will cooperate in any further ongoing sage grouse studies within the WSA and with the WGFD on any existing and new sage grouse habitat improvement efforts (e.g., water developments) within Upland Game Bird Management Area 7 (TRC Mariah 2001a).

It is recommended that prior to March 2002, water development structures proximal to lek 4 (Clay Hill) be removed, as directed by BLM. Removal of these facilities may eliminate potential raptor perch sites and/or reduce the use of this area by livestock and humans (TRC Mariah 2001a).

3.3 THREATENED, ENDANGERED, PROPOSED, CANDIDATE, AND WYOMING SPECIES OF CONCERN

3.3.1 Results

3.3.1.1 Black-footed Ferret

All whitetail PDTs within the J2PA have been mapped, and those within the MJ2PA were censused in 2001 for open burrows using GPS to determine whether they meet the black-footed ferret habitat criteria established in the USFWS (1989) guidelines. Proposed disturbance in PDTs 2, 2a, 3, and 3a (see Appendix A, Wildlife Map) will not adversely affect black-footed ferrets since these towns are not suitable black-footed ferret habitat.

Results of the 2001 censuses conducted on PDTs 1, 2a, 2b, 3a, 3b, 6, and 21-25e are presented in Table 3.8. Refined PDT boundaries and high-density areas within towns are presented in Appendix A (Wildlife Map). It was determined that PDT 6 and portions of PDT 1 within the MJ2PA contain prairie dog burrow densities suitable for black-footed ferret, and black-footed ferret surveys may be required if additional developments are proposed within these towns/areas. In addition, PDT 25A and portions of PDTs 8, 16, 17, and 18 in the southeastern portion of the WSA have prairie dog burrow densities suitable for black-footed ferret (see Appendix A, Wildlife Map), and black-footed ferret surveys may be required if development is proposed within these towns.

3.3.1.2 Bald Eagle, Ferruginous Hawk, Golden Eagle

No bald eagles were observed on the WSA during 2001 wildlife investigations. Information on ferruginous hawks and golden eagles is provided in Section 3.1.1.

3.3.1.3 Mountain Plover

Mountain plover were observed adjacent to the J2PA during 1999, and a single plover was observed within the J2PA during 2000 (TRC Mariah 2001a). Adults with at least two chicks were recorded on several occasions outside the J2PA during 1999, indicating the presence of breeding mountain plover in the Alkali Creek drainage (TRC Mariah 2001a). In 2001, one adult mountain plover was observed near the Alkali Creek drainage in the CSW Section 25, T29N, R110W, in the western portion of the WSA (see Appendix B). During 2001 mountain plover surveys in the adjacent Pinedale Anticline Project Area (PAPA) by TRC Mariah personnel, two adult plover were observed in [REDACTED] approximately 75 m north of the WSA (TRC Mariah in progress). However, no mountain plover were observed during species-specific investigations on and within 0.5 mi of the MJ2PA during 2001.

During 2001 investigations, suitable mountain plover habitat was redefined in a number of areas (see Appendix A, Wildlife Map). Several previously defined areas were removed from the survey based on their small size, rolling terrain, or unsuitable vegetative characteristics (see Appendix G). It was also determined that large portions of many of the PDTs in the MJ2PA

Table 3.8 Whitetail Prairie Dog Towns, Jonah Field II Wildlife Study Area, 2001.

Prairie Dog Town ¹	Acreage ²	Number of Open Burrows ^{2,3}	Burrow Density (burrows/acre) ^{2,4}
1	159 (42)	586 (370)	3.7 (8.8)
2a	174 (71)	646 (522)	3.7 (7.4)
2b	43 (25)	159 (137)	3.7 (5.5)
3a	56	34	0.6
3b	47	24	>0.5
4	903	NS	UNK
5	106	NS	UNK
6	212	1,811	8.5
7	800	NS	UNK
8	1,131 (131)	5,090 ⁵ (1,860) ⁶	4.5 (14.2) ⁶
9	280	NS	UNK
10	39	NS	UNK
11	203	NS	UNK
12	79	NS	UNK
13	86	NS	UNK
14	105	NS	UNK
15	189	NS	UNK
16	214 (52)	1,477 ⁵ (718) ⁶	6.9 ⁵ (13.8) ⁶
17	108 (30)	702 ⁵ (468) ⁶	6.5 ⁵ (15.6) ⁶
18	328 (55)	1,345 ⁵ (913) ⁶	4.1 ⁵ (16.6) ⁶
19	10	NS	UNK
20	9	NS	UNK
21	73	137	1.9
22	210	840	4.0
23a	872	3,586	4.1
23b	14	36	2.6
24	2	13	6.5
251	38	372	9.78
25b	7	3	0.4
25c	2	6	3.0
25d	<1	4	5.7
25e	1	5	5

¹ See Appendix A, Habitat Map, for location.

² Numbers in parentheses are for high density areas; unless otherwise noted, number of open burrows and burrow density are based on a complete census of burrows in the town. Data for PDT 1, 2A, 2B, 3A, 3B, 6, and 21-25E are from TRC Mariah field data (2001a); data for PDT 8, 16, 17, and 18 are from Schlumberger Geco-Prackla (2000).

³ NS = not surveyed.

⁴ UNK = unknown.

⁵ Estimates based on a sample of up to 5% of the entire PDT (Schlumberger Geco-Prackla 2000).

⁶ Estimates based on a sample of approximately 5% of the dense portion of the PDT (Schlumberger Geco-Prackla 2000).

are vegetated with dense to moderately dense sagebrush and, thus, are not suitable mountain plover habitat. It is recommended that no future surveys for mountain plover be conducted in the following locations:

- PDT 2 vicinity [REDACTED]
- PDT 3 as revised in 2001 [REDACTED]
[REDACTED]
[REDACTED] as noted on the Wildlife Map in Appendix A remains suitable habitat and should be surveyed;
- PDT 4 vicinity [REDACTED]
- [REDACTED]
- [REDACTED]
- all areas designated as scattered to no sagebrush on the 1999-2000 wildlife report habitat map (TRC Mariah 2001a) which were not surveyed in 2001.

Mountain plover habitat recommended for continued survey is presented in Appendix A (Wildlife Map).

3.3.1.4 Western Burrowing Owl

Eight western burrowing owl nests/nest sites are known to occur within the WSA (see Table 3.1 and Appendix C, Raptor Nesting Records). Of these nests, only one (BO117) is known to have produced at least one fledgling in 2001; however, BO86 and BO124 also were active in 2001 and may have produced young. Because the nests of burrowing owls are underground, productivity for this species is often difficult to determine without numerous nest site visits.

3.3.1.5 Other TEPC&WSC Species

Of the TEPC&WSC species potentially occurring in the WSA, sage grouse, whitetail prairie dog, ferruginous hawk, and burrowing owl are discussed elsewhere in this report. The only other TEPC&WSC noted within the WSA during 2001 surveys and on-site investigations conducted during APD and ROW reviews were loggerhead shrike, sage thrasher, and Brewer's sparrow, and these species may breed in the area.

3.3.2 Monitoring and Protection

USFWS and/or WGFD consultation and coordination will be conducted for all necessary mitigation activities relating to TEPC&WSC and their habitats implemented during 2001.

3.3.2.1 Black-footed Ferret

In PDTs/portions of PDTs of sufficient size and burrow density for black-footed ferret habitat (i.e., PDT 6 and high-density portions of PDT 1) which are proposed for disturbance, black-footed ferret surveys will be conducted in adherence to USFWS guidelines as established in USFWS (1989). Several proposed wells and roads are mapped within the high-density area of PDT 6; thus, if these facilities are not relocated such that the PDT is avoided, black-footed ferret surveys will be required in 2002. Surveys will be conducted by a USFWS-qualified biologist no more than 1 year prior to proposed disturbance, and reports identifying survey methods and results will be prepared and submitted to the USFWS and BLM in accordance with Section 7 of the *Endangered Species Act of 1973*, as amended, and Interagency Cooperation Regulations. Surveys will be financed by the Operators.

If black-footed ferrets are found within the J2PA but outside the MJ2PA, the USFWS will be notified immediately and formal consultation will be initiated to develop strategies that ensure no adverse effects to the species (BLM 1997). If black-footed ferrets are found within the MJ2PA, the USFWS will be notified immediately, and no further disturbance will occur to the prairie dog complex in which the black-footed ferret was observed. Before ground-disturbing activities are initiated in black-footed ferret habitat, authorizations to proceed will be required from the BLM in consultation with the USFWS.

In 2001, numerous prairie dogs and open burrows were discovered outside of the currently defined boundaries of PDT 9. During 2002, PDT 9 will be re-investigated to redefine the town perimeter, and open burrows within the town will be censused to determine burrow density and define areas of high burrow density within the town.

3.3.2.2 Bald Eagle, Ferruginous Hawk, Golden Eagle

Monitoring and protection protocol for bald eagle, ferruginous hawk, and golden eagle in 2002 will be as described for raptors (see Section 3.1.2). Additional measures may be applied on a species- or site-specific basis, as deemed necessary by the USFWS and/or BLM, if potential impacts to these species are identified during 2002 APD and ROW application reviews.

3.3.2.3 Mountain Plover

The following protocol has been modified from that presented in BLM (Appendix E in 1998a) to accommodate USFWS changes to mountain plover survey and avoidance protocol. The protocol remains consistent with that presented in BLM (2000b).

During the period of May 1-June 15, 2002, mountain plover surveys will be conducted by an Operator-financed, BLM-approved biologist in accordance with USFWS guidelines (USFWS 2001) on suitable nesting habitat within 200 m (656 ft) of proposed disturbance sites (BLM 2000c). Survey procedures will be as described in Section 2.3.3. If breeding birds are observed, additional surveys will be implemented immediately prior to construction to search for active nest sites. If an active nest is located, a 200-m (656-ft) buffer zone will be established around the nest to prevent direct and indirect nest disturbance and planned activities will be delayed 37 days, or 1 week post-hatching. If a brood of flightless chicks is observed, activities will be delayed at least 7 days. In areas where no plover are observed, surface-disturbing activities will occur as near to completion of surveys as possible. Mountain plover surveys will not be conducted for construction activities planned for the period of July 11 through April 9.

It is recommended that mountain plover presence/absence surveys be discontinued in areas described in Section 3.3.1.3 that were previously surveyed but, in 2001, were deemed to be unsuitable plover breeding habitat.

Where access roads and/or well locations have been constructed prior to the mountain plover nesting season (April 10-July 10) and development activities have not been initiated prior to April 10, a BLM-approved biologist will conduct a site investigation of the disturbed area prior

to proposed activities to determine whether mountain plover are present. If plovers are nesting in the area, Operators will delay development activities until nesting is complete.

Nest success and productivity of all mountain plover nests found within the MJ2PA will be monitored and reported to the BLM and USFWS Wyoming Field Office annually. Survey results will be compared with annual development plans to determine if any proposed surface-disturbing activities will affect occupied mountain plover nesting habitat. Where feasible, development plans will be modified to avoid nesting habitat (e.g., through road re-alignment).

No nesting mountain plovers have been observed within or adjacent to the MJ2PA during surveys conducted from 1999 to 2001; thus, it is highly unlikely that mountain plover concentration areas (i.e., areas where broods and/or adults have been observed in the current year or documented in at least 2 of the last 3 years) occur within the MJ2PA and a 0.5-mi buffer. However, if concentration areas are identified, Operators will consult with the BLM regarding initiation of informal conferencing with the USFWS prior to implementing surface disturbance within 200 m (656 ft) of identified mountain plover concentration areas.

If removal of mountain plover nesting habitat is unavoidable, loss will be minimized by creating additional nesting habitat; it is assumed that many of the existing and proposed pipeline reclamation areas on the MJ2PA would provide suitable plover breeding habitats. Areas of pipeline reclamation that provide suitable plover breeding areas will be identified annually. If nesting habitat is disturbed, the area will be reclaimed to approximate original conditions (topography, vegetation, hydrology, etc.) after completion of activities, such that disturbed potential mountain plover breeding habitat is reclaimed to conditions suitable for mountain plover breeding.

Operators will minimize road construction and maintenance activities (i.e., grading) in suitable plover habitat from April 10 to July 10. No surface-disturbing activities will be conducted from April 1 to 30 within 200 m (656 ft) of identified mountain plover concentration areas.

Several proposed wells and roads are located in suitable mountain plover habitat (i.e., two wells and roads [REDACTED]; two wells and roads [REDACTED] and one well and road [REDACTED]

Surface disturbance associated with construction of these facilities should be avoided from April 10 to July 10 if feasible. These areas will also be surveyed for breeding plover as described above.

If, during the life of the project, the mountain plover becomes listed as an endangered or threatened species and if project activities may affect mountain plover or their habitat, the BLM will initiate consultation with the USFWS; a formal *Endangered Species Act* Section 7 consultation will be necessary. No further surface-disturbing activities will be permitted in occupied or suitable mountain plover habitat until the USFWS issues a Biological Opinion (BO), which will include the reasonable and prudent measures and terms and conditions with which Operators must comply prior to the initiation of further development activities in the area covered by the BO.

3.3.2.4 Western Burrowing Owl

Monitoring and avoidance of prairie dog colonies (see Section 3.3.2.1) and avoidance of active raptor nests during the nesting period (see Section 3.1.2) will continue in 2002. Additionally, productivity monitoring will be implemented for all active burrowing owl nests on the MJ2PA and a surrounding 0.5-mi area. Additional measures may be applied in future years if burrowing owl nesting and/or productivity in the WSA appears to be declining. These potential measures will be identified by the BLM.

3.3.2.5 Other TEPC&WSC Species

No formal surveys for other TEPC&WSC are proposed for 2002; however, since loggerhead shrike, Brewer's sparrow, and sage thrasher have been seen in the area, special attention to these species is recommended for APD and ROW application field reviews. If, during implementation of surveys for other species or during APD and ROW application field reviews, any TEPC&WSC is observed on areas within 0.5 mi of proposed disturbance sites, nests or other crucial features for the observed species, if any, will be avoided. Consultation and coordination with the BLM, USFWS, and WGFD also will be conducted, as necessary. Construction activities in these areas will be curtailed until there is concurrence among Operators, BLM,

USFWS, and WGFD on what activities can be authorized. Activities will, in most cases, be delayed until such time that no adverse effects would occur (e.g., after fledging).

No additional protection measures will be applied for other sensitive species potentially present on the WSA; however, it is assumed that the protection protocol specified below for general wildlife will benefit TEPC&WSC as well (see Section 3.3.3.2). In addition, if TEPC&WSC are observed, efforts will be made to determine the activities of the species on the WSA (e.g., breeding, nesting, foraging, hunting). If any management agency (i.e., BLM, WGFD, USFWS) identifies a potential for impacts to any TEPC&WSC species, additional monitoring and/or protection measures will be implemented as directed by the BLM.

3.3.3 General Wildlife

3.3.3.1 Results

Limited data on other wildlife species observed on the WSA during 2001 surveys are provided in Appendix B and in APD and ROW application field review data available at the BLM Pinedale Field Office.

3.3.3.2 Monitoring and Protection

No formal wildlife monitoring for other wildlife is recommended for 2002.

Protection measures primarily designed to minimize impacts to other area resources (e.g., vegetation and surface water resources including wetlands, steep slopes) are identified in BLM (1998a, 2000b), and these measures provide additional impact mitigation for area wildlife. Well locations, access roads, pipelines, and ancillary facilities will be selected and designed to minimize disturbances to areas of high wildlife habitat value, including wetlands and riparian areas. Areas with high erosion potential and/or rugged topography (i.e., steep slopes, dunes, floodplains, unstable soils) will be avoided, where practical.

Removal or disturbance of vegetation will be minimized through construction site management (e.g., by utilizing previously disturbed areas, using existing ROWs, designating limited

equipment/materials storage yards and staging areas, scalping), and Operators will adhere to all reclamation guidelines presented in the Reclamation Plan for this project (see Appendix B in BLM 1997, 1998a, 1998b).

To minimize wildlife mortality due to vehicle collisions, Operators will continue to advise project personnel regarding appropriate speed limits (i.e., 35 mph) in the project area, and roads will be reclaimed as soon as possible after they are no longer required. Some existing roads in the area may be closed and reclaimed by Operators as authorized by the BLM. No roads are currently proposed for reclamation.

To protect plant populations and wildlife habitat, project-related travel will be restricted to established project roads; no off-road travel will be allowed, except in emergencies.

No road or pipeline ROW fencing is proposed; however, if ROW fencing is required, it will be kept to a minimum and the fences will consist of four-strand barbed wire that meets BLM and WGFD approval for facilitating wildlife movement. Wildlife-proof fencing will be utilized only to enclose reclaimed areas where it is determined that wildlife species are impeding successful vegetation establishment. No improvements to existing fences on the area are currently proposed.

No new wildlife/livestock water sources are currently proposed for development.

Potential increases in poaching will be minimized through continued employee and contractor education regarding wildlife laws, and Operators will notify all employees (contract and company) that conviction of a major game violation could result in disciplinary action. If violations are discovered, Operators will immediately notify the BLM and WGFD, and if the violation involves an employee or contractor, said employee or contractor will be disciplined and may be dismissed by the Operator and/or prosecuted by the WGFD.

Additional nonspecies-specific wildlife mitigations include the following.

- Reserve, workover, evaporation, and flare pits potentially hazardous to wildlife will be adequately protected by netting and/or fencing as directed by the BLM to prevent access by migratory birds and other wildlife.

-
- Siphons will be constructed at each reserve pit to collect, as necessary, any undesirable materials that may enter the pits.
 - Potential impacts to fisheries will be minimized by using proper erosion control techniques (e.g., water bars, jute netting, rip-rap, mulch). Construction within 500 ft of open water and 100 ft of intermittent or ephemeral channels will be avoided, where possible. Channel crossings for roads and pipelines will be constructed when flows are not expected (i.e., late summer or fall). All necessary crossings will be constructed perpendicular to flow. No surface water or shallow groundwater in connection with surface water will be utilized for the proposed project.
 - Firearms and dogs will not be allowed on the J2PA during working hours by BLM or Operator employees or their contractors. Operators will enforce existing drug, alcohol, and firearms policies.
 - If injured wildlife are observed on the J2PA, Operator personnel will contact the BLM Pinedale Field Office and the WGF D Pinedale Office. Under no circumstances will injured wildlife be approached or handled.
 - Wildlife reporting as specified in the ROD (Appendix E in BLM 1998) will be continued in 2002.

4.0 LITERATURE CITED

- Baxter, G.T., and M.D. Stone. 1980. Amphibians and Reptiles of Wyoming. Wyoming Game and Fish Department, Bulletin No. 16. 137 pp.
- Bureau of Land Management. 1997. Draft Environmental Impact Statement Jonah Field II Natural Gas Project. U.S. Department of the Interior, Bureau of Land Management, Rock Springs District Office, Pinedale and Green River Resource Areas. BLM/WY/PL-97/015+1310.
- _____. 1998a. Record of Decision for Jonah Field II Natural Gas Development Project Environmental Impact Statement, Sublette County, Wyoming. U.S. Bureau of Land Management, Rock Springs District, Pinedale and Green River Resource Areas. 43 pp. + append.
- _____. 1998b. Final Environmental Impact Statement Jonah Field II Natural Gas Project. U.S. Department of the Interior, Bureau of Land Management, Pinedale and Green River Resource Areas. BLM/WY/PL-98/001+1310.
- _____. 2000a. Decision Record and Finding of No Significant Impact for the Modified Jonah Field II Natural Gas Project, Sublette County, Wyoming. U.S. Bureau of Land Management Pinedale and Rock Springs Field Offices. BLM/WY/PL-001/019+1310.
- _____. 2000b. Environmental Assessment and Finding of No Significant Impact for the Modified Jonah Field II Natural Gas Project, Sublette County, Wyoming. U.S. Department of the Interior, Bureau of Land Management, Pinedale and Rock Springs Field Offices. BLM/WY/PL-001/009+1310.
- _____. 2000c. Revised Biological Assessment. Modified Jonah Field II Natural Gas Development Project. Prepared for Pinedale Field Office, Pinedale, Wyoming, and Rock Springs Field Office, Rock Springs, Wyoming, by TRC Mariah Associates Inc., Laramie, Wyoming. 38 pp.
- Dorn, J.L., and R.D. Dorn. 1990. Wyoming Birds. Mountain West Publishing, Cheyenne, Wyoming. 138 pp.
- Fertig, W. 1997. Wyoming Plant and Animal Species of Special Concern. Prepared for the Wyoming Natural Diversity Database. 32 pp.
- Schlumberger Geco-Prakla. 2000. Final Black-footed Ferret and Burrowing Owl Surveys, South Jonah Seismic Exploration Project, Sublette County, Wyoming. Prepared for Schlumberger Geco-Prakla, Midland, Texas by TRC Mariah Associates Inc., Laramie, Wyoming. 7 pp. + append.

TRC Mariah Associates Inc. 1999. 1997 and 1998 Wildlife Studies Jonah Field II Natural Gas Development Project. Prepared for U.S. Bureau of Land Management Pinedale Field Office, Pinedale, Wyoming, and Rock Springs Field Office, Rock Springs, Wyoming, by TRC Mariah Associates Inc., Laramie, Wyoming. 32 pp. + append.

_____. 2001a. 1999-2000 Wildlife Studies, Jonah Field II Natural Gas Development Project. Prepared for U.S. Bureau of Land Management Pinedale Field Office, Pinedale, Wyoming, and Rock Springs Field Office, Rock Springs, Wyoming, by TRC Mariah Associates Inc., Laramie, Wyoming. 47 pp. + append.

_____. 2001b. Noise Monitoring and Noise Curve Data from the Bird Canyon Sage Grouse Lek near the Bird Canyon Compressor Station, 2001. Letter report prepared for U.S. Bureau of Land Management, Rock Springs Field Office. 5 pp. + append.

_____. In progress. 2001 Wildlife Studies Pinedale Anticline Project. Prepared for U.S. Bureau of Land Management Pinedale Field Office, Pinedale, Wyoming, and Rock Springs Field Office, Rock Springs, Wyoming, by TRC Mariah Associates Inc., Laramie, Wyoming.

U.S. Fish and Wildlife Service. 1989. Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act. U.S. Fish and Wildlife Service, Denver, Colorado and Albuquerque, New Mexico (April 1989). 10 p. + append.

_____. 2001. Mountain Plover Survey Guidelines. U.S. Fish and Wildlife Service, 1999. Photocopy. 6 pp.

Wyoming Game and Fish Department. 1992. Wyoming Bird and Mammal Atlas. 170 pp.

_____. 1996. Wyoming observation system records. Biological Services, Wyoming Game and Fish Department, Cheyenne, Wyoming.

_____. 1999. Wyoming observation system records. Biological Services, Wyoming Game and Fish Department, Cheyenne, Wyoming.