ASTER CANYON CONSULTING, INC.

2009 JONAH FIELD WILDLIFE INVENTORY AND MONITORING

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1.0 EXECUTIVE SUMMARY

Aster Canyon Consulting, Inc. (Aster Canyon) has prepared this 2009 Jonah Field Wildlife Inventory and Monitoring Report in compliance with criteria set forth by the Bureau of Land Management (BLM) and the Jonah Interagency Mitigation Office (JIO) as described in the Wildlife Monitoring Protection Plan (WMPP; (BLM and JIO2007)). The purpose of these inventories are as follows: to present findings which result from the monitoring of wildlife in the Jonah Infill Drilling Project Area (JIDPA) and its 3-mile buffer, to compare trends of observations and data collected over time, to identify existing mitigation and protection measures as described in the BLM Jonah Field Record of Decision (ROD; (BLM2006), and to make recommendations for new measures and monitoring efforts.

Data presented in this report was collected between August 15, 2008, and August 15, 2009. Existing criteria discussed in the WMPP are for: threatened, endangered, proposed, and candidate species (TEPC); species of greatest conservation need (SGCN); and BLM Wyoming Sensitive Species (WSS). Species from these listings, which were independently inventoried in 2009, include: raptors and raven (*Corvus corax*), mountain plovers (*Charadrius montanus*), and greater sage-grouse, (*Centrocercus urophasianus*). Species that were not independently inventoried for 2009 but are discussed in this Monitoring Report and the WMPP include: landbirds, pygmy rabbits (*Brachylagus idahoensis*), white-tailed prairie dogs (*Cynomys leucurus*), black-footed ferret (*Mustela nigripes*), and big game.

Other species not specifically referred to in the WMPP but who are on the TEPC, WSS, or SGCN lists are addressed in this document under general wildlife. This report evaluates trends in wildlife on the JIDPA over the period of time from 1999-2009. This report is presented by species, and provides an introduction, methods, results, and discussion of current and recommended protection measures for each. A summary of inventory results is given below.

RAPTOR AND RAVEN

- A total of 118 raptor and raven nests were monitored during the 2009 breeding season. There were 101 inactive nests and 17 active nests.
- From the 6 active western burrowing owl (*Athene cunicularia*) nests, 2 were successful, with 7 chicks observed.
- Two successful ferruginous hawk (*Buteo regalis*) nests (both artificial nesting structures) fledged a total of 5 chicks.
- We observed a total of 7 active common raven (*Corvus corax*) nests, 4 nests were successful with 12 chicks fledged.
- Incidental raptors recorded outside of the nesting surveys observed utilizing the JIPDA and 3-mile buffer include long-eared owl (*Asio otus*), prairie falcon (*Falco mexicanus*), Swainson's hawk (*Buteo swainsoni*), ferruginous hawk, golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), and red-tailed hawk (*Buteo jamaicensis*).
- Trends indicate that ferruginous hawks have the potential to increase if additional artificial nesting structures are provided. The number of active burrowing owl nests decreased this year, most likely due to a decrease in available habitat we were permitted to search.
- It is recommended that to improve burrowing owl monitoring, a survey protocol that utilizes foot surveys of prairie dog towns should be adopted.

MOUNTAIN PLOVER

- A total of 18 individual mountain plovers were observed during the 2009 nesting season. Eleven adults and 7 chicks were observed.
- All mountain plover observations were within previously mapped active habitats. All mountain plover observations were within areas that are inhabited by prairie dogs.
- Sites were once again evaluated and given a habitat ranking. Twenty-one sites were given the ranking of low-quality this year. This number is up from only 7 in 2008 and is most likely due to the increase of shrub and grass height, as a result of the wet spring in combination with a decrease in cattle grazing.

- To maintain and improve mountain plover habitat we recommend removing all unused man-made structures within plover habitat that may serve as perches for predators.

LANDBIRDS

- Nineteen species of landbirds were recorded as incidental wildlife in 2009.
- No point count monitoring for land birds occurred in 2009 on the JIDPA.

GREATER SAGE-GROUSE

- In 2009, there was a total of 353 sage-grouse sign observations made, along with 20 sage-grouse.
- Most of the sage-grouse sign located during the 2009 survey was found in areas of little human development, outside of well pad boundaries.

PYGMY RABBIT

- Three pygmy rabbits were recorded as incidental wildlife in 2009.
- No transect monitoring for pygmy rabbits occurred in 2009 on the JIDPA.

WHITE-TAILED PRAIRIE DOG AND BLACK-FOOTED FERRET

- No monitoring for white-tailed prairie dog and black-footed ferrets occurred in 2009 on the JIDPA.
- Prairie dogs are beneficial to many members of the ecosystem found on the JIDPA.

BIG GAME

- No monitoring for big game occurred in 2009 on the JIDPA.

GENERAL WILDLIFE

- Thirty-three different species were recorded under general wildlife observations.
- Species of note include: red-necked phalarope (*Phalaropus lobatus*), green-winged teal (*Anas carolinensis*) and a red-naped sapsucker (*Sphyrapicus nuchalis*).
- The JIDPA is used by a diversity of breeding, migratory, wintering, and transient species. Thus, management recommendations for general wildlife are broad.

The principle protection measure underway on the JIDPA for most wildlife species is the avoidance of sensitive/critical habitats during certain times each year, specifically, raptor and burrowing owl nest sites, mountain plover breeding grounds, and sage-grouse leks. The principle mitigation program underway for the development in the JIDPA is the allocation of $24.5 million by the JIO to support such measures. These funds are in place for distribution and management of off-site mitigation. Please refer to the following website for a list of 2008 project approval decisions by the JIO: www.wy.blm.gov/jonah_office/about_jio.htm.

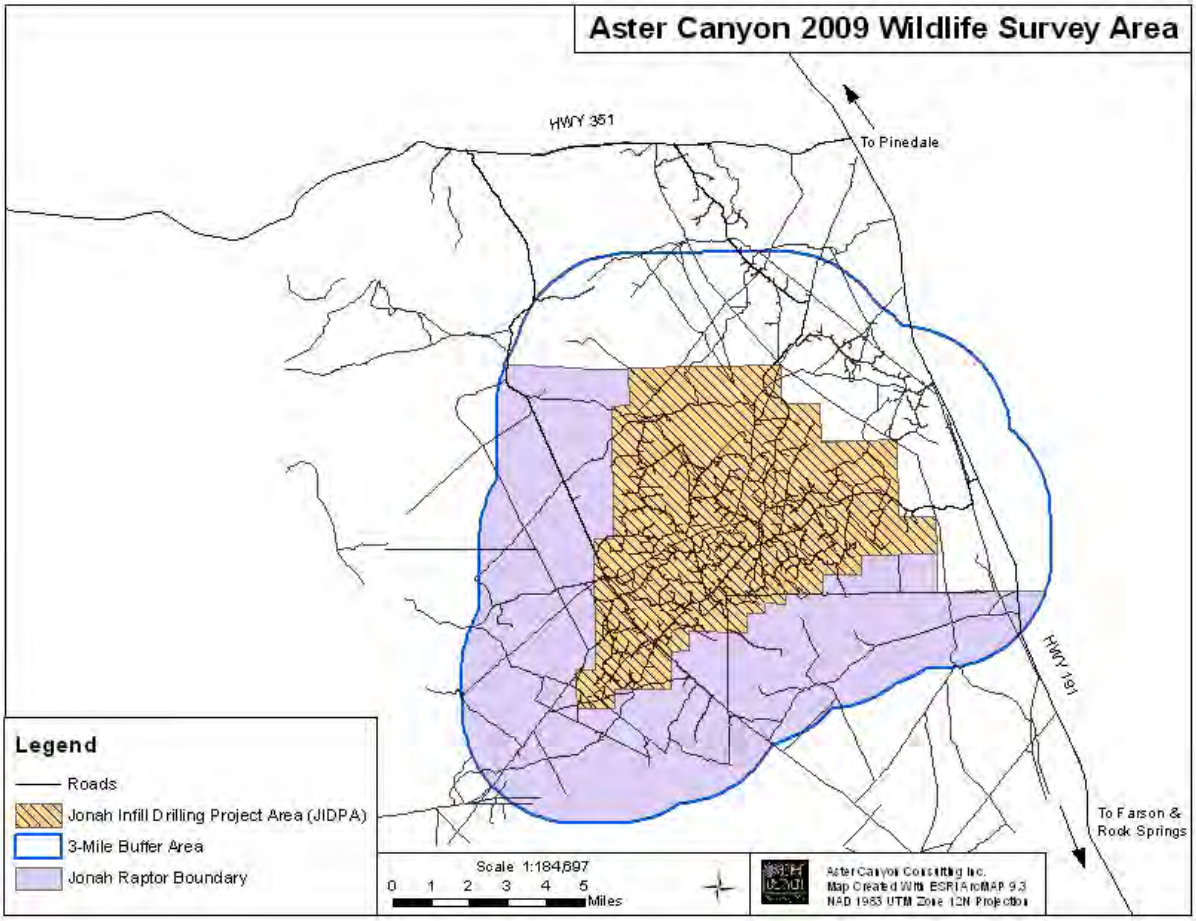
Area within the JIPDA revealing shrub-steppe habitat seen throughout the study area.

2.0 INTRODUCTION

The JIDPA is located in the Upper Green River Basin, south of Pinedale, within Sublette County, Wyoming. The JIDPA is 94% federally owned. The area has one of the richest concentrations of natural gas in the United States (JIO2009). The sagebrush dominated ecosystems located in the area are critically important to many of Wyoming's wildlife species. Many of Wyoming's TEPC, SGCN, and WSS depend on sagebrush during some part of their life. Accordingly, the BLM has initiated wildlife monitoring and inventory studies recommended under the Environmental Impact Statement (EIS), written in compliance with the National Environmental Policy Act (NEPA) of 1969. These studies were instituted in 1996 with Anderson Environmental Consultants, Inc. TRC Mariah Associates, Inc. (TRC) conducted the inventories from 1997 through 2005, and Aster Canyon inventoried during 2007 and 2008. Funding was not allocated for the project for 2006, thus no data was collected for that year.

Study Area

Aster Canyon's 2009 Jonah Field Wildlife Inventory and Monitoring study area includes the JIDPA and a surrounding 3-mile buffer (Map 1). The 3-mile buffer was eliminated on the north and east sides of the JIDPA for raptor monitoring due to overlapping study areas with the Pinedale Anticline (Map 1). The JIDPA encompasses approximately 30,500 acres of townships 28N and 29N, ranges 107W through 109W and is located approximately 32 miles southeast of Pinedale and 28 miles northwest of Farson in Sublette County, Wyoming (BLM2006). The area consists of shrub-steppe habitat, which is dominated by Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*) and includes other species of sagebrush (*Artemisia* spp.), rabbitbrush (*Chrysothamnus* spp.), saltbush (*Atriplex* spp.), and a variety of forbs and grasses. It is considered a semi-arid, cold desert climate punctuated with rolling hills interspersed with scattered buttes and rock outcrops. It is intersected by numerous ephemeral washes and playas but lacks any permanent water bodies, although 2009 brought a very wet spring and a few washes and playas on the JIDPA held water throughout the summer. Total precipitation averages 8.0 inches per year, and elevation ranges from 7,000 - 7,400 feet (BLM2006).



Map 1. 2009 Study Area, the JIDPA, 3-mile buffer and Jonah Raptor Boundary.

2.1 Purpose and Objectives

The main purpose of the 2009 Jonah Wildlife Inventory was to identify wildlife and resources being utilized in the area in order to make recommendations to land managers and operators for continued and/or new mitigation and protection measures. When data is available from previous years, trends in wildlife populations and survival success are presented. Aster Canyon's monitoring of the study area was done in an effort to determine disturbance effects on wildlife resources within the JIDPA and its 3-mile buffer. This information will 1) assist land managers in determining appropriate mitigation and protection measures; 2) provide suggestions for continued monitoring; and 3) provide the data necessary to validate and revise EIS wildlife models and projections.

2.2 Datum and General Information

Specific methods and techniques employed follow those presented in the WMPP. Revisions to these methods were discussed and made in accordance with the BLM Pinedale Field Office and JIO's recommendations. All Geographic Information Systems (GIS) locations are projected in NAD83 UTM Zone 12 North. Geographic Positioning Systems (GPS) units used during survey efforts included Garmin e-trex legend and the Garmin Rino 110. Details of previous information and data are outlined in the 2007 and 2008 Aster Canyon reports.

2.3 Threatened, Endangered, Proposed, and Candidate Species; BLM Wyoming Sensitive Species; and Species of Greatest Conservation Need

There are several species on the TEPC species list generated by the U.S. Fish and Wildlife Service, the BLM WSS list, and the SGCN list by the Wyoming Game and Fish Department (WGFD) that occur within the JIPDA. Appendix E includes lists and tables of the TEPC, WSS, and SGCN species. The species discussed in the WMPP include the following (BLM and JIO2007): the black-footed ferret (surveys were not required in 2009), ferruginous hawk, golden eagle; bald eagle (*Haliaeetus leucocephalus*), western burrowing owl (for which surveys were conducted in conjunction with BLM Raptor Nest Survey Procedures and Data Standards and the Burrowing Owl Survey Protocol, Appendix A-4 and A-5); mountain plover (for which surveys were conducted in conjunction with BLM Mountain Plover Survey Guidelines, Appendix B-2), the pygmy rabbit (surveys were not required in 2009), landbirds (surveys were not required in 2009), greater sage-grouse (for which surveys were conducted in conjunction with Human Visual Identification of Greater Sage-grouse Sign In the Jonah Infill project area Prepared by Aster Canyon 2008, Appendix C-2), and white-tailed prairie dogs (surveys were not required in 2009). Efforts to inventory species that occur on the list, but are not known to occur within the study area because of specific habitat requirements, were limited to general wildlife observations.

2.4 Overall Monitoring and Protection Measures

Each species presented in this report has monitoring and protection measures specific to their needs. These measures as well as additional recommendations are presented independently in each species' section. However, some common applications of measures apply to the wildlife seen throughout the JIDPA and its 3-mile buffer. A recurring theme identified from monitoring efforts is the importance of protecting critical habitat. Resources which have been found to be vital to the success of the JIDPA's fauna include rock outcrops, intermittent stream beds, prairie dog colonies, and un-fragmented sagebrush stands. Two specific areas observed to contribute to the JIDPA's species diversity include Sand Draw and a rocky area east of the North Jonah Road in sections 12 and 13. Table 1 presents the wildlife protection measures for all surface disturbance activities in the JIDPA.

Female greater sage-grouse observed utilizing Sand Draw within the JIDPA

Table 1. Standard protection measures for all surface-disturbing activities in the JIDPA by the species affected areas, the applied restrictions and time frame, and the boundary area for the specified restriction (BLM 2006).

Affected Areas	**Applied Restrictions**	**Restriction Time Frame**	**Restricted Area Boundaries**
Greater sage-grouse leks	No surface occupancy	Year-round	Within 0.25-mile of occupied lek boundary
Greater sage-grouse leks	No surface-disturbing activity	March 1–May 15	Within 0.25-mile of occupied lek boundary
Greater sage-grouse nesting habitat	No surface-disturbing activity	March 15–July 15	Up to 2-mile radius of active lek or within suitable Nesting Habitat
Winter Greater sage-grouse habitat	No surface-disturbing activity	November 15-March 14	Within identified winter habitat
Greater sage-grouse leks/strutting grounds	Surface occupancy or use restricted or prohibited	March 1-May 15 (8pm to 8 am)	Within 0.25-mile of lek/strutting ground boundary
Mountain plover	No surface-disturbing activity until 2 surveys (no earlier than 4/20 and 5/4) show no nesting activity; activity must begin within 72 hrs of survey	April 10-July 10	Within potential mountain plover habitat
Bald eagle nest	No surface occupancy	Year-round	Within 0.5-mile of active nest
Bald eagle nest	No surface-disturbing activity	February 1-August 15	Within 1-mile radius
Bald eagle winter use areas	No surface-disturbing activity; disruptive activities restricted	November 15-April 30	Within 1-mile radius
Ferruginous hawk nest	No surface occupancy	Year-round	Within 1,000 feet of active nest
Ferruginous hawk nest	No surface-disturbing activity	February 1-July 31	Within 1-mile radius
Other raptors	No surface occupancy	Year-round	Within 825-feet of active nest
Other raptors	No surface-disturbing activity	Nesting season	Within 0.5-mile radius
Sand Draw	No surface occupancy	Year-round	Within 300-feet

Aster Canyon recommends that maintaining vital habitat such as drainages, waterholes, and rock outcrops is important for the persistence of many sensitive species in the area. Likewise, it should be recognized that a mosaic landscape that maintains a community of various plants with varied structures and ages provides more opportunities for wildlife use. It has also been determined that prairie dogs are an important resource for several species on the JIDPA as they provide food for raptors, as well as habitat for burrowing owls and mountain plovers.

As stated in the ROD, intensive surface disturbance practices on the JIDPA will likely have significant impacts on natural resource values, including wildlife displacement and/or extirpation of local populations. Therefore, mitigation is encouraged to maintain these resources and help protect wildlife. The JIO was formed to provide overall on-site and off-site management of field monitoring and mitigation activities and is tasked with managing $24.5 million funded by EnCana Oil and Gas (USA) Inc and BP American Production Company.

Organizations interested in mitigation efforts may submit project proposals to the JIO, and the proposed projects must meet criteria described in the JIDPA EIS (JIO2009). The JIO was created to provide overall management of field monitoring and mitigation activities, both on- and off-site (JIO2009). The JIO and BLM jointly authored the WMPP for the 2009 inventory and monitoring project. The goal of the JIO is to:

> *Maintain, preserve and/or enhance up to 90,000 acres of sagebrush-steppe habitat for native wildlife, with emphasis on sage grouse, antelope, and SGCN species; and ensure access to habitat by pronghorn* (JIO2009).

Mitigation measure projects approved by the JIO appear to be providing protection and habitat for wildlife species in the area. The Jonah Field funded project lists indicates several projects aimed at enhancing areas for wildlife. Four dynamic message sign boards are currently in use on Sublette County highways to advise drivers of wildlife concentration areas. Funding was approved in 2006 for nesting platforms for ferruginous hawk platforms and is currently undergoing NEPA evaluation in the Pinedale BLM (JIO2009).

The Wyoming Landscape Conservation Initiative (WLCI) is another source of funding for wildlife projects. The WLCI is a “long-term science-based effort to assess and enhance aquatic and terrestrial habitats at a landscape scale in Southwest Wyoming, while facilitating responsible development through local collaboration and partnerships”(WLCI2009).

Wyoming Wildlife and Natural Resource Trust (WWNRT) funding is also available for a wide variety of projects throughout the state, including natural resource programs of other agencies (WWNRT2009).

Finally, protection measures for TECP, WSS, and SGCN not previously identified are often identified during field reviews by the BLM and operator on-site meetings for Applications for Permits to Drill, Right of Way applications, and in Sundry Notices. When these protection measures are identified, surveys by BLM- approved consulting biologists are usually required. Protocols for these species are coordinated with BLM biologists at the time of the survey request.

A loggerhead shrike, a species often seen utilizing Sand Draw

3.0 RAPTOR AND RAVEN

The word raptor comes from the Latin word “rapere” which means to seize or plunder. Raptors are set into their own group based on certain characteristics. They are characterized by a hooked beak, strong feet with sharp talons, keen eyesight and a carnivorous diet. Hawks, eagles, falcons, and owls are all considered raptors (Hawkwatch.org 2009). Common ravens (*Corvus corax*) are not considered raptors but are included in our nest monitoring for reasons mentioned within the discussion section. The species of raptors recorded nesting within the JIPDA during the 2009 nesting season include ferruginous hawk (*Buteo regalis*), American kestrel (*Falco sparverius*), and the western burrowing owl (*Athene cunicularia*). The JIDPA is not only important for nesting raptors but also for hunting. Raptors that were seen using the JIPDA for other activities besides nesting were also recorded and can be seen within the general raptor observation section. The objective or our monitoring effort is to determine nest activity and productivity and to use those indices to determine nesting trends within each raptor species.

The following sections will outline the methods used during the 2009 nesting season, along with the results, discussion, and mitigation measures based on individual species and, finally, incidental raptor sightings.

3.1 Raptor and Raven Methods

Raptors and ravens have been monitored on the JIPDA since 1996; the biggest change occurred during these years that has affected monitoring results is the change in study area. As per the 2007 WMPP, the study area includes a 3-mile buffer surrounding the JIDPA. The study area was changed once again for the 2009 nesting season, eliminating 41 nests from the total that were checked in 2008. The 3-mile buffer was eliminated from our study area to the north and east of the JIDPA (Map 1) due to an overlap of the Pinedale Anticline and the results for those nests will be provided by the Anticline contractor.

Nests were monitored monthly throughout the 2009 nesting season. The results from monthly monitoring were distributed as real-time data to the BLM and Jonah Field Operators and

appropriate protection measures were evaluated by the BLM at that time. The results presented in this section are a summary of the entire nesting season and not individual monthly real-time data reporting.

A total of 6 biologists (Nicole Thiele, Renan Yanish, Joslin Hayward, Chris Eardley, Jessica Pollock, and Mark Pollock) conducted the raptor monitoring surveys according to the BLM Raptor Nest Survey Procedures and Data Standards and the Burrowing Owl Survey Protocol within the Wildlife Survey Protocols Version 2, April 2009 (Appendix A-4 and A-5). Raptor surveys began on April 15 and concluded on August 13, 2009. Total field days spent monitoring existing nests and searching for new nests was about 37 days.

All burrowing owl nests were checked at least 3 times with at least one month apart. We visited all other raptor and raven nests at least twice, with at least a month apart. A few nests were checked 4-5 times depending on activity. The June monitoring effort was pushed back by one week due to precipitation during the month of June. Surveys were not performed in adverse weather conditions and all surveys were conducted with every precaution so not to disturb nesting raptors.

Nest monitoring data was recorded on the Raptor Survey Summary Form as seen in Appendix A-2 in the field. Data was then transferred to the Raptor Nesting Record (Appendix A-3) data sheet that was altered this year to conform to the Raptor Survey Summary Form. Data was transferred to the Raptor Nesting Record to maintain a raptor nest history dataset.

To determine annual activity status raptor species were divided into two categories; (1) open cup nesters, which include ferruginous hawks and ravens (2) cavity nesters which include burrowing owls and American kestrels. In order to provide clarity between open cup nesters and cavity nesters methods used are presented here. For open cup nesting species observations with a spotting scope made determining activity and incubation status clear. It proves more difficult to determine if a cavity nest is active and whether or not incubation has begun (Garcia and Conway 2009b). The following criteria for cavity nesters' activity status are based off of Garcia and Conway's 2009 paper.

Open cup nesters were determined to be active for the year if one or more of the following was observed:

- eggs were observed in a nest
- young were observed in a nest
- fledged young were observed near a nest
- an incubating adult was observed in the nest

Cavity nesters were considered active if one or more of the following was observed:

- one or more adults was observed at a nest at least twice throughout the breeding season and at least one month a part
- an adult was observed and burrow showed sign of use such as evidence of prey items, mutes, or nesting material
- young were observed at a nest
- fledged young were observed near a nest

In previous years, protocols grouped open cup nesters and cavity nesters into one group. The location and visibility of the 2 groups' nests is dissimilar enough to warrant separate criteria.

A traditional measure of productivity, the proportion of eggs that hatch and ultimately develop into fledglings, was unobtainable for all nests. Instead of measuring "traditional" productivity nesting success of each nest was measured using 3 productivity classifications: failed, successful, or unknown.

A nest was considered successful if a pair produced one young to minimum acceptable age for assessing success. We defined minimum acceptable age for assessing success according to Steenhof and Newton 2007:

> *Minimum acceptable age for assessing success- A standard nestling age at which a nest can be considered successful. An age when young are well grown but not old enough to fly at an age when nests can be entered safely and after which mortality is minimal until actual fledging.*

A nest was given *unknown* reproductive status if no young were seen and it is unknown whether eggs were laid. This designation may differ from previous years in that if an active nest produced no young to advanced age it would be considered failed. Nest success classifications were made by using binoculars and spotting scopes, nests were not approached. The numbers of young were counted and monitoring continued until this could be accomplished.

Searches for new nests consisted of walking portions of major draws within the JIPDA. We also performed call broadcast surveys within prairie dog towns for burrowing owls, following the Burrowing Owl Survey Protocol within the Wildlife Survey Protocols Version 2, April 2009 (Appendix A-5).

3.2 Raptor and Raven Results and Discussion

A total of 118 (Table 2 and Map 2) nests were monitored during the 2009 nesting season. This number includes 5 new burrowing owl nests and 1 new raven nest found during the 2009 nesting season. The total number of monitored nests is down from 153 nests monitored in 2008 due to the decrease in the study area.

The nesting species found within the study area included ferruginous hawk, western burrowing owl, American kestrel, and common raven. Several species of raptors were seen using the JIPDA and 3-mile buffer outside of nesting surveys and these were recorded as general wildlife observations (Table 3 and Map 3). Below are the results and discussion of the 2009 raptor nest monitoring, separated by species.

Table 2. Total number of raptor nests monitored in the JIPDA and buffer in 2009 and their activity status, success, and number of young observed

Species Monitored in 2009	Total Number Nests	Number Inactive Nests	Number Active Nests	Number Successful Nests	Number Young Observed
American Kestrel	25	23	2	unknown	0
Ferruginous Hawk	31	29	2	2	5
Long-eared Owl	1	1	0	0	0
Short-eared Owl	2	2	0	0	0
Western Burrowing Owl	38	32	6	2	7
Common Raven	18	11	7	4	12
Unknown Raptor	3	3	0	0	0
Total	118	101	17	8	24

A ferruginous hawk, a species often seen within the JIPDA, hunting for prey.

Nadav Nur recommends waiting 5-10 years to achieve population trend results (Nur et al. 1999). The JIPDA has been monitored over ten years, but the study area has changed multiple times which along with the change of contractors and BLM protocols, compromises consistency during this period.

American Kestrel

Aster Canyon monitored 25 previously recorded kestrel nests this year; no new nests were found. Two nests were considered active for the 2009 nesting season. There were 3 active nests in 2007 and 2 in 2008 within the current study area. These 2 active nests in 2009 are very close to each other (Map 2). These nests are considered active because one adult was seen during the May monitoring survey and 2 males were seen at the nests in June. It is possible that only one of these nests were actually active. The nesting success status for the two active kestrel nests is unknown. After the nesting season, whitewash was observed at both cavities but no egg shells were located.

American kestrels utilize rock cavities located on the eastern side of the JIDPA and it is unlikely population numbers will decrease within the JIPDA with the protection of these rocky areas.
It may be difficult to locate and determine activity status of American kestrels nests due to the location of their nest cavities within rock out crops. Kestrels have higher tolerance to disturbance; this may cause them to refuse to flush from their nest (Smallwood and Bird 2002). Because of the kestrel's high tolerance to disturbance walking to the rock cavities during nesting season should not disturb the kestrel and could allow for a more accurate reading on nest activity and success.

Ferruginous Hawk

Aster Canyon monitored 31 previously recorded ferruginous hawk nests; no new nests were found. For the second consecutive year, both platform nests, 291073301 (FH126) and 291073202 (FH128) have been the only active ferruginous hawk nests recorded and have successfully produced young. Nest FH128 produced 3 young and FH126 produced 2 young during the 2009 nesting season.

Early in the nesting season ferruginous hawks were observed hunting east of North Jonah Road in sections 12 and 13 of township 29N and range 108W. Further investigation of these areas later in

the nesting season proved that these nests were inactive 2009. Ferruginous hawks were seen utilizing other areas of the JIPDA throughout the nesting season and locations can be found on the general wildlife observations map (Map 3).

During 2009 and 2008 two nests were successful; in 2007 there was 1 successful nest. The one successful nest in 2007 occurred on one of the artificial nesting structures (FH128). In 2008 and 2009 the only nests used were the artificial nesting structures (ANS) 291073301 (FH126) and 291073202 (FH128), and in both years both nests were successful. The decrease in use of natural structures such as rock outcrops, buttes, and steep hills could possibly be due to increased disturbance and/or predation. Nesting activity could increase with the implementation of more artificial nesting structures. Aster Canyon predicts the successful nest numbers will remain stable at 2 with the use of the artificial nesting platforms.

Western Burrowing Owl

Aster Canyon monitored 33 previously recorded burrowing owl nests this year, five new nests were recorded for the 2009 nesting season. Even though some of the burrows were naturally collapsed or destroyed by human activity, the areas surrounding the burrows were searched for the presence of owls. Most burrows that had collapsed or were destroyed were still surrounded by prairie dog burrows and it is possible owls will return to these areas.

A burrowing owl pair preparing to nest on the JIDPA.

Of the total 38 burrowing owl nests monitored; 6 of these nests were determined to be active. Two of these nests were determined successful; both were newly recorded nests with one being within a historical nesting area. The two successful nests produced a total of at least 7 young, with broods of 3 and 4 chicks. Both of theses nests were fledged by August 13, 2009. The nest success

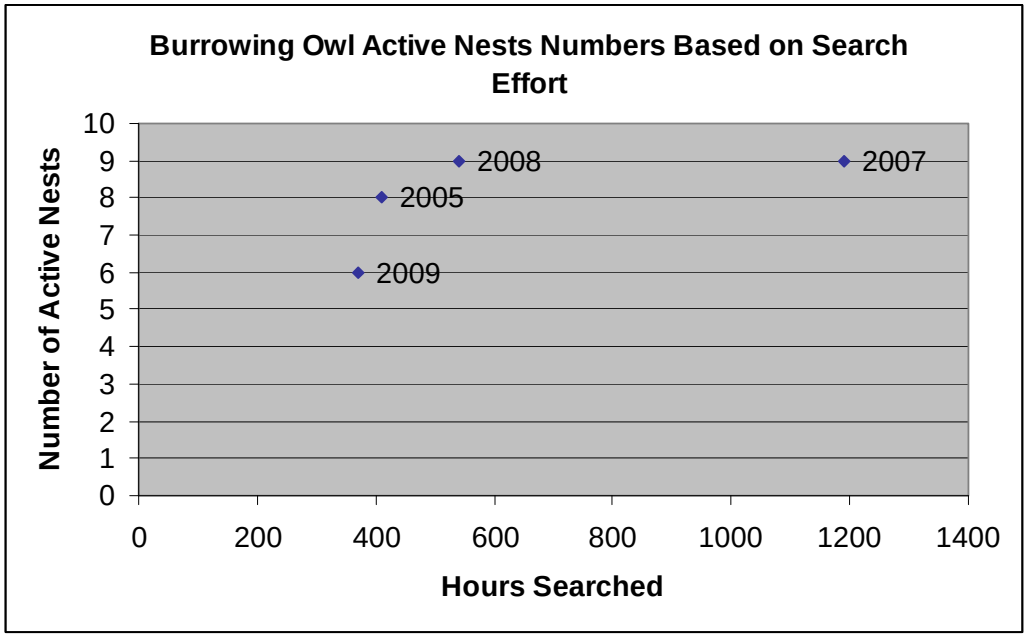
of the remaining 4 active nests is unknown. Young were never observed at these nests, but it is undetermined whether these nest produced eggs.

Sightings of owls were made at 4 different burrows early in the breeding season, subsequent visits to these burrows indicated that the burrows were inactive for the year. Two of the 4 sightings took place at burrows not previously recorded as nests and therefore were recorded as new nest locations so that they can be monitored for future activity.

The search effort for burrowing owl nests was significantly reduce this year and it is probable that more active burrowing owl nests were present in the JIPDA but went undetected. Our study area was decreased causing raptor crews to cover less area. The number of biologists on the JIDPA this year was much lower than in past years due to less species being monitored for and prairie dog town mapping not required this year. In the past, Jonah Field operators and contractors reported burrowing owl sightings, however, this year there were less operators and contractors on the field and present contractors were spending less time in the field. Previously, ground surveys of prairie dog towns to search for new burrowing owl nests were possible. Such surveys have enabled us to locate numerous nests, but this survey method was not permitted in 2009. The call back or broadcast protocol (Appendix A-5) was utilized but it did not produce any new owl sightings. However, known owls did respond to the callback.

Figure 1 compares the past 4 monitoring years with hours searched and the resulting active nests found. Trends show that as search effort increases number of active nests found also increases. Hours include time spent on raptor monitoring along with any time spent on mapping prairie dog towns. The hours from 2005 also include hours spent on mountain plover surveys as stated in TRC 2005 report (TRC Mariah 2006).

Figure 1. Trend of active burrowing owl nests found in relation to search effort. Effort data was taken from Aster Canyon past reports and from the TRC 2005 report. Only nests within the 2009 study area were included in this figure. Hours are based on entire study area of the corresponding year



Burrowing owls reuse traditional nesting areas without necessarily using the same burrow (Rich 1984, Haug and Oliphant 1990, Plumpton and Lutz 1998, Lutz and Plumpton 1999). Burrow fidelity and nest area re-use may be enhanced if birds are reproductively successful during the previous year (Plumpton and Lutz 1998). Rich 1984 found that owls were returning to a burrow for 1-3 consecutive years. He also found owls were returning to burrows after a period of non-use. It is recommended that with species that demonstrate less fidelity to an actual nest such as the burrowing owl, studies should be designed to sample all potential nesting habitat along with all previously occupied nests and territories (Rich 1984, Steenhof and Newton 2007).

Call playback surveys can be utilized to help locate burrowing owls within prairie dog towns. Some towns within the JIDPA are very large while others are in the midst of roads and gas development which may inhibit the effectiveness of call playback surveys.

A monitoring protocol should be initiated in future years to perform ground surveys of all burrowing owl habitats, especially within active prairie dog towns. Ground transects should be designed to be repeatable every year to analyze trends with consistency. They should be performed early in the breeding season to reduce overestimates of nesting success and productivity

by not accounting for non-egg layers or early failed nests (Steenhof and Newton 2007). An infrared video scope (Sandpiper Technologies, Manteca, CA) could be used to assist in accurately determining, whether eggs have been laid, clutch size, and growth stage of a nest. Using an infrared probe does not affect reproductive parameters in burrowing owls (Garcia and Conway 2009a, Lantz and Conway 2009)

Common Raven

A total of 17 previously monitored common raven nests were monitored this year and 1 new raven nest was discovered during the 2009 nesting season. Two well pad locations where common raven nests had been recorded were removed. Those nest locations 291080301 (CR358) and 291081701 (CR361) were only observed once and will not be monitored in the future due to the lack of structures for potential common raven nests.

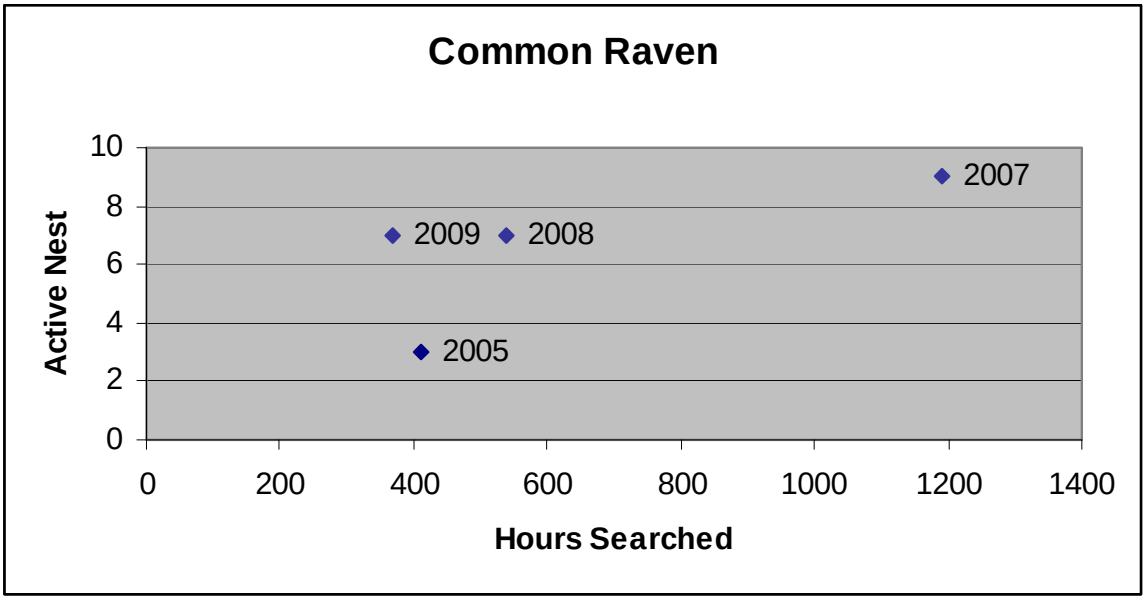
Common raven chicks nested on a stair platform in the JIPDA.

Eighteen common raven nests were monitored and 7 were considered active. Four nests were successful and produced at least 12 young with brood counts ranging from 2-4. The success of the remaining 3 active nests is unknown.

Over the past 3 nesting seasons, (2007- 2009) active raven nests have fluctuated between 7-9 nests within the current study area. Numbers may continue to increase over time within the JIDPA as more nesting structures become available, ravens become adapted to the existing structures, and populations continue to increase in the surrounding area. An example of ravens becoming comfortable with structures takes place in Idaho, in 1980. A power line was installed, after the first year 1 raven pair nested on the power line, 9 pairs nested in 1982, and 39 pairs nested in 1983, this number doubled in 1987. Numbers of nesting ravens did not decline in the surrounding area as a result of the power line (Steenhof et al. 1993).

Figure 2 compares the past 4 monitoring years with hours searched and the resulting number of active nests found. Trends show that as search effort increases, the number of active nests found also increases.

Figure 2. Trend of active common raven nests found in relation to search effort. Effort data was taken from Aster Canyon reports past and form the TRC 2005 report. Only nests within the 2009 study area were included in this figure. Hours are based on entire study area of the corresponding year



Long-eared Owl

No long-eared owl (*Asio otus*) nests were located within the JIPDA or the 3-mile buffer. One area in which a long-eared owl sighting occurred in 2007 was investigated in 2009, but no long-eared owls were seen at this location. One long-eared owl sighting was made this year within the 3-mile buffer of the JIPDA and occurred while walking draws in search of new nests. This observation was recorded as a general wildlife sighting.

Long-eared owl most commonly uses stick nests built by other species in trees or other dense vegetation. Less often, they nest in cavities of trees and cliffs or on the ground. Long-eared owls do hunt in open rangeland (Marks et al. 1994), and it is most likely that the long-eared owls seen with in the JIDPA were using the area as hunting grounds.

Short-eared Owl

No short-eared owl (*Asio flammeus*) nests were located within the JIPDA or 3-mile buffer. Two areas where previous sightings had been recorded were investigated and no owls were located.

Prairie Falcon

No prairie falcon (*Falco mexicanus*) nests were monitored this year and no new nests were found. One incidental prairie falcon sighting was made in section 22 of range 108W, township 29N, where a falcon was observed perching on top of a spoil pile.

Unknown Raptors

Three nests previously recorded as unknown raptor species were monitored this year: UN350, UN329, and UN330. Nest UN350 (291081314) was in poor condition; 281092202 (UN329), although suggestive of a nest; is not an actual nest; and nest 291090204 (UN330) was recorded as a possible loggerhead shrike (*Lanius ludovicianus*) nest. After further investigation these nests have been removed from future raptor nest monitoring.

3.3 Raptor and Raven Protection Measures

Protection measures are already in place for raptors within the JIDPA under the 2006 Jonah Infill Drilling Project Area Record of Decision. Protection measures outlined within the ROD state that well pads, access roads, and other facilities not be located within 1,000-feet of active ferruginous hawk nests or within 825-feet of all other active raptor nests (BLM 2006). Seasonal restrictions apply for surface disturbance activities near active raptor sites and are to be avoided within 1-mile of active ferruginous hawk nests and within 0.5-mile for all other active raptor nests (February 1 – July 31; BLM 2006).

Additional protection measures implemented include the requirement for operator coordination with the BLM, USFWS, and WGFD for all mitigation activities related to raptor or other sensitive species and their habitats, and the need for operators to obtain permits for relocation, removal, and establishment of raptor nests. Facilities and sites are to be selected and designed to avoid disturbance to known active nest sites (BLM 2006). Raptor nest surveys are to be conducted

within a 1-mile radius of proposed surface activities between February 1 and July 31, and the above protection measures and seasonal restrictions discussed are to be applied. Finally, the Jonah Field Operators are to notify officials immediately if a raptor nesting location is found on a project facility in order to coordinate erection of an artificial nest structure in the area and relocation of the nest (BLM 2006).

Additional protection measures that are notable for nesting species within the JIDPA are listed below.

Ferruginous Hawk

Ferruginous hawks are believed to be in an overall population decline throughout their range (Travsky and Beauvais 2005). Nesting ferruginous hawks must contend with human-induced stresses in addition to naturally existing challenges (Travsky and Beauvais 2005).

Nesting on an elevated nesting structure seems to increases a ferruginous hawk's tolerance of disturbance, and decreases the chance a nest will fail or be predated by ground predators (Gilmer and Stewart 1983, Schmutz et al. 1984, Schmutz and Fyfe 1987, Bechard et al. 1990, Schmutz 1991). Installing additional artificial nesting structures within the JIPDA and buffer would increase availability of suitable nesting structures and may increase ferruginous hawks' tolerance of disturbance. Ferruginous hawks are highly reliant on their food source. Prairie dogs (*Cynomys* spp.) and ground squirrels (*Spermophilus* spp.) are the most common prey species taken by ferruginous hawks (Olendorff 1993). Therefore, ground squirrel and prairie dog populations should be protected. Parish et al. published a report for the BLM "Raptor Mitigation Handbook" and this report should be reviewed for tools in developing mitigation plans and guide mitigation development for disturbance to raptors from surface mining and other land uses (Parrish et al. 1994).

Common Ravens

Ravens are one of the most abundant naturally occurring birds word-wide. However, their population numbers vary widely by region. In some areas the raven is considered a pest and population reduction programs are utilized, while in other areas raven numbers have drastically

declined and reintroductions are taking place (Boarman and Heinrich 1999). The raven's diet also varies dramatically. It is widely known as a scavenger but, it is also a predator. The raven will hunt for rodents and take nestlings from other bird nests, and may also eat insects, seed, and grain (Boarman and Heinrich 1999).

In some parts of its range ravens have received notoriety as garbage scavengers and predators, but in other areas this species is a symbol of wilderness and are being reintroduced to its original range. With the spread of diseases such as brucellosis, the important cleanup role of scavengers such as the raven is recognized. Ravens contribute to the consumption of aborted fetuses, decreasing the likelihood that domestic cattle will be exposed to this potential health hazard (Cook et al. 2004).

Ravens have the ability to reduce population numbers of their prey species including threatened and endangered species. Numerous birds, toads, and tortoises populations have been effected by ravens. Ravens take enough desert tortoises, an endangered species, to prevent recruitment for a sustainable population (Boarman and Heinrich 1999). Studies have also identified ravens as greater sage-grouse nest predators (Connelly et al. 1999, Schroeder et al. 1999, Coates et al. 2008). Coates et al. found that female sage-grouse were not able to defend their nests successfully when confronted by ravens or badgers. On the JIDPA where important sage-grouse and threatened or endangered wildlife habitat exists, this is a concern.

Ravens will nest almost anywhere food and nesting substrate are available (Boarman and Heinrich 1999). Population numbers may not be affected by deterrence on the JIDPA, but this measure could decrease the amount of ravens nesting within the JIDPA.

To eliminate food available to ravens, dumpsters should be kept closed at all times. Aster Canyon biologists have observed dumpsters left open with ravens feeding inside. If the dumpster cannot be kept closed manually, automatic closing hinges could be added. Signs placed on the dumpsters with a picture of a raven eating garbage may influence workers to close the dumpsters. Strict enforcement of littering regulations may help reduce trash on the field. Education can play a key role in implementing food elimination for ravens.

Additionally, any road kill within the JIDPA and surrounding area should be removed from the road immediately. Not only will this decrease food for ravens but also other scavengers and thus reduce road collisions with birds of prey such as golden eagles, bald eagles, and rough-legged hawks. To reduce nesting substrate a few deterrence methods may be applied. All raven nests within the JIDPA in 2009 were found on stair platforms or catwalks on tanks and on windmills. Therefore any unused windmills should be removed. Bird spikes (porcupine spikes) could be placed on platforms, catwalks, or windmills (birdbgone.com). Bird spikes are stainless steel spikes that will not harm birds but prevents them from landing or nesting. The bird spiders may also be an effective deterrent in some areas (birdbgone.com).

A bird spider used as a deterrent for roosting or nesting birds (birdbgone.com)

These items could be used experimentally on the JIPDA in areas of known raven nests to observe their effectiveness. Workers should be instructed to remove early nesting materials placed by ravens up until an egg is laid.

In conclusion, stable naturally abundant raven populations are important for the ecosystem. While deterrence methods within the JIDPA may not significantly decrease raven population numbers it can assist in eliminating the unnatural factors that attract ravens.

Prairie Falcon

Prairie falcons have varying degrees of sensitivity to disturbance but appear to be more affected during courtship and incubation. Their preferred habitat is bluffs and cliffs that punctuate open plains and sage-steppe (Steenhof 1998). The JIDPA does not contain any of the appropriate bluffs and cliffs but the northeastern edge of the 3-mile buffer contains appropriate habitat (no longer in our study area). Therefore, these areas of bluffs and cliffs and surrounding areas should be protected to maintain nesting habitat. Construction of artificial nests has been an effective management tool within cliffs lacking nest sites or where erosion is a risk. Prairie falcons main food source is ground squirrel species (*Spermophilus* spp.) and horned larks *(Eremophila alpestris*)

(Steenhof 1998). Areas of ground squirrel colonies should be protected. Horned lark populations appear to be stable and they were the most abundant songbird observed within the JIDPA monitoring in 2008 (Aster Canyon Consulting Inc. 2008).

A well pad location on the JIPDA.

4.0 MOUNTAIN PLOVER

Contrary to its name, the mountain plover (*Charadrius montanus*) inhabits flat, dry tablelands characterized by low and sparse vegetation and avoids forested and shrubby landscapes common to montane habitat. These "shorebirds" of arid and shortgrass prairie landscape prefer large, open expanses with local disturbance and an absence of trees and are described as a "disturbed prairie or semidesert species" by Knopf and Miller 1994. The JIDPA includes such areas favorable to mountain plovers.

A breeding mountain plover observed on the JIDPA in 2009.

Mountain plovers breed in short-grass prairies and shrub-steppe landscape of the Rocky Mountain States from Canada south to Mexico (Keinath and Ehle 2001). They nest in areas that have been impacted by herbivores including prairie dogs (*Cynomys sp.*), pronghorn (*Antilocapra americana*), and historically, American bison (*Bison bison*), whose grazing would have shortened and thinned vegetation. Plovers are also known to occupy areas disturbed by heavy grazing (including by domestic cattle), agricultural tilling, and lightning strike fires (Knopf and Wunder 2006). Breeding occurs in areas characterized by less than a 5% slope (Graul 1975) and plovers exhibit territoriality in defense of suitable nesting sites (Knopf 1996).

Degradation of habitat remains a conservation concern for this species. Conversion of grassland to agricultural use negatively affects mountain plovers by destroying favorable habitat (Knopf and Wunder 2006). Removal of grazers such as American bison and prairie dogs also negatively impacts potential mountain plover habitat (Knopf and Miller 1994). A recent study found that plover nesting densities at prairie dog towns decreased relatively rapidly within 1-2 years of a decline in local prairie dog numbers, in this case due to sylvatic plague (Augustine et al. 2008).

Direct destruction of nests by agriculture or other disturbances during nesting season also threatens mountain plover reproduction (Knopf and Rupert 1996).

Due to an apparent decline in the continental mountain plover population of 3% per year in the 1970s-1990s for a total decline of 63% overall (Knopf and Miller 1994), the mountain plover was proposed for listing as a threatened species under the Endangered Species Act by the USFWS in 1999. The species was withdrawn from listing consideration in 2003 (Knopf and Wunder 2006), as the USFWS determined that threats to the species were not as significant as originally believed (United States Fish and Wildlife Service 2003). The mountain plover is currently considered a sensitive species by the BLM, providing for protections that include maintaining the species and its habitat in functional BLM ecosystems, ensuring species consideration in management decisions, a goal of avoiding the need for Endangered Species Act listing of the species, and prioritizing needed conservation work with an emphasis on habitat for the species. The BLM developed this designation to "ensure that any actions on public lands consider the overall welfare of these sensitive species and do not contribute to their decline (Smith and Keinath 2004)."

4.1 Mountain Plover Methods

In 2009, mountain plover monitoring consisted of conducting presence/absence and nesting/productivity surveys in previously identified habitats and re-evaluating habitats based on the ranking system developed by Wyoming Natural Diversity Database (Keinath and Ehle 2001, Beauvais and Smith 2003).

Methods employed for mountain plover surveys by Aster Canyon in 2009 coincide with previous surveys conducted during inventory efforts from 1999 through 2007, as well as with Mountain Plover Survey Guidelines within the BLM Pinedale Field Office Wildlife Survey Protocol (Appendix B-2). Data was not collected in 2006. The 2009 presence/absence surveys were conducted from April 21 through June 5, 2009 by biologists Chris Eardley and Mark Pollock. Productivity surveys were conducted from June 24 through June 30, 2009 by Chris Eardley. A total of 15 survey days were logged and typically involved the following techniques:

- Surveys were conducted between sunrise and 10:00 and between 17:30 and sunset to facilitate spotting the white breast of the plovers.

- Surveys were only conducted during favorable weather conditions.
- Surveys were conducted by truck on main roads and two-tracks throughout habitat.
- Binoculars were used to scan the habitat for birds. If needed, a spotting scope was used to confirm a sighting. Vehicles were frequently stopped within and turned off with windows down, allowing for audible detection of plovers.
- Suitable habitat was surveyed from between 3 and 4 times, with survey periods at least 14 days apart.
- Surveys were initiated after the beginning of mountain plover breeding/nesting season, around April 20 for Wyoming.
- Areas were searched for nests and eggs if it was deemed non-intrusive.
- Locations of observed plovers were recorded with distance-trained estimates

Locations of individuals sighted were recorded on the mountain plover survey forms (Appendix B-1).

Habitat Ranking

Aster Canyon adopted a habitat ranking method from "Survey for Mountain Plover (*Charadrius montanus*) on Federal lands in the Powder River Basin," prepared by Douglas A. Keinath and Donna Ehle for the Cheyenne, WY BLM in 2001. This ranking system is a 3-level categorical scale, based on formal habitat information. Rankings are as follows:

- High-Quality Sites- "an area of about 160 acres or more with low vegetation (≤ 4"), at least 25% bare ground and flat topography (slope of less than about 5%)"
- Medium-Quality Sites- "generally met the criteria of high-quality sites but had 1 or 2 of the negative habitat modifiers"
- Low-Quality Sites- "an area that had 3 or more of the negative habitat modifiers (see below)"
- Unsuitable Sites- "areas of forest, wetlands, dense and tall stands of sagebrush, riparian areas, and canyons" These were not applicable for our sites, therefore there were no unsuitable rankings.

The negative habitat modifiers used to determine habitat quality are as follows:

- The average height of shrubs is greater than 4 inches.
- The average height of grass is greater than 4 inches.
- The topography is not flat (e.g., slopes are >5% or overlooking hills are near the site).
- The site contains less than 25% bare ground.
- There are no prairie dogs present on the site (this is not used to downgrade an otherwise good site).
- Water is present near the site.
- Killdeer (*Charadrius vociferous*) are present on the site.
- The size of the patch is too small (i.e., < 160 contiguous acres).
- Active agriculture is present (i.e., the site contains plowed or planted fields).
- Trees are present (e.g., cottonwoods).
- There is human development (e.g., houses, barns, fences, well pads).

All sites were evaluated by on-site investigations during the 2009 mountain plover nesting season to receive the most accurate real-time, on-the-ground habitat rankings. All negative habitat modifiers that applied and were available for the 28 habitat sites were evaluated. Prairie dog presence on the site was evaluated in 2009. Absence of prairie dog towns was not used to downgrade a site, per Keinath and Ehle. Prairie dog activity was evaluated based on the number of prairie dogs seen during a 3-5 minute count method used in Keinath and Ehle's habitat ranking.

Percentage of bare ground was estimated using a Daubenmire plot.

On-site investigations conducted in 2009 consisted of analyzing human development by recording the number of structures (i.e. well pads, fence lines, pipeline markers) that could potentially be used as perches by raptors, a predatory threat to mountain plovers. Aster Canyon analyzed the percentage of bare ground within a habitat site by randomly laying down a Daubenmire plot within the habitat sites and then

estimating the percentages of bare ground within the plots. Multiple plots were used for each site and the average was taken. The number of plots used per site was determined by acreage and variation of vegetation within the site. Shrub height was taken from the nearest shrub to each Daubenmire plot. Where measured habitat consisted of little to no vegetation and no shrubs were present near sample plots, shrub heights were recorded as zero. Shrubs were measured using a measuring stick to the top of the leaves, excluding the seed heads. Shrub averages were taken from total shrubs measured per site. Slope was estimated by the biologists. These results were used to determine if the slopes could be used as perch sites for predatory raptors. The presence of surface water near the site was noted. Active agriculture and trees are not present on the JIDPA and therefore were not used as negative ranking factors.

4.2 Mountain Plover Results and Discussion

A total of 28 mountain plovers were documented during survey efforts (Map 4, Table 4) in 2009. At sites 1, 26, 27, and 29 plovers were observed during multiple separate survey efforts. Thus, the birds seen in sites 1, 26, 27, and 29 may have been counted multiple times rather than being additional birds recorded. Based on this assumption, it is believed that one mountain plover pair was present at site 1; that 1 mountain plover adult pair with at least 1 chick and a single interloping adult were present at site 26; that at least 2 mountain plover adults (1 observed in each of 2 locations) and 3 chicks (observed with one adult) were present at site 27; at least 1 adult, 1 pair and 3 chicks at site 29; and that at least 1 mountain plover adult was present at site 30. For the 2009 field season, an assumed 18 individual mountain plovers (11 adults and 7 chicks) were observed.

Table 4. Number of confirmed mountain plover sightings by date and site during the 2009 survey of the study area, includes 2009 habitat rankings.

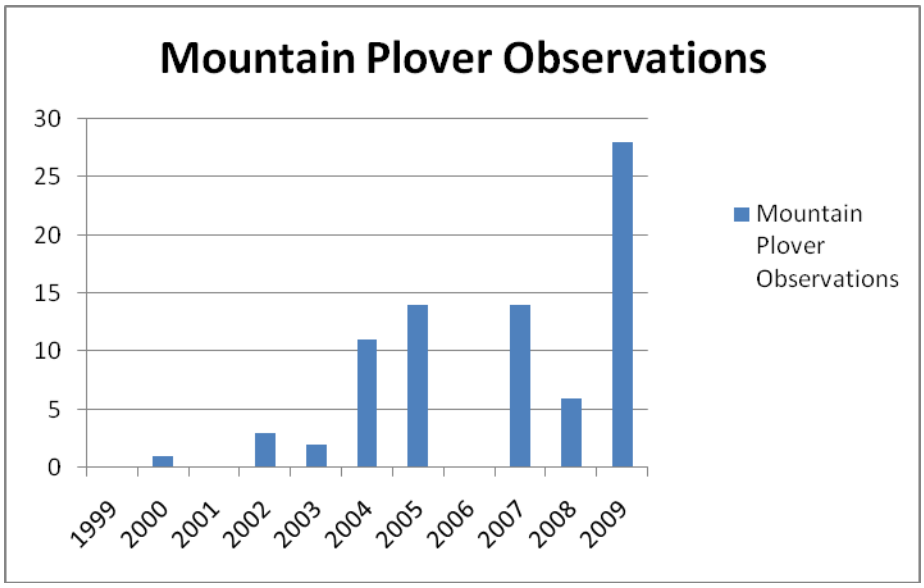
Site #	Date	# of Birds	Habitat Type and Ranking	# Times Site visited
1	04/22/09	2	Large flat grassy area surrounded by sage with prairie dog colony/medium	4
1	05/13/09	2	Large flat grassy area surrounded by sage with prairie dog colony/medium	4
26	04/23/09	3	Large flat grassy area surrounded by sage with prairie dog colony and dry lake bed/medium	4
26	05/13/09	2	Large flat grassy area surrounded by sage with prairie dog colony and dry lake bed/medium	4
26	05/14/09	2	Large flat grassy area surrounded by sage with prairie dog colony and dry lake bed/medium	4
26	06/04/09	1	Large flat grassy area surrounded by sage with prairie dog colony and dry lake bed/medium	4
26	06/30/09	2	Large flat grassy area surrounded by sage with prairie dog colony and dry lake bed/medium	4
27	05/14/09	2	Small to medium-sized patches of grass within sage/low	4
27	06/30/09	4	Small to medium-sized patches of grass within sage/low	4
29	04/21/09	1	Medium to large-sized grassy areas within sage/medium	4
29	06/25/09	6	Large flat grassy area surrounded by sage with prairie dog colony/medium	4
30	05/15/09	1	Large grassy area within sparse sage/medium	4
Total		**28***		

*Based on observational data, it is believed that 18 individual birds were seen, with the same birds being observed multiple times in some areas.

For the 2009 field season, both the total number of plover observations and the number of suspected individual plovers observed was greater than in 2008 and than any year since 1999, the earliest year for which data is available. This could be the result of a number of factors. Firstly, more surveys were conducted in 2009 than in 2008, as each habitat site was visited at least three times, with sites having previously recorded sightings in 2009 visited a fourth time for productivity surveys. Secondly, 7 chicks were observed in 2009, compared to none in 2007 and 2008. The chicks comprised one fourth of plover observations and almost half of the suspected individual plovers observed in 2009. This may be a result of a milder spring in 2009 than in 2008, when the last snowfall was experienced in June. It also may be the result of plovers being concentrated on better-quality habitat, as overall quality diminished (an increase in average grass height downgraded 10 previously medium-quality sites to low-quality rankings). A wet spring and the

removal of cattle grazing in 2008 may have contributed to an unfavorable increase in average grass (and shrub) height in 2009. Additionally, 6 individual biologists were used to conduct surveys in 2008 compared with just 2 in 2009. With the use of only 2 biologists, each biologist is conducting more surveys and presumably enhancing an ability to detect mountain plovers as well as maintaining a consistency in survey technique from survey to survey and from site to site. Lastly, no plovers were detected in 1999 and 2001, before the current protocol was developed in 2002, and no surveys were conducted in 2006. Figure 3 depicts the trend in plover observations from 1999-2009.

Figure 3. Trend of recorded mountain plover sightings from 1999 to 2009, (data was not collected in 2006). No mountain plovers were found within the present JIPDA study area in 1999 and 2001, before the current protocol was developed.



Ten mountain plover observations occurred in site 26 and 4 observations in site 1, both ranked as medium-quality sites due to average shrub heights of greater than four inches (site 1 is also less than 160 acres in size). One mountain plover observation was made in site 30. Site 30 is ranked as a medium-quality site due to average grass and shrub heights of greater than four inches while site 29, in which 7 observations were made, is additionally less than 160 acres in size and is therefore a low-quality ranked site. Site 27 received a low-quality ranking due to average grass and shrub height being greater than four inches and the observed presence of killdeer at the site on one occasion. All 2009 plover observations were made within sites that have recorded past observations; no plovers were observed in sites that have not previously recorded plover

observations (Map 5). This excludes 2006, when data was not collected, and 1999 and 2001 when no mountain plovers were observed within the present JIDPA study area.

According to the habitat ranking system developed by Keinath and Ehle, there are no high-quality nesting habitat sites located on the JIDPA or 3-mile buffer due to at least 1 negative modifier being present. There are 7 medium-quality sites (Table 5). All mountain plovers observed this year were recorded in medium-quality habitats, with the exception of the plovers observed in sites 27 and 29, which are ranked as low-quality habitat. There are 21 low-quality habitat sites present in the JIDPA. Seven mountain plovers, including 3 chicks (site 27), were found in low-quality habitat in 2009. Seven mountain plovers also including 3 chicks were found in low-quality habitat at site 29.

A mountain plover within the JIDPA 3-mile buffer observed during a raptor nesting survey.

The number of 21 low-quality ranked sites in 2009 represents an increase from 2008's seven sites being ranked as low-quality. This dramatic increase is likely due to an increase in average grass height at sites resulting from a wet spring in 2009, as well as a decrease in grazing with the removal of cattle from the JIDPA in 2008. Without such an increase in average grass height, ten of the sites ranked as low-quality in 2009 would have ranked as medium-quality. Habitat sites 27 and 29, where plover observations have occurred in 2008 and 2009, are two such sites.

All mountain plover sightings occurred in areas where prairie dogs were present, although the activity rankings for each of these prairie dog towns ranged from low to high. Because 2009 was the first year prairie dog town activity was ranked, not enough data yet exists to analyze the relationship between prairie dog towns and mountain plovers on the JIDPA. Subsequent data

collection will provide a more accurate insight into the size and activity levels of these prairie dog towns and their relationships with local mountain plover habitat.

All ranking factors will be re-evaluated during the 2010 mountain plover nesting season and subsequent nesting seasons, as grass and shrub height, prairie dog presence/activity levels, and other ranking factors may change from year to year.

Table 5. Negative modifiers that apply to each plover site.

Site	Ht. of Shrubs >4in	Ht. of Grass >4in	Slope >5 %	< 25% Bare Ground	P-dog activity	Killdeer/ Water	< 160 Acres	Human Development	Total Negatives	Quality
1	Yes				Low		Yes		2	medium
4	Yes	Yes			None		Yes		3	low
6	Yes	Yes			Low			Yes	3	low
8	Yes	Yes			None		Yes	Yes	4	low
10	Yes	Yes			None		Yes	Yes	4	low
13	Yes	Yes			None		Yes		3	low
14	Yes	Yes			None		Yes		3	low
15	Yes	Yes			None		Yes		3	low
16	Yes	Yes			None		Yes		3	low
17	Yes	Yes	Yes		Low	Yes / Yes	Yes		6	low
18	Yes				Low		Yes		2	medium
19	Yes	Yes			None		Yes	Yes	4	low
20	Yes				None		Yes	Yes	2	medium
21	Yes	Yes			None		Yes	Yes	4	low
22	Yes	Yes			None		Yes	Yes	4	low
24	Yes	Yes			Low				2	medium
25	Yes	Yes			Low		Yes		2	low
26	Yes				Medium				1	medium
27	Yes	Yes			Medium	Yes / No			3	low
28	Yes	Yes			None		Yes	Yes	4	low
29	Yes	Yes			Low		Yes		3	low
30	Yes	Yes			High				2	medium
31*	Yes	Yes	Yes		None			Yes	4	low
32	Yes				Low			Yes	2	medium
33	Yes	Yes			Low		Yes	Yes	4	low
34	Yes	Yes			Low			Yes	3	low
35	Yes	Yes	Yes		Low			Yes	4	low
38	Yes	Yes			None		Yes		3	low

*Section 31 Township 29N, Range108W was surveyed as requested by the Pinedale, BLM
**Lack of Prairie dog town does not denote sites and therefore not added to total negative modifiers

4.3 Mountain Plover Protection Measures, Mitigation, & Recommendations

The mountain plover is a sensitive species and is vulnerable to destruction of habitat by human development (Smith and Keinath 2004). This species warrants continued monitoring, protection measures, and mitigation efforts. The results from the 2009 and previous nesting seasons, existing protection measures, and recommendations for further mitigation are discussed below.

Protection measures in place for the mountain plover on the JIDPA include prohibition on surface disturbance activity from April 10 through July 10 within potential habitat until 2 surveys (3 surveys for large/scale long-term projects) show no nesting activity. Surface-disturbing activities must take place 72 hours post-survey completion where no mountain plovers are observed to avoid requirements to perform additional surveys. Formal surveys for mountain plovers are conducted on or after April 20, with the second survey following 14 days after the first survey (BLM2004). These surveys are performed by an operator-financed, BLM approved biologist in accordance with USFWS guidelines (USFWS2002). If breeding mountain plovers are observed within 0.25 mile of a proposed surface disturbance, activity will be postponed until July 10 with no additional surveys, or another survey will be implemented immediately prior to construction to search for active nests. A 0.25-mile buffer will be placed around active nests to prevent disturbance, and planned activities will be delayed 37 days or 1 week post-hatching (USFWS2002). Activities will be delayed 7 days when flightless chicks are observed (USFWS2002).

While limitations on activity potentially disturbing to mountain plovers may be helpful, the preservation of plover habitat is recognized as crucial to the health of this species. Identified mountain plover breeding sites should be maintained and protected.

An increase of development and presence of manmade structures near otherwise suitable mountain plover habitat can render such sites unusable to mountain plovers. Fences, windmills, soil piles and other installations can act as perches for raptors and for other

predators of mountain plovers. As mountain plovers will actively avoid such structures, it is recommended that existing unused fence, windmills, and other structures be removed from known mountain plover habitat and that installation of such impediments to plover breeding be avoided in these areas. Consideration to mountain plovers should also be given when designing mitigation efforts for other species. For example, a nesting platform being installed to benefit raptors might negatively affect mountain plovers if located in mountain plover nesting habitat.

Populations of native grazers such as pronghorn and prairie dogs should be protected, as these animals help to control grass height and density, benefits to the mountain plover. Prairie dog numbers have declined in some areas due to habitat loss, introduced sylvatic plague, and persecution by humans resulting in shooting and poisoning (Travsky and Beauvais 2005). If prairie dogs are not protected and allowed to perform their natural ecosystem functions, mountain plovers will lose another native grazer (the other being the American bison) upon which they depend for habitat creation.

Breeding site fidelity is prevalent among most shorebirds, including mountain plovers (Manning and White 2001). Both males and females return to the same breeding site (within 0.5 mile) annually (Graul 1973). Because mountain plovers exhibit nest site fidelity, returning annually to the same nesting locations (assuming they remain suitable), drilling activity planning with consideration to mountain plover breeding can be done with confidence in some areas. If known mountain plover habitat sites are deemed to be of low-quality and are not being used by mountain plovers as documented via repeated annual survey efforts, it may be appropriate to remove them from survey efforts.

Another potential threat to future breeding success of mountain plovers in the study area concerns the invasion of exotic grasses, such as cheatgrass (*Bromus tectorum*), into habitat (Dinsmore 2003). Cheatgrass is present on many reclaimed sites and moderately observed in native areas of the JIDPA and 3-mile buffer by Aster Canyon biologists in 2009. It is recommended that exotic plant invasions, especially with aggressive intruders

like cheatgrass, continue to be monitored and eradicated when found to prevent native habitat alteration.

Mitigation measures benefiting mountain plovers exist. Enhancing existing mountain plover habitat is possible. Provisions exist that are known to be beneficial to mountain plovers. Increasing acreage of identified habitat sites can be developed by seeding areas adjacent to existing mountain plover areas with native grasses (Smith and Keinath 2004). Reclamation sites seeded with native grasses and with non-native weeds controlled could increase the quality and possibly acreage of existing plover habitat. Managing grass and vegetative cover for height and density to benefit mountain plovers may be accomplished with rotational grazing or prescribed burn (Smith and Keinath 2004).

Continued nesting season surveys are crucial to maintaining current data for managing the mountain plover and potential human-plover conflict. Plentiful data will also aid in the understanding of the response of mountain plovers to ongoing human activity in the project area. Given the dynamic nature of landscapes, it is also recommended that the project area be continually assessed for the presence, extent, and health of mountain plover habitat. Mapping of potential mountain plover habitat should be conducted periodically to ensure that management is updated on existing field conditions. While some habitat may become unsuitable to mountain plovers over time, other areas may become suitable or new habitat discovered. Knowing which areas are important to mountain plovers and which are not will provide for sound management decisions. Known habitat sites should be evaluated for quality on a yearly basis because they may change annually.

5.0 LANDBIRDS

The JIDPA has historically provided shrub-steppe habitat for many avian species. Some species that inhabit the JIDPA are listed as sensitive species by the BLM and the United States Forest Service Rocky Mountain Region Two, and are included on the USFWS Birds of Conservation list. Birds that inhabit the JIDPA and are listed as sensitive species in Wyoming include; Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), loggerhead shrike, northern pintail (*Anus acuta*), burrowing owl, ferruginous hawk, mountain plover and greater sage-grouse (*Centrocercus urophasianus*) (Holmes and Johnson 2005). Please see the table of contents in this report for detailed information on independent monitoring efforts of burrowing owls, other raptors, mountain plovers, and greater sage-grouse. In addition to sensitive species listings, migratory birds that exist on the JIDPA (i.e. horned larks, common ravens) are protected by the Migratory Bird Treaty Act (USFWS2009b).

Olive-sided flycatcher perched on a sage bush within Sand Draw on the JIDPA

Inventories and monitoring for landbirds within the JIDPA was not required in 2009. However, general wildlife observations of landbirds in 2009 were recorded during surveys for other species (Map 7). For the purpose of this report we include all birds except raptors, sage-grouse, and mountain plovers, and commonly seen birds of less concern such as the horned lark, in the landbird section. Please see Table 6 for an overview of land bird species recorded.

Table 6. Landbird species recorded as general wildlife observations in 2009.

Species	Number of Observations Made	Numbers of Individuals Observed
American Avocet	1	2
Brewer's Sparrow	17	26
Chipping Sparrow	1	1
Common Nighthawk	1	1
Dark-eyed junco	1	1
Green-winged Teal	1	4
Killdeer	2	2
Loggerhead Shrike	22	26
Long-billed Curlew	1	20
Mountain Bluebird	1	1
Northern Harrier	3	3
Northern Mockingbird	1	1
Olive-sided Flycatcher	1	1
Red-naped Sapsucker	1	1
Red-necked Phalarope	1	1
Sage Sparrow	30	48
Sage Thrasher	33	38
Spotted Sandpiper	1	1
Vesper Sparrow	1	1

Long-term protection of sagebrush habitat on the JIDPA is essential for the survival of landbirds in this area. Sagebrush obligate passerine populations are decreasing in disturbed habitat due to development (Madson 2006), even in areas with dirt roads and low traffic (Ingelfinger 2001). In order to protect avian species, sagebrush expanses should be preserved as much as possible, especially areas including rock outcroppings, intermittent stream beds, and large expanses of sagebrush undisturbed by roads.

This year EnCana continued to implement the *Avian Protection Plan* and installed USFWS approved netting on open evaporation ponds to prevent any birds or wildlife from entering or becoming entrapped in the open water.

6.0 GREATER SAGE-GROUSE

Ever-present in recent Wyoming and national news headlines, the greater sage-grouse is a characteristic feature of big sagebrush ecosystems, such as those found within the JIDPA and much of Wyoming. Greater sage-grouse can be found in a variety of sagebrush habitat types, as variation is typical of sagebrush habitat (Schroeder et al. 1999). Variation in topography, vegetative species and heights, substrate, etc. allows for sage-grouse to select shelter and nest sites as seasonal conditions dictate. Thus, sage-grouse thrive and depend on a mosaic of healthy sagebrush landscapes (Connelly et al. 2000).

Greater sage-grouse numbers have declined dramatically throughout western North America (Braun 1998). Sage-grouse mortality is known to result from human activity including from farm equipment, moving vehicles, power lines, fences, livestock, and pesticides (Barber 1991). Alteration and destruction of habitat, however, has been most detrimental to sage-grouse populations. The greater sage-grouse formerly occurred in 16 states and three Canadian provinces, but has been extirpated from 5 states and 1 Canadian province. In the remaining states, sage-grouse have experienced a reduction in range due to habitat alteration and destruction. Millions of hectares of sagebrush habitat has been converted for crop cultivation and millions more have been treated to remove sagebrush. Urbanization and heavy livestock grazing pressure has degraded the remaining habitat (Schroeder et al. 1999). Due to the fact that sage-grouse are dependent upon sagebrush for habitat and food (Connelly et al. 2000), the removal of sagebrush has a negative affect on sage-grouse abundance (Braun et al. 2002).

Additional threats to sage-grouse result from mining and natural resource development. Traffic and noise near lek sites may impact display activity in these breeding areas. Most nest abandonment is also the result of direct or indirect disturbance from human activity (Schroeder et al. 1999).

Greater Sage-Grouse Objectives

This study serves to provide interested parties with information on the seasonal use of habitat within the JIDPA by greater sage-grouse. It is designed to follow the WMPP directed by the 2006 ROD.

The primary objectives of the study were:

1. To search for greater sage-grouse within specified survey areas and locate any sign of foraging, nesting and/or sign of roost pellets within survey areas for determination of potential sage-grouse seasonal use.
2. To provide sage-grouse seasonal use data for the JIDPA as per the ROD and a planning meeting with BLM biologists.
3. To provide a sage-grouse seasonal use database for a ground truth of habitat modeling analysis efforts on the JIDPA.
4. Provide recommendations for future monitoring and management of sage-grouse in the JIDPA.

6.1 Greater Sage-Grouse Methods

Surveys conducted in 2009 consisted of visual searches for sage-grouse sign on the northern half of the JIDPA, as requested by the BLM. Surveys were conducted between July 16 and July 24, 2009, by Nicole Thiele, Chris Eardley, William Daut, and Joslin Heyward. A total of eight days were spent surveying for sage-grouse sign and covered 33 sections.

Two methods of sage-grouse surveys have been utilized to monitor the presence/absence of sage-grouse over the past 3 years. In 2007, nesting surveys were performed within the northern portion of JIDPA and 3-mile buffer area with the assistance of trained pointing dogs to locate live birds.

Surveys conducted in 2008 involved visual searches for sage-grouse and sign by biologists walking circular transects following in the southern portion (areas not covered during 2007). For 2009 surveys, the technique used mirrored that used in 2008: a ground search by biologists trained in the visual identification of sign left by sage-grouse along circular transects, following; Human Visual Identification of Greater Sage-grouse Sign In the Jonah Infill project area prepared by Aster Canyon in 2008 (Appendix C-2). The surveys performed in 2009 took place in the northern potion of the JIPDA much like the 2007 surveys but included less of the 3-mile buffer. We did not cover areas within the buffer that could cause a possible disturbance to sage-grouse already in a study taking place on the Pinedale Anticline Natural Gas Field. The surveys were conducted during normal daylight hours when sage-grouse sign would be easily visible. No adverse weather was encountered which would have made identification of sage-grouse sign difficult.

A female greater sage-grouse observed in Sand Draw.

Within the study area the following protocols were observed:

- GIS coordinates for the center of each JIDPA section were located using ArcMap software.
- Two circular transects per JIDPA section were walked by biologists; one each at 0.40-mile and 0.20-mile from the center of each section. Biologists utilized Garmin Rino hand-held GPS units to maintain transect routes.

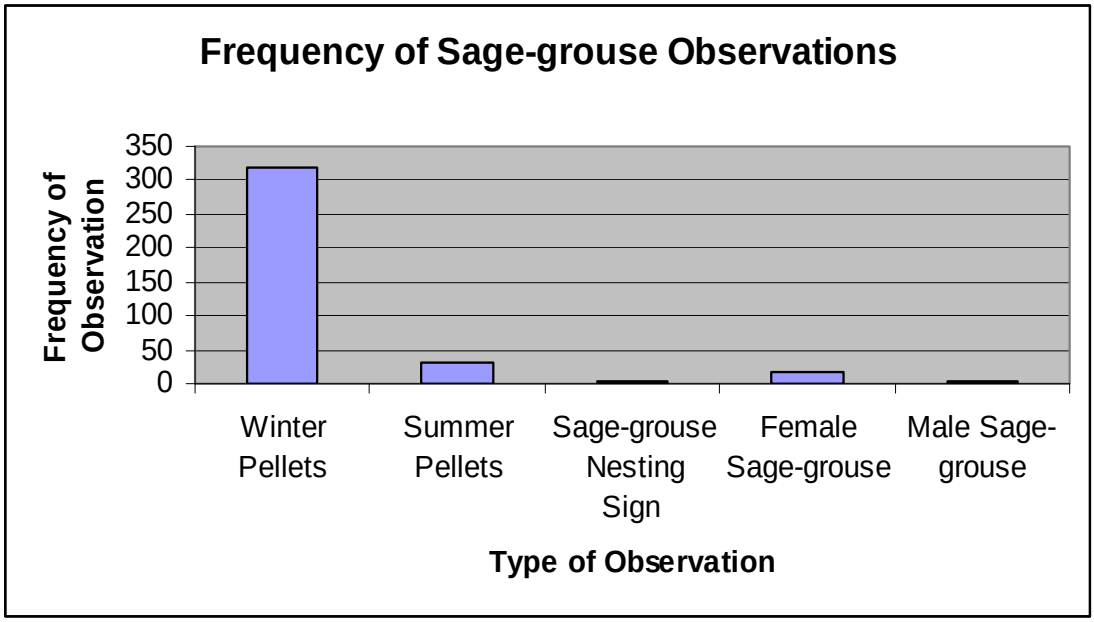
- Once sage-grouse or sage-grouse sign was located, a GPS waypoint and appropriate field notation were recorded.
- Sign was recorded using alphanumeric codes according to the sage-grouse code list developed by Aster Canyon (Appendix C-2). Typical sign included: roost pellets, and foraging pellets. Season and year of the sign was determined according to the color, extent of sun bleaching, texture, shape, and content (i.e. sage, insects) of the pellets.
- Data collected in the field was post-processed at the office of Aster Canyon.

6.2 Greater Sage-Grouse Results

Aster Canyon conducted a greater sage-grouse sign survey in 2009 and recorded typed (i.e. roost, forage) and ages (i.e. 2008, 2009) of sign in order to identify habitat use and trends. This is the third year that sage-grouse surveys has been conducted, the second year surveying the northern portion of the JIDPA. Data from 2007, 2008, can be found in Aster Canyon's 2007 and 2008 Jonah Reports. Caution should be used when comparing trends due to the change in methods over the past 3 years and the change in study areas.

Figure 4 displays frequency of sign found in 2009. These observations consisted of the following: 89 roost pellet groups from the winter of 2009; 135 roost pellet groups from the winter of 2008; 40 scattered foraging pellets from the winter of 2009; 56 scattered foraging pellets from the winter of 2008; 13 summer roost pellets from the 2009 nesting season; 4 summer roost pellets from the 2008 nesting season; 8 scattered summer foraging pellets from the 2009 nesting season; 4 scattered summer foraging pellets from the 2008 nesting season; 1 scattered summer foraging pellet sighting from multiple years; 1 clocker from the 2008 nest year; 2 sage-grouse egg shells; 18 female sage-grouse (6 sightings); and 2 male sage-grouse (1 sighting).

Figure 4. Number of each category of sage-grouse sign observed in 2009 JIDPA surveys.



Most of the sage-grouse sign located during the 2009 survey was found in areas of little human development, outside of well pad boundaries.

Most of the sage-grouse sign seen across the years consisted of pellets. Winter pellets were seen considerably more frequently than summer pellets. This is possibly due to the fact that summer pellets contain large quantities of insect remains, making the pellets fairly coarse. This may cause them to break down more quickly than the winter pellets which consist almost entirely of sagebrush leaves (Patterson 1952).

Typical winter roost pellets

Another reason more winter pellets were found than summer pellets is because winter pellets are much easier to find due to their bright white color resulting from sun bleaching.

6.3 Greater Sage-Grouse Mitigation and Protection Measures

Greater sage-grouse are widely considered in scientific and public arenas to be a species of significant conservation concern (Connelly and Braun 1997, Schroeder et al. 1999). In response to these concerns, states and provinces inhabited by sage-grouse have implemented extensive conservation efforts. Despite the ruling that the species did not warrant listing as endangered or threatened under the Endangered Species Act in December 2004, protection measures do exist for this species.

Existing sage-grouse protection measures, as outlined in the 2006 ROD, include: avoiding disturbance of leks during the breeding season; avoidance of nesting habitat within a 2-mile lek buffer; and as deemed appropriate, habitat disturbance outside the lek buffers is prohibited during March 15 - July 15. Surface disturbance activities are prohibited within 0.25 mile of the perimeter of leks, and human activity in these areas is to be avoided between 8:00 and 20:00 from March 1 to May 15. Compressor stations are to be placed at least 2-miles away from lekking areas. Nest surveys are required prior to construction activities within identified nesting habitat. Optimal sage-grouse nesting habitat is to be avoided. Such habitat is identified by the BLM as consisting of: sagebrush heights of 20-31 inches; 15-25% average cover; and an understory cover of >15% (BLM 2006).

The relatively random distribution of nests in relation to lek location indicates that most effort should be directed towards management of specific nesting habitat, regardless of hypothetical distances between leks and nests (Wakkinen et al. 1992). A study found some female sage-grouse nested >12.4-miles from their original nest site in consecutive years in habitat fragmented by natural gas development in Wyoming (Schroeder and Robb 2003).

During the sage-grouse strutting period (March 1-May 15), Jonah Field Operators have agreed to avoid all drilling and construction activities. Directional drilling practices are

to be implemented to access resources beneath the 0.25-mile active sage-grouse lek buffer and beneath a 600-foot buffer of Sand Draw (BLM 2006).

While existing measures may do well to protect sage-grouse breeding areas and breeding periods, overall habitat management to benefit sage-grouse is recommended. Habitat management should be focused on: avoiding fragmentation of habitat, maintaining wildlife corridors within landscapes, the seasonal distribution of habitat, and quality and quantity of habitat necessary to support minimum viable populations (Braun et al. 1994). Additionally, operators are encouraged to make use of drilling rigs that have noise-reducing equipment, manage water availability to enhance or maintain sage-grouse habitat, and to develop new technologies that would reduce the disturbance of sage-grouse habitat.

Braun 2006, summarizes critical habitat management considerations, many of which are applicable to the JIDPA (Braun 2006). Because the JIDPA is part of an area used by a large existing sage-grouse population, habitat management that maintains the present abundance and distribution of sage-grouse should be a priority.

Structures can be used as perches by raptors, a predatory threat to sage-grouse. Since sage-grouse will avoid areas in proximity to potential raptor perches, it is also recommended that unused structures, such as windmills, be removed. Surveying sage-grouse leks provides the best measurement of management success.

Sage-grouse pellet transects, such as those conducted by Aster Canyon in 2009, provide an easy way to measure continued use of previously used areas, as well as expansion of birds into vacant or former habitat (Braun 2006).

Enhancing habitat for sage-grouse or restoring lost habitat is also recommended for the JIDPA. Steps should also be taken to ensure that reclaimed areas are characterized by native vegetation and that invasive weeds are controlled. Non-native species can alter the characteristics of habitat upon which sage-grouse rely. Areas infested with cheatgrass, a

concern on the JIDPA, are susceptible to increased fire frequency, which can be detrimental to healthy sagebrush ecosystems (Schroeder et al. 1999).

The JIO has proposed numerous off-site mitigation projects underway to protect sage-grouse habitat in the Upper Green River Valley. Specifically, these include: the provision of drinking water and habitat improvement for sage-grouse; the installation of wildlife escape ramps in existing range water tanks, and the conservation of sage-grouse habitat.

Wyoming represents an essential segment of remaining sage-grouse range, as the species is found in most of the state (Schroeder et al. 1999). As sage-grouse habitat comes under increasing pressure in the state from a variety of interests, it is important that management decisions lend consideration to this BLM Wyoming *sensitive species*. Habitat protection and mitigation measures may assist in the preservation of the greater sage-grouse within the JIDPA, an important sage-grouse habitat area for Wyoming and overall sage-grouse populations. Through ongoing efforts from conservation groups, the oil and gas industry, and government departments, and applying the most current data with present management strategies and sufficient funding, it is possible to ensure the long term survival of the greater sage-grouse within the JIDPA.

7.0 PYGMY RABBIT

The smallest member of the family Leporidae (hares and rabbits), the pygmy rabbit (*Brachylagus idahoensis*) is considered a BLM Sensitive Species (Appendix E). The pygmy rabbit was petitioned for consideration as a threatened and endangered species under the U.S. Endangered Species Act with the USFWS on January 8, 2008 (Department of the Interior United States Fish and Wildlife Service 2008). A decision resulting from a 12 month status review to determine its substantiation for petition has not yet been released.

Additionally, the pygmy rabbit is classified as a WGFD Species of Special Concern, with a Native Species Status of 3, because populations are restricted in distribution, and because its habitat is vulnerable, although there is no ongoing significant loss of habitat. The pygmy rabbit is considered rare in Wyoming and is listed as a Species of Greatest Conservation Need.

Pygmy rabbit observed on the JIDPA. This individual was found along Sand Draw.

Pygmy rabbits occur in swales of taller, denser sagebrush in a setting of hillsides with thinly distributed, shorter sage and occur patchily, rather than evenly over a landscape. The pygmy rabbit is uniquely dependant on sage brush, which comprises up to 99% of its winter diet (Wyoming Game and Fish Department 2006). Tall sagebrush and deep soils are the two main features of pygmy rabbit habitat. Pygmy rabbits, however, may also occupy habitat with shorter sagebrush and soil of lesser quality.

Pygmy rabbits are important members of sagebrush ecosystems. As one of only 2 leporid species in North America known to excavate its own burrows, the rabbit provides burrows and tunnels used by a variety of vertebrate and invertebrate species (Wyoming

Game and Fish Department 2005a). Additionally, pygmy rabbits are an important food source for many species (Keinath and McGee 2004).

Inventories of pygmy rabbits and monitoring their existing and known burrow complexes within the JIDPA and the surrounding 3-mile buffer were not required in 2009, and such surveys are only required every 3 years. In 2009, however, 3 pygmy rabbit sightings (Map 7) were recorded as general wildlife observations during surveys for other species. Pygmy rabbit surveying is next scheduled for the JIDPA in 2010.

Present threats to pygmy rabbits include habitat loss, alteration, and fragmentation and a present lack of information on the species. Efforts to identify and preserve existing key pygmy rabbit habitat on the JIDPA, such as mature stands of sage brush and drainage areas will be important to supporting pygmy rabbit populations. Habitat corridors between identified key habitats will be important in assuring gene flow between population patches, a critical component of a healthy overall population (Wyoming Game and Fish Department 2005b). Finally, much work remains to be done with regard to what is known about the pygmy rabbit. Frequent monitoring will enhance what is known about pygmy rabbit populations and their habitat requirements on the JIDPA. Support of research on pygmy rabbits will help in understanding how to manage the species, how to mitigate potential threats to the species, and how to ensure a future for pygmy rabbits and ecosystem integrity on the JIDPA.

8.0 WHITE-TAILED PRAIRIE DOG AND BLACK-FOOTED FERRET

The black-footed ferret (*Mustela nigripes*) is a federally listed endangered species under the United States Endangered Species Act (United States Fish and Wildlife Service 2009a). Inventories for the black-footed ferret were not required in 2008 or 2009 because the area has been block-cleared for this species, as the species is assumed to be absent from the JIDPA (USFWS pers. comm. 2008).

In May of 2008, the USFWS initiated a status review of the white-tailed prairie dog (*Cynomys leucurus*) to determine if it warrants protection as a threatened/endangered species. The results of this review are scheduled to be submitted to the U.S. Federal Register by June 1, 2010 (United States Fish and Wildlife Service 2009c).

White-tailed prairie dog towns provide important habitat for species such as mountain plover, burrowing owl, several species of rabbit, and black-footed ferret through their burrowing, vegetation-clearing, and soil moving activities, (Korfanta et al. 2001, Dinsmore 2003, Esch et al. 2005).

Prairie dog stands sentry on the JIDPA in 2009.

While Aster Canyon did not conduct prairie dog surveys in 2009, we did conduct prairie dog point count surveys in the mountain plover habitat assessments per the methods presented by Douglas A. Keinath and Donna Ehle for the Cheyenne, WY BLM in 2001. Mountain plovers are one species known to associate closely with prairie dog towns, as prairie dog activity results in the low and sparse vegetative height favored by mountain plovers (Knopf and Wunder 2006). In its 2009 habitat assessments, Aster Canyon observed prairie dog towns in each of the five mountain plover habitat sites where mountain plovers were observed. Each of the 28 mountain plover observations in 2009 occurred within sites

featuring prairie dogs. Prairie dog activity ranged from low to high, per the standards presented by Keineth and Ehle. The mere presence of prairie dogs, even in low numbers, appeared to benefit habitat for mountain plovers on the JIDPA. Table 7 summarizes the results of 2009 mountain plover habitat assessments with regard to prairie dog presence/absence.

Table 7. Mountain plover sightings relative to prairie dog presence/absence on JIDPA mountain plover habitat sites.

Site	P-dog activity	Mountain Plover presence
1	**Low**	**Yes**
4	None	No
6	Low	No
8	None	No
10	None	No
13	None	No
14	None	No
15	None	No
16	None	No
17	**Low**	No
18	**Low**	No
19	None	No
20	None	No
21	None	No
22	None	No
24	Low	No
25	Low	No
26	**Medium**	**Yes**
27	**Medium**	**Yes**
28	None	No
29	**Low**	**Yes**
30	**High**	**Yes**
31*	None	No
32	Low	No
33	Low	No
34	Low	No
35	Low	No
38	None	No

*Section 31 Township 29N, Range108W was surveyed as requested by the Pinedale BLM.

Prairie dogs influence vegetative structure, nutrient cycling, and ecosystem processes (Coppock et al. 1983). Prairie dog grazing facilitates below ground herbivory where much of the energy flows in some ecosystems (Ingham and Detling 1984). As a result, prairie dog colonies support higher numbers of nematodes and higher levels of soil nitrogen (Ingham and Detling 1984). This provides plants with a higher nutritional content, higher digestibility, and a greater ratio of live plants to dead plants, all of which help to create favorable feeding habitat for other herbivores. Prairie dogs contribute greatly to soil turnover (Whicker and Detling 1988), which increases the incorporation of nutrients into the soil and reverses compaction, allowing for deeper penetration of precipitation into the soil for plants (Munn 1993). The burrow system of prairie dogs also provides a third dimension of available habitat structure in an otherwise two dimensional landscape. Further, prairie dog colonies provide a stable abundance of prey for predators (Miller et al. 2000).

Prairie dog numbers have declined in some areas due to habitat loss, introduced sylvatic plague, and persecution by humans resulting in shooting and poisoning (Travsky and Beauvais 2005). Since white-tailed prairie dogs provide forage and habitat for a variety of wildlife, it is important to identify the shift in their towns over time and implement monitoring and protection measures. Accordingly, protection of this keystone species provides additional security for those sensitive species dependent on prairie dogs. The BLM requires re-mapping of prairie dog towns every 3 years, which is necessary in order to monitor plague events and other species of concern which rely on these habitats.

With a decision on the status review of the white-tailed prairie dog due in 2010, management of this species may be on the verge of changing significantly. Prairie dogs are an integral part of the JIDPA ecosystems, reducing the destruction of prairie dog towns is recommended for the benefit of the ecosystem.

A white-tailed prairie dog family enjoying the spring on the JIDPA.

9.0 BIG GAME

Inventories and monitoring for big game within the JIDPA was not required by Aster Canyon in 2009. Pronghorn antelope were the single species of big game observed within the JIDPA this year. The JIPDA is highly used by pronghorn during all times of the year. Aster Canyon has observed a group of approximately 1000 during the winter months, fawns have been seen being born during the spring, and pronghorn forage on the JIDPA and 3-mile buffer during the summer. Although ubiquitous on the JIDPA and throughout the Green River Basin, natural gas development and private housing subdivisions may be detrimental to pronghorn winter ranges and migration routes in these areas (Sawyer and Lindzey 2000).

A pronghorn antelope and her fawn

Extensive energy development on the JIDPA can have a negative impact on pronghorn distribution; however, there is also evidence that some pronghorn on the JIDPA do not avoid areas with high levels of human activity (Berger et al. 2007). This species warrants continued management to monitor pronghorn behavior in relation to energy development. Currently multiple studies are underway to enhance knowledge of the pronghorn in the Upper Green River Valley.

10.0 GENERAL WILDLIFE

Aster Canyon biologists recorded observations of rare, unusual, and elusive wildlife while surveying for target species in 2009. To efficiently utilize inventory efforts, common species such as ravens, mountain cottontail rabbits (*Sylvilagus nuttallii*), pronghorn, prairie dogs, white-tailed jackrabbits (*Lepus townsendii*), and horned larks were not documented. The data in this section includes only incidental observations while conducting other inventory efforts in the study area.

Wild horse observed in June 2009 on the JIDPA.

10.1 General Wildlife Methods

As per the WMPP, observations were made in accordance with the Wyoming Observation System (WOS) created by the WGFD. Species documented during specific surveys were not reported as part of the general wildlife observations. For example, mountain plovers observed during mountain plover surveys and greater sage-grouse recorded during sage-grouse surveys were not included. Mountain plovers and greater sage-grouse observed during surveys for other species, however, were recorded.

10.2 General Wildlife Results

A total of 33 different species and 234 individuals were recorded during the 2009 field season (Table 8). Incidental sightings were made throughout the JIDPA 3-mile buffer (Map 7). Raptors and songbirds were the most commonly recorded species. Raptors were regularly seen perched on various natural and manmade structures, including fences, condensate tanks, and power-line poles and were frequently seen hunting on the

JIDPA. Most of the shorebird species were seen in the beginning of the summer when water was plentiful in reservoirs and ditches. Although sightings of wild horses were minimal, a large amount of sign from these animals was seen in the southern portion of the JIDPA buffer. Many ravens, cottontail rabbits, pronghorn antelope, prairie dogs, horned larks and jackrabbits were seen throughout the JIDPA so were not considered uncommon enough to include in the incidental wildlife sightings. Other notable species sighted included badger, coyote, pygmy rabbit, long-eared owl, burrowing owl, red-naped sapsucker, and green-winged teal. Incidental wildlife sightings are summarized in Table 8 below.

A mother coyote seen with her pups within Sand Draw

Table 8. General wildlife observations with number of observations made.

Species	Number of Observations Made	Numbers of Individuals Observed
Birds		
American Avocet	1	2
Brewer's Sparrow	17	26
Burrowing Owl	3	3
Chipping Sparrow	1	1
Common Nighthawk	1	1
Dark-eyed junco	1	1
Ferruginous Hawk	7	9
Golden Eagle	9	9
Greater Sage-Grouse	6	13
Green-winged Teal	1	4
Killdeer	2	2
Loggerhead Shrike	22	26
Long-billed Curlew	1	20
Long-eared Owl	1	1
Mountain Bluebird	1	1
Mountain Plover	2	2
Northern Harrier	3	3
Northern Mockingbird	1	1
Olive-sided Flycatcher	1	1
Red-naped Sapsucker	1	1
Red-necked Phalarope	1	1
Red-tailed Hawk	2	2
Sage Sparrow	30	48
Sage Thrasher	33	38
Spotted Sandpiper	1	1
Swainson's Hawk	1	1
Prairie Falcon	1	1
Vesper Sparrow	1	1
Mammals		
Pygmy Rabbit	3	3
Wild Horse	1	1
Badger	2	2
Coyote	4	6
Reptiles		
Greater Short-horned Lizard	2	2

10.3 General Wildlife Discussion and Recommendations

The JIDPA is used by a diversity of breeding, migratory, wintering, and transient species. Thus, management recommendations for general wildlife are broad. Vehicle traffic on the JIDPA is one central threat to wildlife. Decreasing vehicle-wildlife collisions should be a goal of general JIDPA wildlife management. Minimizing traffic levels, maintaining speed limits, and educating JIDPA workers on how to drive with wildlife in mind are all means of lessening the frequency of such collisions. Controlling the amount of disturbance that occurs throughout the field by disturbing only as much as is necessary and seeking ways to lessen impact will keep habitat alteration minimal. Due to the arid climate on the study area, water sources are especially critical for wildlife. Avoiding further development near seasonal and permanent water will benefit all wildlife.

Coyote pup observed within Sand Draw

Human structures such as fences, windmills, and condensate tanks are actively avoided by some species such as sage-grouse and mountain plovers, as they may serve as artificial perches for predatory raptors. Fences have the additional distinction of being directly injurious to wildlife as well as habitat-fragmenting barriers to wildlife movement. Aster Canyon recommends that unused installations such as fences and windmills be removed from the JIDPA. Areas of importance to various wildlife species include draws and creek beds, which tend to provide more cover due to the denser and older sagebrush, rocky outcrops, and bluff areas. These areas should be lent special consideration in planning processes as they are crucial to wildlife as shelter, foraging, and breeding sites, and movement corridor sites.

LIST OF ACRONYMS

Agencies and Companies:

BLM = Bureau of Land Management
JIO = Jonah Interagency Mitigation Office
TRC = TRC Mariah Associates, Inc.
USFWS = United States Fish and Wildlife Service
WGFD = Wyoming Game and Fish Department
WLCI = Wyoming Landscape Conservation Initiative
WWNRT = Wyoming Wildlife and Natural Resource Trust

Other:

EIS = Environmental Impact Statement
ESA = Endangered Species Act
GIS = Geographic Information Systems
GPS = Geographic Positioning Systems
JIDPA = Jonah Infill Drilling Project Area
NEPA= National Environmental Policy Act
ROD = Record of Decision
SGCN = Species of Greatest Conservation Need
TEPC = Threatened, Endangered, Proposed, and Candidate Species
WMPP = Wildlife Monitoring Protection Plan
WSS = Bureau of Land Management Wyoming Sensitive Species

LIST OF DEFINITIONS

Artificial nesting structure = manmade structures placed in suitable nesting habitat to encourage birds to nest in the area. Artificial nesting structures for raptors usually consist of a telephone pole with a platform atop it.

Cecal cast = large, dark-green brown, liquid-like deposits from greater sage-grouse, which tend to be deposited once a day, usually in the morning

Clocker = larger-than-normal intestinal droppings, 4-8 cm long and 1-3 cm in diameter. Females deposit these during incubation when feeding away from nests or near nest at time of hatching.

Elusive = used to describe a species that is rare or secretive and not easily detected.

Fidelity = quality or characteristic of being faithful. For birds, this is often used to refer to individuals that return to the same breeding ground on an annual basis.

Fledgling = young bird that has recently acquired its flight feathers or has just become capable of flying, are often still dependent on their parents for food for a week or more.

Keystone species=a species whose activities have a significant role in determining community structure.

Lek = gathering place of male greater sage-grouse to attract females for breeding by strutting and displaying; are adjacent to or in sagebrush-dominated habitat and typically are surrounded by potential nesting habitat.

Obligate = restricted to a particular condition of life, necessary for survival

Passerine = of, belonging, or pertaining to the order Passeriformes, comprising more than half of all birds and typically having the feet adapted for perching

Playa = round, seasonal depressions in the surface of the ground that fill with rainwater. The impermeable clay bottoms hold water for long periods through rainless months.

Seral = relating to a series of ecological communities formed in ecological succession

Strutting = a behavioral pattern combining wing swishes with a variety of sounds and tail rattles by male greater sage-grouse to attract females during the breeding season.

Whitewash = bird defecation, white in color, easily visible, and often indicating a nest or perch site.

COMMON AND SCIENTIFIC NAMES OF SPECIES PRESENTED IN THIS REPORT

COMMON NAME	SCIENTIFIC NAME
Birds	
American avocet	*Recurvirostra americana*
American kestrel	*Falco sparverius*
Bald eagle	*Haliaeetus leucocephalus*
Brewer's sparrow	*Spizella breweri*
Chipping sparrow	*Spizella passerina*
Common nighthawk	*Chordeiles minor*
Common raven	*Corvus corax*
Dark-eyed junco	*Junco hyemalis*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Greater sage-grouse	*Centrocercus urophasianus*
Green-winged teal	*Anas carolinensis*
Horned lark	*Eremophila alpestris*
Killdeer	*Charadrius vociferous*
Loggerhead shrike	*Lanius ludovicianus*
Long-eared owl	*Asio otus*
Mountain bluebird	*Sialia currucoides*
Mountain plover	*Charadrius montanus*
Northern harrier	*Circus cyaneus*
Northern mockingbird	*Mimus polyglottos*
Northern pintail	*Anas acuta*
Olive-sided flycatcher	*Contopus cooperi*
Prairie falcon	*Falco mexicanus*
Red-naped sapsucker	*Sphyrapicus nuchalis*
Red-necked phalarope	*Phalaropus lobatus*
Red-tailed hawk	*Buteo jamaicensis*
Sage sparrow	*Amphispiza belli*
Sage thrasher	*Oreoscoptes montanus*
Short-eared owl	*Asio flammeus*
Spotted sandpiper	*Actitis macularia*
Swainson's Hawk	*Buteo swainsoni*
Vesper sparrow	*Pooecetes gramineus*
Western burrowing owl	*Athene cunicularia*
Mammals	
American badger	*Taxidea taxus*
American bison	*Bison bison*
Black-footed ferret	*Mustela nigripes*
Coyote	*Canis latrans*

Ground squirrels	*Spermophilus* spp.
Mountain cottontail	*Sylvilagus nuttallii*
Pronghorn	*Antilocapra americana*
Pygmy rabbit	*Brachylagus idahoensis*
White-tailed jackrabbit	*Lepus townsendii*
White-tailed prairie dog	*Cynomys leucurus*
Wild horse	*Equus ferus*

Plants

Cheatgrass	*Bromus tectorum*
Rabbitbrush	*Chrysothamnus* spp.
Sagebrush	*Artemisia* spp
Saltbrush	*Atriplex* spp.
Wyoming big sagebrush	*Artemisia tridentata* var. *wyomingensis*

Reptiles

Greater short-horned lizard	*Phyrnosoma hernadesi*

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