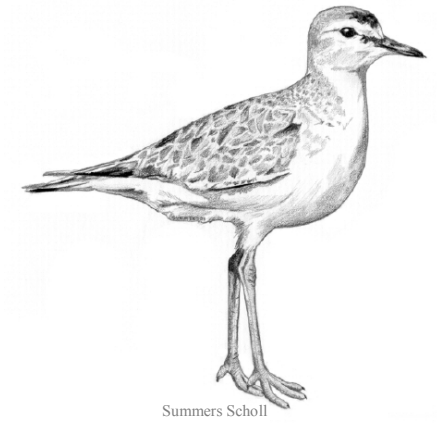
Survey for Mountain Plover (*Charadrius montanus*) on Federal Lands in the Powder River Basin



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Executive Summary

The Wyoming Natural Diversity Database (WYNDD) conducted a presence-absence survey for mountain plovers in Wyoming's Powder River Basin during the spring of 2001 under a contract to the Bureau of Land Management's (BLM's) state office in Cheyenne. The survey area consisted of a large portion of the basin for which the BLM is developing an environmental impact statement (EIS) to identify and quantify the potential biological consequences of coalbed methane development. WYNDD surveyed the eastern half of the EIS area, while Western Ecosystem Technologies, Incorporated (WEST) surveyed the western half. During this survey, WYNDD technicians documented 9 sightings of mountain plovers concentrated in two locations within their survey area, and a BLM employee documented one more sighting (Figures 3 and 6). Only 2 of these sightings fell within the EIS boundary, and both of these were on private land. Further, habitat quality on survey routes was documented and, although there appeared to be a fair amount of suitable plover habitat in the Powder River Basin, it seemed to be somewhat sparse and fragmented. This makes those limited areas with larger tracts of contiguous high-quality mountain plover habitat more valuable. In particular, large, flat, sparsely vegetated grasslands with active prairie dog towns are important. Finally, the limited documentation of plovers in this survey effort is not conclusive evidence that plovers do not occur in the areas we surveyed. Moreover, due to private landowner considerations, our surveys were restricted to publicly maintained roads, which greatly reduced the area we where able to effectively survey. In short, small numbers of mountain plovers appear to use portions of the Powder River Basin where highly suitable habitat exists, and our survey likely underestimated the extent of this use due to the fragmented distribution of such habitat in the basin and logistical restrictions placed on our survey effort.

Introduction

The mountain plover (*Charadrius montanus*) was proposed for listing as threatened under the U. S. Endangered Species Act (ESA) by the U.S. Fish and Wildlife Service (FWS) on February 16, 1999, based on evidence of large, range-wide declines in abundance. Mountain plovers breed in short-grass prairies and shrub-steppe landscapes of the Rocky Mountain states from Canada south to Mexico. The FWS noted in the proposal that most known breeding birds occurred in Montana and Colorado, although there is evidence that Wyoming may also contain sizable breeding populations,

primarily in the southeast and south-central portions of the state. These birds over-winter mainly on grasslands or similar landscapes in California, with fewer occurrences in Arizona, Texas, and Mexico. The FWS noted conversion of grassland habitat, agricultural practices, management of domestic livestock, and decline of native herbivores as factors likely contributing to the mountain plover's decline. Pesticides may also be a factor contributing to the decline of mountain plovers, but their effects are not completely understood.

The FWS encourages consideration of proposed taxa in local and statewide land used planning efforts and in federal environmental planning, such as Environmental Impact Analyses (EIA) conducted under the National Environmental Policy Act of 1969 (NEPA). As a result, the mountain plover became a management priority for the Wyoming BLM, which has subsequently attempted to incorporate mountain plover conservation practices into its multiple-use management practices. In the last few years, there has been extensive current and proposed development of land in Wyoming's Powder River Basin for the extraction of coalbed methane. Much of the surface ownership of land in the Powder River Basin is private (Figure 1), but the BLM still has significant land ownership in the area and owns most of the subsurface mineral rights. It is not clear to what extent mountain plovers occur in the Powder River Basin, so the BLM initiated a basin-wide survey effort to survey for mountain plovers and identify areas of potential plover occupation, of which this study is part.

Methods

Staff of the Wyoming Natural Diversity Database (WYNDD) surveyed portions of BLM's Casper, Buffalo, and Newcastle Field offices for mountain plovers from mid-April through June 5, 2001. Areas of potential plover occupation encompassed by the BLM's coalbed methane environmental impact statement (EIS) were identified based on a habitat model developed by WYNDD (Keinath, 2001; Beauvais and Smith, 1999), historic prairie dog town maps (Reeves, 1988; George Soehn, pers. comm.; Larry Gerard, pers. comm.; Gary Lebsack, pers. comm.), documented plover occurrence data from WYNDD (Figure 2). The main focus of efforts was within the boundary of the coalbed methane EIS, as established by BLM officials, but suitable habitat was investigated outside this range as time permitted.

The protocol used to conduct surveys was a modification of the official USFWS protocol (USFWS, 1999) involving the use of breeding call play-backs. Initial, cursory surveys were driven though much potential habitat to determine habitat suitability. Due to complex surface ownership and the difficulty of obtaining consent from private landowners, survey routes were limited to publicly maintained roads in all areas with private surface ownership. Formal

survey transects were located in habitat deemed to be at least marginally suitable for mountain plovers based on current knowledge of habitat use (e.g., UWFWS, 1999; Knopf, 1996). Transects were driven from dawn until 10 AM and from 5 PM until dusk. Stops where made every half-mile along each transect, at which points technicians played three or four cycles of the recorded plover breeding call (approximately 40 seconds of call) while scanning the area with the naked eye and 10X binoculars. They continued to scan the area with the naked eye and binoculars for 3-5 additional minutes, while listening for possible answering calls from mountain plovers. If a mountain plover was potentially sighted, the tape was played again for several cycles to draw birds closer to the observer and a few more minutes were spent to confirm identification.

In addition to standard data on transect points technicians also ranked the habitat suitability of each survey point on a three-tiered categorical scale and documented any evidence of recent or historical prairie dog activity (see Attachment 1). Incidental observations of species on the BLM species of concern list were also recorded on an opportunistic basis throughout the survey season.

Results and Discussion

During the survey period we observed a total of 11 mountain plovers, which were concentrated in 2 areas (Figures 3 and 6). One of these groups consisted of 6 sightings of 7 or 8 birds (one sighting may have been a of a previously seen bird) that clustered north and west of Casper near the town of Waltman (e.g., Figure 8). Although these sightings were within the Casper Field Office, they were outside the coalbed methane EIS boundary. The land in the vicinity of these sightings was of mixed federal, state, and private ownership. Three of the sightings appeared to be on BLM land and the remaining three were on private land. No plover nests were found during subsequent nest surveys in these locations (conducted in June), so we are unable to comment on breeding in this area.

The other group of sightings centered around known plover habitat in the Thunder Basin National Grasslands that immediately borders the southeastern edge of the EIS boundary (e.g., Figure 9). This group consisted of three sightings of individual mountain plovers (one of which was a potential re-sighting of a previously seen bird). One of these sightings fell within the EIS boundary (Figure 3). As with the previous group of sightings, no plover nests were found during subsequent nest surveys in these locations, so we are unable to comment on breeding in this area.

As noted in the methods, formal survey transects were established in areas that field personnel deemed to be at least marginally good habitat based on known habitat preferences and field reconnaissance. This determination was based

on the commonly held image of plover habitat being flat, with low, sparse vegetation (Knopf, 1996; USFWS, 1999). Points along transects were further given a ranking of high, medium or low suitability (Attachment 1), some examples of which are given in Figure 10. Of about 1000 survey points, 35 % were classified as being of low suitability, 31% of medium suitability, and only 6% were high suitability (Figures 4 and 6). The remaining 29% were classified as unsuitable habitat. Based on our limited plover sightings, the habitat that we classified as high suitability was used in excess of what we would expect based on the given proportions of habitat in the transects. Moreover, 6 out of 9 plovers were observed in highly suitable habitat and no plovers were seen in habitat that we deemed to be unsuitable or of low suitability. This suggests that our search image for plover habitat was accurate, and that habitat we classified as being highly or moderately suitable accurately represents those areas where plovers are more likely to be seen. Further, transects on which plovers where sighted contained 5 times more high-quality points than the mean of non-plover transects (see Figures 5 and 6). Therefore, in conducting future survey or monitoring efforts, it may be most productive to focus on those areas with concentrations of what we classified as high quality habitat.

We recorded evidence of past and present prairie dog habitation at 52 of about 1000 survey points (about 4%) and on 10 of the 38 transects that were over 5 miles long (Figure 7). We estimate that these 52 points represent about 28 prairie dog towns, with survey points separated by over 2 miles considered to be separate towns. Each survey point with evidence of prairie dogs was ranked based the level of prairie dog activity (see Attachment 1). Of these, 5 points (18%) where inactive and 13 (25%) had low activity (i.e., less than 10 prairie dogs were seen during a 5 minute observation period). Further, 25% of the points with evidence of prairie dogs had more than 30 prairie dogs and where therefore labeled as highly active.

The locations where we found mountain plovers matched very well with earlier occurrence data from WYNDD's database. The localities where we identified plovers in this survey were all within 10 miles of previous occurrences, and several were within 2 miles. Also, about half of our plover sightings occurred on recently active prairie dog towns and nearly all prairie dog towns we found were ranked as high-quality mountain plover habitat. This re-emphasizes the potentially important connection between prairie dogs and mountain plovers. The best location to find mountain plovers in otherwise marginal habitat continues to be large, active prairie dog towns on flat ground, generally in prairie grassland communities, but also in some short sage communities.

There were some limitations of this survey that preclude its use as conclusive evidence of plover absence in regions of Powder River Basin. The most severe restriction was that surveys were limited to publicly maintained roads.

This greatly limited the utility of surveys, since only a relatively small portion of suitable habitat was likely to fall sufficiently close to county and state roads to be effectively surveyed (i.e., within about 100 meters). For this reason, we were unable to survey large areas of land that were potentially suitable based on maps and vegetation models of the area (e.g., Figure 2). Also, active prairie dog towns are highly suited to mountain plover habitation, and there were several known prairie dog concentrations that were similarly out of our reach. Thus, the best use of the data generated by this report may be to guide more targeted inquiries in the future than to guide specific management actions over a broad area. Figures 2, 3, 6, and 7 and the associated GIS coverages highlight areas of potentially good habitat and likewise eliminate much habitat as unsuitable or of low quality.

Acknowledgements

Many thanks to Tim Smyser for assisting with field work. Thanks also to Jeff Carroll for funding support and George Soehn, Larry Gerard, and Gary Lebsack for logistical support.

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Keinath, D.A. 2001. Survey for mountain plovers (*Charadrius montanus*) in the Henry's Fork area of the Great Basins Echoregion. Report prepared for the Bureau of Land Management, Rock Springs Field Office, Rock Springs, Wyoming by staff of the Wyoming Natural Diversity Database.

Knopf, F. L. 1996. Mountain Plover (*Charadrius montanus*), in The Birds of North America, Number 211. A. Poole and F. Gill, eds. The Academy of Natural Scienced, Philadelphia, Pennsylvania and The American Ornithologist's Union, Washington, D.C.

United States Fish and Wildlife Service (USFWS). 1999. Mountain Plover Survey Guidelines.

Figures

Figure 1: Area covered by the BLM coalbed methane environmental impact statement (EIS) and its surface-ownership status.

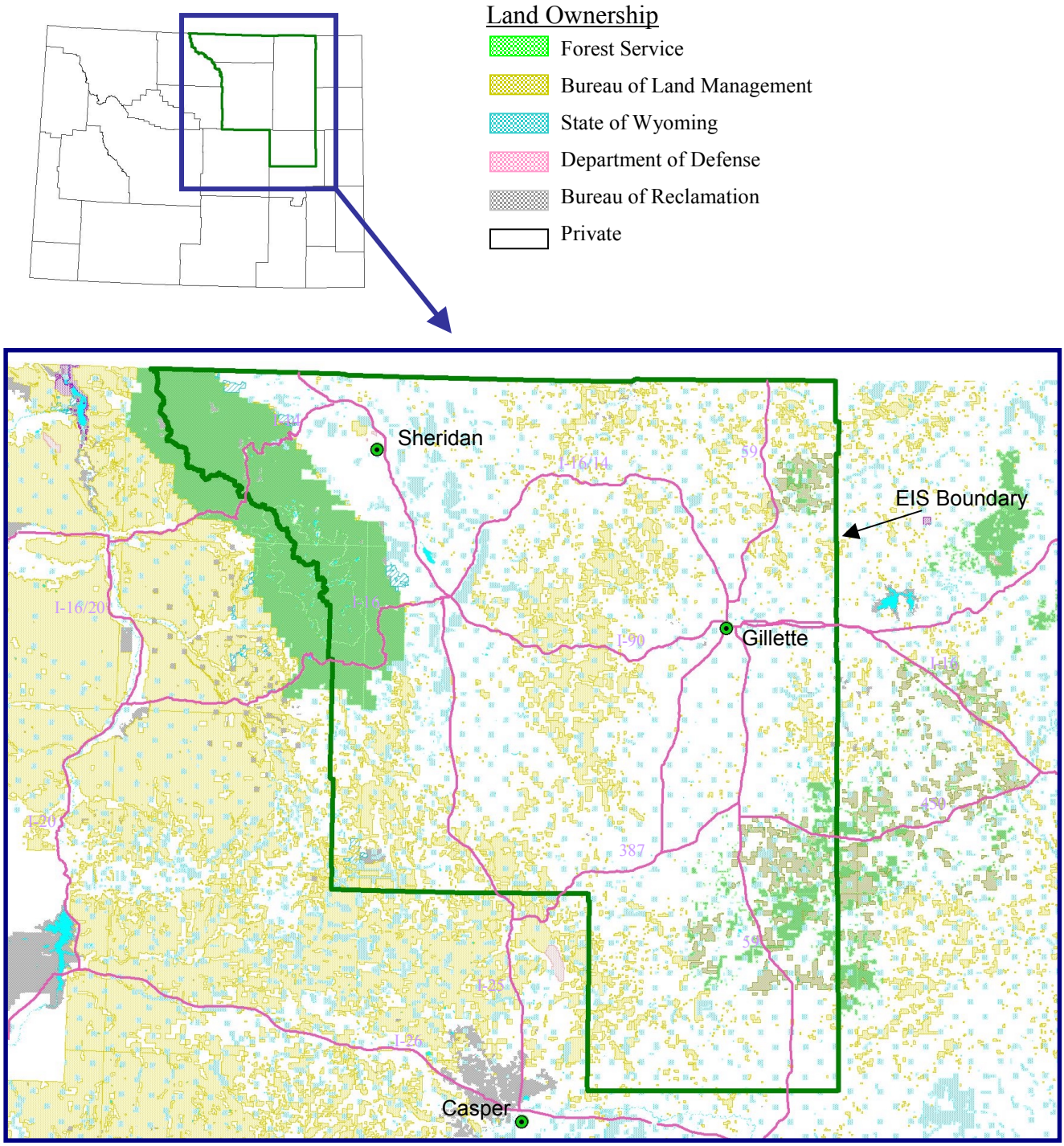
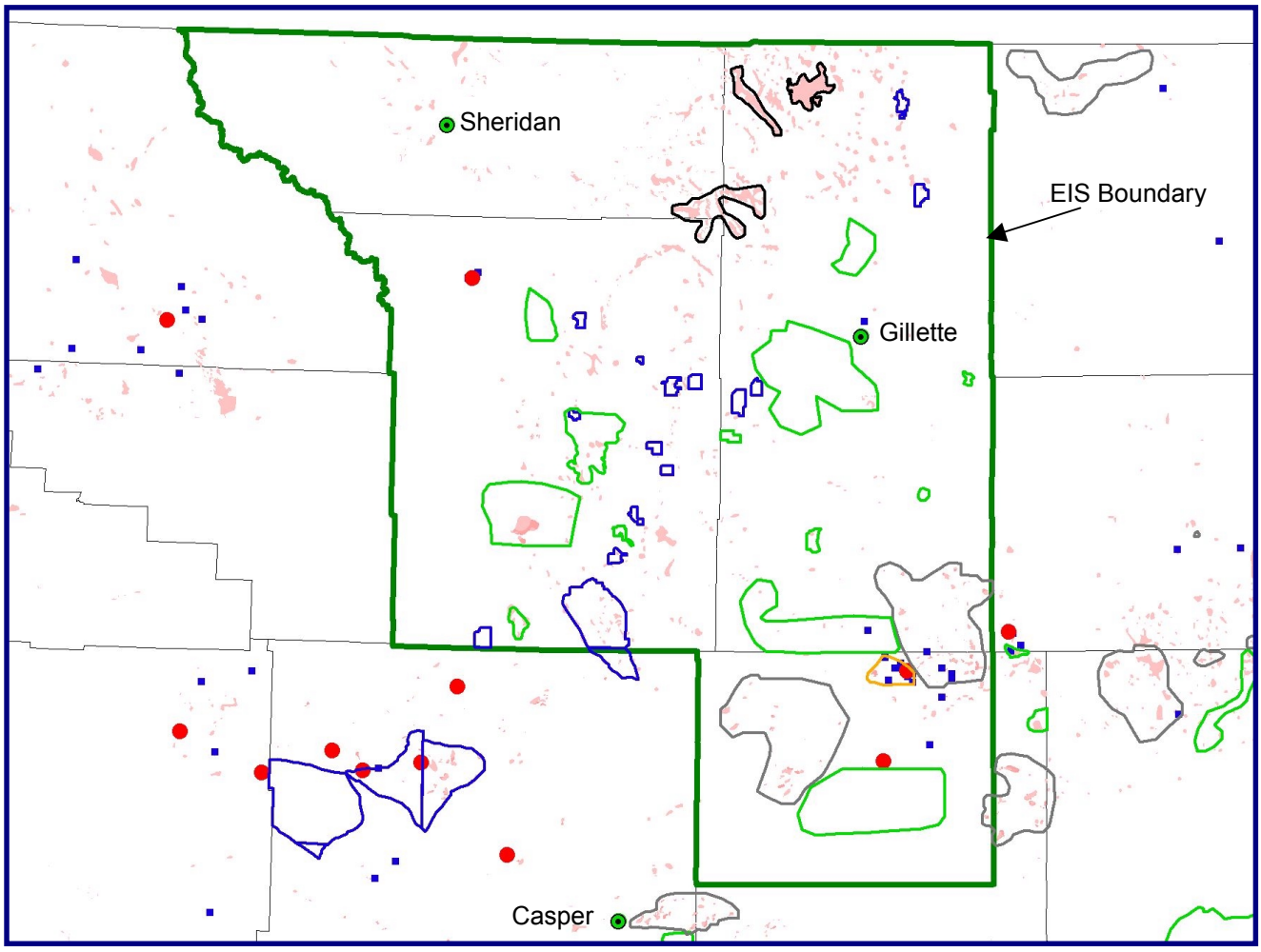


Figure 2: Map of preliminary survey sites and selected input data.



Site Justification

- Input from BLM biologists
- WYNDD occurrences
- Remote sensing of habitat
- Historic prairie dog towns (WYGF, 1988)

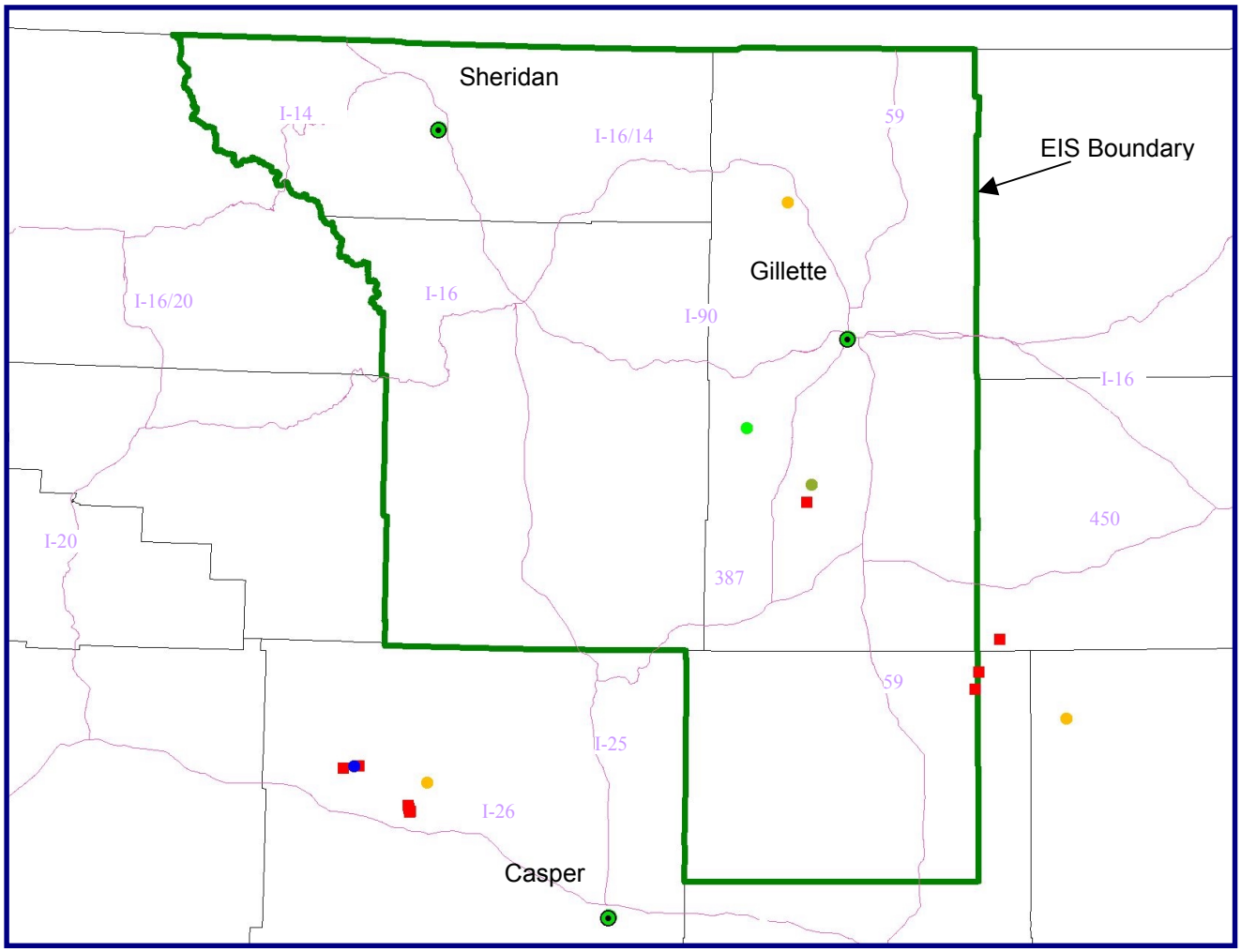
Input Data

Historic prairie dog towns are denoted by pink polygons ( ).

Mountain plover occurrences in WYNDD's BCD database are denoted by red dots ( ).

Mountain plover occurrences in WYNDD's point observation database are denoted by blue sqares (■).

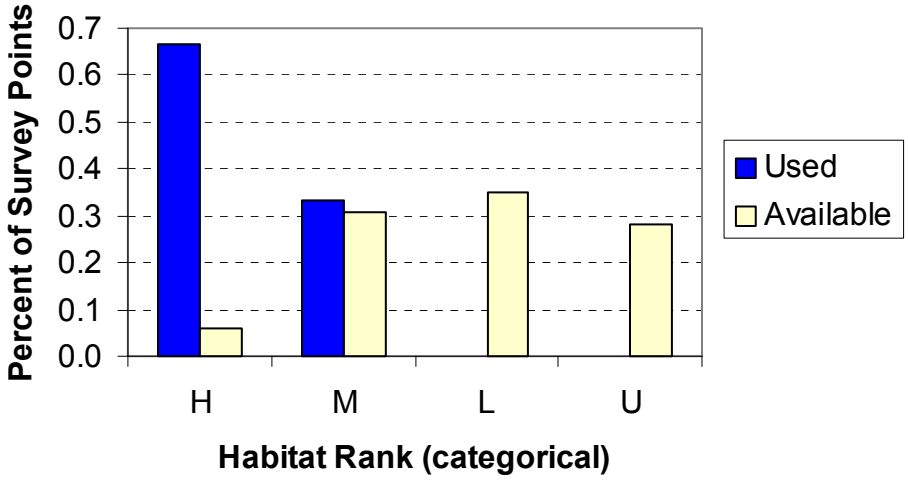
Figure 3: Map of mountain plover and sensitive species sightings during mountain plover surveys of the Powder River Basin in the spring of 2001.



Species Occurrences

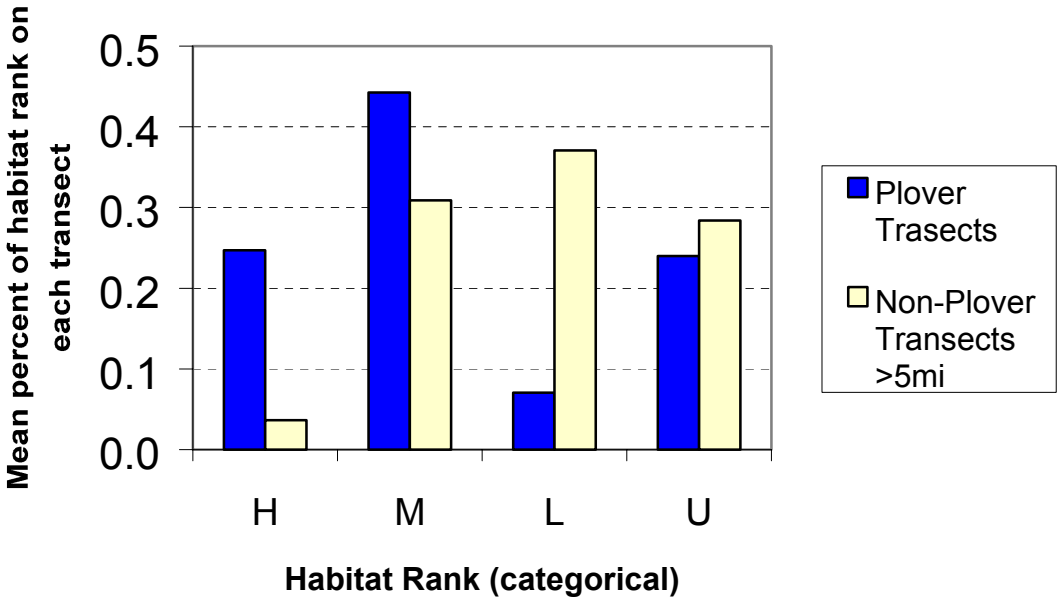
- Mountain Plover
- Burrowing Owl
- Loggerhead Shrike
- Sage Grouse
- Sage Grouse Lek

Figure 4: Graph of used vs. available habitat by rank



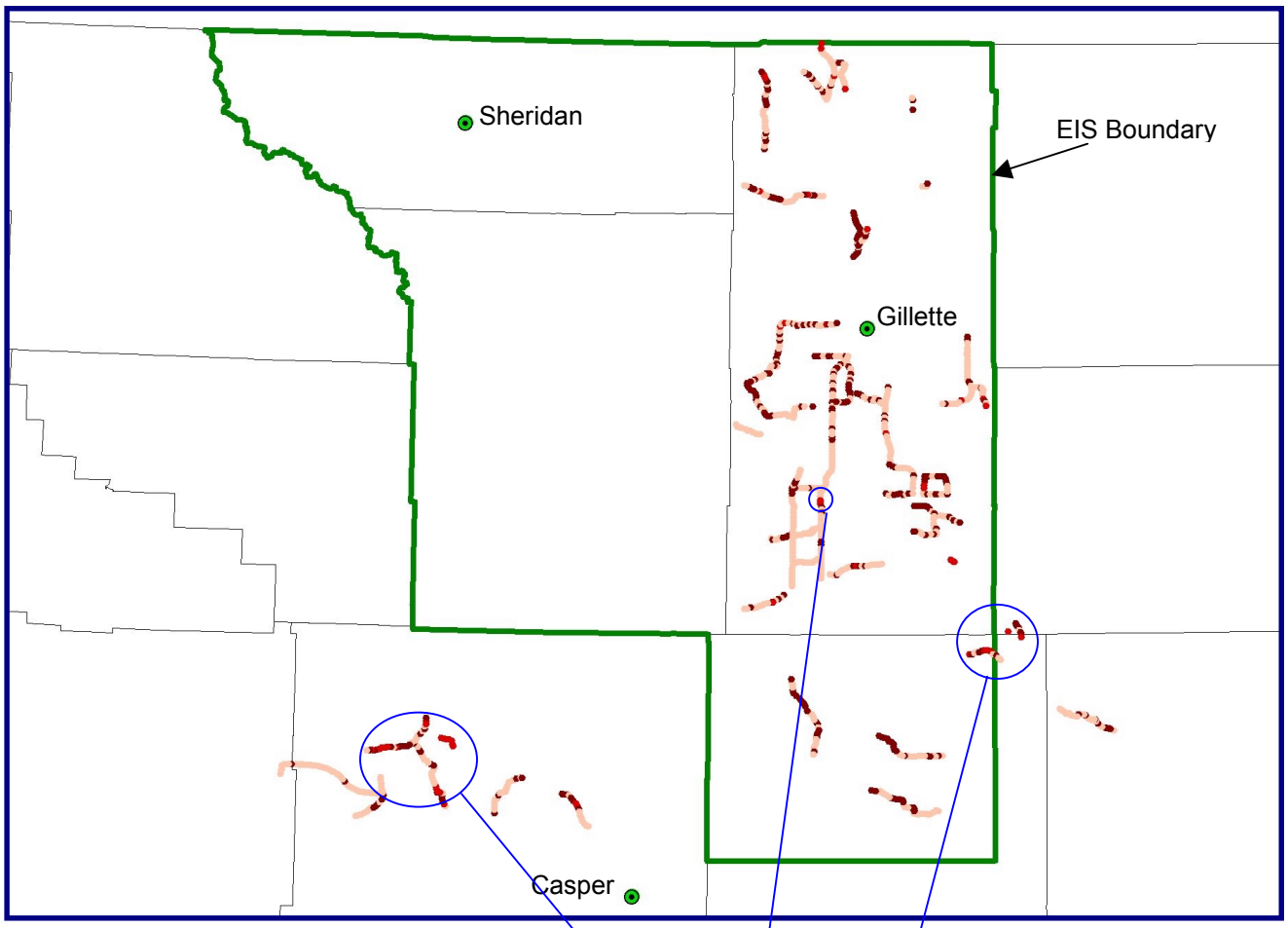
Note: "Used" habitat was defined by survey points at which mountain plovers were seen. Available habitat was defined by points on all designated survey routes. Habitat rank categories are: High quality (H), Medium quality (M), and Low quality (L), as defined in Attachment 1. In addition, an unsuitable (U) rank was added for habitat that was so poor as to be unrankable.

Figure 5: Graph of habitat ranks of transects with plovers versus that of all transects



Note: "Plover transects" are those on which mountain plovers were seen during this survey. "Non-plover transects" are those at which a survey was conducted but where no mountain plovers were seen. Only transects greater than 5 miles long were included in this analysis. Habitat rank categories are: High quality (H), Medium quality (M), and Low quality (L), as defined in Attachment 1. In addition, an unsuitable (U) rank was added for habitat that was so poor as to be unrankable.

Figure 6: Survey transects, habitat ratings, and mountain plover occurrence from mountain plover surveys of the Powder River Basin in the spring of 2001.



Habitat Suitability Rating

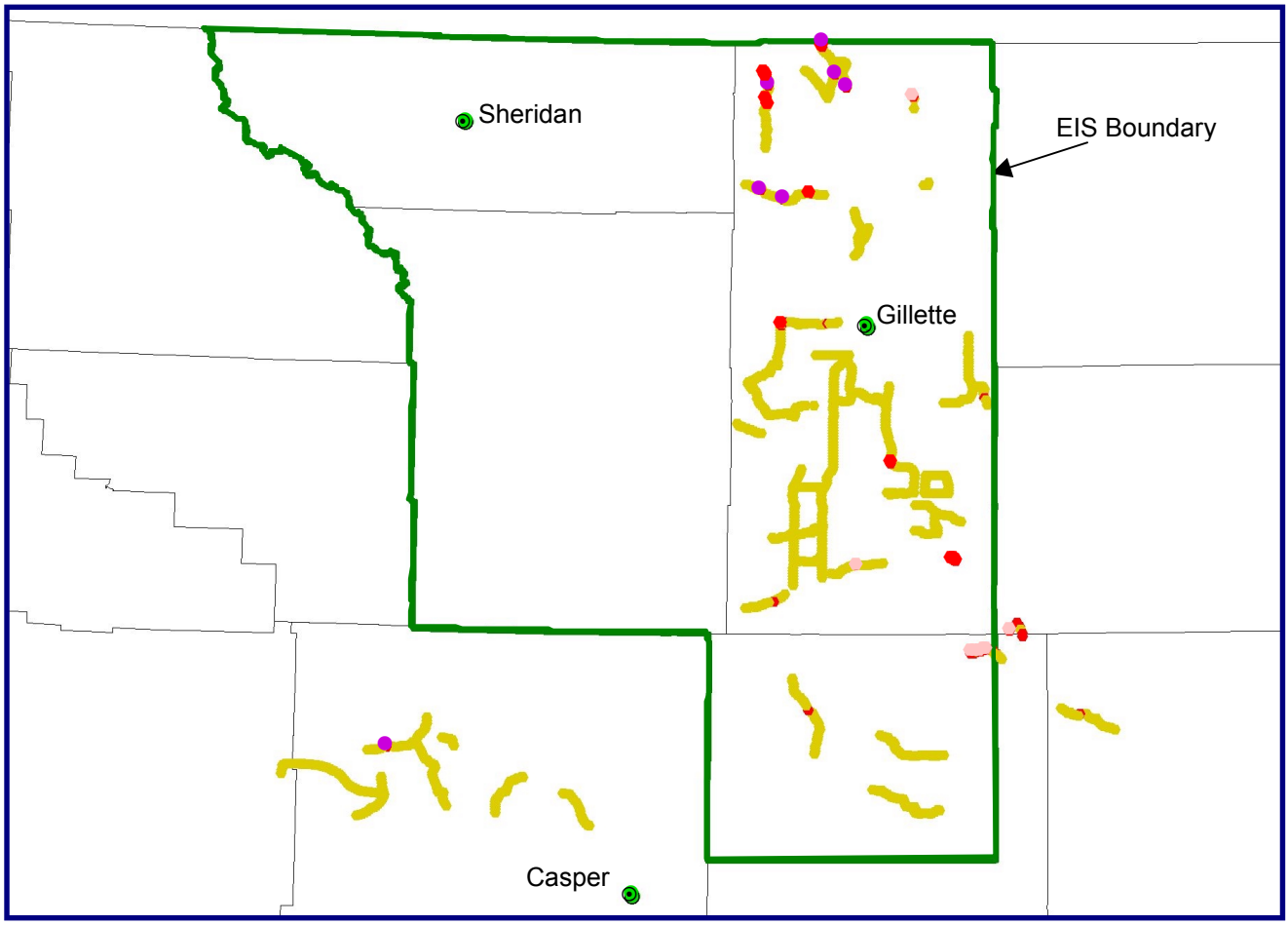
Low

Medium

High

These are areas in WYNDD's survey where mountain plovers were found in the summer of 2001. Note that they all occur near high suitability areas as defined in Attachment 1 (i.e., red lines).

Figure 7: Survey points with evidence of recent prairie dog activity documented during mountain plover surveys of the Powder River Basin in the spring of 2001.



Prairie Dog Activity

Prairie dog activity is defined in Attachment 1.

- High
- Medium
- Low
- None

Figure 8: Photos: Mountain plover observed southwest of Casper, Wyoming during surveys in May 2001.

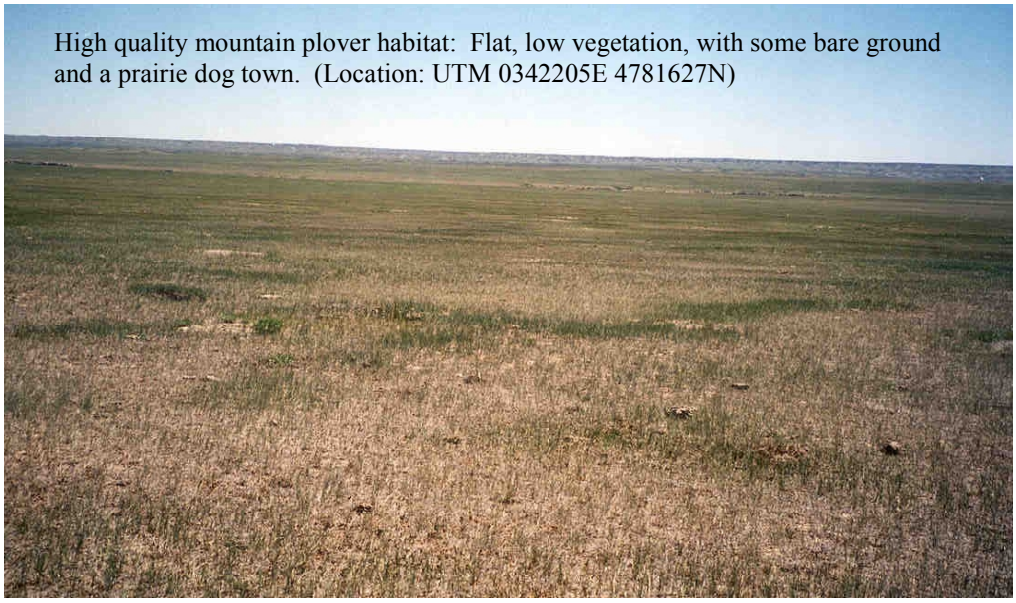
Transect T43 (UTM 0336566E 4771620N) on May 23, 2001

Location: UTM 0317991E 4783465N; Date: May 23, 2001

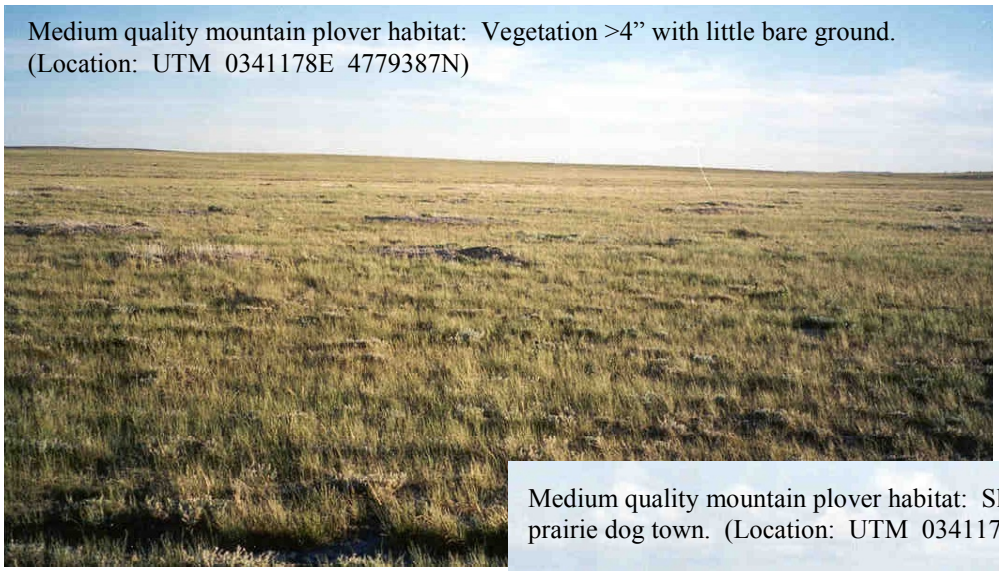
Figure 9: Photos: Mountain plover observed in Thunder Basin National Grassland within the coalbed methane EIS boundary during surveys in April 2001.

Location: UTM 493141E 4805408N; Date: April 17, 2001

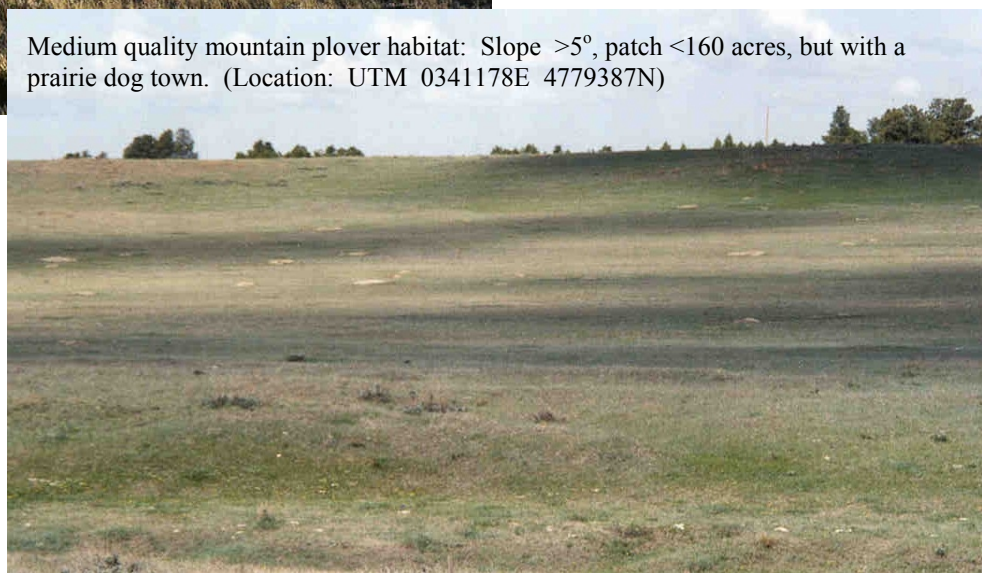
Figure 10: Photos: Examples of representative habitat deemed to be of medium or high quality based on the guidelines in Attachment 1.



High quality mountain plover habitat: Flat, low vegetation, with some bare ground and a prairie dog town. (Location: UTM 0342205E 4781627N)



Medium quality mountain plover habitat: Vegetation >4" with little bare ground. (Location: UTM 0341178E 4779387N)



Medium quality mountain plover habitat: Slope >5°, patch <160 acres, but with a prairie dog town. (Location: UTM 0341178E 4779387N)

Attachments

Attachment 1: Mountain Plover Habitat Ranking Procedures (including prairie dog activity).

For each survey point along each transect, and for opportunistic sightings of plovers, habitat was ranked on a three-level categorical scale, based on formal habitat information and survey guidelines (USFWS, 1999; Knopf, 1996) compiled by WEST, Inc, Cheyenne, Wyoming. Highly suitable habitat was defined as an area of about 160 acres or more with low vegetation (≤ 4" tall) of grass or low shrubs, such as black sagebrush, Gardner's saltbush, etc. High-quality sites also had at least 25% bare ground (i.e., a total canopy cover of less than 75%) and flat topography (i.e., a slope of less than about 5%). Medium-quality sites generally met these criteria, but one or two of the negative habitat modifiers (Box 1) were applicable. A site was further downgraded from medium to low quality when three or more of the negative habitat modifiers were applicable. However, it is important to note that although modifier number 5 is the absence of prairie dogs, this was not used to downgrade sights. Rather, it was recorded as further evidence of habitat condition at previously downgraded sites. (In other words, an otherwise high-quality sight without prairie dogs was still classified as a high-quality site.

If habitat at a survey point was clearly very poor for mountain plovers the point was recorded as "unsuitable" or "skipped," codes were given from the negative modifier list (Box 1) for why the point was unsuitable, and that point was not formally surveyed. Examples of unsuitable sites included such habitat as forests, dense and tall stands of sagebrush, riparian areas, canyons and wetlands.

Also, at each survey site that contained prairie dog towns, the area of the town was estimated and a measure of activity was taken. Prairie dog activity was estimated by recording the number of prairie dogs seen in a 3-5 minute observation period and using that number to assign a categorical activity rank. The rank definitions pertaining to prairie dogs are noted in Box 2.

BOX 1: MOUNTAIN PLOVER HABITAT RANKING

Negative Habitat Modifiers

1. The average height of shrubs is greater than 4 inches (e.g., big sagebrush, greasewood, willows).
2. The average height of grass is greater than 4 inches.
3. The topography is not flat (e.g., slopes are >5^{o} or overlooking hills are near the site).
4. The site contains less than 25% bare ground.
5. There are no prairie dogs present on the site (this is not used to downgrade an otherwise good site).
6. Water is present near the site.
7. Killdeer are present on the site.
8. The size of the patch is too small (i.e., < 160 contiguous acres).
9. Active agriculture is present (i.e., the site contains plowed or planted fields.)
10. Trees are present (e.g., cottonwoods).
11. There is human development (e.g., houses, barns).

BOX 2: PRAIRIE DOG TOWN INFORMATION

P-dog town Activity

High: greater than 30 prairie dogs
Medium: 10-30 prairie dogs
Low: less than 10 prairie dogs
None: no prairie dogs seen

P-dog town size

Very Large: more than 100 acres
Large: 50 – 100 acres
Medium: 20 – 50 acres
Small: 5 - 20 acres
Very Small: less than 5 acres

Attachment 2: ArcView GIS Shapefile Information

Attached to the inside, back cover of this report is a CD-ROM containing a set of ArcView shapefiles (generated with ArcView 3.2, Environmental Research Systems Institute, Inc., Redlands, California) that contain much of the data discussed in the report. Specifically, there are 5 shapefiles, documentation for each of which is given below. All files are projected into Zone 13 of the Universal Transverse Mercator (UTM) projection based on the North American Datum of 1927. Each shapefile has three constituent files (e.g., pdogs.dbf, pdogs.shp, pdogs.shx) and a readme file in Microsoft Word format that contains the same information printed below. Many thanks to Rhette Good of WEST, Inc. for helping to merge GIS information from WYNDD and WEST into one dataset and for drafting most of the following text.

1. Filename: mopl_observations

This a point coverage of mountain plovers observed during call play-back surveys in the Powder River Basin during the spring of 2001. A few incidental observations are also included. Surveys were conducted by Western EcoSystems Technology, Inc. (WEST) and the Wyoming Natural Diversity Database (WYNDD). Observation locations were recorded with handheld Trimble GeoExplorer Global Positions Systems (GPS) and were not differentially corrected.

Transect:	Name of transect on which the mountain plover was detected
Date:	Date of observation
Odometer:	Odometer reading at which mountain plover was detected
Survey_inc:	(S) = Observed during scheduled survey and (I) = Observed during other Activities
Time:	Time of mountain plover observation
Hab_rating:	Rating of habitat quality for mountain plover occurrence. H = High, M = Medium
Easting:	Easting coordinate (UTM NAD 27 Zone 13)
Northing:	Northing coordinate (UTM NAD 27 Zone 13)
Trans_note:	General notes on transect, habitat, and observation
Z_mopl:	Number of mountain plovers detected
Sex:	Sex of mountain plover detected
Call_respo:	Did the mountain plover respond to the taped call (Y) = Yes, (N) = No. NOTE: Tapes were not played during incidental observations
Sight_dist:	Distance at which mountain plover was first detected (m)
Sight_dire:	Direction from observer at which mountain plover was first detected
Visual_aud:	The type of first detection (V) = visual and (A) = Auditory
Sighting_:	Sighting number recorded by WYNDD, not recorded by WEST.
Observer:	Company who made the observation.

2. Filename: sensitive_spp

This is a point coverage of BLM sensitive species detected in the Powder River Basin during surveys for mountain plovers. Surveys were conducted by Western EcoSystems Technology, Inc. (WEST) and the Wyoming Natural Diversity Database (WYNDD). Observation locations were recorded with handheld Trimble GeoExplorer Global Positions Systems (GPS) and were not differentially corrected.

Transect:	Name of transect on which the sensitive species was detected
Date:	Date of observation
Odometer:	Odometer reading at which the sensitive species was detected
Mopl_surve:	(S) = sensitive species was detected during schedule mountain plover survey and (I) = incidental observation made during other activities.
Pdog_prese:	(Y) = sensitive species detected on prairie dog town and (N) = sensitive species not detected on prairie dog town. This data was recorded for WEST observations only.
Pdog_size:	Ocular estimates of prairie dog town sizes made in the field.
Easting:	Easting coordinate (UTM NAD 27 Zone 13)

Northing:	Northing coordinate (UTM NAD 27 Zone 13)
Species:	Species detected.
Notes:	General notes on the observations and habitat
Observer:	Company who made the observation.

3. Filename: pdogs

This is a point coverage of black-tailed (and white-tailed prairie dog towns southwest of Casper) detected at mountain plover survey points and incidental observations. In some cases, large prairie dog towns were detected at multiple points along transects. Surveys were conducted by Western EcoSystems Technology, Inc. (WEST) and the Wyoming Natural Diversity Database (WYNDD). Observation locations were recorded with handheld Trimble GeoExplorer Global Positions Systems (GPS) and were not differentially corrected.

Transect:	Name of transect on which the prairie dog town was detected
Date:	Date of observation
Odometer:	Odometer reading at which the prairie dog town was detected
Mopl_surve:	(S) = detected during scheduled mountain plover surveys. (I) = detected during other activities.
Time:	Time of observation
Pdog_size:	Ocular estimates of prairie dog town sizes made in the field.
Pdog_acti:	Rating of prairie dog activity. H = High (greater than 30 dogs). M = Medium (10-30 dogs). L = Low (less than 10 dogs). N = None (no prairie dogs seen).
Hab_rating:	Rating of habitat quality for mountain plover occurrence. H = High, M = Medium. This data was recorded for WEST observations only.
Easting:	Easting coordinate (UTM NAD 27 Zone 13)
Northing:	Northing coordinate (UTM NAD 27 Zone 13)
Sens_spp1:	Sensitive species detected on prairie dog towns. This data was recorded for WEST observations only
Observer:	Company who made the observation.
Notes:	General notes on the prairie dog town and associated species.

4. Filename: survey_points

This is a point coverage of locations used to survey for mountain plovers in the Powder River Basin, Wyoming. Surveys were conducted by Western EcoSystems Technology, Inc. (WEST) and the Wyoming Natural Diversity Database (WYNDD). Observation locations were recorded with handheld Trimble GeoExplorer Global Positions Systems (GPS) and were not differentially corrected. Survey points were located on transects. Suitable mountain plover habitat along transects was patchy. Areas of unsuitable habitat along transects were not surveyed for mountain plovers. WYNDD recorded positions of areas where unsuitable habitat was present and no surveys were conducted. WEST only recorded the positions at which suitable mountain plover habitat was present and where tape play-back surveys were conducted. Areas along transects where no survey points are located were evaluated in the field by WEST personnel as unsuitable, and are described in the habitat descriptions associated with the survey transect coverage.

Transect:	Name of transect on which survey point was conducted
Date:	Date point was surveyed
Odometer:	Odomoter reading at which survey point was conducted
Time:	Time survey point was completed recorded by WEST during the survey
Hab_rating:	A rating of potential for mountain plover occurrence at the survey point. (H) = High, (M) = Medium, (L) = Low, (unsuitable) = not suitable and no survey was conducted.
Pdog_prese:	(Y) = Prairie dogs present at survey point and (N) = Prairie dogs not present at survey point
Pdog_size:	Ocular estimates of prairie dog town sizes made in the field by WYNDD
Pdog_acti:	Rating of prairie dog activity. H = High (greater than 30 dogs). M = Medium (10-30 dogs). L = Low (less than 10 dogs). N = None (no prairie dogs seen).

Easting:	Easting coordinate (UTM NAD 27 Zone 13)
Northing:	Northing coordinate (UTM NAD 27 Zone 13)
Notes:	Notes made by WEST on habitat and species observed . (SB) = Sagebrush , (GW) = greasewood, (CR) = Cottonwood / Riparian, (SG) = short-grass, (MP) = milepost
Observer:	Company which conducted the survey point
Reason:	Reasons contributing to habitat being downgraded in the Hab_rating field. For more explanation, see Attachment two of the report by WYNDD. 1 = The average height of shrubs is greater than 4 inches (e.g., big sagebrush, greasewood, willows). 2 = The average height of grass is greater than 4 inches. 3 = The topography is not flat (e.g., slopes are >5o or overlooking hills are near the site). 4 = The site contains less than 25% bare ground. 5 = There are no prairie dogs present on the site (this is not used to downgrade an otherwise good site). 6 = Water is present near the site. 7 = Killdeer are present on the site. 8 = The size of the patch is too small (i.e., < 160 contiguous acres). 9 = Active agriculture is present (i.e., the site contains plowed or planted fields). 10 = Trees are present (e.g., cottonwoods). 11 = There is human development (e.g., houses, barns).
Pdog_size_:	Ocular estimates of prairie dog town sizes made in the field by WEST

5. Filename: survey_transects

This is a line coverage of transects used to survey for mountain plovers in the Powder River Basin. Surveys were conducted by Western EcoSystems Technology, Inc. (WEST) and the Wyoming Natural Diversity Database (WYNDD). Observation locations were recorded with handheld Trimble GeoExplorer Global Positions Systems (GPS) and were not differentially corrected.

Id:	Id number of transect used by WYNDD
Trans_name:	Name of transect
Date:	Date transect was surveyed
Observer:	Company which surveyed the transect.
Temp__c_:	Average temperature (C) recorded by WEST during the survey.
Low_wind_s:	Low wind speed (kph) recorded by WEST during the survey.
High_wind_:	High wind speed (kph) recorded by WEST during the survey.
Wind_direc:	Average wind direction recorded by WEST during the survey.
General_ha:	A general habitat description of the transect recorded by WEST during the survey.
Total_dist:	Total distance of survey route (miles) recorded by WEST during the survey.
Trans_type:	(completed) = entire route was completed and (rejected) = survey route did not have suitable mountain plover habitat and was not surveyed.
Weather_:	Descriptions of weather recorded by WYNDD during the survey.