

# **FISH AND WILDLIFE GUIDELINES**

**for**

**The Montana Strip and Underground Mine Reclamation Act**

**Montana Department of Environmental Quality  
Industrial and Energy Minerals Bureau  
Coal Program**

**As Revised**

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## INTRODUCTION

The Montana Strip and Underground Mine Reclamation Act (MSUMRA) and the associated Administrative Rules of Montana (ARM) govern the operation of strip and underground coal mines in Montana. One objective of MSUMRA is wildlife protection [82-4-202(2)(a), MCA]. Procedures for achieving this objective are outlined in ARM adopted pursuant to MSUMRA.

An applicant for a strip or underground coal mine permit is required to submit environmental resource information which includes a wildlife survey [ARM 17.24.304(10)]. Each permit application must also contain a fish and wildlife plan (ARM 17.24.312). The operator must conduct periodic monitoring of the wildlife resource (ARM 17.24.723). Data and a narrative interpretation must be included in Wildlife Monitoring Reports. These reports are submitted regularly - usually on an annual basis - for review by Montana Department of Environmental Quality (DEQ), Permitting and Compliance Division, Industrial and Energy Minerals Bureau staff (ARM17.24.723). Criteria for release of reclamation phase IV (final) bond deem that reclamation is complete, in part "... when fish and wildlife habitats and related environmental values have been restored, reclaimed or protected in accordance with the Act, the rules, and the approved permit..." [ARM 17.24.1116(7)(d)]. The primary rules, on which this document is based, are summarized above. Additional rules which include some relationship of mining and/or reclamation to fish and wildlife are listed in Table 1.

There are three basic steps to the process. These are:

- (1) Pre-mine inventories to determine species composition, density, and distribution of the wildlife community prior to mining activity;
- (2) Bond release goals are established using pre-mine inventories and projected post-mine habitat conditions and wildlife communities. Monitoring is conducted throughout the life of the mine and progress toward the bond release goal(s) is determined. Additionally, to the extent possible, a determination of impacts (positive and negative) to the wildlife communities, both on and adjacent to the permit area, is made; and,
- (3) Post-mine inventories to determine composition, density and distribution of the wildlife community. Current conditions are compared to the bond release goals. A final determination is made on whether or not to release the reclamation bond.

These guidelines are to assist the mine permit applicant and mine operator in collecting resource information. They also offer suggestions on design and implementation of a fish and wildlife plan and a monitoring program in compliance with MSUMRA.

Table 1. Rules having some relationship to fish, wildlife and related resources - Administrative Rules of Montana (ARM).

ARM Rule	Subject
<b>Definitions</b>	
17.24.301(19)(b)	Best technology currently available
17.24.301(37)	Definition of ephemeral streams
17.24.301(58)	Definition of intermittent streams
17.24.301(62)(h)	Definition of fish and wildlife habitat
17.24.301(80)	Definition of perennial streams
17.24.301(82)	Definition of permanent impoundments
17.24.301(123)	Definition of temporary impoundments
<b>Application Requirements</b>	
17.24.302(1)-(9)	Format and supplemental information
17.24.304(4)	Special, exceptional, critical and unique characteristics
17.24.304(6)(a)(iii)	Listing of wells and springs
17.24.304 (6)(b)(i)	Name, location and description of surface water bodies
17.24.304(10)(a)-(e)	Wildlife survey report
17.24.305(1)(n)(r)&(t)	Maps
17.24.312 (all)	Fish and Wildlife Plan
17.24.313(5)	Revegetation Plan
17.24.323 (all)	Grazing Plan
<b>Mine Permit Procedures</b>	
17.24.404(4)	Adequacy of Fish and Wildlife Plan
17.24.405(6)(e)	Confirmation of no effect to endangered or threatened species
17.24.413(2)	Special permit conditions
17.24.416(2)(b)	Permit renewal
17.24.416(4)(a)(i),(ii),(vii)	Permit renewal
17.24.417 (all)	Permit amendment
<b>Backfilling and Grading Requirements</b>	
17.24.501(4)	Post-mining topography; final grading
17.24.503(1)	Small depressions
17.24.504 (all)	Permanent impoundments
17.24.515(2)(a)	Highwall reduction/retention
17.24.518(all)	Buffer Zones
<b>Transportation Facilities</b>	
17.24.601(3)	Railroad loop and road construction
17.24.602(6)	Location of roads and railroad loops
17.24.605(all)	Hydrologic impact of roads and railroad loops
17.24.608(1);(4)(a),(b)	Impacts of transport facilities
17.24.609(1)(a)	Other support facilities
<b>Hydrology</b>	
17.24.631(2)	Hydrology requirements
17.24.633(all)	Water quality standards
17.24.634(1)(a),(f),(g)	Reclamation of drainages
17.24.635(1)(b)	Diversion of flow
17.24.639(2)(d)(ii)	Sedimentation ponds
17.24.639(24)	Removal of sedimentation ponds
17.24.642(1)(a),(b),(c),(h);5	Permanent impoundments
17.24.651 (all)	Stream buffer zones
<b>Revegetation, Grazing, and Wildlife</b>	
17.24.711 (all)	Revegetation
17.24.717 (all)	Planting of trees
17.24.719 (all)	Livestock grazing
17.24.723 (all)	Monitoring
17.24.724 (all)	Use of revegetation comparison standards

ARM Rule	Subject
17.24.726 (all)	Vegetation production, cover, diversity, density and utility requirements
17.24.728(2)	Composition of vegetation
17.24.730 (all)	Season of use
17.24.731 (all)	Analysis for toxicity
17.24.732 (all)	Vegetation requirements for previously cropped areas
17.24.733 (all)	Measurement standards for trees, shrubs and half-shrubs
17.24.751 (all)	Protection of fish and wildlife
17.24.762 (all)	Postmining land use
<b>Alternate Reclamation</b>	
17.24.821(1)(b),(c),(d)(i),(e)(i)(ii),(f),(g)	Alternate reclamation: submission of plan
17.24.824 (all)	Alternate reclamation: Alternate postmining land use
17.24.825(6)	Alternate reclamation: alternate revegetation
<b>Prospecting</b>	
17.24.1001(2)	Application requirements
17.24.1002(1),(2)(a)(j)(l)	Information and monthly reports
17.24.1004 (all)	Environmental monitoring
17.24.1006(1)	Roads
17.24.1008(2)	Revegetation
17.24.1013(1),(2)	Drilling
17.24.1014(1)(a)	Testpits and stream channels
<b>Bonding</b>	
17.24.1114(1)(a)	Departmental review and decision on bond release application
17.24.1116(4)(7)	Criteria and schedule for release of bond
17.24.1119(1)(a),(b),(c)	Criteria for forfeiture
<b>Annual Report</b>	
17.24.1129(1),(2)(b),(e),(j)	Annual report
<b>Protected Areas</b>	
17.24.1131(1)	Protection of parks and historic sites
17.24.1132 (all)	Areas upon which coal mining is prohibited
17.24.1133 (all)	Procedures for determination
17.24.1137 (all)	Consultation with other agencies
17.24.1138 (all)	Designation process not affected
<b>Lands Unsuitable</b>	
17.24.1141(1)	Definition
17.24.1143 (all)	Prospecting on designated lands
17.24.1144 (all)	Petition for designation or termination of designation
17.24.1147 (1)	Decision on petition
17.24.1148 (all)	Data base and inventory system

Final bond release is, in part, dependent on whether the reclaimed landscape supports a post-mining wildlife community that compares favorably to the one occupying the area prior to mining. Pre-mine inventories, mine-life monitoring, and inventories conducted during final reclamation will facilitate determination of final reclamation acceptability. Final bond release is dependent on the degree to which composition, relative density and function of the post-mining wildlife community approximates, to the extent possible, pre-mining conditions.

Guidelines should not be considered rules. However, for cases in which regulatory requirements are specific (the action is directed by one or more established laws or rules) the guidelines have little flexibility and need to be followed. These cases are indicated throughout this document.

This document outlines numerous surveys and survey techniques. For the most part, it would be excessive if each of the surveys were conducted on a particular mine. Realistically, the number of surveys and survey intensity should be relative to both habitat and wildlife community diversity. Additionally, the total amount of disturbance and subsequent reclamation proposed for a given mine will influence the survey level and intensity. Techniques and approaches that differ from those outlined in this document may be acceptable. However, use of alternate techniques must be approved in advance by DEQ.

An extensive literature search was conducted during the preparation of these guidelines. A bibliography summarizing the pertinent publications is included.

SECTION I  
PRE-MINE FISH AND WILDLIFE SURVEY  
(Baseline Inventory)

**Purpose and Objectives**

The primary purpose of a fish and wildlife survey is to provide an understanding of the species existing on and adjacent to the proposed permit area. Species diversity, distribution, density and habitat requirements are determined prior to mining. This survey provides baseline information from which effects (negative and positive) of mining and reclamation operations can be determined. Areas of crucial habitat(s) - e.g., wetlands, raptor nesting sites, prairie grouse leks, big game winter ranges, etc. - need to be identified through this process. Protective and/or enhancement measures can then be incorporated into the mine and reclamation plans.

Specific survey objectives are:

- (1) Determine fish and wildlife species present on and adjacent to the proposed permit area;
- (2) Map and describe existing habitats potentially affected by mining and reclamation;
- (3) Describe wildlife-habitat relationships;
- (4) Provide a data base from which, to the extent possible, accurate determinations of impacts due to proposed mining and reclamation activity can be made;
- (5) Provide data enabling determination of the relationship between projected impacts related to the proposed mine and anticipated cumulative impacts (mine-related plus other outside impacts);
- (6) Provide a basis for developing an effective reclamation plan; and,
- (7) Provide a data base to be used to develop and implement mitigation practices.

**Data Collection**

Data collection and presentation procedures for the surveys need to be standardized. DEQ strongly encourages all permit applicants and mine operators (particularly those in the same region) to use similar survey methods. These guidelines suggest methods that could be used to standardize procedures. These methods will also help ensure fish and wildlife surveys are conducted according to the requirements of MSUMRA and ARM.

A requirement of these regulations is that surveys and inventories be conducted by a qualified person [ARM 17.24.302(2)]. The on-the-ground field leader should have a



combination of education and field experience which meets the standards for certification as a fish or wildlife biologist - based on the type of surveys to be conducted. These standards have been established by The Wildlife Society and the American Fisheries Society. Members of the field crew should have at least a Bachelor of Science Degree in the respective field. The name(s) and qualifications of the person(s) responsible for the survey need to be included in the annual wildlife survey or monitoring report. DEQ may reject the results of any field survey not conducted by a qualified individual.

### **Pre-Survey Consultation**

An applicant for a mining permit is requested to contact DEQ prior to initiating baseline surveys. This contact is intended to make the applicant aware of legal requirements. Pre-survey contact should include a Proposed Plan of Study (POS). Submittal and review of the POS helps ensure survey designs and proposed data analyses are scientifically sound and acceptable to DEQ. Pre-survey contact is mine-specific, primarily to focus on site-specific needs.

Rules require the applicant and DEQ to consult with Montana Department of Fish, Wildlife and Parks (MDFWP), U.S. Fish and Wildlife Service (USFWS) and other concerned wildlife and land management agencies (Bureau of Land Management, U.S. Forest Service, etc.) [ARM 17.24.304(10), 312, 404(4), and 751(1) and (2)(e)]. Consultation is necessary to help ensure reclaimed areas provide habitat needs of selected wildlife species. Also, consultation provides an avenue for including provisions for threatened and endangered species utilizing the proposed mine area. Documentation of the consultation needs to be incorporated into the respective annual reports, as well as the permit application. In order to obtain additional wildlife information on a specific area and as a means of providing better information exchange, DEQ recommends the applicant also contact local interest organizations (Audubon chapters, recreation organizations, etc.) to discuss proposed mine and reclamation plans. This latter contact should not be considered a form of consultation and is not based on legal mandates, as is the consultation with the various agencies.

Wildlife inventories must be conducted during each of the four seasons - spring (March-May), summer (June-August), autumn (September-November) and winter (December-February). Therefore, agency and public contacts should begin at least two years prior to the preparation of a mine permit application. Input from these contacts needs to be incorporated into the POS which is submitted for DEQ review and approval.

### **Literature Search/Review**

A thorough search of available literature - scientific journals, research/resource publications, books, theses, etc. - should be completed prior to designing a fish or wildlife survey or baseline study. Completion of a review of existing inventories, surveys and research projects conducted in the general area of the proposed mine is recommended. Literature searches can be conducted for a variety of subjects by many libraries, agencies, and organizations. Montana Natural Resource Information System (NRIS) operates out of the Montana State Library. This program provides literature searches, computer-assisted inventory of Montana's biological resources, Geographical Information

System (GIS) project assistance, as well as access to the Montana water information system. In accordance with ARM 17.24.1148, DEQ contributes to the NRIS database maintenance.

A literature search is helpful in generating a list of fish and wildlife species potentially occurring in the area. It is also valuable in determining: (1) species habitat requirements; (2) special species designations (endangered, threatened, species of special concern, etc.); (3) areas of potential critical (T&E) or crucial habitats (winter ranges, breeding areas, etc.); and, (4) proper selection and design of inventory and study techniques.

### **Study Area Delineation**

Mobility of wildlife species found in Montana is highly variable. The majority of amphibians, reptiles and small mammals have very small home ranges and dispersal usually occurs into immediately adjacent areas. Song birds, prairie grouse, raptors, waterfowl, and big game are more mobile, have larger home ranges and can disperse over larger areas. Mobility of different species, as well as their ability to disperse, must be a consideration when determining study area boundaries.

A study area encompassing the proposed permit area, life-of-mine area and a buffer zone of at least 2 miles would be suitable for inventorying and studying the majority of wildlife species. For some species, raptors and big game for example, a larger area of consideration may be necessary. Larger raptors, such as golden eagles, hunt over a large area. They may nest some distance from a mine, but use part of the permit area as a hunting ground. These movement patterns need to be considered when establishing study areas. Deer, elk and pronghorn have seasonal home ranges varying greatly in size. Home range size is dependent on many factors. These include preferences of individual animals, habitat availability and the season. To the extent practicable, inventory and survey areas should encompass an area large enough to include seasonal ranges, migration corridors and crucial habitats of species utilizing the proposed mine site and adjacent areas.

As further clarification, it should be understood that the survey areas should be established to characterize the population norm of each species. Survey areas need not include areas utilized by individuals which are not considered part of the norm for the population, e.g., wanderers, individuals or herds which undergo abnormal movements due to severe storms, etc. Because of variation in species use areas, incorporation of several different-sized, species-specific study areas may be appropriate.

Final study area boundaries will be established in consultation with DEQ. These boundaries will remain consistent throughout the inventory and monitoring periods.

### **Habitat Type Delineation and Description**

Prior to collection of fish and wildlife observations and habitat use information, the applicant must complete a map delineating the various habitats in the survey area [ARM 17.24.304(10)(d)]. The habitat map delineates habitat units and other features important to fish and wildlife. These features include rock outcrops, cliffs, springs, ponds and other

water sources (ephemeral, intermittent or perennial water sources need to be identified as such), as well as man-made features that significantly affect fish and wildlife. The habitat map is a base map for future fish and wildlife inventory and survey efforts.

Suggested methods for wildlife habitat classification are systems based on the dominant vegetation of the area. Aerial photos are useful during preparation of wildlife habitat maps; however, a wildlife biologist must ground-truth the map. Each habitat feature (e.g., outcrop or cliff), distinct habitat unit (e.g., wetland or seep) or group of units (e.g., grassland) must be documented and described. Important habitats of limited size (e.g., riparian habitat adjacent to a spring or seep) must be individually plotted on the map and described in a detailed narrative. Each habitat type should be described using methods from the Vegetation Guidelines. Habitat types need to be identified on the map using standardized symbols throughout. Individual habitat features should be assigned a unique number identifying the feature on the map and in narratives. To facilitate integration of the habitat map with other related baseline information and maps, DEQ strongly recommends the use of an electronic data base. Geographical Information System (GIS) capability greatly facilitates development of maps using information from one or more data bases.

### **Species List**

A complete list of fish and wildlife species occurring or potentially occurring on or adjacent to the study area must be compiled. This list is a compilation of information from the literature search, personal contacts, observation routes, inventories and surveys. It is recommended this list be categorized as: aquatic invertebrates, terrestrial invertebrates (only species of particular concern/indicator species), fish, amphibians, reptiles, song birds, upland game birds, waterfowl and shorebirds, raptors, small mammals, medium-sized mammals and big game. The following information should be included for each species on the list: source (avian/mammalian atlas, literature, observation, etc.), common name, scientific name, legal classification (species of special concern, endangered, threatened, etc.), status (resident, seasonal resident, migrant, occasional visitor, breeding, etc.), primary habitats used and seasons of use.

### **Observation Form**

A standardized observation form should be used throughout the three phases of inventory/monitoring. Distinct and separate forms should be adopted for aquatic invertebrates, fish and wildlife. The wildlife observation form should include: type of survey (aerial - fixed-wing or helicopter, vehicle or pedestrian); date; time of day (military); weather conditions (temperature, wind speed and direction, cloud cover, precipitation, snow depth and cover, occurrence of any storm events in the previous 24 hours); species observed; age and sex of the observed animals (if identifiable); animal activity; habitat type; and, topography (position on slope, slope - percent or degrees, aspect, and type of topography). Information on the fisheries inventory form should include: date; time of day; weather conditions (temperature, wind speed and direction, cloud cover, precipitation and occurrence of any storm events in the previous 24 hours); body of water, type of sampling, species sampled, and age and sex of sampled fish (if possible).

## **Survey Techniques**

### **Aquatic Invertebrates**

Macro-invertebrate community composition can reveal the health of an aquatic ecosystem. It can also provide a warning system or show the relative intensity of pollution or other impact related problems. A complete inventory of aquatic macro-invertebrates in waters receiving surface or groundwater from the mine area should be completed. Sampling may include the use of kick nets, dip nets, Surber samplers, artificial substrate samplers and dredges. At a minimum, sampling should be conducted in spring, summer and fall. Increased levels of sampling may be necessary, depending on site characteristics and/or the type of information sought. Site- and case- specific needs regarding scope and methods of invertebrate sampling must be established in consultation with DEQ.

### **Fish**

Inventories of the fisheries resource in all perennial streams, lakes and impoundments, anticipated to be impacted by a proposed mining operation must be completed [ARM 17.24.304(10) (a), (b), (c)]. Electro-fishing, nets and traps are useful tools to inventory fisheries present in these areas. Selection of a method depends on desired results and suspected fish species present. All fish inventories need to be coordinated with DEQ and the regional fisheries biologist for MDFWP. Additionally, MDFWP may have an existing data base which is sufficient for the baseline inventory. The Plan of Study (POS) must be approved by DEQ. The POS should include the following: (1) inventory objectives; (2) desired sampling methods; (3) proposed sampling location(s); and, (4) timing of the sampling. If a sampling permit is necessary, the appropriate request must be submitted to:

Director  
Montana Department of Fish, Wildlife and Parks  
P.O. Box 200701  
Helena, MT 59620-0701

## **Suggested Surveys**

- (1) Aquatic Invertebrates
  - \* Sampling method(s) and survey timing need to consider the desired results. Final methods to be approved by DEQ.
  
- (2) Fish
  - \* Breeding (March - November, depending on species)
  - \* Species occurrence/abundance (yearlong)
  - \* Electro-fishing, nets and traps can be used to sample species distribution and abundance.

## **Wildlife**

Commonly, a combination of survey techniques will be used to obtain desired results. One survey technique may be preferred for a given species or group of species. However, a supplemental technique may be used to gather additional useful information. Once appropriate survey methods and routes are established, they should remain consistent. Changing methods and modifying routes may seriously complicate data analysis, or in the worst case, the data may not be comparable at all. In this case, the investigator has wasted a lot of time and money, and hasn't produced the desired results. However, if the investigator determines a selected method is not producing the desired results (for example mule deer, mid-day habitat selection within the study area) then a change in methods is appropriate. Additionally, influential factors outside the control of the company - fire, logging, drought, etc. - may also require a change in methods. Operators need to remember that any changes to sampling methods have to be approved, in advance, by DEQ.

When designing surveys, one should consider desired objectives, as well as potential impacts of the survey. Aerial surveys are a good method for collecting data on big game distribution, habitat use and population characteristics. They are also useful for surveying raptor nest locations. However, wildlife can be adversely impacted by an aerial survey if precautions are not taken. For example, spring big game surveys can cause unnecessary stress to females and young prior to and following parturition. This stress may result in the loss of animals. Another example might involve an investigator continuing to circle an active nest while conducting a raptor nest search. This type of unnecessary disturbance may cause nest abandonment and is easily avoided.

## **Suggested Surveys**

- (1) Terrestrial Invertebrates
  - \* Surveys and inventories are designed according to needs and goals. Final methods will be approved by DEQ.
  
- (2) Amphibians and Reptiles
  - \* Breeding (May - July)
  - \* Abundance (May - August)

- \* Pitfall traps, as well as pedestrian and spotlight surveys, are effective survey techniques.
- (3) Breeding Birds
- \* Abundance, distribution and habitat selection (mid-May through June).
  - \* Survey methods include line transects, belt transects, spot maps and circular plots. It is recommended that circular plots (point counts) be used and incorporated into the state-wide survey efforts.
- (4) Upland game birds
- \* Lek Surveys
    - Presence of activity (mid-March through early June).
    - Breeding population estimate (first three weeks of April).
  - \* Pheasant crowing counts (May).
  - \* Production (brood) surveys (mid-June to early August).
  - \* Aerial, pedestrian and vehicle surveys can be used to locate leks. On-the-ground surveys should be used to census leks. Vehicle routes can be established for brood surveys.
- (5) Wading and Shore Birds
- \* Abundance (May through July)
  - \* Nesting (May and June)
  - \* Aerial, vehicle or pedestrian surveys can be used.
- (6) Waterfowl
- \* Migration
    - Spring (March through May)
    - Fall (September through November)
  - \* Breeding (April through June)
  - \* Production (June through July)
  - \* Aerial, vehicle or pedestrian surveys can be used.
- (7) Raptors
- \* Nest location and production
    - Initiate surveys for early nesters (eagles and owls) from mid-February to mid-March. The majority of nest inventory time should be spent between April and early July.
  - \* Seasonal occurrence (seasonal surveys and miscellaneous observations).
- (8) Small Mammals
- \* Species occurrence (all seasons)
  - \* Abundance - trapping (June through August)
  - \* A combination of live traps, snap traps and pitfall traps is recommended. Trapping should be conducted for a minimum of five nights for each grid.
  - \* Precautions should be taken when handling trapping equipment and trapped animals. The Hanta virus has been documented in Montana. This virus is potentially fatal and should receive utmost caution and consideration from all investigators.

- (9) Bats
- \* Species occurrence (late spring, summer, early fall)
  - \* Maternity/nursery roosts (late spring and early summer)
    - \* Caution should be taken to prevent undue disturbance to the bats.
  - \* Hibernacula (late fall and winter)
    - \* Extreme caution needs to be taken to avoid disturbing hibernating bats. Disturbance can cause bats to come out of torpor and die because of energy demands and lack of food. DEQ strongly recommends suspected or confirmed hibernacula be surveyed only by qualified individuals.
- (10) Medium-sized Mammals
- \* Species occurrence (all seasons).
  - \* Spot-light and scent-post surveys are the best inventory methods. Opportunistic observations may also be included.
- (11) Big Game
- \* Population size, distribution and habitat selection (all seasons).
  - \* Priority surveys are winter (December through February) and production - before hunting season (late summer through early fall) and after hunting season (late November through early December)
  - \* Aerial surveys are recommended. Vehicle and pedestrian routes can be used to supplement the data.
- (12) Threatened and Endangered Species
- \* Survey needs for specific threatened, endangered or candidate species need to be identified during initial consultations with the U.S. Fish and Wildlife Service.
- (13) State Sensitive Species
- \* Surveys and inventories are designed according to the species.

Special Note: DEQ is concerned with health and safety. Should concerns with hazards, such as the Hanta virus, be an issue, DEQ will discuss these concerns with the involved parties to determine an appropriate solution. It is also recommended that individuals involved with handling of bats receive the 3-shot rabies pre-exposure.

### **Pedestrian and Vehicle Routes**

Systematic pedestrian and vehicle routes can be used to obtain a general inventory of visible wildlife species. These techniques are useful in surveying upland game birds, waterfowl and raptors. They can be used to supplement surveys for medium-sized mammals and big game. Using a combination of pedestrian and vehicle routes allows the entire study area to be surveyed. Areas of open topography and vegetation are conducive to the use of vehicle routes. Wooded areas, drainages and ridge tops should normally be surveyed using pedestrian routes.

Data from these routes should be collected in a consistent manner - lengths of routes and their locations should remain static throughout the study period. Vehicle routes should be plotted on the base map. Routes should be driven at a consistent speed, at approximately the same time of day, with the same number of observers. Pedestrian routes should also be plotted on the base map and surveyed in a consistent manner.

In selected instances, such as raptor nest surveys, vehicle and pedestrian surveys may be combined to create a saturation survey of an area. In this case, the area surveyed, not the individual routes should be delineated on a map. Additionally, pedestrian routes can be used to survey animal use of special habitat features. Surveys of amphibian and reptile use associated with wetlands, riparian areas and rock outcrops are examples of this type of survey.

### **Aerial Surveys**

This is the most efficient method of collecting data on seasonal big game densities, distributions, habitat preferences, age and sex ratios, and other general trend information. It is also an effective method to inventory raptor nest sites, waterfowl use of ponds and streams, and to determine the location of prairie grouse leks. Observations of medium-sized mammals are often made during aerial surveys. These observations can be used to supplement other survey methods for these species.

Two different types of aerial surveys can be conducted: saturation level flights and grid flights. Saturation flights require complete coverage of all habitats in the survey area. This method is best utilized for inventorying raptor nest sites. It ensures that all areas are inventoried for possible nest sites. Grid flights utilize a systematic approach to area coverage. Flight lines are spaced equidistant across the survey area, usually no more than 1/2 mile apart. Fence lines, rock outcrops and other easily identifiable landmarks should be used to locate flight lines during a survey. Permanent, on-the-ground markers may be used to delineate the grid lines. This provides consistency between surveys. This method is best used to conduct seasonal big game surveys. Depending on the type of information to be collected, type of topography, and the species to be inventoried, survey flights can be completed using a fixed-wing aircraft or a helicopter. For most surveys, a Piper super-cub is a very efficient aircraft. This aircraft allows low altitude (<300 ft.) surveys at a reasonable speed (55-70 mph).

Aerial surveys need to be conducted in a consistent manner. Air speed, elevation above the ground, type of aircraft, number of observers, grid spacing and direction of flight need to be consistent between surveys. This provides for a valid comparison of data over time. Additionally, survey patterns need to consider sun position. Survey lines and/or patterns need to be established so the sun does not obstruct the visibility of the observer(s).

To maximize data gathered during aerial big game surveys, investigators may consider incorporating the use of marked (ear-streamers, neck bands and/or radio-collars) animals. By using an adequate sample of marked animals in the population, a reliable population estimate can be obtained as follows. A series of flights during a given period of time are completed. The number of marked animals observed is compared to the



number of marked animals known to exist in the population and an estimate of the total population is calculated. The observation of marked animals also indicates general seasonal movement patterns.

### **Scent-post Surveys**

The scent station index method is used primarily to census carnivores, particularly coyotes. Additional studies have shown that raccoons and cottontail rabbits can also be surveyed using this method. Scent stations consist of a circular area (1 meter diameter) cleared of vegetation and debris and covered with a layer of sifted soil. An attractant is used to entice the animals onto the cleared area. The number of visits is determined by the footprints that are made in the cleared area.

### **Spotlight Surveys**

Spotlight surveys can be used to inventory herps, lagomorphs and medium-sized mammals. Surveys should be conducted just after dark, during a period of no precipitation, and when the wind is <15 mph. Spotlight surveys are also a useful tool for classifying both mule deer and white-tailed deer. Deer tend to forage in open areas after dark. Therefore, they can be easily classified with the aid of a spotlight. Prior to conducting spotlight surveys, the investigator should contact the local game warden for MDFWP, the local law enforcement agency, and adjacent land owners. This will help avoid potential problems in the field when a concerned citizen turns in a suspected "poacher".

### **Live, Snap and Pitfall Trapping**

These methods, singly or in combination, are used to census small mammal populations. Small mammal trapping documents species occurrence, relative abundance and habitat preference. Each method is selective for a particular species or group of species. A mark-recapture survey can be used if the only means of trapping is live-traps. This method provides a density estimate, as well as an estimate of the average home range. A main drawback to this method is the number of replications needed to develop a reasonable population estimate. Another drawback is not all species are susceptible to trapping with live-traps.

A variety of small mammals can be successfully trapped with Sherman live-traps. Other species are more susceptible to capture with snap-traps. Some species, such as shrews, are not susceptible to live-traps or snap-traps. However, pitfall traps set across their runs are an effective way to inventory their presence and relative abundance. Therefore, it is best to utilize a combination of methods.

Two methods can be used to select locations of trapping lines or grids. First, randomly selected points can be used as permanent sampling locations. Once the locations are selected they should be permanently marked. This will allow trapping to be conducted in the same location in successive years. The second method involves the annual selection of random sampling points. These points should be a subset of the vegetation sampling points. This method allows for the determination of the relationship between the small

mammal community and the vegetative community. In both cases, trapping should be conducted in areas disturbed by mining activity and are reclaimed, as well as similar undisturbed reference areas that can be used for comparison.

Traps are typically set in a grid in the habitat type to be sampled. The recommended grid configuration, number and kinds of traps and the duration of trapping are:

- \* Two parallel/perpendicular transects spaced at a great enough distance so there is no probability of both intersecting a common home range (minimum of 400 meters).
- \* Twenty-five stations spaced at 10-m intervals along each transect.
- \* Two museum specials, a Sherman live-trap and a sunken pitfall trap (large coffee can) placed at each station. The traps should be arranged around the sampling point so they are approximately 1 m apart.
- \* A minimum of five nights of trapping (1000 trap nights) should be conducted at each grid.

Using this grid, an 80 to 85% confidence level can be obtained for the probability that all the species within the area have been detected.

Care should be taken to ensure the grid is totally within a habitat type. If possible, a buffer of at least 100 m should be maintained between the edges of the grid and the habitat type boundary. In linear habitats, such as a riparian zone, a modified grid (longer and narrower or a continuous line) will be necessary. There is a potential that the pitfall traps used to survey small mammals may also provide a sample of the herps within the area.

Small mammal populations are at their highest levels during mid-summer to early fall. The majority of breeding is complete by this time and juveniles are dispersing. Additionally, those species which initiate hibernation early in the fall are still mobile and susceptible to trapping. A minimum of one trapping session should be conducted in each habitat type between early July and mid-September. Each trapping session should include five consecutive nights of trapping. Checking and re-setting of traps and recording of captures on a daily basis is necessary. A summary of each trapping effort should be prepared. Included in the summary are: dates; number of trap nights; species captured; trap type; sex and age of each individual; total captures by species; and, relative abundance estimates for each species. If mark-recapture is utilized, the average home range for each species should also be calculated.

Before initiating trapping, a permit needs to be obtained from MDFWP. The company must submit a permit request, outlining the proposed study and trapping methods, to:

Director  
Montana Department of Fish, Wildlife & Parks  
P.O. Box 200701  
Helena, MT 59620-0701

## **Mist Netting**

Monofilament mist nets are useful in sampling bat and song bird populations. Mist nets are suspended above the ground using poles and/or trees. To target bat species, mist netting can be done at the mouth of caves or mine shafts and in foraging areas, such as above streams and ponds.

Mist netting should not be used as a regular inventory method. Because of the harm that can be caused to the animals, mist nets need to be almost constantly watched. When a bat or bird is caught, the observer immediately removes it from the net, makes the appropriate observations/measurements and releases the animal. This method is very labor intensive and requires trained individuals to watch the nets and release animals in an expedient manner. Permits from both MDFWP and USFWS are necessary prior to conducting mist netting. These permits will be issued only to individuals who have been properly trained. Permit requests should be submitted to:

Director  
Montana Department of Fish, Wildlife & Parks  
P.O. Box 200701  
Helena, MT 59620-0701

and

Director  
Bird Banding Laboratory  
U.S. Fish and Wildlife Service  
Laurel, MD 20708

### **Line Transects, Belt Transects, Spot Maps, and Circular Plots**

These methods are commonly used to survey birds. Desired results and the habitats to be surveyed need to be considered when selecting the survey method(s).

Transects/plots need to be established in representative areas which are to be disturbed by mining and later reclaimed. Additionally, representative habitats which will remain undisturbed for the life of the mine need to be sampled as control areas - reference areas used for vegetation monitoring should be included as control areas. Again, once a survey method has been adopted, it should be maintained for the life of the survey. If changes in methods are needed, a method should be selected which allows for the incorporation of the original data into the new data base.

Line and belt transects are suitable for determining species inhabiting a particular habitat type. Additionally, relative abundance of some species can be determined. Belt transects, spot maps and circular plots can be used to determine species occurrence, relative abundance and population estimates. Belt transects and spot maps are best adapted to more open habitats. The circular plot method is suitable for use in open habitats, as well as habitats with more closed canopy - e.g., creek bottoms and timbered areas.

Because of the inter-relationship between the vegetative community and the bird community, the Department recommends the following survey method for censusing song birds. On an annual basis, a randomly selected subset of the vegetation sampling

points is selected. These points are the center of circular plots which are used for sampling the song bird community. A main goal of the sampling effort is to develop population estimates for at least a portion of the species inhabiting a particular area. Therefore, investigators must make sure a sufficient number of plots are sampled throughout both representative reclaimed areas and associated undisturbed reference areas.

Each plot should be sampled three times during the breeding season. After arriving at the sample point, the observer allows a few minutes for the birds to return to their morning routine. The observer then records all visual and vocal observations for a 10-minute period. Observations are entered into one of three categories - within a 50 m circle, 50+ m, and fly-overs. To help determine the adequacy of the 10-minute time period, it is recommended observations also be placed in time categories - 5 minute, 5-6 minute, 6-7 minute, 7-8 minute, 8-9 minute and 9-10 minute. Analysis of this latter data may show that an observation period of less than 10 minutes is adequate.

Bird surveys should be conducted in May and June during the height of the breeding season. These surveys are started approximately 1 hour after sunrise, following the morning chorus period. The surveys are conducted until approximately three to four hours after sunrise, at which time activity becomes significantly reduced. The investigator should monitor the activity on a given morning and quit when activity begins to drop off. During the survey period (three days), the start time should be rotated between the plots/transects. Thus, during the survey period, each of the plots/transects is completed from early to late in the morning. The results of this survey are comparable to those obtained from plots/transects conducted just at sunrise. This allows for plots/transects to be completed later in the morning; thus, more plots/transects can be completed during the spring period.

Weather greatly influences bird activity and singing. Therefore, bird surveys should be conducted only on days with favorable weather conditions. Favorable conditions are considered to be: winds <10 mph, no precipitation, reduced cloud cover and moderate temperatures. If these conditions are not present on a given day, surveys should be canceled until conditions become favorable.

## **Vocalization Surveys**

**Echolocation** is an effective way to conduct bat inventories. Using an electronic bat detector, the ultrasonic chirps of bats can be listened to and recorded. Because each species of bat emits chirps at a distinct frequency, an investigator is able to determine the species utilizing a particular habitat during a given time. Bat detectors, such as the AnaBat II, have been developed to be used as hand held units, as well as monitoring stations for a given time period - e.g., overnight. These detectors can then be interfaced with a computer to generate an analysis of the numbers of each species of bat which were heard. Walking transects can also be established in given habitats. The investigator can listen to the bat detector along the entire length of the transect or at listening stations placed equidistant along the transect.

**Crowing Counts** are used to determine the presence, distribution and relative number of male pheasants within a particular area. Pheasant crowing activity is influenced greatly by weather conditions. Therefore, surveys should be completed only during periods of favorable weather - low percent cloud cover, no precipitation, winds <10 mph. Crowing counts should be initiated approximately 1 hour before sunrise and completed by 2 hours after sunrise.

Usually, a vehicle route is established through or adjacent to the habitat considered to be occupied by pheasants - e.g., drainage bottoms or cropland. The route is divided into regular stops spaced 1/4 to 1 mile apart. At each stop, the observer leaves the vehicle and listens for a given amount of time, 3 to 5 minutes. The crowing count survey should be conducted on at least three mornings during the peak of the breeding season - early to mid- May. All pheasant calls that are heard during the listening period are counted and recorded. The average and maximum number of calls heard along the route and average number heard per mile are compared on an annual basis.

**Prairie grouse lek surveys** are used to determine the location of sage grouse and sharp-tailed grouse leks. Using a vehicle, the observer travels throughout the study area. Approximately every 1/4 to 1/2 of a mile, the observer stops the vehicle and gets out to listen for the sounds produced by displaying grouse. Listening periods are a minimum of five minutes. This allows for periods when the grouse are inactive and not vocalizing. After hearing vocalizations, the observer proceeds in the direction they came from until the displaying grouse are observed. In addition to on-the-ground surveys, aerial surveys may be used to locate leks.

Male sage and sharp-tailed grouse usually display from approximately mid-March to late May and occasionally early June. Activity usually peaks during the first three weeks of April. Surveys to locate new leks can be conducted any time during the breeding season. Surveys to determine the breeding population within a given area should be completed during the peak display period. These surveys should be conducted from the ground (aerial surveys may be used to locate new leks). The number of grouse - males (adult and juvenile), females and unidentified - should be recorded for at least three mornings during the breeding season peak. The weather conditions discussed below should be present when the three surveys are conducted.

As with the pheasant crowing counts, weather influences the amount of activity that occurs. Both presence of grouse on the lek and the amount of activity are influenced by weather. Therefore, surveys to determine breeding populations should be conducted during periods of no precipitation, wind velocities <10 mph and moderate temperatures.

## **SECTION II** **MONITORING**

### Mining, Reclamation and Bond Release

#### **INTRODUCTION**

Current rules direct that periodic wildlife monitoring be conducted and results reported regularly (ARM 17.24.723). Because it is stated as law is a good reason to conduct monitoring; however, a purpose or end result of the monitoring needs to exist. Final bond release is dependent, in part, on whether or not ... "fish and wildlife habitats and related environmental values have been restored, reclaimed, or protected in accordance with the Act, the rules, and the approved permit" [ARM 17.24.1116(7)(d)(ii)]. Therefore, the Department requires wildlife objectives for bond release be developed for each mine. Objectives should be further refined to each habitat type within the mine.

Bond release objectives, such as estimating the number of wildlife species that could be expected to inhabit a particular habitat type at the end of the responsibility period (selected by the operator - minimum 10 years), should be developed. These objectives may be developed in coordination with bond release criteria established in the context of vegetation, hydrology, engineering, etc. These objectives provide long-term reclamation goals and help direct wildlife and related monitoring during the life of the mine and post-mining reclamation. For example, bond release objectives for reclamation of habitat types such as grasslands should include characteristics that closely approximate pre-mining conditions. Pre-mine vegetative species composition and structural diversity of this habitat type may be closely replicated within the minimum 10-year reclamation responsibility period. Other, more structurally complex habitat types, such as the ponderosa pine type, have varied vegetative species and structural diversities that are difficult or impossible to replicate during the minimum 10-year responsibility period. With habitat types of similar structural complexity to the ponderosa pine type, a key factor in establishing a mature stand is the time needed to establish some of the vegetational characteristics - grass and shrub understory, multi-age trees, snags, etc. Because of the extended time needed to completely reclaim habitats such as these, bond release objectives need to be tailored accordingly (also see Vegetation Guidelines).

#### **PURPOSE AND OBJECTIVES**

Monitoring is necessary to determine the relationship of mining and reclamation to the wildlife community on and adjacent to the mine site. Primary, post-baseline, wildlife monitoring objectives are:

- (1) Supplement the initial data base;
- (2) Act as a surveillance system to detect impacts (negative and positive) from mining and reclamation activities;
- (3) Quantify the magnitude and duration of impacts (negative and positive);
- (4) Document the continuing status of state and federally protected species;

- (5) Evaluate the effectiveness of mitigation and reclamation practices;
- (6) Determine the relationship between wildlife populations and reclaimed habitats;
- (7) Provide an indicator of how the existing wildlife community relates to bond release objectives.
- (8) Demonstrate whether monitoring should be increased, decreased, remain the same, or be eliminated.

Baseline data are gathered to determine population parameters, distributions and habitat selection of the wildlife community prior to mine related disturbances. This baseline is used to predict potential impacts mining and reclamation will have on the wildlife species using the area. These predictions are made using the best available data and data analysis techniques. Monitoring of the wildlife community during mining and reclamation provides long-term comparison of trends in population size and composition, animal distribution and habitat selection.

Some questions which monitoring of the wildlife community can answer include the following: Are the projected impacts occurring? If so, are they occurring at the predicted level? If not at the predicted level, is the change positive or negative? Is one reclaimed habitat type more successful than another? Does a particular combination of topography and vegetation provide a situation which allows a greater preference to a particular species? Are certain wildlife species being more adversely impacted by mining activity than other species?

Long-term trends can be established by comparing the annual findings to the pre-mine baseline. These trends indicate how various wildlife species are responding to mining and reclamation. Monitoring and establishment of the long-term trends may provide justification for modifications to mine and reclamation plans. These modifications, in turn, may help mitigate some of the negative impacts of the mine.

One of the most important aspects of a wildlife monitoring program is to determine if the bond release criteria are being achieved. Monitoring should establish wildlife population trends and how these trends relate to the observed trends in the various vegetative communities. Monitoring prior to application for bond release allows modifications - additional seeding, shrub and tree planting, etc. - of the reclaimed habitats. While these actions may restart the bond release clock, it is better to restart the clock when a problem is indicated than to wait until the end of the responsibility time period and discover the problem.

## Data Collection

Prior to initiating monitoring, companies must submit a Wildlife Monitoring Plan for DEQ approval. Unless data analysis suggests a need for modification, the study area(s) established during the pre-mine inventory phase should also be used during the monitoring phase. Additionally, survey techniques should remain consistent between the two phases. Maintaining a consistent study area and using consistent inventory methods will allow for the comparison of results in a sound, scientific manner.

In some instances, the intensity of pre-mine inventories may not be necessary during monitoring.

**Example:** During monitoring, a mid-winter aerial survey (three repetitions during a period of one to two weeks) could be used to obtain mule deer population size and composition. Mid-winter animal distribution and habitat selection could also be obtained at the same time. This survey would replace the aerial surveys conducted during all four seasons.

Additionally, emphasis may change between species and species categories as the shift from pre-mine inventory to monitoring occurs.

**Example:** The four seasons of mule deer surveys are replaced as in the previous example. However, as additional areas are reclaimed, with a diversity of topography and vegetation, the number of breeding bird and/or small mammal transects should be increased to adequately monitor any changes in the respective wildlife communities. This is particularly appropriate with larger mines which disturb greater acreages.

As inventories and monitoring progress, the species list should be updated on an annual basis.



### **SECTION III** **Data Analysis and Reports**

Data analysis techniques must be presented in the Plan of Study (base-line) and the Wildlife Monitoring Plan (monitoring) for approval by DEQ. Data analysis must be done using methods commonly accepted by the scientific community. Several of the publications included in the bibliography address techniques suitable for data analysis. In the past, numerous annual reports have presented data with little or no analysis and discussion. This is no longer acceptable. Data must be analyzed to the extent possible. Compilation and analysis of inventory and monitoring data must be completed annually. Ideally, data should be reported by biological year. However, biological years are not the same for each species or group of species. To facilitate reporting and reduce the confusion in data presentation and analysis, it is recommended that December 16 through December 15 be used as the reporting period. To standardize seasons of use, the following time periods are recommended: spring - March 16 through June 15; summer - June 16 through September 15; autumn - September 16 through December 15; and, winter - December 16 through March 15. A 90-day period, following the end of the inventory year, would be provided for data analysis, report writing and report submission. Therefore, annual wildlife reports would be due no later than March 15.

In addition to presenting data and data analysis, the report needs to include several other items. A copy of the Plan of Study or Wildlife Monitoring Plan should be included, as well as a complete description of the methods used. Any modifications to the existing plans and methods which the company proposes to initiate must also be included. Survey maps, using the habitat map as a base, must also be included. An updated species list, with columns showing survey years and indicating during which years each species was observed, should be included in the Annual Wildlife Report.

Geographic Information Systems and electronic data processing are strongly encouraged. Computer technology and capabilities are rapidly advancing. Use of computers and computer software to store, retrieve and analyze data is strongly recommended. GIS systems can be used to electronically overlay selected data bases and to produce desired maps.

In addition to the written annual report, DEQ encourages the use of photographic and video equipment to document fish and wildlife related activities on each of the mines. Examples include installation of special habitat features, unusual sightings, habitat use, etc. Such records are useful not only for documentation but also for purposes of technology transfer, professional presentations, etc.

### **SECTION IV** **Mitigation**

In order to reduce impacts of mining and reclamation, mining companies must develop and implement a habitat mitigation and enhancement plan. Techniques designed to minimize impacts to wildlife and/or enhance wildlife habitats during and following mining should be incorporated into the Fish and Wildlife Plan (ARM 17.24.312). Consideration

of past successes and failures (both at the mine and elsewhere) needs to be part of the development process.

Mitigation is multi-faceted and multi-disciplinary. For example, when designing a wildlife habitat enhancement feature, topography, hydrology, soils, vegetation and potential wildlife uses all have to be considered. The relationship of each of these facets has to be considered in order to maximize the effort and achieve overall reclamation goals. Thus, by modifying post-mine topography and using a variety of soil handling techniques (e.g. direct-haul soil salvage, varying replacement thickness, segregating soil types, etc.) a diverse vegetative stand may be created. This vegetative mosaic will allow a greater variety of uses by wildlife than a gently sloping area of uniform soil depth covered with a vegetative monoculture. Surface water features will also vary due to the topographic and vegetative differences.

Ultimately, avoiding disturbance of important habitats and habitat features - for example water resources and related habitats - is desired. Where such disturbance is allowed through the permit process, efforts should be made to minimize impacts to the various resources. DEQ proposes a variety of mitigation techniques which can be used during mining and reclamation. The following good management practices are mitigation measures that should be implemented on a regular basis. These mitigation measures can be used singly or in combination. Upon approval by DEQ, these measures can be implemented at the discretion of the mining company.

## **Partial List of Potential Fish and Wildlife Mitigation Measures**

### Wildlife

#### Topography

- ✎ Design final topography to approximate pre-mine conditions. Include varying aspects, slopes and micro-topographic features - swales, rocky knobs, benches, ridge-tops, drainage bottoms, rubble zones, etc. Modern equipment can be used to create post-mine conditions which are vastly improved over the golf course look of past reclamation.
- ✎ Drainage bottoms should be designed to approximate the pre-mine pattern. This should promote a diversity of riparian vegetation.
- ✎ Sediment control structures can be used to create wetlands (temporary and permanent) and to provide sources of surface water.

#### Soil Materials

- ✎ Soil material should be direct hauled whenever possible. This enhances vegetative establishment and diversity in reclaimed areas. Direct hauling provides increased viable propagules and helps to maintain soil organics and structure (i.e. soil aggregation).
- ✎ Special-handle drainage bottom and wetland soils. Replacement of alluvial soils maintains the moisture-holding capacity and desired seed bank in these areas. This promotes better establishment of desired vegetation.

- ✎ Use rocky or coarse textured soil and/or spoil material to promote establishment and propagation of ponderosa pine, shrub and other plant communities. Permeable soil/spoil material reduces herbaceous competition by increasing surface infiltration.

### Vegetation

- ✎ Following the Vegetation Guidelines, plant a diversity of native species to enhance nutrition, cover and structural values.
- ✎ Implement planting patterns to optimize edge and interspersion and to create travel corridors.
- ✎ In selected cases, to promote specialist wildlife species, edge and interspersion may be de-emphasized to promote a larger stand of desired habitat conditions.
- ✎ Use pads of mature vegetation to establish areas of immediate cover. These "vegetation islands" will also add to the diversity within a given area.
- ✎ Leave undisturbed "vegetation islands" to act as wildlife habitat and provide a nucleus for seed dispersal.
- ✎ Use tree and shrub seedlings to improve probability of establishment of desired species.
- ✎ Carefully select plant species varieties that will maximize survival, growth and palatability.
- ✎ Use of shelter belts/fence rows where cover and agricultural use must be compatible.

### Habitat Replacement/Enhancement

- ✎ Use boulder piles to replace similar features destroyed by mining to provide wildlife cover, as well as perching sites. Boulder piles also provide micro-habitat conditions suitable for establishment of selected vegetation, therefore, adding diversity and utility.
- ✎ Installation of snags for wildlife species requiring perching sites and nesting cavities.
- ✎ Placing nest boxes and/or constructing nesting cavities for selected species - kestrels, falcons, bluebirds, etc. - at appropriate locations.
- ✎ Construction and placement of appropriate "bat houses" to provide short-term replacement of habitats lost through the mining process.

- ✎ Replace or enhance bluffs/cliffs (extensions of pre-mining bluff/cliffs, leaving selected portions of highwalls and/or creating new bluff/cliffs) and associated rubble zones when suitable substrate is encountered.
- ✎ Use of creative blasting to produce desired cliff habitats -nesting cavities, ledges, broken areas, etc.
- ✎ Replacement of water sources - seeps, springs, wells, ponds and streams - lost as a result of mining.
- ✎ Creation of food plots to influence animal distribution patterns. These could be used to attract animals away from sensitive reclamation areas - e.g. new shrub or tree plantings, etc.
- ✎ Utilize controlled hunts to reduce animal numbers and affect animal distribution.

#### Human disturbance

- ✎ Time activities to minimize disturbance during sensitive periods - e.g. courtship display periods, nesting, parturition, etc.
- ✎ Develop company policy penalizing wildlife harassment and poaching by mine personnel.
- ✎ Employee education to "sensitize" employees toward wildlife. Make employees aware of the various wildlife needs - food, cover, security, etc.
- ✎ Adopt speed limits and traffic patterns minimizing wildlife/vehicle collisions.
- ✎ Utilize "mass" transit or carpools to reduce the overall traffic volume to and from the mine site.
- ✎ Use controlled hunts to minimize human disturbance.

#### Mine Facilities

- ✎ Design facilities, such as coal conveyers, to minimize disturbance/hindrance to animal movements.
- ✎ Design electrical transmission facilities to minimize the electrocution hazard to raptors.
- ✎ Design livestock fences to permit necessary wildlife movement/access. Fences around hazardous areas should be designed to exclude both livestock and wildlife.
- ✎ Transportation corridors should be located in a manner to reduce impacts to wildlife and wildlife habitats.

- ✎ Size and location of mine facilities can be designed to minimize disturbance to wildlife and wildlife habitats.
- ✎ Enhancement of off-site areas to improve carrying capacity. This can be done to sustain animals displaced from disturbed areas, or to attract animals away from newly reclaimed areas.

## Aquatics

### Topography

- ✎ Appropriate pond slopes and depths to promote post-mine habitat diversity for aquatic communities.
- ✎ Suitable stream geometry, pattern and gradients for aquatic communities - pools to support aquatic biota during low flows, etc.

### Soil Materials

- ✎ Proper sealing of ponds where water retention is desired and/or necessary.
- ✎ Selection of appropriate substrate type, size etc. for the given stream conditions.
- ✎ Use of drainage controls to control flow and reduce erosion potential.

### Vegetation

- ✎ Selection of suitable riparian and emergent vegetation species to achieve post-mining objectives.
- ✎ Protective fencing to exclude livestock from selected riparian areas and wetlands.

### Shelter

- ✎ Installation of appropriate in-stream and bank structures to provide cover, shelter from high flows, habitat diversity, etc. This needs to be accomplished in consultation with the hydrologists and engineers.
- ✎ Use of rocks and/or brush in ponds to provide additional habitat features for fish, aquatic invertebrates, and amphibians.

### Human Activity

- ✎ Timing of diversions and in-stream construction to avoid important reproductive periods.
- ✎ Locate roads and facilities away from riparian zones and wetlands.
- ✎ Sediment control to minimize excess transport and deposition in streams, ponds and wetlands.

- ✎ Minimum use of diversions and careful design of necessary diversions to include suitable meanders, riparian cover, etc.
- ✎ Approximate pre-mine stream flow and water conditions by careful use of water flow from pits and other mine workings.
- ✎ Maximize the distance between disturbances and undisturbed aquatic habitats.
- ✎ Educate employees on the importance of maintaining water quality.
- ✎ Controlled fishing.

## **SECTION V Threatened and Endangered Species**

The Office of Surface Mining and the U.S. Fish and Wildlife Service has developed a Biological Opinion and Conference Report on Surface Coal Mining and Reclamation Operations Under the Surface Coal Mining and Reclamation Act of 1977. A non-jeopardy opinion covering all surface coal mining activities, for all listed species, was determined as long as the required terms and conditions specified in the Incidental Take Statement are implemented. As part of this agreement, the Department must implement and require compliance with any species-specific protective measures developed by the USFWS field office and the regulatory authority. As part of the coordination, species-specific protective measures applicable to all surface mines in Montana are being included in this document. Additionally, all permit applications and existing permits must include a commitment to implement the applicable measures contained in the following protective measures (letter from USFWS to MDEQ, September 20, 2001).

### **BLACK-FOOTED FERRET SURVEY GUIDELINES FOR COMPLIANCE WITH THE ENDANGERED SPECIES ACT**

These revised “Black-Footed, Ferret Survey Guidelines” (April 1989) are currently used by the Fish and Wildlife Service’s (Service), Ecological Service’s offices to evaluate surveys conducted for the presence or absence of black-footed ferrets on areas with proposed Federal actions.

Compliance with or disregard for these guidelines does not, of itself, show compliance with or violation of the Endangered Species Act or any derived regulations. It is advisable that the appropriate State wildlife agency; State Supervisor, Fish and Wildlife Service, be contacted if there are any questions about an activity to be conducted in prairie dog towns that may be black-footed ferret habitat. In Montana, contact Lou Hanebury, Billings Suboffice, (406) 247-7367.

These guidelines establish minimum areas of prairie dog habitat (80 acres of black-tailed prairie dog towns and 200 acres of white-tailed prairie dog towns) that the Service believes are needed to support a black-footed ferret. Preactivity ferret surveys will not be required to satisfy the regulations (50 CFR 402) governing interagency cooperation under the Endangered Species Act (Act) if the



projects are proposed in areas with less than 80 acres of black-tailed prairie dogs and less than 200 acres of white-tailed prairie dogs.

The guidelines also establish that areas having 1,000 or more acres of white-tailed or black-tailed prairie dog habitat should be evaluated as possible sites for future black-footed ferret reintroduction. Any Federal action proposed on these areas should be preceded by a survey for black-footed ferrets using the 1989 guidelines. Prairie Dog colonies that are greater than 5,000 acres are considered as viable black-footed ferret reintroduction sites. Any Federal action that diminishes the size of such a complex, would require formal consultation with the Service, and result in a biological opinion stating the proposed action would Jeopardize the continued existence of the black-footed ferret.

Intermediate areas having 80 to 1,000 acres of black-tailed prairie dog towns or 200 to 1,000 acres of white-tailed prairie dog towns may have importance for black-footed ferret recovery. Until potential black-footed ferret reintroduction sites have been identified, evaluated, and secured through management plans with affected landowners and agencies, any Federal action proposed on areas meeting these criteria shall be surveyed to determine if a ferret or ferret population exists.

Section 7 consultation requirements (50 CFR 402) will be met if one of the following conditions is satisfied for Federal actions effecting black-tailed prairie dog areas of 80 to 1,000 acres and white-tailed prairie dog areas of 200 to 1,000 acres:

1. If no black-footed ferrets or their sign is found as a result of surveys on prairie dog towns affected by the proposed Federal action (action), a “no effect” black-footed ferret situation occurs. However, an updated survey may be required on the prairie dog town(s) affected by the action to address the current “may affect” question if (1) the action will occur at some future date and not shortly after the initial survey, or (2) the surveyed towns are only part of a larger complex.
2. If no black-footed ferret(s) or their sign is found as a result of a survey over an entire prairie dog town or complex of less than 1,000 acres, which includes the prairie dog town(s) affected by the proposed Federal action, a “no effect” black-footed ferret situation occurs. The Service will consider the town or complex permanently cleared of black-footed ferrets and additional surveys for ferrets will not be needed, provided a ferret is not later confirmed in the town or complex.

The Service encourages implementation of these guidelines. These guidelines will be used by the Service for the next few years during which time the Service and cooperating agencies will be working to identify and secure sites with potential for ferret reintroduction, identify those prairie dogs towns that do not meet these requirements for ferret survival and recovery, and develop plans for managing prairie dog ecosystems. The ultimate goal of these activities is to identify and secure prairie dog complexes needed for black-footed ferret recovery and to categorize large areas within each State where prairie dogs can be managed without surveys, for the purposes of Section 7.

## **GUIDELINES FOR BLACK-FOOTED FERRET SURVEYS**

### **INTRODUCTION**

The Endangered Species Act (Act), as amended, requires Federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of a threatened or endangered species. Regulations implementing Section 7 of the Act require that Federal agencies determine if any action they propose “may affect” any threatened or endangered

species. If it is determined that a proposed action “may affect” an endangered or threatened species, then the agency is required to request formal Section 7 consultation with the Fish and Wildlife Service (Service).

The black-footed ferret is a federally listed endangered species that depends upon the prairie dog (Cynomys spp.) as a source of food and uses its burrows for shelter. Ferrets are rare, nocturnal animals whose brief above ground nighttime activities make them difficult to find and observe. Any actions that kill prairie dogs or alter their habitat could prove detrimental to ferrets occupying the affected prairie dog town(s). This requires that we determine whether ferrets are present in a proposed project area and whether the proposed project activity “may affect” the survival and recovery of this endangered species.

To help detect the presence of ferrets on a prairie dog town, the Service has prepared this set of guidelines. These guidelines should assist agencies or their authorized representatives in designing surveys to “clear” prairie dog towns prior to initiation of construction projects, prairie dog control projects, or other actions that affect prairie dogs. They are intended for use by Service personnel and other State, Federal, or private agencies or organizations interested in conducting surveys for the black-footed ferret. In addition, these guidelines should assist individuals in designing surveys to be used in areas suspected of maintaining a ferret population, but without confirmed or recent sightings. If these guidelines are followed by persons conducting black-footed ferret surveys, agency personnel can be reasonably confident in results that show black-footed ferrets are not occupying a proposed project area. A survey for ferrets will supplement the consultation process, but does not relieve any agency of their obligation to consult with the Service as required by Section 7 of the Act.

To determine whether the limits and exclusions apply to an area being proposed for a planned action, the lead agency should consult with the appropriate Service office. In situations where the limits or exclusions do not apply, each State Supervisor or Associate Regional Director is authorized to determine what precautions must be taken to ensure that ferrets are not adversely affected before a prairie dog town is impacted or destroyed.

## **SURVEY CRITERIA**

### **Delineation of Survey Areas**

Until the time that the Service, States, and other Federal agencies are able to identify reintroduction areas and to classify other areas as being free of ferrets, surveys for black-footed ferrets will usually be recommended. During this interim period the following approach is recommended to determine where surveys are needed.

A black-tailed prairie dog (Cynomys ludovicianus) town or complex of less than 80 acres having no neighboring prairie dog towns may be developed or treated without a ferret survey.

A neighboring prairie dog town is defined as one less than 7 kilometers (4.34 miles) distance from the nearest edge of the town being affected by a project.

Black-tailed prairie dog towns or complexes greater than 80 acres but less than 1,000 acres, may be cleared after a survey for black-footed ferrets has been completed, provided that no ferrets or ferret sign have been found.

A white-tailed prairie dog (Cynomys leucurus) town or complex of less than 200 acres having no neighboring prairie dog towns may be cleared without a ferret survey. White-tailed prairie dog towns or complexes greater than 200 acres but less than 1,000 acres, may be cleared after completion of a survey for black-footed ferrets provided that no ferrets or their sign were found during the survey.



A complex consists of two or more neighboring prairie dog towns each less than 7 kilometers (4.34) from the other. Instructions for determining a complex of black-tailed or white-tailed prairie dogs is found in *Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-footed Ferret, USFWS, Biological Report 13, July 1993.*

Before any federally funded or permitted activities are conducted on black-tailed or white-tailed prairie dog towns or complexes greater than 1,000 acres, the appropriate Service office should be contacted to determine that status of the area for future black-footed ferret reintroductions. That office also will determine whether a survey for black-footed ferrets should be completed.

### Defining a Prairie Dog Town

For the purpose of this document a prairie dog town is defined as a group of prairie dog holes whose density meets or exceeds 20 burrows per hectare (8 burrows/acre). Prairie dog holes need not be active to be counted but they should be recognizable and intact; i.e., not caved in or filled with debris.

### Timing of Surveys

The Service recommends that surveys for black-footed ferrets be conducted as close to the initiation of a project construction date as possible but not more than 1 year before the start of a proposed action. This is recommended to minimize the chance that a ferret might move into an area during the period between completion of a survey and start of a project. If the town being affected is part of a complex in which the combined acreage of prairie dog towns total less than 1,000 acres, a survey of all the prairie dog towns within the complex will serve to clear the entire area provided no black-footed ferrets or their sign are found. If this is done, no future surveys for ferrets will be required within the borders of the complex regardless of future project activities unless a ferret is observed and confirmed on the complex at a later date.

An alternative to clearing all of the complex would be to search only the prairie dog town(s) being affected. Assuming that no ferrets or ferret sign is found, this would allow an activity to take place on the prairie dog town. If an activity is proposed in the same area in the future, a survey for ferrets may again be required if the Service cannot justify an exemption based upon the ferret history in the area, survey records, or current status of prairie dog habitat.

In a prairie dog town or complex where the acres of prairie dog towns meet or exceed 1,000 acres, any prairie dog town being affected should be surveyed as close to the initiation of project activity as possible, but not more than 1 year prior to the proposed action. When other projects are planned that will affect different prairie dog towns within the complex, they too will need to be surveyed before the project starts. Towns or complexes of 1,000 or more acres should be given special consideration for the importance to the overall recovery and survival of the black-footed ferret as potential reintroduction areas. The Service would like to minimize disturbances of these areas until black-footed ferret reintroduction sites have been selected. Once reintroduction sites are selected, these large areas of prairie dogs can be cleared from the need for future surveys if the area is surveyed, no ferrets or ferret sign are found and it is determined that the area is not needed or suitable for ferret recovery.

### Project Type

Construction projects – both linear and spatial developments that permanently alter prairie dog towns (buildings, facilities, surface coal mines, transmission lines, major roadways, large pipelines, impoundments, etc.) should be surveyed. The area to be surveyed should include all black-tailed prairie dog towns or complexes greater than 80 acres and white-tailed prairie dog towns or complexes greater than 200 acres occurring on a project right-of-way and the portion of those towns found within one-mile of the construction site or right-of-way border. Projects of a temporary nature and those that involve only minor disturbance (e.g., fences, some power lines, underground cable, etc.) may be exempted from surveys when project activities are proposed on small prairie dog towns or complexes of less than 1,000 acres, do not impact those areas where ferret sightings have been frequently reported, or occur on areas where no confirmed sightings have been made in the last 10 years. To determine whether a project qualifies for exemption, the lead agency must contact the appropriate Service Office.

Pesticide or toxicant use – The Service recommends that before any action involving the use of a toxicant in or near a prairie dog town begin, a survey for ferrets should be conducted. This includes all black-tailed prairie dog towns or complexes greater than 80 acres or white-tailed prairie dog towns or complexes greater than 200 acres proposed for control. If phosphide-treated grain, gas cartridges, or tablets are the proposed toxicants and the town proposed for treatment is in a complex of less than 1,000 acres, the town should be surveyed 30 days or less before treatment using the nocturnal survey technique (see Selection of Survey Method, Method 2). In this situation it is recommended that the entire complex be surveyed and cleared before treatment begins. This would avoid the need for an additional survey if the town needs to be treated again at a later date. Otherwise the town to be treated should be surveyed as described above and surveyed again if a second treatment is needed.

Prairie dog towns or complexes greater than 1,000 acres should not be poisoned without first contacting the appropriate Service office. Procedures to be followed on large towns or complexes will be the same as for those recommended for construction projects.

If the proposed control agent involves the use of any other compound under registration with the Environmental Protection Agency, then the area to be surveyed for ferrets should include the prairie dog town to be treated and any other town or portion of a town within 1 mile of the town being treated with the toxicant. The survey should be conducted within 30 days or less of the treatment using the nocturnal survey technique. This difference is justified on the basis of potential hazards to ferrets from secondary poisoning. As above, if the town(s) are part of a complex of less than 1,000 acres and the entire complex is surveyed for ferrets, then no future surveys will be required in the affected area if ferrets or their sign are not found.

## SELECTION OF SURVEY METHOD

Two methods to survey for black-footed ferrets or their sign are recommended. Either can be used. These methods are based upon the most recent survey research data, and both involve specific time periods. Research has shown a marked decrease in ferret activity and/or sign in November, April, May, and June. For this reason surveys for ferrets during these months are not recommended, since no acceptable confidence can be placed on the results of surveys conducted during this period.

### METHOD 1

Diurnal (daylight) surveys for ferrets are recommended if surveys are conducted between December 1 and March 31. This type of survey is used to locate signs left by ferrets. During winter months, ferret scats, prairie dog skulls, and diggings are more abundant because prairie dogs are less active and less likely to disturb or destroy ferret sign. When there is snow cover, both ferret tracks and fresh diggings are more obvious and detectable.

Daylight searches for ferret sign, should meet the following criteria to fulfill the minimum standards of these guidelines:

1. Three searches must be made on each town. Each search should be done when fresh snow has been present for at least 24 hours and after 10 or more days have passed between each search period.
2. Vehicles driven at less than 5 miles per hour may be used to search for tracks or ferret diggings, but complete visual inspections of each part of the town being surveyed is required (i.e., visually overlapping transects).
3. In Montana, if ferret sign is observed, mark the area, photograph the sign, and make drawings and measurements of diggings before contacting Lou Hanebury, Billings Service office (406-247-7367) and Montana Fish Wildlife and Parks.

Aerial surveys for ferrets are considered experimental, but may be allowed in winter using skilled aerial observers when suitable snow conditions exist. Determination of when to use this technique should be made with the appropriate Service office.

### METHOD 2

Nocturnal (nighttime) surveys involve the use of spotlighting techniques for locating ferrets. This survey method is designed to locate ferrets when the maximum population and the longest periods of ferret activity are expected to occur.

Minimum standards have been established by the Service for nocturnal surveys. These should be followed as recommended and include:

1. Surveys should be conducted between July 1 and October 31.
2. The prairie dog town should be continuously surveyed using spotlights. Surveys should begin at dusk and continue until dawn on each of at least three consecutive nights. Large prairie dog colonies should be divided into tracts of 320 acres and each tract systematically searched throughout three consecutive nights. Rough uneven terrain and tall dense vegetation may require smaller tracts to result in effective coverage of a town. Conversely, tracts larger than 320 acres could be adequately covered on even, flat and unvegetated terrain.

3. Observations on each prairie dog town or tract searched should begin at a different starting point on each successive night to maximize the chance of overlapping the black-footed ferrets' nighttime activity period(s).
4. A survey crew consists of one vehicle and two observers equipped with two 200,000 to 300,000-candle power spotlights. In terrain not suitable for vehicles, a crew will consist of two individuals working on foot with battery-powered 200,000 to 300,000 candle power spotlights. To estimate the number of crew nights for a survey, divide the total area (acres) of prairie dog town to be surveyed by 320/acres and multiply by 3. One or both of the observers in each survey crew should be a biologist trained in ferret search techniques.

### Survey Reports

The following outline provides a general summary of the types of information useful to the Service in reviewing the results of ferret surveys for concurrence with an agency's decision of "may affect" or "no affect." This information will be used to assist in Section 7 compliance decisions. Headings listed can be used in field data forms to ensure that all pertinent data are collected and surveys are not unnecessarily repeated. It is recommended that a report summarizing survey data be prepared for each project and submitted to the lead agency and to the appropriate Service office.

Data requirements for daylight searches (December 1 to March 31) or night searches (July 1 to October 31) are as follows:

1. Date
2. Hours spent searching (record time started – time stopped)
3. Acres searched
4. Number of colonies searched
5. Number of burrows inspected
6. Ferrets or ferret sign observed and locations
7. Photos taken
8. Names, address(s), telephone numbers and qualifications of searchers
9. Weather conditions (ground condition bare or snow covered)
10. Method used to search (backpack spotlight, vehicle, walking)
11. Mapped survey route and location of prairie dog town

### Survey Summary

1. Starting and completion dates for the survey
2. Total hours of spotlight search
3. Total acres searched by spotlight
4. Total colonies searched using spotlight
5. Total ferrets observed and locations by night search
6. Total hours searched in daylight
7. Total acres searched in daylight
8. Total colonies searched in daylight
9. Total ferret sign observed and location of sign observed
10. Narrative describing search technique used
11. Mapped location of central project (include acres and description)
12. Copies of field data sheets

## Surveyor Qualifications

The Service has established a process to provide specific training for conducting ferret surveys. This formal training (a 1-day workshop for biologists) is currently available through the Wyoming Cooperative Fishery and Wildlife Research Unit, Box 3166, University Station, Laramie, Wyoming 82071, telephone 307-766-5415. A trained biologist should accompany each survey crew; i.e., one trained biologist in each two person crew, when surveys are being conducted.

A field guide "Handbook of Methods for Locating Black-footed Ferrets" provides detailed methods for locating black-footed ferrets and interpreting sign made by this animal under field conditions. This handbook should be useful when designing surveys for black-footed ferrets, whether for Section 7 compliance or for locating ferrets for conservation and recovery. A copy of this document may be obtained from:

Bureau of Land Management  
Wyoming State Office  
5353 Yellowstone  
P.O. Box 1828  
Cheyenne, Wyoming 82001  
state\_office\_wymail@blm.gov  
307-775-6256

Bureau of Land Management  
Montana State Office  
5001 Southgate Drive  
P.O. Box 36800  
Billings, Montana 59107  
MT\_SO\_Mail\_Room@blm.gov  
406-896-5000

## COORDINATION OF SURVEYS

This section discusses coordination measures that the Service believes are vital to completing a proper survey.

### State Wildlife Agency

The appropriate State wildlife agency should be contacted prior to initiating ferret surveys. State agency personnel may provide historical information or literature pertinent to the survey or offer suggestions regarding access or landowner contacts needed for the survey. In addition, some States may require special permits for spotlighting wildlife or have minimum requirements for protecting ferrets under State laws which are different or more detailed than those described in these guidelines.

### Other Local Authorities

We recommend that persons planning surveys contact local authorities before initiating surveys. Many sheriff departments cooperate with State conservation officers in investigating possible game violations. Spotlighting crews are often reported to the game warden and sheriff by local citizens and ranchers. Proper coordination of survey activities should prevent unnecessary conflict with these groups and agencies.

## PROCEDURES TO FOLLOW IF FERRET SIGN OR A FERRET IS LOCATED

Wildlife agencies of some states located within the potential range of the black-footed ferret have developed a procedure to follow when ferrets are seen and reported. We recommend that agencies or their representatives request these procedures from the states in which they are working and review them before conducting surveys. If no procedures are available, contact the appropriate Service office for guidance. If you observe a ferret while conducting surveys, you should notify the closest Service or State wildlife agency office.

Experience has shown that premature release of a ferret sighting to the news media or others can have lasting negative effects upon recovery actions in the area. We request that contacts with the public be avoided until the presence of a ferret is confirmed by the Service or State wildlife agency and necessary landowner contacts and discussions are completed.

**MOUNTAIN PLOVER SURVEY GUIDELINES**  
**U.S. Fish and Wildlife Service**  
**2001**

The mountain plover (*Charadrius montanus*) is a small bird (17.5 cm, 7 in.) about the size of a killdeer (*C. vociferus*). It is light brown above with a lighter colored breast, but lacks the contrasting dark breast-belt common to many other plovers. During the breeding season it has a white forehead and a dark line between the beak and eye, which contrasts with the dark crown.

Mountain plover breeding habitat is known to include short-grass prairie and shrub-steppe landscapes; dryland, cultivated farms; and prairie dog towns. Plovers usually nest on sites where vegetation is sparse or absent, due to disturbance by herbivores, including domestic livestock and prairie dogs. Vegetation at shortgrass prairie sites is less than 4 inches tall, while shrubs visually predominate nest sites within the shrub-steppe landscape. Usually, nest sites within the shrub-steppe are on active prairie dog towns. Nests are commonly located near a manure pile or rock. In addition to disturbance by prairie dogs or livestock, they have also been found on oil drill pads. Mountain plovers are rarely found near water. They may be found on heavily grazed pastures throughout their breeding range and may selectively nest in or near prairie dog towns. Positive indicators for mountain plovers therefore include level terrain, prairie dogs, bare ground, *Opuntia* pads, cattle, widely spaced plants, and horned larks. It would be unusual to find mountain plovers on sites characterized by irregular or rolling terrain; dense, matted vegetation; grass taller than 4 inches, wet soils, or the presence of killdeer.

These guidelines were developed by Service biologists and Dr. Fritz Knopf, USGS-BRD. Keep in mind these are guidelines - please call the local Fish and Wildlife Service, Ecological Services office, if you have any suggestions.

**GENERAL GUIDELINES FOR SURVEYS**

On February 16, 1999, the Service proposed the mountain plover for federal listing as threatened. Because listing of this species is proposed, the Service may recommend surveys for mountain plovers to better define nesting areas, and minimize potential negative impacts. The Service recommends surveys for mountain plovers in all suitable habitat, as well as avoidance of nesting areas, to minimize impact to plovers in a site planned for development. While the Service believes that plover surveys, avoidance of nesting and brood rearing areas, and timing restrictions (avoidance of important areas during nesting) will lessen the chance of direct impacts to and mortality of individual mountain plovers in the area, these restrictions do nothing to mitigate indirect effects, including changes in habitat suitability and habitat loss. Surveys are, however, a necessary starting point. The Service has developed the following 3 survey guidelines, depending on whether the intent is to determine the presence or absence of plovers at a site during the nesting season for permanent and short term projects, or to determine the density of nesting plovers at know nesting sites.

## Survey Protocol

Two types of surveys may be conducted: 1) surveys to determine the presence/absence of breeding plovers (i.e., displaying males and foraging adults), or 2) surveys to determine nest density. The survey type chosen for a project and the extent of the survey area (i.e., beyond the edge of the construction or operational ROW) will depend on the type of project activity being analyzed (e.g., construction, operation) and the users intent. One methodology outlines a breeding survey that was used in northeastern Colorado to establish the density of occupied territories, based on displaying male plovers or foraging adults. The other was developed to only determine whether plovers occupy an area.

### Techniques Common to Each Survey Method

- ✂ Conduct surveys during early courtship and territorial establishment. Throughout the breeding range, this period extends from approximately mid-April through early July. However, the specific breeding period, and therefore peak survey days, depends on latitude, elevation, and weather.
- ✂ Conduct surveys between local sunrise and 1000 and from 1730 to sunset (periods of horizontal light to facilitate spotting the white breast of the adult plovers).
- ✂ Drive transects within the project area to minimize early flushing. Flushing distances for mountain plovers may be within 3 meters for vehicles, but plovers often flush at 50 to 100 meters when approached by humans on foot.
- ✂ Use of a 4-wheel drive vehicle is preferable where allowed. Use of ATVs has proven highly successful in observing and recording displaying males. Always seek guidance from land management agencies regarding use of vehicles on public lands, and always obtain permission of private landowners before entering their lands.
- ✂ Stay in or close to the vehicle when scanning. Use binoculars to scan and spotting scopes to confirm sightings. Do not use scopes to scan.
- ✂ Do not conduct surveys in poor weather (i.e., high wind, precipitation, etc.).
- ✂ Surveys conducted during the courtship period should focus on identifying displaying or calling males, which would signify breeding territories.
- ✂ For all breeding birds observed, conduct additional surveys immediately prior to construction activities to search for active nest sites.
- ✂ If an active nest is located, an appropriate buffer area should be established to prevent direct loss of the nest or indirect impacts from human-related disturbance. The appropriate buffer distance will vary, depending on topography, type of activity proposed, and duration of disturbance. For disturbances including pedestrian foot traffic and continual equipment operations, a 1/4 mile buffer is recommended.

## **SURVEY TO DETERMINE PRESENCE/ABSENCE**

### **Large scale/long term projects**

Conduct the survey between May 1 and June 15, throughout the breeding range.

Visual observation of the area should be made within 1/4 mile of the proposed action to detect the presence of plovers. All plovers located should be observed long enough to determine if a nest is present. These observations should be made from within a stationary vehicle, as plovers do not appear to be wary of vehicles. Because this survey is to determine presence/absence only, and not calculate statistical confidence, there is no recommended distance interval for stopping the vehicle to scan for birds. Obviously numerous stops will be required to conduct a thorough survey, but number of stops should be determined on a project and site-specific basis.

If no visual observations are made from vehicles, the area should be surveyed on ATV's. Extreme care should be exercised in locating plovers due to their highly secretive and quiet nature. Surveys by foot are not recommended because plovers tend to flush at greater distances when approached using this method. Finding nests during foot surveys is more difficult because of the greater flushing distance.

A site must be surveyed 3 times during the survey window, with each survey separated by at least 14 days.

Initiation of the project should occur as near to completion of the survey as possible. For example, seismic exploration should begin within 2 days of survey completion. A 14 day period may be appropriate for other projects.

If an active nest is found in the survey area, the planned activity should be delayed 37 days, or one week post-hatching. If a brood of flightless chicks is observed, activities should be delayed at least seven days.

### **Short-term, linear projects**

For short-term, linear projects such as pipelines, fiber optic cables, and seismic exploration, the presence/absence guidelines above should adhere to the dates below.

1. **Before April 10** - All ROW surveying activity should be completed before April 1. If ROW surveying of these areas cannot be completed before April 1, surveyors will need to coordinate with the lead Federal agency before entering these areas, and a plover survey would be required prior to activity.
2. **April 10 through May 7** - a plover survey will need to be completed 1 - 3 days prior to any construction activity, including initial brush clearing. If there is a break in construction activity in these areas of more than 3 days (for example between pipe stringing, trenching, or welding), an additional plover survey is necessary before construction activity can resume after that break in activity.



3. **May 8 through July 10** - A plover survey will need to be completed 3 - 7 days prior to any construction activities. If there is a break in construction activity in these areas of more than 7 days, an additional plover survey is necessary before construction activity can resume after the break in activity.

Should breeding plovers be discovered during any of the surveys, no construction activity would be allowed until the young have left the nest, which is usually within 7 days of hatching.

### **SURVEY TO DETERMINE DENSITY OF NESTING MOUNTAIN PLOVERS**

We are assuming people will have received training on point counts in general before using this specialized point count technique adapted to mountain plovers.

#### **Establishing Transects**

Identify appropriate habitat and habitat of interest within geographic areas of interest.

Upon arriving in appropriate habitat, drive to a previously determined random starting point.

For subsequent points, drive a previously determined random distance of 0.3, 0.4 or 0.5 miles.

Each transect of point counts should contain a minimum of 20 points.

#### **Conducting The Point Counts**

1. Conduct counts between last week in June to July 4<sup>th</sup> at eastern plains elevation in Colorado.
2. Only 1 counter is used. Do not use a counter and recorder or other combinations of field help. Drivers are okay as long as they don't help spot plovers.
3. If an adult mountain plover is observed, plot occupied territories on a minimum of 1:24,000 scale map and on a ROW diagram or site grid (see attached). The ROW diagram will be at a greater level of detail, depicting the location of breeding birds (and possible nest sites) relative to ROW centerline, construction boundary, and applicable access roads.
4. Estimate or measure distances (in meters) to all mountain plovers. Method used should be noted, e.g., estimates w/distance training, estimates w/o distance training, rangefinder or measured with tape measure, etc.
5. Record "fly-overs" as "FO" in the distance column of the data sheet.
6. If you disturb a mountain plover while approaching the point, estimate the distance from point-center to the spot from which the

bird was flushed.

7. Conduct counts for 5 minutes with a 3 minute subsample to standardize with BBS.
8. Stay close to your vehicle while scanning.

### **Recording Data**

Record the following information AT EVERY POINT, EVERY DAY.

- start time
- unique point code (don't duplicate within a field crew or across dates)
- number of mountain plovers and distance to each
- land use and/or habitat type (e.g., fallow wheat, plowed, shortgrass)
- temperature, Beaufort wind, and sky conditions (clear, partly cloudy, overcast)
- Information on the data sheet somewhere.
- your name and address
- date
- Record for each point at some point during the census.
- detailed location description of each point count including road number, distance to important intersections.
- record transect and point locations on USGS county maps.
- Universal Transverse Mercator from maps or GPS are useful.

### **GENERAL HABITAT INDICATORS**

#### **Positive habitat images**

Stock tank (non-leaking, leaking tanks often attract killdeer)  
Flat (level or tilted) terrain  
Burned field/prairie/pasture  
Bare ground (minimum of 30 percent)  
Spaced grass plants  
Prairie dog colonies  
Horned larks  
Cattle  
Heavily grazed pastures  
*Opuntia* pads visible

#### **Negative habitat images**

Killdeer present (indicating less than optimal habitat)  
Hillsides or steep slope  
Prominent, obvious low ridge  
Leaky stock tanks  
Vegetation greater than 4 inches in height in short-grass prairie habitat  
Increasing presence of tall shrubs  
Matted grass (i.e., minimal bare ground)  
Lark buntings

## **Bald Eagle**

The Montana Bald Eagle Management Plan, July 1994, is used as the guideline. This document is available from Bureau of Reclamation, Montana Projects Office, P.O. Box 30137, Billings, MT, 59107-0137 or the U.S. Fish and Wildlife, Field Office, 100 N. Park, Suite 320, Helena, MT, 59601.

## **Peregrine Falcon**

The Peregrine falcon (*Falco peregrinus*) was delisted on August 25, 1999. Protection from take and commerce for the peregrine falcon under the Endangered Species Act is removed upon delisting. However, peregrine falcons are still protected by the Migratory Bird Treaty Act (MBTA). The MBTA and its implementing regulations (50 CFR Parts 20 and 21) prohibit take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11). With limited exceptions, take will not be permitted under MBTA until a management plan developed in cooperation with State wildlife agencies, undergoes public review, is approved, finalized, and published in the Federal Register.

## **ADDITIONAL SPECIES**

Measures will be incorporated as they are received from the U.S. Fish and Wildlife Service.

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