GUIDELINES FOR COMPLIANCE WITH FISH AND WILDLIFE REQUIREMENTS OF THE COLORADO MINED LAND RECLAMATION BOARD FOR COAL MINING

STATE OF COLORADO

DEPARTMENT OF NATURAL RESOURCES

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DIVISION OF MINERALS AND GEOLOGY
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I. Introduction

This document provides guidelines to assist coal mine applicants in developing plans which will meet Colorado Regulatory Requirements for Fish and Wildlife issues. The document represents the Division's interpretation of portions of the regulations. However, as explained in section 1.15 of the regulations, guidelines shall be suggestions only, and may be prepared to assist permittees and applicants in complying with the Act and Regulations adopted thereunder. The guidelines shall not be binding on the permittees or consultants.

Techniques and approaches which differ from those outlined in this document may be acceptable and creative approaches are welcome. It is suggested that such proposals be discussed with Division staff in pre-application meetings, prior to substantial investments of time or money. Given the variability of environmental conditions within and among the coal regions in Colorado, the Division strongly recommends that all applicants schedule pre-application meetings with State and Federal agencies, prior to the initiation of baseline data collection, preparation of plans to minimize adverse impacts on fish and wildlife resources, or the development of reclamation and land use plans.

The Division is the main contact for all applicants and, if the Division determines that contact with the DOW is necessary, arrangements are made for a joint meeting with the DOW, DMG and the applicant. The USFWS is the primary contact to determine potential impacts on threatened and endangered species. On any area which involves Federal surface or coal the USBLM is the primary Federal contact. On areas which may involve National Forest property the US Forest Service may also need to be contacted.

It is not usually necessary to include studies and mitigation plans for all wildlife species. The species for which studies, impact assessment and/or mitigation plans are needed should be determined during the pre-application meetings.

In addition to aiding the applicant in meeting the statutory and regulatory requirements, these recommendations attempt to focus on specific issues to produce permit applications that are accurate and complete. Such applications can be more easily and efficiently reviewed for compliance with the regulatory program, and the necessary findings can be issued in an expeditious manner. In addition, a good Fish and Wildlife Program benefits the operator and the public as well as the fish and wildlife species in the mine area. A well planned and implemented mitigation plan will also aid the operator in complying with the Mined Land Reclamation Board's regulations.

SECTION II

CONSULTATION PRIOR TO COLLECTING BASELINE INFORMATION

Part 2.04.11 of the Colorado Rules and Regulations describes the requirement for each permit application to include a study of fish and wildlife resources in and adjacent to the proposed permit area. Item 2 of this regulation requires contact with the regulatory authority before initiating baseline studies. This contact is intended to avoid situations where the permit applicant, using a broad approach, collects unnecessary information while omitting important data. The resultant application could result in deficiencies and ultimately delay the review while additional information is collected.

While the recommendations in this guidelines document provide a framework for minimizing adverse impacts on fish and wildlife, the pre-study contact will be mine-specific to focus efforts. The Division recommends that the applicant involve the appropriate State and Federal agencies to provide the applicant with specific advice at the earliest possible point in the application preparation process. Appropriate contacts can be provided by the Division. Examples of specific advice could include:

A. availability of existing data such as critical big game range, known locations of raptor nests, stream quality and biota, etc.;

B. identification of species of particular interest or habitats deserving special attention;

C. guidance on appropriate survey methods and seasons to produce meaningful data;

D. suggestions on mitigation techniques and enhancement measures appropriate for this mine; and,

E. data base availability through the CDOW and other agencies.

Depending on the circumstances, the pre-study meeting can be combined with an on-site tour of the habitats proposed for disturbance. This pre-study meeting is an opportunity for the applicant to reduce the time and effort necessary to produce a complete and accurate application. The applicant is encouraged to summarize discussions and understandings reached during these meetings and, through a letter, allow responsible agencies to confirm such understandings. Copies of such correspondence may become part of the permit application.

SECTION III

PERMIT APPLICATION RULES AND FORMAT

Applicable Rules

There are a number of sections of the state rules which apply to fish and wildlife issues. The majority of the wildlife related rules are found in Section 2.03.3(7), Section 2.04.11 - Fish and Wildlife Resources Information, Section 2.05.6(2) - Fish and Wildlife Plan and Section 4.18 - Protection of Fish, Wildlife and Related Environmental Issues. The most recent revised Rules should be examined to determine the current specific requirements of the regulations.

Report Format

Consolidation of all wildlife data in one section of an application makes for an easier review. Information required for an adequate review includes location and general description of the permit area, a summation of the reclamation and revegetation plans and proposed post-mining land use or uses as they apply to the fish and wildlife plan, a map of the proposed permit boundaries which portrays the lands to be affected by mining, the fish and wildlife baseline data, habitat descriptions, projected impacts and the mitigation plan.

I. Introduction

The introduction usually includes a general description of the site and its locations, and a comprehensive summarization of anticipated activities. Cross references to applicable sections of the application are often helpful. A location map is also useful.

In addition a list should be provided of the names, addresses and telephone numbers of the persons and organizations that have participated in the wildlife studies as well as of all persons and agencies contacted during the pre-baseline survey meetings and during subsequent baseline and other information gathering activities.

II. Baseline Information

A. Description of existing habitat

In addition to describing the topography and various vegetation types, the description also includes a description of habitats of high value for fish and wildlife such as streams, ponds and wetlands, riparian areas, cliffs and rock outcrops, areas offering shelter or other protection, reproduction and nursery areas, migration corridors and wintering areas including critical winter range for big game. A map may be included to show the locations of all habitat types. Photographs of each habitat are also useful. Acreages for each habitat type, and total length of linear habitats are also useful.

B. Description of fish and wildlife species and populations

This section is most useful if it includes a determination of wildlife populations, diversity, and distributions according to habitat. Seasonal changes in populations or habitat utilization

may also be described. A general check list of species which may occur in the area is of some value, but such a list is only useful if the species which may occur in the habitats available in or adjacent to the proposed permit area are included. Another list is often prepared which includes all species actually detected on the permit or adjacent areas. It is useful to describe the method of detection, season and habitat affinity.

All methods used to determine fish and wildlife populations must be described in detail. A map or maps may be included showing study areas, transect or trap line locations, bird roosting and nesting locations including raptor nests, elk calving grounds and other important features.

Baseline population studies may be divided into the following groups or into other workable categories:

1. Big game
2. Predators
3. Small game and game birds
4. Small mammals - nongame
5. Passerine birds
6. Waterfowl and shore birds
7. Raptors
8. Herptiles
9. Fish
10. Aquatic invertebrates
11. Threatened and Endangered species

It is not always necessary to include studies on all these groups; the studies which are needed may be determined during the pre-application meetings.

III. Impact Assessment

Impact assessment is important because it leads to a determination of measures which may be taken to mitigate these impacts. The assessment is used to determine the possible impacts of the operation on those habitats and species determined to be of importance during the pre-application meetings.

Impact assessments are based upon the loss or gain of habitat useful to the selected species of concern and loss or gain of actual fish and wildlife populations. Affected habitat may include; raptor resting locations, deer and elk migration routes, big game summer and winter ranges, grouse strutting grounds and fish spawning areas. For selected species, losses or gains of habitats classified by vegetation types may be useful in determining the impacts of a proposed operation. A balance sheet such as that shown in Appendix "A" may be helpful in determining the changes in habitat or vegetation types. This approach aids in assessing the impacts to particular wildlife species.

Other impacts which may need to be addressed include: increased road kills, effects of population growth due to mine employment, the impacts of populations of wildlife being displaced from disturbed areas, additional poaching and the effects on wildlife movements by the construction of fences or conveyor systems or the excavation of large pits.

The Division realizes that the operator may have limited or no control over some of the off-site impacts, but, if there is a reasonable opportunity to mitigate these, it is helpful to describe the proposed mitigation measures.

It should also be noted that impact evaluation is an interdisciplinary exercise. Factors such as geohydrologic effects, which may figure prominently in mining's influence on spring and alluvial discharge, and surface water depletion or augmentation which affect the availability and distribution of waters within the affected area must be calculated to assess the extent of fish and wildlife related impacts.

IV. Fish & Wildlife Mitigation Plan

The "Fish and Wildlife Mitigation Plan" (the plan) may be presented by the applicant in many ways. However, it would be useful to the Division in its review if the plan addresses certain items. Past Division experience has shown that the review can be expedited if the plan provides the following information:

A. Enough information to demonstrate that the plan fully complies with all rules.

B. The utilization of the baseline studies and impact assessment data to describe the changes which will take place (acres of each habitat affected, numbers of big game displaced, etc.) and a description of how these effects will be mitigated. General statements such as "revegetation will provide wildlife habitat" or "there is adequate adjacent habitat for displaced wildlife" usually are not descriptive enough to provide an adequate evaluation. To the extent possible, mitigation measures should be quantified and include the following sections:

1. A description of how the facilities, roadways, powerlines and fences will be located and constructed to preserve sensitive wildlife habitats, maintain movement corridors, protect wildlife, and provide buffer areas for habitats such as wetlands and riparian areas, elk calving grounds and raptor nests. A discussion of construction scheduling may also be included if it will be of benefit to schedule construction activities to avoid critical nesting or calving periods, concentration times for bald eagles or big game, or to avoid disturbance on big game winter range.

2. A description of the practices to be utilized during the operational phase of the mine to protect wildlife. These could include a description of how employee and public access will be controlled to protect critical wildlife habitat, or how access will be managed during hunting seasons.

   Control of traffic to protect wildlife might include mass transit of workers and speed limits for workers and haul trucks. Work shifts may also be scheduled to avoid periods of high wildlife hazard (dawn and dusk). Employee firearm and anti-poaching policies, and worker wildlife awareness programs are also valuable.

   Off-site habitat enhancement measures such as chaining, brush beating, clear cutting and selective thinning of forest stands, nitrogen fertilization, and adjustment of grazing pressures could be undertaken to temporarily mitigate lost big game habitat

until the disturbed areas are reclaimed.

3. A reclamation plan for the areas to be disturbed. The plan may include items such as a description of the reclaimed topography, including what special wildlife considerations are included such as rock piles, water sources, stream channel reestablishment, and topographic diversity.

   The proposed revegetation plan can be described to the extent necessary to demonstrate that wildlife values will be restored or enhanced. Important vegetation topics include habitat diversity, plant species diversity and value to wildlife, and woody plant density and distribution standards. Plans for strip or clump shrub plantings and the establishment of "edge" habitat can also be described.

4. A description of all mitigation and enhancement practices not previously stated in 1, 2, or 3. Such practices may encompass a wide range of items such as stream fishery habitat improvement, moving or establishing raptor nesting sites, placing bird nest boxes, establishing brush piles, or creating habitat suitable for grouse strutting grounds.

   A list of potential mitigation measures is given in Appendix B. Additional information on this material can be obtained from the Colorado Division of Minerals and Geology, Colorado Division of Wildlife, and the U.S. Fish and Wildlife Service.

To assure that the mitigation plan is complete, the applicant must address each performance standard in the rules. If any of these standards are not applicable, the applicant should state why they do not apply. In order for the Division to determine that the proper coordination has taken place to determine potential impacts to rare and endangered species, the applicant should document their correspondence with the Colorado Division of Wildlife and the U.S. Fish and Wildlife Service.

All wildlife monitoring programs which are planned during the mining operation or after reclamation should be described.

SECTION IV
METHODOLOGIES FOR ESTIMATING WILDLIFE POPULATION PARAMETERS

Introduction

The following are techniques that may be employed for gathering wildlife baseline information. The list is not exhaustive of available methods. The selection of methods should depend on basic objectives. Much of the information needed for an application may be obtained from the Colorado Division of Wildlife. CDOW should be contacted before beginning baseline data collection.

It should be noted that many of the studies are dependent on repetition to determine seasonal changes on population trends. Also, all survey techniques described below must be conducted or overseen by qualified individuals. The exact methods and scope of necessary surveys should be determined through pre-study meetings between the applicant, CDOW and FWS.

It should also be noted that any direct handling, banding, trapping, collection, temporary possession, or transporting of fish, herptiles or other wildlife requires a scientific collection permit issued by the Colorado Division of Wildlife.

Big Game

Information on big game species can be collected utilizing a wide variety of techniques. Most census of big game is done by direct counts using either fixed-wing aircraft or helicopters. The type of aircraft used is determined by the detail of information needed. Another form of direct count is a ground count. These usually employ some type of drive or transect. Indirect counting is used if members of a population are more secretive or rare. Population parameters can be estimated by conducting scat or track counts, by examining range conditions and browse utilization and by looking for scrapings. Division of Wildlife mail and telephone harvest surveys can also be used as method of collecting big game information.

In cases where very site specific or detailed habitat utilization measurements are needed, trapping and banding studies may need to be done. Precision and accuracy can be greatly improved if a portion of a population is marked. Radio telemetry has improved substantially recently as a tool for studying habitat utilization and population.

Much information can be obtained by direct examination of animals. Ages can be estimated, fecundity rates can be determined, and body condition can be measured. Sources of animals may be hunter killed, automobile mortalities or animals collected specifically for studies. Any direct handling requires a scientific collection permit issued by the Colorado Division of Wildlife. The applicant should always contact the DOW before using aircraft or drive techniques. If approval from the DOW is not obtained the techniques may be construed as illegal wildlife harassment.

Birds

Bird populations can be monitored using a variety of techniques. The most common are strip-transect censuses, Emlen transects and roadside drives. A strip-transect covers a specific area. Observers walk the transect route recording all birds observed. Included are all birds resting, feeding, or nesting but not those flying over the transect.

Absolute and breeding bird counts are most often done using a methodology called an Emlen transect, or circular plots. The absolute census includes all birds observed while the breeding bird census includes only those birds that were determined to be nesting. In these techniques an observer proficient in field identification determines and records all birds seen or heard as to species, sex, age, and proximity to predetermined locations.

Trend information is often collected using roadside drives where a driver and passenger drive very slowly along back roads early in the morning recording birds seen or heard.

Small Game and Game Birds

Many of the techniques employed for bird census are also used for game birds and small game mammals. Birds classified as small game in Colorado include pheasants, grouse, quail, waterfowl, band-tailed pigeons, doves, chukar and turkey. Small game mammals include rabbits, squirrels and some furbearers.

A harvest survey is one of the ways that the Division of Wildlife collects information on small game species. Questionnaires are mailed to hunters to obtain a sample to estimate harvest. This information is available upon request. Other techniques include collection of waterfowl and grouse wings and tails to estimate population parameters.

Aerial, roadside and survey transect counts are used for many wildlife species. Conditions that need to be considered include activity of the animals as affected by time of year, hour of the day, habitat type and food supply, weather and condition of roadside cover.

Auditory indexes have long been used as a measure of quail, pheasant and dove abundance. For example, a dove coo count consists of 20 stations at one mile intervals with counts beginning 30 minutes before sunrise. Calling doves are counted for three minutes at each of the 20 stations with three minutes allowed for travel between stations. Thus, the total elapsed time for census is two hours, standardizing the method.

Time area counts are used for species such as squirrels. An observer selects a spot in the woods and records all squirrels seen in 30 minutes. The distance to the farthest squirrel defines the area of the sample. Grouse may be censused by aerial counts of leks during the mating season.

Herptiles

Herptiles are usually inventoried by ground searches and pitfall trapping. Pitfall trapping consists of placing large coffee cans in the ground with the open end flush with the ground surface. A drift fence approximately 25 cm high is placed so as to guide animals into the trap. A thin coat of vegetable oil on the can prevents captured animals from climbing out. Pitfalls are generally set out along transects in habitats where reptiles and amphibians would likely be found. Precautions must be taken to avoid trap mortality.

Small Mammals - Nongame

Nongame mammals are most often inventoried by trapping, through spotlighting, examination of tracks

and scat, mist netting, and examination of road kills. Rather than random trapping it is often more useful to identify key species or groups to be studied. Various species or groups can be selected for by the utilization of different trap sizes, types of bait or lure, trap placement and location and the time of day that traps are activated. Trapping can be in a line or grid pattern. Live traps are set out for a predetermined amount of time and checked daily. Captured animals are usually weighed, sexed, marked and released. Mist netting is used to capture bats. Fine mesh nets are set out at dusk near water or caves then checked at dawn. They are taken down during the day to avoid capturing birds. A trapping permit must be obtained from the Colorado Division of Wildlife before some species of small mammals are taken.

T & E Species

Methods for determining presence of threatened or endangered species are very specific for each species. The Colorado Division of Wildlife and the U.S. Fish and Wildlife Service must be contacted to determine the likelihood of finding T&E animals and to also determine the most up-to-date and acceptable methods of inventory.

Predators

Scent stations, calls, track identification, scratches, scat, locating of kills and use of hounds are used to collect data on large predators and carnivorous big game animals. Detailed knowledge is required to gather much more than presence or absence data for bear and lion.

Many predators can be censused utilizing a scent station index. A scent station is a circle of sifted earth in which a perforated plastic capsule filled with a synthetic attractant is placed. Predator visitations are then determined by analyzing track impressions in the sand.

Raptors

Specific raptor inventory techniques for each potential mine permit area should be obtained from the USFWS and the CDOW. In general, locations of raptor nests and any winter/summer communal roosts must be ascertained prior to and included in a mine permit application. Both aerial and ground surveys may be performed over the proposed mine permit area and over a previously determined buffer zone. If nest relocations are presumed to be necessary, additional surveys may be required. Surveys may be required if it is determined that nests and/or roost sites will be destroyed or potentially disturbed by proposed mine activity. No collecting or undue disturbance of raptors or raptor nests will be allowed except as specifically authorized for by the USFWS and CDOW (see the Migratory Bird Treaty Act, 16 U.S.C. 701-718h; Eagle Protection Act, 16 U.S.C. 668-668d and State of Colorado Nongame, Endangered, or Threatened Species Conservation Act, 33-2-101, 33-2-108). Extreme care must be taken to ensure that raptor investigations themselves do not cause nesting failures or roost abandonments.

Fisheries

In order to acquire population information, fisheries may need to be sampled. Many techniques exist to accomplish this. Electrofishing, seining, trawling, netting, toxicants, explosives, traps and hook and line are all acceptable methods under specific circumstances. Fish can be aged, tagged, marked and fitted with radios. Movements can be determined and estimates can be made of population size. Colorado Division of Wildlife collecting permits are required for all these methods.

Summary

There are a variety of sources from which to obtain procedures for estimating wildlife population parameters. This document discusses only a sampling of what is available. When preparing for field work the permit applicant is encouraged to investigate these and other methods more thoroughly and to plan the effort with CDOW and the USFWS.

APPENDIX A
SAMPLE HABITAT BALANCE SHEET

Habitat Type	Pre-Mine Extent	Post-mine Extent	Net Change	Changed to
Grassland	100 Acres	385 Acres	+285	NA
Shrub	200 Acres	50 Acres	-150	to Grassland
Aspen	150 Acres	50 Acres	-100	to Grassland
Riparian	50' by 1000'	50' by 1000'	0	NA
Ponds	10 Acres	10 Acres	0	NA
Rock outcrop	40 Acres	5 Acres*	-35	to Grassland

* The placement of rock piles at the density of
1 per 5 acres will simulate some values of this habitat

APPENDIX B

A PARTIAL LIST OF FISH AND WILDLIFE MITIGATION MEASURES

TERRESTRIAL SPECIES

Topography

Provide undulations to provide a variety of exposures, serve as windbreaks or provide a screen. It should be noted that such undulations must conform with the approximate original contour requirements of the DMG Rules and Regulations.

Create small depressions to enhance available moisture for plant establishment and growth. Under the DMG Rules and Regulations these depressions may not exceed one cubic yard in size.

Use sediment control structures to provide conditions for open water and wetland habitats.

Soil Materials

Direct haul, to the extent possible, to enhance establishment of species adversely affected by soil storage.

Special handling of soils in drainages or wetlands to restore such communities.

Use of rocky or coarse materials to benefit certain plant species, e.g. pinyon-juniper.

Vegetation

Diversity of species to enhance nutrition, cover and structure values, i.e. grasses, forbs, shrubs and trees.

Thoughtful planting patterns to optimize edge and interspersion, and create travel lanes.

Use of pads of mature vegetation to expedite cover function in shrub lands, wetlands, and other critical areas.

Use of tree and shrub seedlings to reduce "lag time" while such vegetation is maturing.

Careful selection of varieties for maximum survival, palatability for desired wildlife species, etc.

Use of undisturbed "islands" within disturbed areas to act as a nucleus for

reclaimed habitats and to provide a seed source.

Use of shelter belts/fence rows where cover must be a minimum hindrance to agricultural operations.

Shelter Values

Use of rock or brush structures for wildlife shelter.

Installation of snags for species requiring cavities.

Selective placement of nest boxes.

Human Activity

Restrict or prohibit public and employee access to sensitive wildlife activity areas such as grouse leks, raptor nesting and elk calving areas and other sensitive areas.

Company policies penalizing wildlife harassment and poaching.

Controlled hunting and trapping.

Control of firearms on the site.

Employee education to "sensitize" employees to values and protection of wildlife.

Speed limits, reflectors, safe driving program to minimize wildlife vehicle collisions.

Mass transit to reduce traffic volume.

Permanent road closures after cessation of operation.

The Division realizes that in some cases the applicant cannot guarantee, but only volunteer to try, some of these measures. There are cases where the company may not have direct control over recreation or transportation activities. Also a mine may not have control of hunting or fishing rights. Some union contracts may not permit a company to penalize employees for violations of company wildlife policies.

Mine Related Facilities

Careful conveyor design to minimize hindrance to animal movement.

Acceptable electric transmission design to minimize electrocution hazard to raptors.

Use of appropriate fence design to permit necessary movement/access or exclude wildlife from hazardous areas.

Thoughtful location of transportation corridors to minimize impacts on habitats.

Careful consideration in the size and location of offices, parking lots, etc., to reduce impacts on wildlife.

Undisturbed Areas

Minimize area actually necessary for stockpiles, corridors, etc.

Enhancement of areas to increase capability to support displaced wildlife.

AQUATIC SPECIES

Topography

Appropriate pond slopes and depths to achieve post-mine uses, support emergent vegetation, etc.

Suitable stream gradients for aquatic communities, pools to support fish during low flow, etc.

Soil Materials

Proper sealing of ponds where water permanence is necessary.

Selection of substrate size - type for streams.

Selection and treatment of drainage materials for stability, use of flow controls.

Vegetation

Selection of suitable riparian and emergent species to achieve post-mining objectives.

Protective fencing to exclude livestock from selected riparian areas.

Shelter Values

Installation of instream and bank structures to provide refuge from high flow, create cover.

Use of rocks or brush in ponds for fish.

Human Activity

Timing of diversions and instream construction to avoid important spawning periods.

Location of roads away from riparian habitat.

Sediment control to minimize deposition into streams and ponds.

Thoughtful use of water flow into pits and workings to enhance stream flow.

Employee education to maintain stream quality.

Controlled fishing.

Mine Related Facilities

Minimum use of diversions and careful design of necessary diversions to include suitable meanders, riparian cover, etc.

Undisturbed Areas

Maximize distance of activities from aquatic habitats.

Enhancement of degraded habitats.

APPENDIX C
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