

RECLAMATION PLANNING FOR SENSITIVE SPECIES IN SOUTHWEST WYOMING¹

by

Robert M. Harshbarger²

Abstract. Surface coal mine land reclamation can be enhanced to improve its attractiveness and usability for sensitive wildlife species. Enhancements for sensitive wildlife have been incorporated into reclamation at the Jim Bridger Coal mine, located in southwest Wyoming. A diverse wildlife population occupies various habitats within the mine's study area and includes several species listed as sensitive by the United States Fish and Wildlife Service. The defined postmine land use is wildlife habitat and livestock grazing. The potential for postmine land use by sensitive species is assessed by documenting the species present during premining baseline studies and monitoring their use of habitat on the permit during mining. The collected wildlife information allows the company to adjust and fine-tune the reclamation plan to create and place habitat where it will attract and accommodate indigenous sensitive species, since extensive lead time is often needed to develop enhanced habitats. Examples would be placement of special vegetative mixes to reestablish historic sage grouse (*Centrocercus urophasianus*) leks or construction of physical entities such as rock structures within current nesting territories for permanent ferruginous hawk (*Buteo regalis*) nest sites. Analysis of the species present, and their habitat requirements during the mining process, also allows time to request variances or modifications in the permitted reclamation plan for enhancements not originally accepted by the regulatory authorities.

Additional Key Words: Wildlife Enhancement, Mined Land Reclamation, Federally Sensitive Species

Introduction

Bridger Coal Company's Jim Bridger mine is 35 miles (56 km) northeast of Rock Springs, Wyoming. The mine permit boundary encloses over 20,000 acres (81 km²). The mine was opened in 1974 and has produced over 127 million tons (115 million tonnes) of coal through 1996. Mining has affected 7,086 acres (29 km²) of the 11,000 acres (45 km²) of planned disturbance. The Jim Bridger Mine is a multi-seam, dragline, surface coal mine. Four draglines remove most of the overburden and interburden from coal seams that vary from 15 to 30 feet (4.6 - 9.1 m) thick. This mining method creates near vertical (55-70°) rock walls (highwalls) up to 280 feet (85 m) tall. The blasted overburden and interburden material removed from the pit is placed in long linear ridges (spoil piles) parallel and adjacent to the pit.

Later the spoil piles are regraded to approximate original contours, topsoil applied then seeded with a mixture of native shrubs, grasses and forbs.

The mine area is in an anticlinal structure known as the Rock Springs uplift. Surface elevations range from 6,500 to 7,200 feet above msl (1975 to 2190 m). Topography is rolling and extensively dissected by incised ephemeral drainages. Climate is semiarid to arid with a mean annual precipitation of 7-9 inches (18-23 cm). The habitat type is sagebrush-wheatgrass (*Artemisia* spp.-*Agropyron* spp.; Bailey 1978). The vegetative community is a mosaic of sagebrush-grass and saltbush (*Atriplex* spp.). The 80,800 acre (327 km²) wildlife study area surrounds and includes land within the permit boundary (Figure 1).

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²Robert M. Harshbarger is Environmental Specialist at Bridger Coal Company, PO Box 2068, Rock Springs, Wyoming 82902

Reclamation is conducted concurrent with other mine operations. Each fall, prior to next year's planting season, environmental and engineering staff analyze the mine equipment sequence, calculate spoil regrading and topsoil movement requirements, and the availability of regraded and topsoiled acres for seeding.

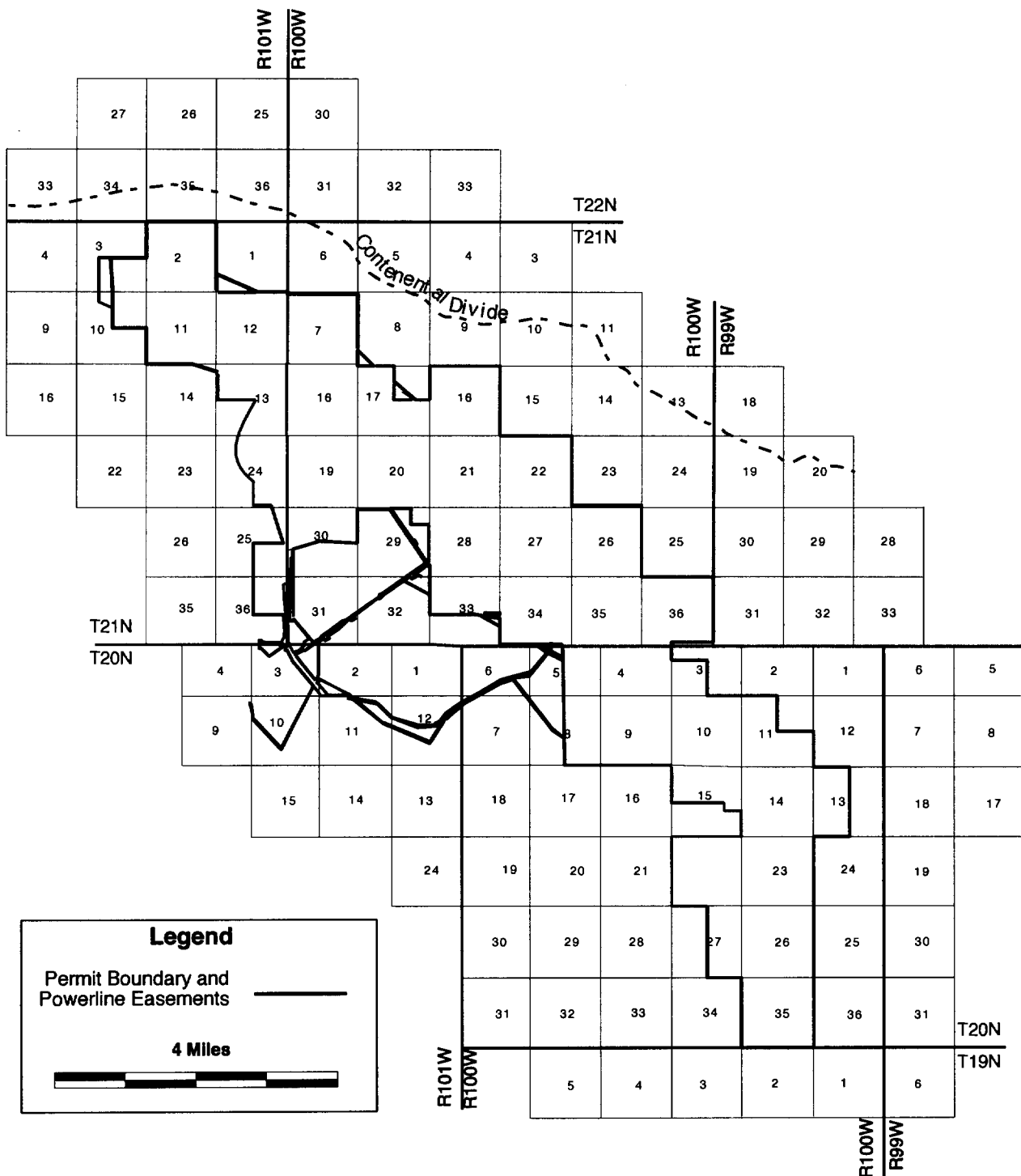


Figure 1. Bridger Coal Company Wildlife Study Area. Township sections displayed are included within the study area.

Reclamation considerations are then incorporated into the overall mine plan. Approved post reclamation contours and plant communities fit the post mining land use of wildlife habitat and livestock grazing. By December 1996, 1,737 acres (7 km²) had been reclaimed.

Bridger Coal generally considers sensitive wildlife as those species listed by the United States Fish and Wildlife Service (USFWS) under 50 CFR Part 17 as endangered, threatened or included as Category 2 (proposal to list the species is possibly appropriate). Listed species observed on Bridger's wildlife study area include the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), ferruginous hawk (*Buteo regalis*) and loggerhead shrike (*Lanius ludovicianus*). Also considered as sensitive are migratory birds of high federal interest in federal coal producing regions. These species observed at the mine include the sandhill crane (*Grus canadensis*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), merlin (*Falco columbarius*), great blue heron (*Ardea herodias*), osprey (*Pandion haliaetus*) and burrowing owl (*Speotyto cunicularia*). Additionally, if the Wyoming Game and Fish Department (WGFD) has concerns about population trends of local species, then those can be considered sensitive. WGFD is concerned about the sage grouse (*Centrocercus urophasianus*) which has undergone recent population declines in Wyoming, including within the mine's wildlife study area. Although all of the species previously discussed are birds, surveys for the presence of sensitive mammals, herptiles and fish have also been conducted, but none have been documented to date within the study area.

Discussion

A definitive baseline of wildlife indigenous to the immediate mine permit area is essential to plan enhanced reclamation for sensitive wildlife species. Continued monitoring is also important to document changes in species status over the life of the mine. The sensitivity of a species can change due to environmental factors and/or regulatory perception.

Baseline Studies

The baseline study will define what (if any) sensitive species exist in the premine environment and their habitats. Mines permitted and opened after passage of the Surface Mining Reclamation and Control Act of 1977 (SMCRA) are required to conduct baseline studies prior to mining. Lands within a proposed mine permit

boundary will not have been impacted by mining and thus may exhibit a truer picture of undisturbed habitats compared to mines in operation prior to SMCRA. Baseline studies should ideally entail more than one year. Multiple-year baseline studies are designed to indicate wildlife population trends prior to and independent of mining and also provide a greater window of time to document the presence of sensitive species which are rarely observed.

Many mines, including this one, were already in operation when SMCRA requirements went into effect. Wildlife baseline studies were conducted in 1979-80 (NUS Corporation 1980). Although habitats may have been impacted by the mining process, wildlife baseline studies still allow the operator to document the presence of species. Reclamation planners can then consider special habitats, if sensitive species are present, when designing reclamation.

Continued Monitoring

For pre-SMCRA and post-SMCRA mines, continued wildlife monitoring is important to document changes in presence, distribution and habitat use by wildlife during mining. Where sensitive wildlife species are documented within a mine permit, long term monitoring can help determine habitat preferences including use of habitat created or altered during the mining process. An example at Bridger Coal Company would be the use by ferruginous hawks of ungraded spoil piles as nesting substrate.

Continued wildlife monitoring can also document habitat use within the mine permit by sensitive species local to the region but not documented during the baseline studies. Additionally, continued monitoring can record wildlife trends and identify mine related impacts to sensitive species. Changes in habitat which impact wildlife populations, including sensitive species, are not always negative (Millsap et al. 1987).

The projected life of a coal mine can be very long and last through several changes in political climate. This mine has been in operation for 23 years and has economic reserves which could last another 25 to 30 years. Regulatory agency policies and priorities change over time. The sensitivity of individual species can change either through real changes in abundance and distribution or through regulatory perception. Should the sensitivity of a species change during

the life of mine, the operator, having monitored wildlife over time, can make educated adjustments in the reclamation plan to accommodate a change if necessary.

Designing Habitat

Once sensitive species and their requisite habitat are identified, either through baseline or continued monitoring, the habitat for those species can then be designed and, if necessary, submitted for regulatory review and approval. Several species have been classified as sensitive at the mine through the use of the previously mentioned criteria to evaluate wildlife populations. Areas of use by sensitive species have been delineated by using baseline and ongoing monitoring. Reclamation has been designed to benefit some of those species which are known breeders within the study area.

Some of the most significant habitat found regionally and within the mine study area are the rock outcrops and rim rock associated with the eastern flank of the Rock Springs uplift. Raptors constitute an important segment of the overall wildlife population inhabiting the study area. Of the twelve sensitive species observed at the mine, eight are raptors, including four migrants that do not breed locally. Rock outcrops are important nesting habitat for three of the four sensitive raptor species known to nest within the study area: golden eagle; ferruginous hawk and prairie falcon. Many outcrops located within Bridger's permit boundary have been or will be destroyed during the mining process. The rock outcrop habitat affected by mining represents only a portion of that habitat type in the area.

Considering the high density of raptors within the study area, habitat for nesting raptors is an important constituent of Bridger's reclamation. Attempts to recreate rock outcrops and rim rock by using materials available in the regraded spoil are difficult. Rock piles and ridges constructed from piled rock can mimic some, but not all, of the preexisting features. As the mine matured and wildlife monitoring data accumulated, evidence began to mount that mine highwall and spoils were attractive nesting substrate for raptors (Bridger Coal Company 1986-96) (Harshbarger et al. 1995). The number and density of red-tailed hawk territories associated with the active pit increased from seven in 1987 to nine in 1996. Ferruginous hawk pairs using mine created habitat increased from one in 1987 to five in 1996.

Regulatory Approval

It is this mine's experience that gaining regulatory approval may actually require more time and energy than the design or creation of habitat for sensitive species. In fact it may take years in the multi-agency environment, in which most coal mines operate, to gain approval from all agencies having jurisdiction in approving reclamation structures (habitat) which vary from the approved permit language. Persistence, good documentation and use of the proper regulations pay off.

Recognizing both the cost saving and environmental benefits of leaving strategically placed highwall remnants, as rock outcrop features in the post reclamation topography, the company's environmental department started pursuing language changes in the mine's operating permit that would allow construction of such features. The permit revision process began in 1987. Although the benefits to wildlife of highwall remnants were documented (Ward, 1987; Ward and Anderson, 1987; Ward and Anderson, 1988), SMCRA and OSM regulations required elimination of mine highwalls upon completion of mining. The regulatory environment appeared to preclude the potential of retaining highwall remnants for wildlife habitat. Efforts to request regulatory reform were initiated (Kearny and Oelklaus, 1988). However, the permit revision submittal was rejected.

A second submittal was prepared that included an extensive examination and analysis of the premine topography. Based on that analysis, the permit revision showed the proposed "bluff features" would mimic the approximate original contour (AOC) of the premine landscape and would replace habitat destroyed in the mining process. Analysis of wildlife needs were also included in the permit revision package. Bluff locations were strategically designed to match known raptor territories while concurrently maintaining drainage densities and reclamation slope stability in the approved post reclamation contours (Figure 2). The permit revision was approved in August 1991.

Time Constraints

Upon regulatory approval, the habitat for sensitive species can be incorporated into the reclamation at the proper time. Adequate lead time is very important when implementing reclamation for a sensitive species. If habitat designed for a sensitive species involves a

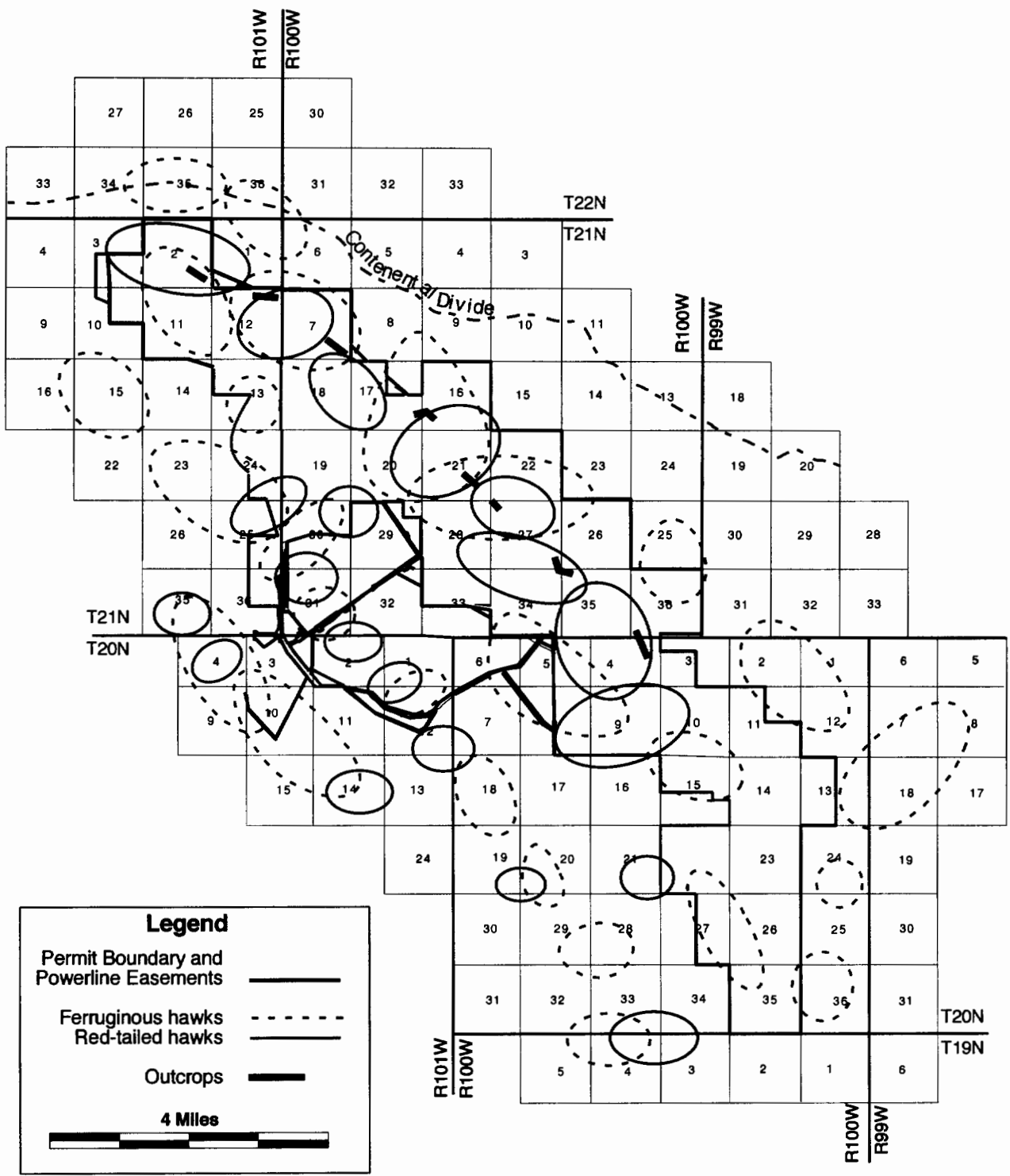


Figure 2. Bridger Coal Company permitted outcrops with territories for ferruginous and red-tailed hawks.

vegetative community, several years of lead time may be needed to allow the vegetation to develop and mature. Annual precipitation combined with the species content of the vegetative community are the major factors that determine how long development will take. At Bridger, with its arid environment, it can take ten to fifteen years for a planned plant community of shrubs and grasses to mature.

Sage grouse were not considered a sensitive species when the mine opened. Declining populations of sage grouse in the intermountain west have recently raised their sensitivity status, although they are not currently listed as a sensitive species in Wyoming. Several sage grouse leks (breeding areas) were destroyed during mining. Environmental department personnel contacted WGFD and inquired about special seed mixes for reestablishing sage grouse leks prior to conducting reclamation at an historic lek site. In 1994 the recommended seed mix was planted on a broad, flat area within the other reclamation. The seed mix was Bridger's sandy seed mix with the tall growth forms removed (Hargis et al. 1995). Several years must still pass before the results of this procedure can be evaluated. The status of sage grouse may change in that time. If so, special habitat will be in place for them.

Interim Habitat

Habitat for sensitive species can potentially take years to complete. Years may be required for regulatory concerns to be addressed, for mine sequences to be completed, or for special vegetative communities to mature. In such situations, interim habitat must be considered. This is especially true if a sensitive species already inhabits the study area. It is probably better to attempt to maintain an existing population of sensitive species with interim habitat, rather than wait for recruitment of outside population sources after reclamation is completed. The time needed to attain a viable population of a sensitive species inhabiting a specially designed habitat can be shortened by years.

Although approved in 1991, the AOC rock outcrop features have not been constructed on Bridger's reclamation because their location is tied to the final mine highwall. Of the nine permitted outcrops, the most northerly may start to be constructed in 1999 or 2000. The rest will follow as pit development reaches the final highwall. Consideration of interim habitat is important, given the time required for these features to be

incorporated into the final reclamation. In the case of the mine's raptor population, interim habitat already exists in the mine highwall and spoils and should be used by raptors (Parrish et al. 1994, Postovit and Postovit 1987). All efforts are being made to avoid negative impacts on that population with an approved raptor mitigation program based on proven techniques, such as artificial nest ledge construction (Boyce et al. 1980, Fyfe et al. 1977); nest manipulations with chicks (Fala et al. 1985); chick fostering (Barclay 1987) and egg transport and incubation (Barclay 1987). Additional interim nest substrate (nest platforms) has been constructed to help augment and maintain raptor populations during the active mining process (Schmutz et al. 1984).

Coordination with Mine Operations

Once designed and approved, the construction of reclaimed habitat for sensitive species should coincide and fit with the overall mine schedule. Operational practices vary greatly between mining operations, so the cost effectiveness of constructing special habitat features on reclamation areas must be evaluated on site by planning staff. Generally, at a mine with over 7,000 acres of disturbance, reclamation must be coordinated with the other mine sequences in order to make efficient and timely use of equipment such as front end loaders, haul trucks, scrapers, and dozers. Spoil regrading is dependent on location and availability of draglines and support dozers. Topsoil application and seeding are dependent on completion of spoil regrading. The best window of opportunity at this mine for installing small structures such as rock piles or rock pillars is between completion of spoil grading and before soil application. Larger features such as rock outcrops need to be constructed before or during spoil regrading. Planting of special vegetation will occur concurrently with planting of larger reclamation areas.

Conclusions

Reclamation planning for sensitive species involves a commitment to an adequate wildlife monitoring program, planning and long term vision. Change in status of a species must be anticipated or recognized before reclamation can be designed for its benefit. Extensive lead time may be needed where regulatory approval is required for habitat or structures which deviate from the approved permit. Development of vegetative communities designed to support a sensitive species will often take years. There are

many opportunities to construct habitat for sensitive species when creative thinking is used and regulatory alternatives are explored cooperatively with the agencies.

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