WHARF RESOURCES (USA), INC.'S
WHARF AND GOLDEN REWARD EXPANSION
WILDLIFE BASELINE REPORT

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1.0 INTRODUCTION

Wharf Resources (USA) Inc. (Wharf) operates the Wharf and Golden Reward gold mines in central Lawrence County, South Dakota. The Wharf Mine is currently in production, while the Golden Reward Mine is in reclamation. Wharf is proposing to expand mining activity to the north and south and to the west of the Wharf and Golden Reward Mines, respectively. The proposed expansion will include portions of Section 33 Township (T) 5 North and Range (R) 2 East (E), and Sections 1, 2, 3, and 12 in T4N:R2E. In support of the permit amendment process, Wharf has contracted ICF International (ICF) to conduct baseline wildlife surveys and a wildlife habitat assessment for the proposed disturbance area and surrounding vicinity.

In fall 2009, Wharf contracted ICF to conduct a wildlife baseline study for the proposed area of expansion adjacent to the Wharf and Golden Reward Mines. The baseline wildlife study area for the Wharf and Golden Reward Expansion (WGRE) permit consists of the proposed disturbance area and a surrounding 0.5-mile perimeter (Exhibits 1 and 2). The objective of the baseline study was to collect both quantitative and qualitative data on vertebrate occurrence, abundance, diversity, and general habitat affinity in the project area. This included identification of habitats that could support Threatened and Endangered (T&E) species and other high value or unusual wildlife, as well as a review of the data from previous monitoring activities to compile a full history of wildlife use and activity in the vicinity of the proposed WGRE permit area. Based on guidance from South Dakota Game, Fish, and Parks (SDGFP) (Biologist, Stan Michals) in winter 2009/2010, wildlife baseline surveys for the WGRE and surrounding 0.5-mile perimeter included raptor nest surveys and searches for mine adits or caves that could host roosting bat colonies (breeding and/or wintering). After further correspondence with SDGFP (Biologist, Stan Michals) in early spring 2010, surveys for breeding owls were also added to the wildlife baseline requirements.

No standardized surveys were conducted for big game, furbearers or predators, lagomorphs, small mammals, breeding birds, upland game birds, waterfowl or shorebirds, reptiles, amphibians, or fish as part of the baseline study. Nevertheless, ICF biologists watched for all of these species and/or their sign during all surveys and documented all that occurred within the survey area.

A significant amount of existing wildlife occurrence data is available for the general WGRE area, as annual wildlife monitoring has been conducted by ICF during all periods of operation at the Wharf and Golden Reward Mines since 1994. During most years from 1994 to 2002, annual monitoring included standardized wildlife surveys for game birds, breeding birds, and nesting raptors. In addition, all incidental animal species (including any federally listed species and other species of concern listed under the South Dakota Natural Heritage Program [SDNHP]) were recorded within both mine survey areas (the permit area and approximately a 0.5-mile perimeter) during that time. Due to the cessation of mining and completion of final reclamation activities at the Golden Reward Mine, no wildlife surveys were conducted for that mine between 2003 and fall 2009. However, annual monitoring at the Wharf Mine has been on-going during the entire period and is current as of 2010.

The WGRE and wildlife baseline survey area are described below, along with a description of the baseline survey methods and results. Survey methods and results are presented by animal group.

2.0 SURVEY AREA DESCRIPTION

The proposed WGRE permit area is located approximately 2.0 miles west of Lead, Lawrence County, South Dakota. The WGRE permit area occupies a total of approximately 363.8 acres in Section 33 T5N:R2E and Sections 1, 2, 3, and 12 in T4N:R2E. The expanded wildlife survey area includes the entire WGRE permit area and a surrounding 0.5-mile perimeter (Exhibits 1 and 2), as per SDGFP (Biologist, Stan Michals) guidance. The entire proposed WGRE permit area is owned by Wharf, but surface ownership within the extended survey area is a mixture of private and federal (U.S. Forest Service [USFS]) land. The proposed WGRE site is primarily located to the south and west, respectively, of the existing Wharf and Golden Reward Mines, but a small parcel is also located north of the Wharf Mine. The current principal land uses in the general area are mineral extraction, recreation, logging, and residences. The area has a long history of mineral extraction, as it was part of an active underground mining district in the past. Numerous occupied residences and a ski lodge are also located just beyond the WGRE permit area in the southeastern portion of the wildlife survey area.

The wildlife survey area lies primarily at the head of several named and unnamed drainages, including Nevada Gulch, Fantail Creek, Annie Creek, and Long Valley. Nevada Gulch and Fantail Creek both flow to the east of the project area, while Annie Creek flows to the west. The southern project area is bisected by a ridge running north to south from Green Mountain to Terry Peak and east to west to Foley Mountain. The smaller survey area in the northwest (Section 33 and 34 T5N:R2E) lies at the head of Long Valley, east of Elk Mountain and west of War Eagle Hill. This drainage flows to the north and northwest. Elevations throughout the entire survey area range from approximately 5,500 to 6,600 feet above sea level. Topography within the project area is comprised of steep hillsides and narrow valleys. Relatively flat topography is limited to a portion of the project area along the Foley Mountain ridgeline in the northwest and the reclaimed grasslands associated with the former Golden Reward Mine in the far eastern extent. Water availability is limited to ephemeral drainages associated with Annie Creek, Fantail Creek, and Nevada Gulch. The climate is temperate, averaging 27.1 inches of precipitation annually, with approximately 73% occurring between March and September. The 30-year mean maximum and minimum temperatures in July and January were 71.7 degrees Fahrenheit (°F) and 14.4 °F, respectively.

Vegetation communities and habitats within the survey area were assessed in the field and generally described below as they apply to wildlife use. However, an in-depth baseline vegetation assessment was completed by BKS Environmental Associates, Inc. The detailed results from that study are available in a separate vegetation report (BKS Environmental 2010).

The principal habitats in the wildlife survey area include ponderosa pine (*Pinus ponderosa*)-creeping juniper (*Juniperus horizontalis*), ponderosa pine-common snowberry (*Symphocicarpus albus*), and small areas of quaking aspen (*Populus tremuloides*) and white spruce (*Picea glauca*). These habitats are described in full detail in the WGRE vegetation baseline report (BKS Environmental 2010).

Ponderosa pine habitats generally occupy the ridges and upper elevations and the south- and west-facing slopes. This tree species is the dominant canopy species, although white spruce and trembling aspen are locally abundant in some pine habitats. The understory in the pine stands is generally open and sparse, with relatively few shrubs or herbaceous plants.

Quaking aspen habitat is less common than pine and spruce. Like spruce, aspen is generally restricted to north- and east-facing slopes, although it also occurs in areas that have been previously disturbed. This habitat generally contains some birch, spruce, and pine in the canopy, and diverse shrub and herbaceous strata.

White spruce habitat exists primarily on north- and east-facing slopes. The dominant tree species is the white spruce, but a significant secondary component of paper birch (*Betula papyrifera*) and/or trembling aspen is often present in these stands. Understory characteristics vary according to stand development. Older stands that have undergone self-thinning include a mixture of pine and spruce, and support relatively diverse understory strata. The closed canopy of younger spruce stands tends to limit understory species. Some spruce stands have experienced significant blow-downs in recent years. Large amounts of precipitation combined with strong winds have uprooted some spruce trees, particularly those on north-facing slopes.

Other minor habitats present within the baseline study area include meadow and riparian habitats, as well as reclaimed and unreclaimed disturbance areas. Meadow habitat is quite limited in the WGRE and the extended survey area. These grassy, open areas can be natural or the result of human disturbances, such as mining and logging. Meadow habitat is characterized by the absence of woody over-story vegetation and an abundance of grasses and forbs. Riparian habitats associated with small ephemeral streams and occasional pools or ponds are also limited, and occur mainly along portions of Annie Creek and Nevada Gulch. Reclamation exists in the northwestern margin of the southern WGRE where mining, backfilling, re-grading, and seeding have been completed at the Wharf Mine. Extensive areas of grassland reclamation also occur east of Terry Peak on the former Golden Reward Mine site. Disturbed areas are often characterized by nearly a complete absence of vegetation. Mining activity associated with the Wharf Mine and former Golden Reward Mine has occurred, or is occurring, in portions of Sections 33-36 T5N:R2E, Sections 1-3 and 12 T4N:R2E, and Sections 6-7 T4N:R3E. Other substantial disturbances include development associated with the Terry Peak ski area and nearby residences, county roads, and other scattered buildings.

3.0 METHODS

All baseline wildlife surveys followed standard survey requirements and protocols used and approved by the SDGFP, United States Fish and Wildlife Service (USFWS), and USFS. Biologists also conducted a wildlife habitat assessment to search for unique or critical habitats that could support T&E or other species of special concern throughout the survey area (WGRE and surrounding 0.5 mile perimeter). These tasks were accomplished by using binoculars and spotting scopes to make observations while traveling throughout the survey area. Standard field guides and references (Burt and Grossenheider 1976, Baxter and Stone 1980, Jones et al. 1983, Sharps and Benzon 1984, Houtcooper et al. 1985, Stebbins 1985, Clark and Stromberg 1987, U.S. Forest Service 1988, Peterson 1990, South Dakota Ornithologists' Union 1991) were used to identify animals and their sign. These resources, as well as the U.S. Forest Service's (USFS) Region 2 Sensitive Species (USFS 2009) and the SDNHP (SDGFP 2009) lists were used to generate a potential species list for the area (Attachment I). Species' habitat requirements and availability were considered when the species list was developed.

3.1 BATS

ICF biologists conducted a thorough search for and assessment of all potential underground habitats that could support bat colonies (i.e., winter and maternal roosting sites) throughout the wildlife survey area on November 11 and 12, 2009; May 17 through May 19, 2010; and October 21 and 22, 2010. Using information provided by Wharf on previous and historical mining activities, biologists searched for exposed underground features such as caves, crevices, pits, shafts, and mine adits that could provide potential roosting or breeding sites for bat species. This was accomplished by having several biologists walk north-south oriented transects spaced approximately 100 meters apart throughout the southern WGRE permit area and entire northern survey area. Within the 0.5-mile perimeter surrounding the southern WGRE permit boundary, biologists focused their searches at areas of previous or historical mining activities and/or at topographic features (e.g., cliff faces, rocky ridgelines, and other significant changes in the terrain) that could host the underground features listed above. Each underground feature that was located was recorded using a handheld GPS device (Garmin ® GPS 72) and the location was plotted on a map. Photographs were also taken of each feature. A visual survey of each feature

was conducted to the extent possible with spotlights, but in the interest of safety, none of the features were physically entered by the biologists.

Consultation (including a site visit on May 25) in spring 2010 with the lead ICF biologist (William Vetter), Wharf personnel (Ron Waterland), SDGFP biologist (Stan Michals), and a regional bat researcher (Joel Tigner of Batworks, Inc.) determined that three of the previously identified features represented marginal but potentially adequate habitat for winter roosting and/or breeding bat species. Based on this assessment, specific bat surveys were conducted by biologists with Batworks, Inc. over the course of three nights from July 7 through July 9, 2010. The specific methods implemented and the results of the surveys are provided in a separate technical report provided as Attachment II at the end of this document.

3.2 RAPTOR NESTS

Raptor nest monitoring was conducted during site visits on May 17 through May 19, and July 21 through July 23, 2010. During each site visit, biologists watched and listened for evidence of nesting raptors within the WGRE and 0.5-mile perimeter. All known raptor territories in the wildlife survey area were monitored for activity. Searches for new nest sites were conducted in existing territories and where adults exhibited nesting behavior (e.g., defensive flight and calls) in new locations. A thorough pedestrian survey for new raptor nests in the northern survey area (Sections 33 and 34 T5N:R2E) was also conducted during the non-breeding season on October 21 and 22, 2010.

Nest monitoring and searches were conducted using a variety of methods. Each previously identified nest site was checked early in the nesting season to determine activity. Nests were initially observed from a parked vehicle using a spotting scope or on foot from a hidden vantage point with binoculars to avoid disturbing active nest sites. Nest searches involved walking and/or driving throughout the wildlife study area while looking for raptors and nests, and by using manual or tape-recorded raptor calls (great horned owl [*Bubo virginianus*] and broad-winged hawk [*Buteo platypterus*]) in an attempt to elicit a defensive responses, especially in heavily wooded areas where visibility was limited. During and after calling, biologists watched and listened for raptors for several minutes with the vehicle engine turned off to enhance the opportunity to hear a response. Areas where raptors had been observed and areas where raptors

responded to calls were thoroughly searched on foot. Nests were not approached closely until young were hatched or the site was determined to be inactive. When a nest was found, the tree was flagged with either pink-and-black striped or solid pink survey tape and marked "WILDLIFE TREE--DO NOT CUT." Surveys during the non-breeding season were accomplished by having several biologists walk north-south oriented transects spaced approximately 100 meters apart throughout the northern WGRE permit area and surrounding 0.5-mile perimeter. The distances to nearest regular human disturbances were estimated for each intact nest recorded.

Biologists also watched for raptors or sign of activity during all other visits associated with the WGRE expansion.

3.3 OWLS

Surveys for breeding owls were conducted using territorial call broadcasts within the southern WGRE permit area and the extended perimeter in spring 2010. No surveys for breeding owls were conducted within the northern WGRE permit area and extended perimeter in spring 2010. ICF biologists established six listening points throughout the southern survey area that were spaced approximately 0.5 mile apart and encompassed all major habitats (ponderosa pine, white spruce, and aspen) found within the expansion area (Exhibit 1). As per SDGFP guidance, survey protocols established by the Rocky Mountain Bird Observatory (RMBO) for annual owl surveys throughout the Black Hills of South Dakota were followed at each of the six listening points. The protocol consisted of playing a pre-recorded CD containing the territorial calls of northern saw-whet owl (*Aegolius acadicus*), eastern screech-owl (*Otus asio*), boreal owl (*Aegolius funereus*), flammulated owl (*Otus flammeolus*), and long-eared owl (*Asio otus*), in that order. Each call was played for 30 seconds and was separated by 30 seconds of silence. For each owl that was heard or seen, pertinent information such as species, detection type (visual or aural), the duration or extent of the response, and the approximate location of the bird was recorded. Weather information at each survey location was recorded prior to the survey, and only calm nights without precipitation were targeted. Each survey location was plotted using hand-held Garmin® Global Positioning System (GPS) receivers and was recorded in Universal Transverse Mercator (UTM) coordinates (NAD 27, Zone 13N).

3.4 THREATENED, ENDANGERED, AND OTHER SENSITIVE SPECIES

The USFWS has identified only one federally listed (T&E) vertebrate species, the whooping crane (*Grus Americana*) (endangered), which could occur in Lawrence County and would require monitoring (USFWS 2010) in project development. However, this species is generally associated with low-elevation wetlands and rivers, which do not occur within the proposed WGRE area. Detailed information regarding vegetation communities and surveys conducted for federally listed plants within the proposed expansion area can be found in the vegetation baseline report (BKS Environmental 2010).

Due to the lack of suitable habitat and/or the unlikely occurrence of T&E species in the WGRE or expanded survey area, specific surveys targeting vertebrate T&E species were not required or conducted for this project. Nevertheless, biologists watched for all federally listed vertebrate species (including endangered, threatened, petitioned, and candidate species) and habitats that could support them while conducting other surveys.

In 2009, the SDNHP updated the *Rare, Threatened, or Endangered Animals Tracked by the South Dakota Natural Heritage Program* list. Additionally, the USFS Region 2 also updated their *Region 2 Regional Forester's Sensitive Species* list in 2009. Both lists were current through 2010, and were obtained and reviewed prior to commencing field surveys.

Specific surveys for other federal (USFS) or state (SDNHP) species of concern were not required for the proposed expansion area during 2010. However, biologists watched for all sensitive species of concern and habitats that could support them while conducting all surveys. In addition, all wildlife sightings (including notes on the number of individuals, sex and age when possible, location, associated habitat, and activity) were recorded during all surveys.

3.5 OTHER ANIMALS

No quantitative surveys for big game, lagomorphs, breeding birds, waterfowl, small mammals, mammalian predators, furbearers, reptiles, amphibians, or fish were required or conducted specifically for the WGRE wildlife baseline study. However, all sightings of non-target animals within the WGRE and 0.5-mile perimeter were recorded, and a species list was maintained

during the baseline surveys (November 2009 through October 2010) to document wildlife use of the entire WGRE and surrounding area.

4.0 RESULTS AND DISCUSSION

Attachment I, included at the end of this document, presents summary tables for all wildlife species (including SDNHP and USFS Sensitive Species) and that could potentially reside within or pass through (during migration) the WGRE area and nearby vicinity. Notations for the individual species that were documented within or near the WGRE during the 2009 through 2010 baseline wildlife surveys are also included in Attachment I.

4.1 HABITAT ASSESSMENT

4.1.1 Ponderosa pine-creeping juniper

The ponderosa pine-creeping juniper vegetation community is located in the eastern portion of the southern project area. The topography is very steep and rocky. Litter was a large component of the understory. The overstory was dominated by ponderosa pine. Quaking aspen was present in the overstory but was not dominant. The dominant shrubs in the understory included creeping juniper, common juniper (*Juniperus communis*), kinnikinnick (*Arctostaphylos uva-ursi*), and Oregon grape (*Mahonia repens*). Common grasses that were present within the understory included prairie sandreed (*Calamovilfa longifolia*), green needlegrass (*Nassella viridula*), Kentucky bluegrass (*Poa pratensis*), and Sandberg bluegrass (*Poa secunda*). Common forbs that existed within the understory included western yarrow (*Achillea millefolium*), field chickweed (*Cerastium arvense*), northern bedstraw (*Galium boreale*), and golden banner (*Thermopsis rhombifolia*).

4.1.2 Ponderosa pine-common snowberry

The ponderosa pine-common snowberry vegetation community is the dominant vegetation community within the project area. The topography ranged from gently rolling to very steep and rocky. The overstory was dominated by ponderosa pine. White spruce and quaking aspen were present in the overstory but were not dominant. The dominant shrubs in the understory included: common snowberry, kinnikinnick, creeping juniper, and Saskatoon serviceberry (*Amelanchier alnifolia*). Common grasses and grass-like species included Sandberg bluegrass, prairie

sandreed, smooth brome (*Bromus inermis*), rough-leaved ricegrass (*Oryzopsis asperifolia*), and Ross sedge (*Carex rossii*). Common forbs that were present included western yarrow, Virginia strawberry (*Fragaria virginiana*), and Mountain blue violet (*Viola adunca*).

4.1.3 Ponderosa pine-moss

The ponderosa pine-moss vegetation community is a very small inclusion within the southern portion of the southern project area. This habitat was located on the edge of a cliff face; however, the surrounding topography was relatively flat but rocky. Ponderosa pine dominated the overstory. Quacking aspen and white spruce were also present. The understory was dominated by a carpet of moss. Howell's pussytoes (*Antennaria howellii*) was the only other species observed in the understory of this vegetation community.

All ponderosa pine habitats, especially those with higher understory cover, support a relatively high diversity of wildlife species. These habitats generally host several levels of open canopy cover that can provide for an array of different species while also allowing for easy movement between canopy levels for greater utilization of the overall habitat. Mammalian species such as white-tailed deer, squirrels, and chipmunks are common. Avian species such as nuthatches, chickadees, warblers, and woodpeckers are abundant in this habitat as well. Ponderosa pine is the preferred nesting habitat for broad-winged hawks.

4.1.4 Quaking aspen

The quaking aspen vegetation community was located in scattered and isolated pockets throughout the project area. The topography ranged from gently rolling to very steep and rocky. The overstory was dominated by quaking aspen. White spruce and ponderosa pine were present in the overstory but were not dominant. The dominant shrubs in the understory included woods rose (*Rosa woodsii*), Saskatoon serviceberry, and wild raspberry (*Rubus idaeus*). Common grasses included prairie sandreed, rough-leaf ricegrass, smooth brome, green needlegrass, and western wheatgrass (*Elymus smithii*). Forb species that were most abundant included false Solomon's seal (*Smilacina stellata*), dogwood (*Dyssodia papposa*), fetid marigold (*Dyssodia papposa*), and wild lily-of-the-valley (*Maianthemum canadense*).

Aspen habitats tend to be more open and less complex than pine habitats. Therefore, wildlife species that utilize them may be less diverse or spend less time in them, as they tend to offer less cover for refuge. However, certain components of this habitat, such as aspen buds and/or the greater diversity of understory species that result from additional sunlight exposure, can be attractive to certain wildlife species. Because aspen habitats in the WGRE survey area tend to occur in small patches within larger areas of ponderosa or spruce, many of the species common to those habitats are also found in aspen habitat.

4.1.5 White spruce

The white spruce vegetation community was small and present only in the northwestern extent of the northern survey area and the north-central and southeastern portions of the southern project area. The topography was moderately steep to very steep. The overstory was dominated by white spruce. Ponderosa pine was present in the overstory but was not dominant. Dominant shrubs that were present in the understory included common snowberry, Saskatoon serviceberry, grouse whortleberry (*Vaccinium scoparium*), and chokecherry (*Prunus virginiana*). Green needlegrass and smooth brome were the common grass species present, along with common forbs such as heartleaf arnica (*Arnica cordifolia*) and bluebell bellflower (*Campanula rotundifolia*).

Spruce habitats generally host relatively dense canopy cover that provides adequate refuge for many species. However, dense overstory may also limit the accessibility for many animals and restrict sunlight exposure to the understory, which can limit plant diversity and overall wildlife use for activities such as foraging. Nevertheless, small mammals such as squirrels and weasels tend to be more common in spruce habitat than in other communities. Avian species found within spruce habitat can include several species of woodpeckers, brown creepers, and kinglets. Ruffed grouse (*Bonasa umbellus*) are also frequently found in mature spruce forests that include an understory of deciduous trees.

4.1.6 Other minor habitats

Riparian habitats associated with portions of Annie Creek and Nevada Gulch and small patches of meadow habitat interspersed throughout the project area are limited in their extent and are

generally similar to the ponderosa pine and white spruce habitats (described above) that neighbor them. Although generally temporary, the availability of water resources associated with riparian habitats can attract many wildlife species from the neighboring areas and often concentrate an abundance of animals in this habitat. However, given the limited extent of riparian and meadow habitat, the species diversity tends to be similar to that of the surrounding habitats with little opportunity to fully support more specialized grassland, riparian, or wetland species.

Disturbed habitats are characterized by nearly a complete absence of vegetation and are, therefore, less valuable to wildlife species. Diversity and abundance of wildlife species are extremely low, if not absent in these habitats.

Reclaimed grassland vegetation communities are located adjacent to the current or former mining activities in the southern extent of the northern survey area and the north-central and eastern portions of the southern survey area. The topography ranges from gently rolling to very steep and rocky. This habitat type was dominated by grasses and forbs with minimal tree and shrub cover. Common grass species within this vegetation community included prairie sandreed, western wheatgrass, sheep fescue (*Festuca ovina*), green needlegrass, and Kentucky bluegrass. Common forbs that were present included northern bedstraw, alfalfa medic (*Medicago sativa*), and red clover (*Trifolium pratense*). Wood's rose was the dominant shrub species within this vegetation community.

Reclaimed grassland tends to support a lower diversity and abundance of wildlife species because it's less complex than other habitats and often comprised of non-native plant species or less overall vegetative diversity. Reclamation practices and maturation of this habitat are key factors in determining their current value to wildlife species. Nevertheless, proper attention to reclamation techniques, timing, and seeding composition can produce grassland habitats that support both grassland specialist species and generalist species for a variety of activities (e.g., nesting, foraging, and refuge). Small mammals such as mice and voles, as well as their predators (e.g., coyotes, foxes, hawks, and harriers) are common in grassland habitats. Other mammals such as deer and marmots can be found foraging or resting in this habitat. Other avian species that utilize reclaimed grasslands include several species of sparrows, larks, and shrikes. Several species of snakes and other reptiles are also typically found in grassland habitats.

4.2 BATS

4.2.1 Habitat Assessment and Surveys

During surveys conducted throughout the WGRE survey area in fall 2009 and spring and fall 2010, biologists identified six separate locations with limited potential to serve as underground roost maternity sites or hibernacula for bats (Table 1). The majority of the sites (four) were clustered in NW NW Section 1 T4N:R2E and located along the southern slope of Green Mountain. The nature of each underground site was characterized as one of four different features (Figures 1 through 4): 1) an open excavation site accompanied with shallow cliff recessions, 2) a vertical shaft, 3) a drift or adit from previous mining operations, or 4) a short (less than 15 feet long), narrow (4 to 6 feet wide) tunnel.

During an on-site assessment in May 2010, three sites within Section 1 (sites 1 through 3; two vertical shafts and one excavation site) were evaluated by ICF biologist (William Vetter), Wharf personnel (Ron Waterland), SDGFP biologist (Stan Michals), and a regional bat researcher (Joel Tigner of Batworks, Inc.). Sites 4 and 5 were not visited during the on-site assessment, as both were comprised of short (less than 15 feet long), narrow (4 to 6 feet wide) tunnels exposed to the outside temperatures and weather conditions and largely unsuitable for roosting bats. Site 6 was not visited during the on-site assessment, as it was first discovered (and surveyed) while conducting nocturnal surveys at sites 2 and 3 in July 2010.

The excavation at site 1 provided an adequate amount of horizontal surface for roosting; however, it remained fairly open and exposed without sufficient protection from outside temperatures and weather conditions. The vertical shafts at sites 2 and 3 were determined to be fairly short in length (less than 50 feet) with relatively little overhang along the vertical walls for roosting. Site 6 was likely an exposed mine drift or adit from historic mining operations in the area. The opening was primarily oriented horizontally, but then angled to more of a vertical drop as it extended into the mountain slope. Several small ledges and overhangs were present at the face of the opening and likely continued for some distance into the drift. With the exception of site 6 (since it was not assessed during the May 2010 on-site), it was determined that all other sites (1-3) within Section 1 T4N:R2E may provide some potential for individual bats roosts but would not likely provide the necessary conditions to host bat maternity or hibernacula colonies.

Table 1. Potential Bat Habitat Locations within the Wharf and Golden Reward Expansion Survey Area.

			UTM (NAD27, Zone 13N)	
Site	Structure	¼ ¼ Section, T:R	Easting	Northing
1	Excavation Site	NW NW 1, 4N:2E	593122	4910256
2	Vertical Shaft	NW NW 1, 4N:2E	593146	4910241
3	Vertical Shaft	NW NW 1, 4N:2E	593095	4910305
4	Short tunnel	NW NE 12, 4N:2E	593892	4908557
5	Short tunnel	NW NW 6, 4N:3E	594820	4910335
6	Mine adit or drift	NW NW 1, 4N:2E	593089	4910251

However, because of site 6 and the unconfirmed potential of additional horizontal drifts radiating from the vertical shafts at sites 2 and 3, nocturnal bat surveys were conducted by a qualified bat biologist over 3 nights in summer 2010 at sites 1, 2, 3, and 6. Site 1 was included in the surveys, simply due to its close proximity relative to the other sites.

Detailed results of the nocturnal bat surveys at sites 1, 2, 3, and 6 are included in Attachment II. In summary, the survey results confirmed that bat use in the area and at the identified sites was low during the course of all 3 survey nights. Weather conditions were conducive to bat activity during all 3 survey nights and a combined total of 30 calls were recorded (11 calls, 9 calls, 10 calls, respectively). Of the identified species that utilize underground roosting habitat, the most common species identified was the western small-footed myotis (*Myotis ciliolabrum*) (13 total calls). These calls were not clustered together but dispersed throughout the course of the surveys. Five additional species were detected during the surveys, but no more than seven calls or observations were documented for any of these species. None of the species identified are federally listed species. However, one to two total calls/observations were recorded for each of the silver-haired bat (*Lasionycteris noctivagans*), northern myotis (*Myotis septentrionalis*), and Townsend's big-eared bat (*Corynorhinus townsendii*), which are listed on the Rare, Threatened, or Endangered Species list tracked by the SDNHP. Nevertheless, the absence of any evidence of collective roosting (observed or recorded) likely excludes these sites from use as

maternity/nursery roosts. As such, it is unlikely that any of these locations provide significant roosting habitat for bats.

4.2.2 Mitigation

Regardless of the low documented use in summer 2010 at the identified underground features within the WGRE area, the potential for future bat use (e.g., as transitional roost sites or winter hibernacula) could not be eliminated unless temporary closures were implemented in advance of permanent closure. Properly implemented, temporary closures can provide a means for exit from the underground structures by enclosed individuals, while also preventing entrance from additional individuals. Based on consultation with Batworks, Inc., tarps positioned across or slightly within the underground entrances for a minimum of 5 days provide a suitable mitigation technique by allowing any individuals inside to crawl out along the edge of the tarp while adequately preventing additional individuals from flying in. Once sufficient time is allowed for escape, permanent closure or excavation of the sites can occur with little probability of inadvertent or incidental loss of bats.

Approval of the aforementioned mitigation strategy was granted by SDGFP (Biologist, Stan Michals) after survey results were determined. As such, biologists placed tarps across the entrances to sites 2, 3, and 6 on September 14, 2010, while bats were still in their active season (in order to allow escape if needed). Figures 5 through 7 illustrate these mitigation actions, although, safety considerations prevented better photographic documentation at site 2. In addition, other known and protected underground roost sites exist beyond the WGRE survey area but in the nearby vicinity and within flight range of the bat species documented during the course of surveys (see Attachment II). In this regard, the closure of sites 2, 3, and 6 should not eliminate all potential bat habitat in the general area.

4.3 RAPTOR NESTS

A review of the historical raptor database documented for the nearby Wharf and Golden Reward Mines revealed 20 previous nest records and two relocation mitigation nest sites within the WGRE survey area (proposed disturbance area and a 0.5-mile perimeter) (Table 2 and mapped in Exhibit 1 and 2). Previous nest identification numbers were utilized for this document, in order

Table 2. The Histories (1994–2010) and Descriptions of Raptor Nests within the Wharf and Golden Reward Expansion Survey Area[1].

Nest #	¼ ¼ Sec T:R (substrate)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
BWH1a	SE SW 35 5N:2E (ponderosa pine)	I	Alt	Alt	Alt	Rel	----	----	----	----	----	----	----	----	----	----	----	----
BWH1b	SE SW 35 5N:2E (ponderosa pine)	D/N	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
BWH1c	SW SE 35 5N:2E (ponderosa pine)	----	A 1f	A 3e, 0h	Alt	Rel	----	----	----	----	----	----	----	----	----	----	----	----
BWH1d	NE SE 35 5N:2E (ponderosa pine)	----	----	----	A 3e, 0h	Rel	----	----	----	----	----	----	----	----	----	----	----	----
BWH1e	NE SE 35 5N:2E (ponderosa pine)	----	----	----	----	I	Rel	----	----	----	----	----	----	----	----	----	----	----
BWH1f	NE SE 35 5N:2E (ponderosa pine)	----	----	----	----	----	A 2e, 2f	I	I	I	D/N	----	----	----	----	----	----	----
BWH2a	SW NE 2 4N:2E (ponderosa pine)	I	I	I	I	I	Alt	Alt	D/N	----	----	----	----	----	----	----	----	----
BWH2b	NW SE 2 4N:2E (ponderosa pine)	----	I	I	I	I	Alt	Alt	Alt	I	Alt	I	I	I	I	I	I	I
BWH2c	NE SW 2 4N:2E (ponderosa pine)	----	----	----	I	I	Alt	Alt	Alt	I	Alt	I	I	I	D/N	----	----	----
BWH2d	NW SE 2 4N:2E (ponderosa pine)	----	----	----	I	I	D/N	----	----	----	----	----	----	----	----	----	----	----
BWH2e	SE NW 2 4N:2E (ponderosa pine)	----	----	----	I	I	D/N	I	A 1h, 0f	I	Alt	I	I	I	I	I	D/N	----
BWH2f	NE SW 2 4N:2E (ponderosa pine)	----	----	----	----	I	A 1f	A 1f	Alt	I	Alt	I	I	I	I	I	I	I
BWH2g	NW SE 2 4N:2E (ponderosa pine)	----	----	----	----	----	----	----	----	----	A 1f	I	I	I	I	I	I	I

Nest #	¼ ¼ Sec T:R (substrate)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
BWH6a	NW NW 34 N:2E (ponderosa pine)	----	----	----	----	A 3e, 0h	Alt	I	I[2]	I	I	I	I	I	I	I	ALT	I
BWH6b	NW NW 34 5N:2E (ponderosa pine)	----	----	----	----	----	A 3e, 3f	I	I[2]	I	I	I	I	I	I	I	A-T	I
BWH7	NE SW 12 4N:2E (unconfirmed)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	A-T
CH4a	NW NW 34 5N:2E (ponderosa pine)	----	----	----	----	----	----	----	----	----	----[2]	I	I	I	ALT	I	D/N	----
CH4b	NW NW 34 5N:2E (ponderosa pine)	----	----	----	----	----	----	----	----	----	----[2]	A 2f	I	I	A-T	I	ALT	I
CH4c	NW NW 34 5N:2E (ponderosa pine)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	A/?	I
RTH2	NE NE 1 4N:2E (ponderosa pine)	----	----	A 0f	I	I	I	I	I	D/N	----	----	----	----	----	----	----	----
UNK6	SW NW 36 5N:2E (ponderosa pine)	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	I	I

[1] None of the relocated nest sites have been used during monitoring for the Wharf Mine and are, therefore, not included in this table.

[2] Selective logging occurred around or near the nest tree after or during the breeding season.

Species Codes:
BWH = broad-winged hawk
CH = Cooper's hawk
RTH = red-tailed hawk
UNK = unknown raptor species

Nest Status Codes:
A = active
Alt = alternate to an active nest
A-T = active, tended
D/N = destroyed by natural causes
I = inactive
Rel = relocated

---- = nest undiscovered or non-existent
#e = number of eggs
#h = number of hatched young
#f = number of fledged young

to provide consistency with historical data. All 22 nest sites were situated in ponderosa pine trees. Although no additional nests were precisely identified during the spring, summer, and fall 2010 baseline surveys, one likely broad-winged hawk territory was documented in the southeastern extent of the southern survey area during ground searches in July (Table 2 and mapped in Exhibit 1). The history (from 1994 through 2010) and description of each known territory is presented below and summarized in Table 2. Because neither of the relocated nests have been used at their new locations (including in 2010), they are not included in Table 2 but are discussed in detail in the *Raptor Nest Relocations* section below. Additionally, the distance from each intact nest to the nearest source of human disturbance in 2010 is presented in Table 3.

Since 1990, three broad-winged hawk territories (BWH1, BWH2, and BWH6) have been identified within the WGRE survey area. The BWH1 and BWH2 territories were active and first identified in 1990, whereas the BWH6 territory was active and first discovered in 1998. As mentioned above, one additional territory (BWH7) was discovered in 2010. In addition, one Cooper's hawk (*Accipiter cooperii*) territory consisting of three nest sites (CH4a-c), one red-tailed hawk (*Buteo jamaicensis*) nest (RTH2), and one nest built by an undetermined raptor species were also documented within the wildlife survey area over the years. Two nests that were relocated as mitigation measures to avoid proposed disturbance at the adjacent Wharf Mine are also present within the survey area.

4.3.1 Broad-winged hawk territory BWH1

Studies in other populations have demonstrated that broad-winged hawks rarely use the same nest in a given territory for consecutive years (Goodrich et al. 1996, Johnsgard 1990); the same has been true for nests in the WGRE wildlife survey area. Six natural nests and one relocated nest site have been identified or created, respectively, in the BWH1 territory north of Green Mountain in S½ Section 35 T5N:R2E (Exhibit 1). Three of the natural nests (BWH1a, BWH1c, and BWH1d) were removed and relocated outside the territory and beyond the WGRE survey area prior to the 1998 breeding season (see the *Raptor Nest Relocations* section below). In August 1999, a fourth nest was moved from the BWH1e site to a pine tree outside of the pit development area (REL6, Exhibit 1) to avoid mine disturbance. The remaining two nests (BWH1b and BWH1f) were destroyed by natural causes prior to the 1994 and 2003 breeding

Table 3. Nearest Disturbances to Intact Raptor Nests in the Wharf and Golden Reward Expansion Wildlife Survey Area (2010 Nesting Season).

Nest #	Disturbance Type	Distance	2010 Status
BWH2b	Residential and ski area paved access road/ski and vacation condominiums	50 feet/ 500 feet	Inactive
BWH2f	Residential dirt road/ residence(s)	60 feet/ 225 feet	Inactive
BWH2g	Residential dirt road/ residence	300 feet/ 1,080 feet	Inactive
BWH6a	Recreational and logging trail	2 feet	Inactive
BWH6b	Recreational and logging trail	975 feet	Inactive
CH4b	Recreational and logging trail	450 feet	Inactive
CH4c	Recreational and logging trail	700 feet	Inactive
UNK6	Transmission line/ recreational and logging road	350 feet/ 250 feet	Inactive

Raptor Species Codes:

BWH= broad-winged hawk

CH = Cooper's hawk

UNK = unknown raptor species

seasons, respectively. Therefore, only the relocated REL6 nest was still intact in the BWH1 territory during the 2010 nesting season.

Nesting activity was documented during 6 of the 20 years that the BWH1 territory has been monitored (Table 2). The pair successfully fledged chicks during 4 of those years. In 2 additional years, the pair incubated eggs but failed to hatch young. No nesting activity has been observed in the territory since 1999. In 2010, the only remaining nest (REL6) in the BWH1 territory was in particularly poor condition. No broad-winged hawks were observed in or near the territory, but one adult was seen soaring at a considerable height east of the territory and near the northeast edge of the wildlife survey area in NE SW Section 36 T5N:R2E on July 17. No new nests were located in the BWH1 territory in 2010.

4.3.2 Broad-winged hawk territory BWH2

The BWH2 territory is located in Section 2 T4N:R2E (Exhibit 1) in an area with heavy existing and increasing residential and recreational development between Foley Mountain to the west and Terry Peak to the southeast. Seven nests have been identified in the BWH2 territory during the years of monitoring for the Wharf Mine and WGRE (Table 2). Broad-winged hawks nested at the BWH2a nest when the territory was first recorded in 1990, but no active nests were found in that area again until 1999 (Table 2). A pair nested in 4 of the 5 years from 1999 through 2003, and fledged young in 3 of the 4 years. Although multiple intact nests have persisted, no active nests have been found in the BWH2 territory since 2003. As indicated above, the first nest (BWH2a) was successful in 1990, but was inactive in each subsequent year through 2000; it was destroyed by natural causes sometime between the 2000 and 2001 breeding seasons. No nesting hawks were documented in the BWH2 territory from 1991 through 1998, though new nest sites were discovered during that period. Nest BWH2b was found by a Wharf geologist in late August 1995. That nest was approximately 0.25 mile south-southeast of BWH2a, adjacent to the road that leads into the Terry Peak residential subdivision. Although the nest was obviously built by broad-winged hawks prior to the 1995 breeding season, hawks have never been documented using or even tending this nest.

Three inactive nests, tentatively identified as those of broad-winged hawks, were discovered in 1997. Nests BWH2c, BWH2d, and BWH2e (Exhibit 1) were all within 0.25 mile of each other, and within 300 feet of the northern-most road through the Terry Peak subdivision. By 1999, both BWH2d and BWH2e had been destroyed by natural causes. Broad-winged hawks rebuilt BWH2e in 2001 and laid eggs, but did not hatch any young. Prior to the 2009 breeding season, the BWH2e nest had once again been destroyed by natural causes. In 1998, nesting material was seen in a pine tree approximately 250 feet west of BWH2c and 60 feet from a gravel residential road in the Terry Peak subdivision (BWH2f), though no birds were observed in the area that year. Broad-winged hawks improved the nest site in 1999, and fledged one chick during both 1999 and 2000. The nest has been inactive since then. A seventh nest (BWH2g) was discovered in the territory in late May 2003. That nest was in a ponderosa pine approximately 100 feet east-southeast of BWH2e (Exhibit 1). The pair fledged one chick from the nest that year, but the nest has been inactive since then. When biologists visited the territory in 2004, the residential lots on

which BWH2c, e, f, and g were located had been logged during the previous fall or early winter. Although all nest trees were flagged and still standing, approximately 90% of the remaining trees had been removed from the lots. Consequently, the nests were exposed to and clearly visible from the residential roads, which likely influenced the lack of activity since 2003. Despite annual searches and calling efforts throughout the area, no hawks or new nests have been detected in recent years. No hawks or new nests were discovered in the area in 2010.

4.3.3 Broad-winged hawk territory BWH6

Only two nests have been discovered in the BWH6 territory (Exhibit 2). In early June 1998, an active broad-winged hawk nest (BWH6a) was found 0.5 mile north of the permit area at the head of Labrador Gulch. The nest was in a pine tree in an area dominated by small aspen and scattered pines. The pair was incubating when the nest was first discovered, but they had abandoned it by early July. In 1999, the pair fledged three young from a new nest (BWH6b) located slightly north of the previous nest site and farther down Labrador Gulch. During the non-breeding season between 2001 and 2002, the pine stands surrounding the BWH6 nests were selectively logged, resulting in a much more open canopy. No nesting activity was documented in the BWH6 territory from 2000 through 2002. In 2003, biologist saw and heard two broad-winged hawks in the vicinity; however, no new nests could be located in that year. By spring 2004, many trees in the logged stands had been toppled by wind and nesting activity was again absent in the territory from 2004 through 2008.

In 2009, broad-winged hawks were observed calling and defending in the territory. No active nests were located in the area in 2009; however, some evidence of new nest material was evident at the BWH6b nest. In 2010, a broad-winged hawk was observed soaring near nest BWH6a on May 17, 2010, but did not display any territorial behavior. No other broad-winged hawks were observed near or at the nest site during the subsequent visit on July 21, and no new nests were found in the general area.

4.3.4 Broad-winged hawk territory BWH7

In 2010, a single broad-winged hawk was observed in NW SE 12, T4N:R2E, demonstrating territorial behavior (circling and calling) indicative of an established nest in the area. From three separate locations within a small area (approximately 34 acres, see Exhibit 1), the hawk

responded with territorial displays to recorded tape playback calls. The habitat within the area is dominated by ponderosa pine stands, which could provide suitable substrate for a broad-winged hawk nest. Although the area was thoroughly searched, no nests were located. Future monitoring may help determine the precise existence of a nest(s) within the apparent territory.

4.3.5 Cooper's hawk territory CH4

This territory was discovered in 2004 when biologists found two nests in NW NW Section 34 T5N:R2E (Exhibit 2). Both nests were situated in ponderosa pine trees just beyond a recently logged area along Labrador Gulch, approximately 300 feet northwest of the BWH6 nests. Nest CH4a was inactive in 2004; CH4b was active and two young fledged from the nest that year. In 2009, a new active nest was discovered approximately 275 feet north of the CH4a nest site, which had been destroyed due to natural causes prior to the 2009 breeding season. Nest CH4c was discovered in July 2009 when a female Cooper's hawk was flushed from the nest tree and proceeded to exhibit a lengthy territorial response by flying and calling from multiple perch sites surrounding the nest. Due to the limited visibility inside the nest and the vigorous defense from the adult, the productivity at the nest could not be determined in 2009. During 2010, no activity was documented within the CH4 territory, and no new nests were found.

4.3.6 Red-tailed hawk nest RTH2

In 1996, Wharf personnel followed a pair of red-tailed hawks seen flying through the area and discovered nest RTH2 east of Bald Mountain (Exhibit 1). The nest was active but unsuccessful in 1996, and inactive in the following 2 years. During the summers of 1999 and 2000, a few isolated sightings of individual red-tailed hawks were recorded in the vicinity of Bald Mountain, but no pairs were observed and the RTH2 nest remained inactive. The nest was also inactive in 2001, but one mildly defensive red-tailed hawk was seen in the vicinity in July of that year. The nest could not be found in 2002 and was assumed to have been destroyed by natural causes. Since then, no red-tailed hawks or new nests were documented in the area. This nest location was not monitored in 2008 or 2009, because it is located beyond the Wharf Mine's annual wildlife monitoring area. However, no activity was observed in the area in 2010.

4.3.7 Unknown species nest UNK6

One newly identified stick nest of unknown origin (UNK6) was discovered east of the Wharf Mine in 2009. The nest was inactive and located in a mature ponderosa pine in SW NW Section 34 T5N:R2E, approximately equidistant from the historical BWH1 and BWH4 territories monitored annually for the Wharf Mine (Exhibit 1). Based on its physical characteristics and general setting, the nest was likely built by broad-winged hawks, but no activity was recorded at the site to confirm a species designation. The nest was in relatively good condition and may have been built in recent years.

4.3.8 Raptor nest relocation sites REL5 and REL6

Prior to the 1998 breeding season, three raptor nests (BWH1a, BWH1c, and BWH1d) within the current WGRE survey area and in close proximity to the pending Wharf Mine activities at that time were relocated beyond the area proposed for future mining. Two additional nests beyond the WGRE survey area were also relocated at the same time and all five relocation sites were randomly designated as REL1 through REL5. Of the five new sites, only REL5 (SW NW Section 1 T4N:R2E) is located within the current survey area for the WGRE (Exhibit 1). However, in August 1999, nest BWH1e was also relocated to a pine tree northeast of the pit development area at that time and designated as REL6 (Exhibit 1). Nest REL6 is also located within the survey perimeter for the WGRE in NE SE Section 35 T5N:R2E. No other nests have been relocated since 1999.

All relocated nests were positioned in trees with a natural crotch formed by the trunk or branches that provided support. Where necessary, additional support was furnished by strips of poultry netting secured under the base of the nest material. The height and aspect of the relocated nests varied, but were well within the range of those parameters found at natural nest sites. Intact, relocated nests have been visited each year to determine if they were being used by raptors. As described previously, none of the relocated nests are included in Table 2 because no raptor activity has been documented at any of the nests during the subsequent years of annual monitoring. As of 2010, both REL5 and REL6 were still intact, but in very poor condition.

4.3.9 Other Raptor Observations

Aside from the broad-winged hawk observation discussed previously, five other raptor species were documented within the WGRE survey area in fall 2009 and in spring, summer, and fall 2010. During the November 2009 visit, a northern harrier (*Circus cyaneus*) was observed foraging in NE NW Section 2, T4N:R2E. On May 18, a single sharp-shinned hawk (*Accipiter striatus*) was observed flying across a clearing in SW NE Section 1, T4N:R2E. During the time the biologist observed the bird (approximately 10 minutes), the bird circled to about 900 feet above the tree line before flying over the ridges to the north. On the same day, a great horned owl was flushed from a roost in NW NW Section 7, T4N:R3E. No evidence of nesting was observed near the observation site and the owl did not respond to the taped playback calls used in nest searching. A single Cooper's hawk responded to taped playback on a single instance on May 19. The individual was detected in NW SE Section 3, T4N:R2E. After approximately 5 minutes, the bird ceased calling. Despite thorough searching of the area, no nest was found and no visual observation of the bird was made. Subsequent surveys during the July visit did no document any Cooper's hawks or sign in the area. A single red-tailed hawk was observed calling from the top of a ponderosa pin in SE NE Section 1, T4N:R2E on July 22. The bird called from this location for approximately 30 seconds before flying out of the survey area to the northeast. Searching in the area on July 23 did not document any red-tailed hawks or further sign of nesting.

4.4 OWLS

Only one owl species was recorded during targeted nocturnal broadcast surveys in spring 2010 (Table 4). On May 17, one northern saw-whet owl was recorded calling at each of the survey listening sites E and F (Exhibit 1). Neither owl was detected visually, as both were heard giving territorial calls only. The owl heard at site E called during the majority of the broadcast period, and was likely located nearly 0.4 mile to the east of the survey point (approximately SW NE Section 2 T4N:R2E). The owl at site F was heard after the 10 minute broadcast period, approximately 0.5 miles east of the survey site in NE SW Section 36 T5N:R2E. During the second owl survey on May 25, two northern saw-whet owls were again heard. A single owl was recorded at site A, and was first detected during the middle of the 10-minute broadcast period. That individual continued to give territorial calls for the remaining duration of the broadcast and

Table 4. Locations and Results of Nocturnal Owl Surveys Conducted within the Wharf and Golden Reward Expansion Wildlife Survey Area in Spring 2010.

Survey Site	UTM (NAD 27, Zone 13N) Easting	Northing	¼ ¼ Section, T:R	Survey 1 (5/17/2010)	Survey 2 (5/25/2010)
A	594185	4908744	NE NE 12, 4N:2E	nothing detected	1 NSWO - aural (NE SE 12, 4N:2E)
B	593877	4909081	SW SE 1, 4N:2E	nothing detected	nothing detected
C	593152	4910020	SW NW 1, 4N:2E	nothing detected	nothing detected
D	594081	4909774	SW NE 1, 4N:2E	nothing detected	nothing detected
E	591435	4909854	SW NW 2, 4N:2E	1 NSWO - aural (SW NE 2, 4N:2E)	nothing detected
F	593559	4911289	SW NW 36, 5N:2E	1 NSWO - aural (NE SW 36, 5N:2E)	1 NSWO - aural (NW SW 36, 5N:2E)

NSWO = northern saw-whet owl.

some time afterward. The bird was estimated to be approximately 0.5 mile to the southeast of the survey point in NE SE Section 12 T4N:R2E. A second owl was recorded at site F, heard giving territorial calls before, during, and after the broadcast period from approximately 0.2 mile south (NW SW Section 36 T5N:R2E) of the survey point when it was first detected. Although the owl was never directly observed, the calls increased in volume during the survey period. It was likely that the owl moved closer to the survey site during that time and may have possibly been within several hundred meters when the survey was concluded.

4.5 THREATENED, ENDANGERED, AND OTHER SENSITIVE SPECIES

No T&E vertebrate species were documented within the WGRE survey area during wildlife baseline surveys conducted in fall 2009 or in spring, summer, and fall 2010, and no records exist within the historical accounts of the nearby Golden Reward and Wharf Mine annual monitoring

programs. Likewise, no candidate, petitioned, or proposed T&E vertebrate species were recorded during recent baseline surveys or previous annual monitoring. Information regarding the potential and documented occurrence of plant T&E species is provided in the vegetation baseline report (BKS Environmental 2010).

The single vertebrate T&E species (whooping crane) that may be expected to occur in Lawrence County, South Dakota is associated with low-elevation wetland or open water habitats, which do not occur within the WGRE and its surrounding 0.5-mile perimeter. Information regarding this species' habitat needs and/or recovery efforts can be found in the USFWS recovery plans and/or agency websites (Canadian Wildlife Service and USFWS 2007 and USFWS 2010).

Attachment I lists all potential vertebrate species that could occur in the area, including any sensitive species tracked by the SDNHP and the USFS (Region 2). Attachment I also provides a brief description of each species' protection status, primary nesting habitat, and records of their occurrence (historical and 2009/2010) in the vicinity of the WGRE.

Seven avian species and one reptile species that are included on the SDNHP list were observed within the WGRE survey area during baseline wildlife surveys completed in 2009 and 2010. Cooper's hawks, sharp-shinned hawks, and broad-winged hawks were discussed in the previous *Raptor Nests* section and the northern saw-whet owl was discussed in the *Owls* section. A single pair of American three-toed woodpeckers (*Picoides dorsalis*) was observed in NE NW 12, T4N:R2E during the May raptor nest surveys. The pair was highly active, foraging in a grove of white spruce and calling repeatedly. Brown creepers (*Certhia americana*) and Cassin's finches (*Carpodacus cassinii*) were both observed on multiple occasions throughout open pine habitats during the July raptor nest surveys. A single smooth green snake (*Opheodris vernalis*) was observed crossing a forest trail in SE NE 2, T4N:R2E during the May surveys for bat habitats. The only USFS sensitive species documented within the WGRE during the 2009 and 2010 surveys was the aforementioned American three-toed woodpecker.

4.6 OTHER ANIMALS

Incidental sightings of animals not targeted by systematic surveys were recorded during all wildlife monitoring efforts in and within 0.5 mile of the WGRE during fall 2009 and spring, summer, and fall 2010 (Attachment I). Thirteen mammal species, 50 bird species, one

amphibian species, and one reptile species were documented within the WGRE. Of these 65 species, 12 (three mammals, eight birds, and one reptile) are included on the SDNHP Sensitive Species list.

White-tailed deer (*Odocoileus virginianus*) and mule deer (*Odocoileus hemionus*) were the only two big game species observed within the WGRE and 0.5-mile perimeter. Both species were observed in forested habitats and open meadows throughout the WGRE survey area and during the entire baseline survey period. The only mammalian predator detected was the coyote (*Canis latrans*). One individual was heard howling in SW SW Section 36 during owl surveys in May, and another was observed in SW NW Section 12, T4N:R2E during the July raptor surveys. Red squirrels (*Tamiasciurius hudsonicus*) and least chipmunks (*Tamias minimus* spp.) were also commonly observed throughout the forested habitats within the WGRE and 0.5-mile perimeter, and yellow-bellied marmots (*Marmota flaviventris*) were regularly seen and heard in disturbed areas.

While no specific surveys targeting upland game birds were required, biologists recorded three game bird species (wild turkey [*Meleagris gallopavo*], ruffed grouse [*Bonasa umbellus*], and mourning dove [*Zeniada macroura*]) during the baseline wildlife surveys. During the May surveys, wild turkeys were observed foraging in or near pine habitats on two separate occasions. Five individuals were observed in SE SE Section 3, and a single individual was observed in SE NE Section 1 T4N:R2E. Ruffed grouse were also observed during the May and July surveys. A "drumming" male was observed in NE NW Section 12 in May, and a single individual was observed crossing a forest trail in NW SE Section 3 T4N:R2E in July. Mourning doves were occasionally observed along power lines associated with residences, as well as nearby reclaimed grasslands.

Additional avian species recorded in the WGRE survey area included many common forest species typical of the Black Hills regions, such as the black-capped chickadee (*Poecile atricapillus*), chipping sparrow (*Spizella passerine*), ruby-crowned kinglet (*Regulus calendula*), red-naped sapsucker (*Sphyrapicus nuchalis*), red-breasted nuthatch (*Sitta canadensis*), and dark-eyed junco (*Junco hyemalis*). Shrubs and scrub understory hosted common species such as MacGillivray's warbler (*Oporornis tolmiei*), song sparrow (*Melospiza melodia*), and Swainson's

thrush (*Catharus ustulatus*). Say's phoebes (*Sayornis sayii*) and mountain bluebirds (*Siali montanus*) were commonly observed in open, disturbed areas.

Only one amphibian species and one reptile species were encountered in the proposed WGRE. Boreal chorus frogs (*Pseudacris triseriata*) were heard on multiple occasions at small pools or along ephemeral streams (typically carrying runoff water) throughout the survey area. The lone reptile species, the smooth green snake, was discussed previously in the *Threatened, Endangered, and Other Sensitive Species* section above.

5.0 CONCLUSIONS

Wildlife habitats within the survey area (WGRE and 0.5-mile perimeter) are common in the Black Hills region of South Dakota. No unique or unusual wildlife habitats were documented in the survey area during baseline surveys or in previous years' monitoring for the adjacent Wharf and Golden Reward Mines. The WGRE area is dominated by ponderosa pine habitats, but other scattered woodland habitats, such as white spruce and quaking aspen, are also common throughout the region. Bottomland habitats, which often support considerable wildlife diversity, are limited in the WGRE, as natural drainages within the WGRE do not maintain persistent flow. Snow run-off during the spring likely provides most of the seasonal moisture to bottomland and streamside habitats within the WGRE. However, because no perennial streams and only a few small ponds occur in the WGRE, no fisheries and only limited riparian/wetland habitat would be affected by the project.

The WGRE currently experiences various levels of regular human disturbance, depending on the time of year. Most of the WGRE area is bounded on the north by ongoing mining activity and to the south and southwest by existing recreational and residential development. Additional disturbances in the area include passive and active recreation, transportation (i.e., county roads), logging, and mine reclamation activities.

No endangered, threatened, proposed, candidate, or petitioned vertebrate species were documented within the WGRE, and it is unlikely that any of those species would rely on the habitats present within the survey area. No designated critical or crucial habitats for any T&E species occur in the area. All of the SDNHP-listed and USFS Sensitive Species documented

within the WGRE survey area during the baseline study period are common in the region, either seasonally or year-round.

Reconnaissance surveys conducted throughout the WGRE survey area in fall 2009 and spring and fall 2010 resulted in the identification of six separate locations that could potentially serve as underground roost maternity sites or hibernacula for bats. On-site assessments with SDGFP and a regional bat researcher determined that three of the sites were largely unsuitable for roosting bats. Nocturnal surveys conducted over 3 nights at the remaining three sites confirmed that bat use in the area was relatively low (30 total calls recorded). Six species were detected during the surveys, with only one species having greater than 10 recorded calls and all others having less than 8 calls or observations. None of the species identified were federally listed species, but the SDNHP-listed silver-haired bat, northern myotis, and Townsend's big-eared bat were detected during the surveys. Nevertheless, the absence of any evidence of collective roosting (observed or recorded) likely excludes these sites from use as maternity/nursery roosts. As such, it is unlikely that any of these locations provide significant roosting habitat for bats. Furthermore, mitigation actions approved by SDGFP were implemented in late summer 2010 to provide temporary closures that provide a means for exit from the underground structures by enclosed individuals, while also preventing entrance from additional individuals. Closures (i.e., tarps) were positioned across or slightly within the underground entrances for a minimum of 5 days to provide individuals inside a chance to crawl out along the edge of the tarp while adequately preventing additional individuals from flying in. After sufficient time was allowed for escape, permanent closure (backfill from heavy machinery) of the sites occurred with little probability of inadvertent or incidental loss of bats.

Numerous raptor nests sites (current and historical) are present in the area, and all but five are associated with broad-winged hawks. However, this species is known to build multiple nests within a single territory, so the number of active nests in any given year would likely be considerably less than the total number of nest sites discovered over the years. In 2010, only one broad-winged hawk territory (BWH7) was active, and no other raptor species were documented nesting in the area. Although no precise nest location was identified at the BWH7 territory, defensive responses on multiple occasions indicated that the territory was active and located south of the proposed WGRE area. Likewise, no other nest sites (current or historical) exist

within the proposed disturbance area associated with the WGRE and, therefore, no nests will be physically disturbed by the WGRE. All raptor species (i.e., broad-winged hawk, Cooper's hawk, and red-tailed hawk) documented as actively nesting within the WGRE during 2010 or in previous years are known to regularly nest elsewhere in the immediate vicinity and throughout the region.

Three additional raptor species (northern harrier, sharp-shinned hawk, and red-tailed hawk) were documented within the WGRE survey area during surveys in 2009 and 2010. None of the species appeared to be associated with an active nest during the 2010 nesting season. All of the raptor species observed within the WGRE are common in the region.

Only one owl species (northern saw-whet owl) was recorded during targeted nocturnal surveys in 2010. This owl species is relatively common in pine and mixed-forest habitats throughout the Black Hills and was documented at three of the six sampling points within the WGRE survey area. The only additional owl species recorded during wildlife baseline surveys in fall 2009 and spring, summer, and fall 2010 was an incidental observation of a great horned owl seen in NW NW Section 7, T4N:R3E during the May raptor nest searches.

In summary, the WGRE and surrounding areas support an array of common wildlife habitats and species, despite the fairly limited variety of habitat types and the presence of existing disturbances within the area. No unique or unusual wildlife habitats or T&E species were documented in the WGRE survey area during baseline surveys. Given the physical and faunal characteristics of the area and the mitigation actions described above, no significant impacts to wildlife or their habitats are anticipated from the proposed mining operations and reclamation of the WGRE.

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Figure 1. Potential Bat Habitat Features: Excavation Site Representing Site 1 in NW NW Section 1, T4N:R2E.

Figure 2. Potential Bat Habitat Features: Vertical Shaft Representing Sites 2 and 3 in NW NW Section 1, T4N:R2E.

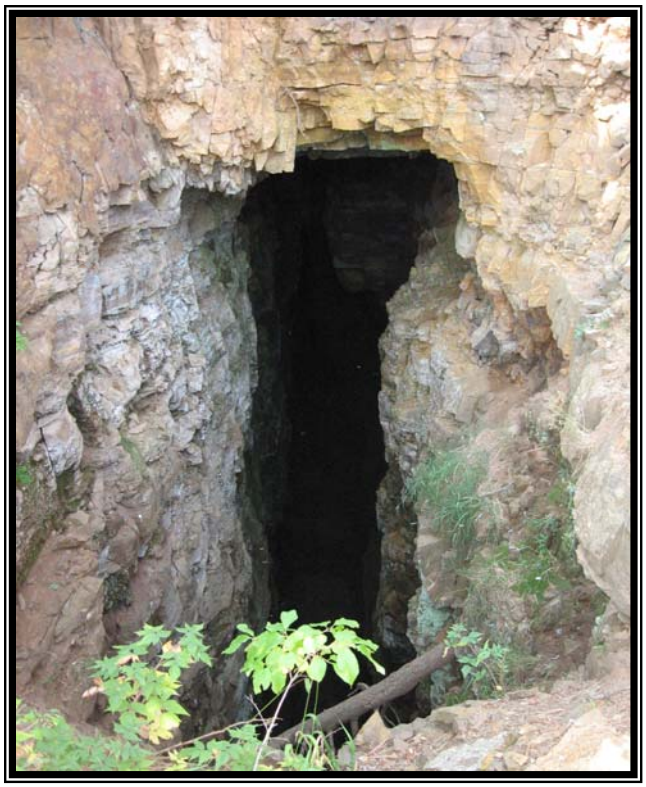


Figure 3. Potential Bat Habitat Features: Mine Drift Representing Site 6 in NW NW Section 1, T4N:R2E.

Figure 4. Potential Bat Habitat Features: Short, Tunnel Representing Sites 4 and 5 in NW NE Section 12 T4N:R2E and NW NW Section 6 T4N:R3E.

Figure 5. Bat Mitigation and Entry Prevention at Site 2 in NW NW Section 1, T4N:R2E.

Figure 6. Bat Mitigation and Entry Prevention at Site 3 in NW NW Section 1, T4N:R2E.

Figure 7. Bat Mitigation and Entry Prevention at Site 6 in NW NW Section 1, T4N:R2E.

ATTACHMENT I

WHARF AND GOLDEN REWARD EXPANSION (WGRE)
WILDLIFE BASELINE REPORT:
POTENTIAL AND DOCUMENTED SPECIES OCCURRENCE LISTS

POTENTIAL† AND DOCUMENTED MAMMALIAN SPECIES LIST

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Insectivores			
Masked shrew	*Sorex cinereus*	---	X
Hayden's shrew	*Sorex haydenii*	---	---
Merriam's shrew*	*Sorex merriami*	---	---
Bats			
Small-footed myotis	*Myotis ciliolabrum*	X	---
Long-eared myotis*	*Myotis evotis*	---	---
Northern myotis*	*Myotis septentrionalis*	X	---
Little brown myotis	*Myotis lucifugus*	---	X
Fringe-tailed myotis*	*Myotis thysandoes*	---	---
Long-legged myotis	*Myotis volans*	---	---
Keen's myotis	*Myotis keeni*	---	---
Red bat	*Lasirus borealis*	---	---
Hoary bat	*Lasirus cinereus*	X	---
Silver-haired bat*	*Lasionycteris noctivagans*	X	---
Big brown bat	*Eptesicus fuscus*	X	---
Townsend's big-eared bat*	*Plecotus townsendii*	X	---
Hares and Rabbits			
Desert cottontail	*Sylvilagus audubonii*	---	---
Mountain cottontail	*Sylvilagus nuttallii*	---	X
Cottontail species	*Sylvilagus* spp.	---	X
White-tailed jackrabbit	*Lepus townsendii*	X	X
Rodents			
Least chipmunk	*Tamias minimus*	X	X
Yellow-bellied marmot	*Marmota flaviventris*	X	X
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	---	---
Red squirrel	*Tamiasciurus hudsonicus*	X	X
Northern flying squirrel*	*Glaucomys sabrinus*	---	---
Northern pocket gopher	*Thomomys talpoides*	---	X
White-footed mouse	*Peromyscus leucopus*	---	X
Deer mouse	*Peromyscus maniculatus*	---	X

POTENTIAL† AND DOCUMENTED MAMMALIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Rodents (Continued)			
Bushy-tailed woodrat	*Neotoma cinerea*	---	X
Southern red-backed vole	*Clethrionomys gapperi*	---	X
Long-tailed vole	*Microtus longicaudus*	---	X
Prairie vole	*Microtus ochrogaster*	---	---
Meadow vole	*Microtus pennsylvanicus*	---	X
Norway rat	*Rattus norvegicus*	---	X
House mouse	*Mus musculus*	---	---
Meadow jumping mouse	*Zapus hudsonius*	---	---
Porcupine	*Erethizon dorsatum*	---	X
Carnivores			
Coyote	*Canis latrans*	X	X
Red fox	*Vulpes vulpes*	---	---
Gray fox	*Urocyon cinereoargentus*	---	---
Black bear*	*Ursus americanus*	---	---
Raccoon	*Procyon lotor*	---	X
Pine marten	*Martes americana*	---	X
Ermine	*Mustela ermine*	---	X
Long-tailed weasel	*Mustela frenata*	---	X
Mink	*Mustela vison*	---	---
Badger	*Taxidea taxus*	---	---
Eastern spotted skunk	*Spilogale putorius*	---	---
Striped skunk	*Mephitis mephitis*	---	X
Mountain lion*	*Felis concolor*	---	X
Lynx* (LT)	*Lynx canadensis*	---	---
Bobcat	*Lynx rufus*	---	---
Ungulates			
Elk	*Cervus elaphus*	---	X
Mule deer	*Odocoileus hemionus*	X	X
White-tailed deer	*Odocoileus virginianus*	X	X
Pronghorn	*Antilocapra americana*	---	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Loons and Grebes			
Common loon*	*Gavia immer*	---	X
Pied-billed grebe	*Podilymbus podiceps*	---	---
Horned grebe*	*Podiceps auritus*	---	---
Eared grebe	*Podiceps nigricollis*	---	X
Herons and Bitterns			
American bittern*	*Botaurus lentiginosus*	---	---
Great blue heron*	*Ardea herodias*	---	X
Black-crowned night heron*	*Nycticorax nycticorax*	---	---
Ibises			
White-faced ibis*	*Plegadis chihi*	---	---
Swans, Geese, and Ducks			
Snow goose	*Chen caerulenscens*	---	---
Canada goose	*Branta canadensis*	---	X
Green-winged teal	*Anas crecca*	---	X
Mallard	*Anas platyrhynchos*	---	X
Northern pintail	*Anas acuta*	---	---
Blue-winged teal	*Anas discors*	---	X
Cinnamon teal	*Anas cyanoptera*	---	---
Northern shoveler	*Anas clypeata*	---	X
Gadwall	*Anas strepera*	---	X
American wigeon	*Anas Americana*	---	---
Canvasback	*Aythya valisineria*	---	X
Redhead	*Aythya americana*	---	X
Ring-necked duck	*Aythya collaris*	---	X
Lesser scaup	*Aythya affinis*	---	X
Bufflehead*	*Bucephala albeola*	---	X
Common merganser*	*Mergus merganser*	---	X
Vultures			
Turkey vulture	*Cathartes aura*	X	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Diurnal Raptors			
Bald eagle* (ST)	*Haliaeetus leucocephalus*	---	X
Northern harrier	*Circus cyaneus*	X	X
Sharp-shinned hawk*	*Accipiter striatus*	X	X
Cooper's hawk*	*Accipiter cooperii*	X	X
Northern goshawk*	*Accipiter gentilis*	---	X
Broad-winged hawk*	*Buteo platypterus*	X	X
Swainson's hawk*	*Buteo swainsoni*	---	X
Red-tailed hawk	*Buteo jamaicensis*	X	X
Ferruginous hawk*	*Buteo regalis*	---	X
Rough-legged hawk	*Buteo lagopus*	---	---
Golden eagle*	*Aquila chrysaetos*	---	X
Osprey* (ST)	*Pandion haliaetus*	---	X
American kestrel	*Falco sparverius*	---	X
Merlin*	*Falco columbarius*	---	X
Peregrine falcon*	*Falco peregrines*	---	X
Prairie falcon*	*Falco mexicanus*	---	X
Grouse and Turkey			
Ruffed grouse	*Bonasa umbellus*	X	X
Sharp-tailed grouse	*Tympanuchus phasianellus*	---	X
Wild turkey	*Meleagris gallopavo*	X	X
Cranes			
Sandhill crane	*Grus canadensis*	---	X
Whooping crane* (LE, SE)	*Grus americana*	---	---
Coots, Gallinules, and Rails			
Virginia rail	*Rallus limicola*	---	X
Sora	*Porzana carolina*	---	---
American coot	*Fulica americana*	---	---
Shorebirds, Gulls, and Terns			
Killdeer	*Charadrius vociferus*	---	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Shorebirds, Gulls, and Terns (Continued)			
American avocet	*Revurvirostra americana*	---	X
Greater yellowlegs	*Tringa melanoleuca*	---	---
Lesser yellowlegs	*Tringa flavipes*	---	---
Solitary sandpiper	*Tringa solitaria*	---	---
Willet	*Catotrophorus semipalmatus*	---	---
Spotted sandpiper	*Actitis macularia*	---	X
Upland sandpiper	*Bartramia longicauda*	---	---
Wilson's snipe	*Gallinago delicate*	---	---
Wilson's phalarope	*Phalaropus tricolor*	---	X
Pigeons and Doves			
Rock pigeon	*Columba livia*	X	X
Mourning dove	*Zeniada macroura*	X	X
Cuckoos			
Black-billed cuckoo	*Coccyzus erythropthalmus*	---	---
Yellow-billed cuckoo*	*Coccyzus americanus*	---	---
Owls			
Eastern screech owl	*Otus asio*	---	X
Flammulated owl*	*Otus flammeolus*	---	---
Long-eared owl*	*Asio otus*	---	---
Great horned owl	*Bubo virginianus*	X	X
Northern saw-whet owl*	*Aegolius acadicus*	X	---
Goatsuckers			
Common nighthawk	*Chordeilus minor)*	---	---
Common poorwill*	*Phalaenoptilus nuttallii*	---	X
Swifts			
White-throated swift	*Aeronautes saxatalis*	---	X
Hummingbirds			
Calliope hummingbird	*Stellula calliope*	---	---
Broad-tailed hummingbird	*Selasphorus platycercus*	---	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Hummingbirds (Continued)			
Rufous hummingbird	*Selasphorus rufus*	---	---
Kingfishers			
Belted kingfisher	*Ceryle alcyon*	---	X
Woodpeckers			
Lewis' woodpecker*	*Melanerpes lewis*	---	---
Red-headed woodpecker	*Melanerpes erythrocephalus*	---	X
Red-naped sapsucker	*Sphyrapicus nuchalis*	X	X
Yellow-bellied sapsucker	*Sphyripicus varius*	---	X
Hairy woodpecker	*Picoides villosus*	X	X
Downy woodpecker	*Picoides pubescens*	X	X
American three-toed woodpecker*	*Picoides tridactylus*	X	X
Black-backed woodpecker*	*Picoides arcticus*	---	X
Northern flicker	*Colaptes auratus*	X	X
Flycatchers			
Olive-sided flycatcher*	*Contopus cooperi*	---	X
Western wood pewee	*Contopus sordidulus*	X	X
Least flycatcher	*Empidonax minimus*	---	X
Hammond's flycatcher	*Empidonax hammondii*	---	X
Dusky flycatcher	*Empidonax oberholseri*	---	X
Cordilleran flycatcher	*Empidonax occidentalis*	---	X
Eastern phoebe	*Sayornis phoebe*	---	---
Say's phoebe	*Sayornis saya*	---	---
Western kingbird	*Tyrannus verticalis*	---	X
Eastern kingbird	*Tyrannus tyrannus*	---	---
Larks			
Horned lark	*Eremophila alpestris*	---	X
Swallows			
Tree swallow	*Tachycineta bicolor*	---	X
Violet-green swallow	*Tachycineta thalassina*	---	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Swallows (Continued)			
Cliff swallow	*Hirundo pyrrhonota*	---	X
Barn swallow	*Hirundo rustica*	---	X
Jays, Magpies, and Crows			
Gray jay	*Perisoreus canadensis*	X	X
Blue jay	*Cyanocitta cristata*	X	X
Pinyon jay	*Gymnorhinu cyanocephalus*	X	---
Clark's nutcracker*	*Nucifraga columbiana*	---	---
Black-billed magpie	*Pica hudsonicus*	X	---
American crow	*Corvus brachyrhynchos*	X	X
Chickadees			
Black-capped chickadee	*Parus atricapillus*	X	X
Nuthatches			
Red-breasted nuthatch	*Sitta canadensis*	X	X
White-breasted nuthatch	*Sitta carolinensis*	X	X
Pygmy nuthatch*	*Sitta pygmaea*	---	---
Creepers			
Brown creeper*	*Certhia americana*	X	X
Wrens			
Rock wren	*Salpinctes obsoletus*	---	X
Canyon wren	*Catherpes mexicanus*	---	X
House wren	*Troglodytes aedon*	X	X
Dippers			
American dipper	*Cinclus mexicanus*	---	X
Gnatcatchers and Kinglets			
Golden-crowned kinglet	*Regulus satrapa*	X	X
Ruby-crowned kinglet	*Regulus calendula*	X	X
Thrushes			
Eastern bluebird	*Sialia sialia*	---	X
Mountain bluebird	*Sialia currucoides*	X	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Thrushes (Continued)			
Townsend's solitaire	*Myadestes townsendi*	X	X
Veery*	*Catharus fuscescens*	---	X
Swainson's thrush	*Catharus ustulatus*	X	X
American robin	*Turdus migratorius*	X	X
Mockingbirds and Thrashers			
Gray catbird	*Dumetella carolinensis*	---	---
Brown thrasher	*Toxostoma rufum*	---	---
Wagtails and Pipits			
American pipit	*Anthus rubescens*	---	X
Waxwings			
Bohemian waxwing	*Bombycilla garrulous*	---	X
Cedar waxwing	*Bombycilla cedrorum*	---	X
Shrikes			
Northern shrike	*Lanius excubitor*	X	X
Loggerhead shrike*	*Lanius ludovicianus*	---	X
Starlings			
European starling	*Sturnus vulgarus*	---	---
Vireos			
Plumbeous vireo	*Vireo plumbeus*	---	X
Bell's vireo	*Vireo bellii*	---	X
Warbling vireo	*Vireo gilvus*	X	X
Red-eyed vireo	*Vireo olivaceus*	---	X
Warblers			
Tennessee warbler	*Oreothlypis peregrine*	---	X
Orange-crowned warbler	*Oreothlypis celata*	X	---
Blackburnian warbler	*Dendroica fusca*	X	X
Yellow warbler	*Dendroica petechia*	X	X
Yellow-rumped warbler	*Dendroica coronata*	X	X

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Warblers (Continued)			
Townsend's warbler	*Dendroica townsendi*	---	X
Blackpoll warbler	*Dendroica striata*	---	X
Black-and-white warbler	*Mniotilta varia*	---	---
American redstart	*Setophaga ruticilla*	---	X
Ovenbird	*Seiurus aurocapillus*	X	X
MacGillivray's warbler	*Oporornis tolmiei*	X	X
Common yellowthroat	*Geothlypis trichas*	---	X
Wilson's warbler	*Wilsonia pusilla*	---	---
Yellow-breasted chat	*Icteria virens*	---	X
Tanagers			
Western tanager	*Piranga ludoviciana*	X	X
Grosbeaks and Buntings			
Rose-breasted grosbeak	*Pheucticus ludovicianus*	---	---
Black-headed grosbeak	*Pheucticus melanocephalus*	---	X
Blue grosbeak	*Guiraca caerulea*	---	---
Lazuli bunting	*Passerina amoena*	---	---
Indigo bunting	*Passerina cyanea*	---	---
Dickcissel	*Spiza americana*	---	---
Towhees, Sparrows, Juncos, and Longspurs			
Spotted towhee	*Pipilo maculatus*	X	X
American tree sparrow	*Spizella arborea*	---	---
Chipping sparrow	*Spizella passerine*	X	X
Clay-colored sparrow	*Spizella pallid*	---	---
Field sparrow	*Spizella pusilla*	---	---
Vesper sparrow	*Pooecetes gramineus*	---	X
Lark sparrow	*Chondestes grammacus*	---	X
Lark bunting	*Calamospiza melanocorys*	---	X
Song sparrow	*Melospiza melodia*	X	X
White-throated sparrow	*Zonotrichia albicollis*	---	---

POTENTIAL† AND DOCUMENTED AVIAN SPECIES LIST (CONTINUED)

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Towhees, Sparrows, Juncos, and Longspurs (Continued)			
White-crowned sparrow	*Zonotrichia leucophrys*	---	---
Harris' sparrow	*Zonotrichia querula*	---	X
Dark-eyed junco	*Junco hyemalis*	X	X
Chestnut-collared longspur*	*Calcarius ornatus*	---	X
Snow bunting	*Plectrophenax nivalis*	---	X
Blackbirds, Meadowlarks, and Orioles			
Red-winged blackbird	*Agelaius phoeniceus*	---	X
Western meadowlark	*Sturnella neglecta*	---	X
Brewer's blackbird	*Euphagus cyanocephalus*	---	X
Common grackle	*Quiscalus quiscula*	---	X
Brown-headed cowbird	*Molothrus ater*	X	X
Orchard oriole	*Icterus spurius*	---	---
Bullock’s oriole	*Icterus bullockii*	X	X
Finches			
Gray-crowned rosy-finch	*Leucosticte tephrocotis*	---	X
Pine grosbeak	*Pinicola enucleator*	---	X
Purple finch	*Carpodacus purpureus*	---	---
Cassin's finch*	*Carpodacus cassinii*	X	X
Red crossbill	*Loxia curvirostra)*	X	X
White-winged crossbill	*Loxia leucoptera*	---	---
Common redpoll	*Acanthis flammea*	---	X
Pine siskin	*Spinus pinus*	X	X
American goldfinch	*Spinus tristis*	X	X
Evening grosbeak	*Coccothraustes vespertinus*	---	X
Weaver Finches			
House sparrow	*Passer domesticus*	---	---

POTENTIAL† AND DOCUMENTED REPTILE AND AMPHIBIAN SPECIES LIST

Common name	Scientific Name	Recorded within the WGRE Survey Area	Recorded in vicinity ††
Salamanders			
Tiger salamander	*Ambystoma tigrinum*	---	---
Frogs and Toads			
Northern leopard frog	*Rana pipiens*	---	X
Boreal chorus frog	*Pseudacris triseriata*	X	X
Lizards			
Short-horned lizard*	*Phrynosoma hernandesi*	---	---
Snakes			
Eastern yellowbelly racer	*Coluber constrictor*	---	---
Smooth green snake*	*Liochlorophis vernalis*	X	X
Black hills redbelly snake*	*Storeria occipitomaculata pahasapae*	---	---
Pale milk snake	*Lampropeltis triangulum multistriata*	---	---
Bullsnake	*Pituophis melanoleucas sayi*	---	---
Western terrestrial (wandering) garter snake	*Thamnophis elegans*	---	X
Common garter snake	*Thamnophis sirtalis*	---	---

† POTENTIAL OCCURRENCE--list derived from range and habitat information in Sharps and Benzon (1984), SDOU (1991), and Peterson (1990). The species listed include those which might pass through the study area, or vicinity, during migration.

†† RECORDED IN VICINITY--based on observations from the following studies in the Wharf area: Golden Reward baseline or monitoring, Wharf baseline or monitoring, Ragged Top Project baseline, Minerva Project baseline, and Clinton baselines or monitoring.

* Species is included on either the South Dakota Natural Heritage Program or U.S. Forest Service sensitive species lists; LT = federally-listed, threatened; LE = federally-listed, endangered; ST = state-listed, threatened; SE=state-listed, endangered.

ATTACHMENT II

WHARF AND GOLDEN REWARD EXPANSION (WGRE)
WILDLIFE BASELINE REPORT:
BAT SURVEY REPORT

Report of Bat Surveys - Wharf Mine Property Lawrence County, SD

Prepared for:
ICF International
Gillette, WY

Funded by:
SD Department of Game, Fish and Parks
Bats and Abandoned Mines Project
Pierre, SD

August 2010

Prepared by:
Joel Tigner
Batworks, LLC
Rapid City, SD

Combined acoustic/observational surveys were conducted at four openings of underground workings to determine the level of bat activity/use associated with the sites. Survey dates were July 7th, 10th, and 11th. Locations of survey sites are on record with ICF International.

Survey Methodology

Surveys were conducted utilizing full spectrum and heterodyne bat echolocation detectors. Heterodyne detectors (BatBox IIID, Stag Electronics, UK) provide real-time bat activity during the course of the survey and full spectrum detectors' (Pettersson 240X, Pettersson Elektronik, Sweden; SM2, Wildlife Acoustics, MA) calls are recorded for later analysis. Analysis of calls was conducted utilizing SonoBat Bat Echolocation Analysis software (CA). Four Pettersson 240X detectors were deployed during the surveys with detected calls downloading to iRivers MP3 recorders. (Call conversion from MP3 to WAV, required for analysis, was done using Acoustica Conversion software.) The SM2 detector was operated in stereo mode with two discreet ultrasonic microphones operating on left and right channels, effectively doubling coverage. One microphone was mounted on a telescoping pole approximately 10 meters above the detector, with the second microphone mounted directly to the SM2 detector unit.

Surveys were conducted from 30 minutes prior to sunset until sixty consecutive minutes of no monitored bat activity occurring after 2200. Temperature, wind speed, and relative humidity, were recorded (Kestrel 4500 Weather Meter).

Survey Results

Bat activity level was low during the course of all three survey nights. A combined total of 30 calls were recorded (11 calls, 9 calls, 10 calls respectively). Weather conditions were conducive to bat activity during all three surveys.

Of identified species that utilize underground roosting habitat, the most common species identified was *Myotis ciliolabrum* (western small-footed myotis) (n=13 total calls). These calls were not clustered together but dispersed throughout the course of the surveys. No evidence of collective roosting was observed at any of the sites. The absence of any evidence of collective roosting (observed or recorded) likely excludes these sites from those used as maternity/nursery roosts.

Other species identified during the course of the surveys include:

Myotis septentrionalis (northern myotis) (n=2 calls)

Eptesicus fuscus (big brown) (n= 2 calls)

Lasionycteris noctivagans (silver-haired) (n=2 calls) (Species not associated w/ underground roosting)

Eptfus/Lasnoc (n= 7 calls) similar call characteristics - unable to reliably distinguish for identification

Lasiurus cinereus (hoary bat) – (n=4 calls) (Species not associated w/ underground roosting)

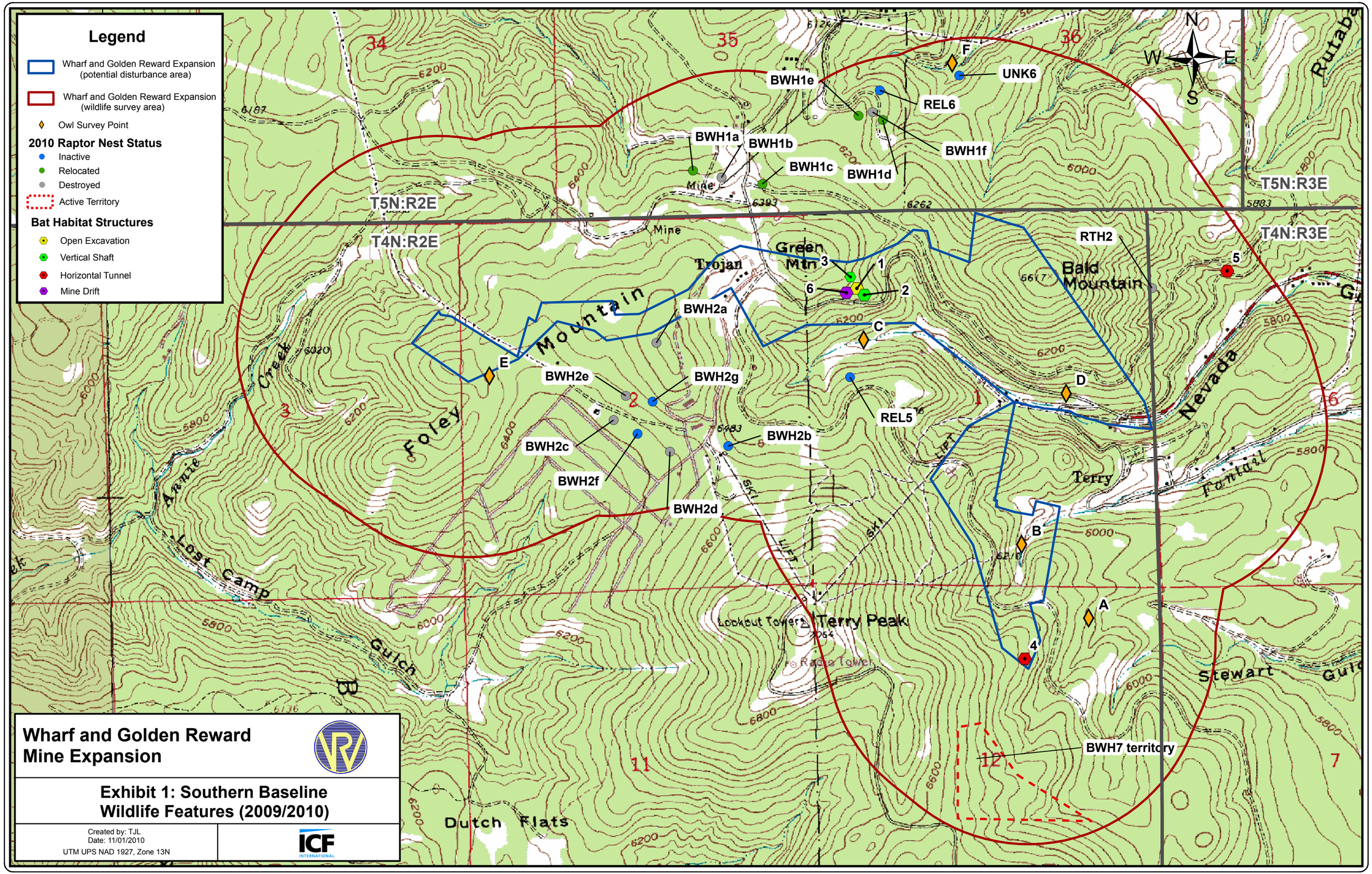
A sixth species, *Corynorhinus townsendii* (Townsend's big-eared bat), was also identified visually, observed exhibiting light-sampling flight behavior with ears clearly visible but no echolocation calls were recorded. (Ear length easily distinguishes this species from all other bat species in the Black Hills).

Recommendations

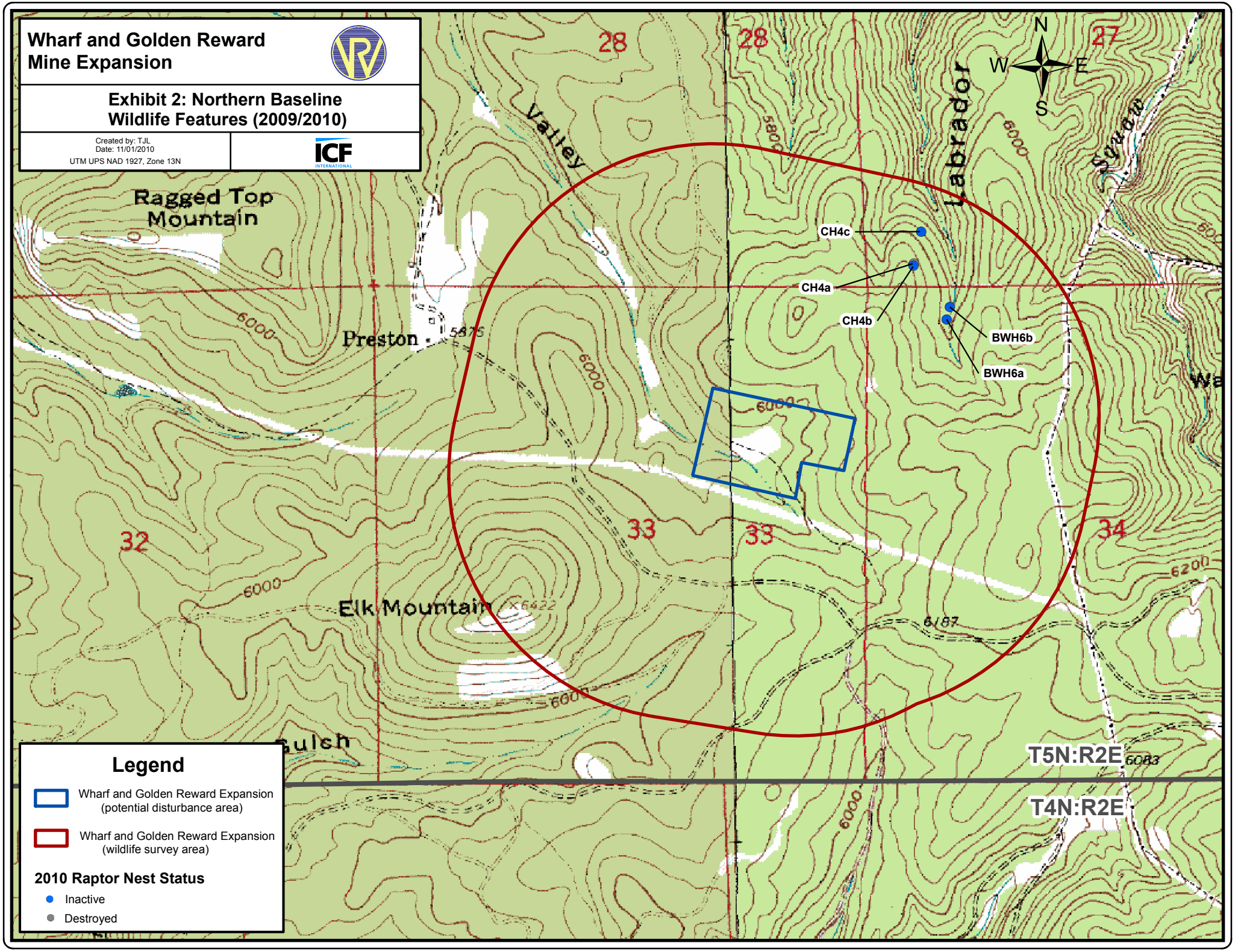
As noted, no evidence of collective roosting was monitored at any of the sites based upon both observation and recording of echolocation calls. However, as the possibility of such sites as transitional roost sites cannot be eliminated and underground winter entry surveys are not planned, any closure or excavation affecting these locations should be conducted during the bats' active season and preceded by implementing advance temporary closures (Tarps can be used for this purpose). Proper tarp placement and closure of these sites should prevent bats from *flying* into the underground portion of the mine. Escape of any bats closed in through this method of temporary closure can be achieved by crawling out from around the edges of the tarp. There should be no openings large enough to permit a flying bat to enter or exit the mine. This temporary closure should be done at least 4-5 nights (during good weather) before permanent closure or excavation of these locations.

Other known and protected underground roost sites of those species identified during the course of these surveys exist within the flight range of these bats. As such, it is unlikely any of these locations provide significant roosting habitat for area bats. Implementing the closure recommendations outlined above should prevent any inadvertent or incidental loss of bats.

Most calls were recorded well after sunset indicating usage of these sites to be related to night-roosting activity. Only two *Corynorhinus townsendii* were confirmed to have used one of the sites as a day-roost. As such, no evidence of any of these locations serving as critical or significant habitat was collected.


Legend
Wharf and Golden Reward Expansion (potential disturbance area)
Wharf and Golden Reward Expansion (wildlife survey area)
Owl Survey Point
2010 Raptor Nest Status
Inactive
Relocated
Destroyed
Active Territory
Bat Habitat Structures
Open Excavation
Vertical Shaft
Horizontal Tunnel
Mine Drift
N
S
E
W
T5N:R2E
T4N:R2E
T5N:R3E
T4N:R3E
BWH1a
BWH1b
BWH1c
BWH1d
BWH1e
BWH1f
BWH2a
BWH2b
BWH2c
BWH2d
BWH2e
BWH2f
BWH2g
BWH7 territory
RTH2
REL5
REL6
UNK6
A
B
C
D
E
F
1
2
3
4
5
6
Green Mtn
Trojan
Bald Mountain
Foley Mountain
Lost Camp Gulch
Terry Peak
Lookout Tower
Radio Tower
Terry
Stewart
Dutch Flats
Nevada
Fontail
Rutabaga
Mine
Wharf and Golden Reward Mine Expansion
Exhibit 1: Southern Baseline Wildlife Features (2009/2010)
Created by: TJL
Date: 11/01/2010
UTM UPS NAD 1927, Zone 13N
ICF INTERNATIONAL

Wharf and Golden Reward Mine Expansion

Exhibit 2: Northern Baseline Wildlife Features (2009/2010)

Created by: TJL
Date: 11/01/2010
UTM UPS NAD 1927, Zone 13N