

Supplement B to
ENVIRONMENTAL BASELINE REPORT 304 K

**FISH AND WILDLIFE RESOURCES MONITORING, 2012-2013
AND THREE-YEAR SUMMARY,
OTTER CREEK MINE
POWDER RIVER COUNTY, MONTANA**

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1.0 INTRODUCTION

1.1 PURPOSE AND TIME FRAME

Otter Creek Coal, LLC (OCC) plans to develop the Otter Creek Mine, a surface coal mine located approximately six miles southeast of Ashland in Powder River County, Montana. The potential mine comprises three tracts (Figure 1); Tract 2 would be developed first.

In 2010 OCC initiated baseline inventories of natural resources in the mine area. Field data collection for the fish and wildlife resources baseline study began with a site reconnaissance in August 2010 and ended in late July 2011. For the purposes of this study, seasons were defined as autumn (September 16 – December 15), winter (December 16 – March 15), spring (March 16 – June 15) and summer (June 16 – September 15). In autumn 2012 OCC submitted the results of the fish and wildlife baseline inventory (Farmer 2012) as part of its mine operating permit application to the Montana Department of Environmental Quality (MDEQ), in accordance with 82-4-222(2)(n) MCA and ARM 17.24.304(1)(j).

As reported by Farmer (2012), the winter and spring of 2010-2011 were atypical, characterized by prolonged, deep snow cover in winter and unusually high precipitation in spring and early summer. There were only three points of access to Tract 2, and two of these points were fords across Otter Creek that were impassable for most of the winter and spring. The landowner of the third access point requested that no field work be conducted on his property until mid-May to avoid conflicts with cattle calving. Consequently field work in the baseline year was skewed towards late spring-summer (Farmer 2012). Therefore OCC continued to monitor fish and wildlife resources in the mine area in 2011-2012, with emphasis on spring 2012 to address the field work limitations of spring 2011 (Farmer 2013).

Monitoring continued for a third year, from autumn 2012 through spring 2013. As in the two previous years, field work emphasized big game distribution and habitat use in autumn and winter, and upland game bird and raptor occurrence and habitat use in spring. This report covers the third year of field work, and compares and summarizes results from all three years (i.e., 2010-2011, 2011-2012 and 2012-2013).

Dates of field work are shown in Table 1. Observations of aquatics, fish and wildlife resources were recorded on 28 calendar days by various personnel, representing approximately 44 person-days of field effort. Of the 20 calendar days by WESTECH personnel, 8 (40 percent) were allocated in spring (primarily for grouse lek and raptor nest searches, and landbird surveys), and 6 (30 percent) each in autumn and winter (primarily for big game distribution and population characteristics). There was no WESTECH field work in summer 2013. Therefore, as intended, 70 percent of WESTECH's field work in 2012-2013 was expended in winter and spring, and 30 percent was expended in summer and autumn.

1.2 OBJECTIVES

The primary objective of the Otter Creek Mine fish and wildlife resources baseline inventory was "...to provide an understanding of the species existing on and adjacent to the proposed permit area" (MDEQ 2001; Farmer 2012). Specific survey objectives were:

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

As in 2011-12 (Farmer 2013), the 2012-2013 monitoring effort was intended to supplement these objectives, while emphasizing field effort in winter to monitor big game distribution and habitat use, and in spring to survey for grouse leks (display sites) and raptor nests in the Tract 2 vicinity.

1.3 ACKNOWLEDGEMENTS

Many people contributed to the Otter Creek Mine fish and wildlife resources monitoring effort, including but not limited to:

Landowners and lessees of the Primary Study Area shared their knowledge of fish and wildlife resources of the area. Their input is greatly appreciated.

Several agency personnel contributed their knowledge and/or guidance to the study. For MDEQ: Chris Yde, Section Supervisor for the Coal and Uranium Section; for Montana Fish, Wildlife and Parks (FWP): Dean Waltee, area wildlife biologist in Broadus, and Adam Messer, GIS/data resource analyst in Helena; for the U.S. Forest Service (USFS): Don Sasse, wildlife biologist with the Ashland Ranger District.

In alphabetical order:

Pauline Atkinson of Schwend Aviation, Forsyth, Montana piloted all aerial surveys. Her prior knowledge of the aerial survey area, and skillful flying through sometimes tricky wind conditions in the King Mountain area, resulted in safe, thorough aerial surveys.

Heidi Kaiser managed Hydrometrics, Inc.'s participation in the project, including WESTECH's subcontract, contacted landowners and coordinated technical support for the study.

Dave Simpson of Simpson and Associates, LLC coordinated preparation of the permit application with Ms. Kaiser, and shared his insights regarding wildlife in the Otter Creek area.

Dave Stagliano (M.S., Aquatic Ecology) of the Montana Natural Heritage Program (MTNHP) designed the aquatics assessment, conducted field work and prepared the report.

For WESTECH: Dan Culwell prepared all figures used in this report. Patrick Farmer (B.S., Fish and Wildlife Management (wildlife option); M.S., Zoology (fisheries option)) conducted all field work, analyzed data, and wrote the report.

2.0 DESCRIPTION OF THE STUDY AREA

OCC has identified three tracts that could eventually be developed for the Otter Creek Mine (i.e., the potential life-of-mine area), but only Tract 2 is under consideration at present. Therefore, for purposes of the baseline study and the first two years of monitoring, the Primary Study Area was Tract 2 (approximately 12 mi²) plus a one-mile buffer (Figure 1), which encompassed the proposed mine facilities area. Where access was available, the Primary Study Area was surveyed by vehicle routes, pedestrian routes and landbird plots.

The Secondary Study Area (Figure 1) comprised Tracts 1 (approximately 8 mi²) and 3 (about 9 mi²). No access was available to these tracts during the baseline study (Farmer 2012) but access to parts of both tracts was obtained late in the 2011-2012 monitoring year (Farmer 2013). In 2012-2013 the accessible portions of these tracts were added to the grouse lek survey area.

The Aerial Survey Area was defined by a two-mile buffer around all three tracts, as shown in Figure 1; the area covered by aerial surveys was approximately 106 mi².

Geology, topography (including availability of slope and aspect), vegetation and land use were discussed in Farmer (2012). In summer 2012 (i.e., late in the 2011-2012 monitoring year) a wildfire burned a portion of the aerial survey area north of Tract 1 (Farmer 2013). Wildlife habitats in this burned area will be remapped after adequate imagery is available.

Both climate (long-term weather patterns) and short-term weather can dramatically affect wildlife (e.g., Frisina and Frisina 2008). The study area climate is continental, having cold winters and warm summers (USFS 1971; cited in Scow 2012); precipitation averages 14.9 inches per year (Scow 2012).

Temperature data collected at the Sonnette 2WNW station (about 15 miles east of Tract 2; NOAA 2014) from the 2012-2013 monitoring year are compared to the 2010-2011 baseline study (Farmer 2012) and 2011-2012 monitoring year (Farmer 2013) in Figure 2. In general, average and maximum high temperatures were higher in 2011-2012 and 2012-2013 than in 2010-2011. In contrast, average and minimum low temperatures were lower in 2010-2011 than in 2011-2012 and 2012-2013, particularly in winter-early spring (January-April).

Precipitation data (NOAA 2014) from the 2012-2013 monitoring year are compared to the 2010-2011 baseline year and 2011-2012 monitoring year in Figure 3. Farmer (2012) reported that winter 2010-2011 and spring 2011 were atypical due to snow accumulations and considerable spring rainfall. Snow fell in late November 2010 and was always present, often in deep drifts that impeded deer and pronghorn movements, through much of the study area until mid-March 2011. In contrast, precipitation from winter 2011-2012 and spring 2012 was generally at or below the long-term average, with comparatively little snow accumulation. Precipitation in 2012-2013 was generally at or below the long-term average in summer and autumn 2012, and near average in winter 2012-2013. Precipitation in

May-June 2013 was above average; Stagliano (2014) reported a similar spike in the hydrograph for Otter Creek, in response to spring precipitation.

2.1 THREE-YEAR SUMMARY

The 2010-2011 baseline year was cold and very wet, with persistent, comparatively deep snow cover in winter. The 2011-2012 monitoring year was warm and very dry (Farmer 2013), and the 2012-2013 monitoring year was characterized by a comparatively warm, dry winter but a cool, wet spring.

The severe 2010-2011 winter restricted big game distribution and may have affected some species, such as the wild turkey and ring-necked pheasant, in spring (Farmer 2012). Big game distribution and habitat use did not appear to be substantially affected during the “open” 2011-2012 and 2012-2013 winters.

The colder temperatures and unusual amount of precipitation in spring 2011 was reflected as a delayed spring in terms of herbaceous vegetation growth (Farmer 2012), while spring 2012 was normal to early, in terms of herbaceous vegetation growth (Farmer 2013). Residual herbaceous vegetation from 2011 may have benefitted some wildlife species in spring 2012 (Farmer 2013).

The fuel produced in 2011 exacerbated the wildland fire conditions experienced in autumn 2011 (when there was a comparatively small, cool fire in the Coal Creek drainage in the Aerial Survey Area east of Tract 2) and in summer 2012, when there were large habitat-altering fires north, east and south of the study area. These fires directly affected comparatively small portions of the Otter Creek Mine Aerial Survey Area but substantially modified ponderosa pine and sagebrush habitats in the surrounding landscape. Farmer (2012) reported that wildland fires from the early 2000s may have altered some species' (e.g., mule deer) use of portions of the Aerial Survey Area, when compared to reported past use (Martin 1980). Thus it is possible that habitat changes resulting from the 2012 fires will indirectly affect some wildlife species' future use of the Otter Creek Aerial Survey Area.

3.0 METHODS

3.1 SPECIES LISTS

The list of fish and wildlife species potentially occurring in the Otter Creek Mine study area (Farmer 2012) was retained for the 2011-2012 (Farmer 2013) and 2012-2013 monitoring years. During field work all species documented by sightings or evidence were recorded by the habitat in which they were observed. These records were used to describe habitat use by species, and species richness by habitat.

3.2 AQUATIC ASSESSMENTS

As in the previous two years, MTNHP was contracted to conduct aquatic assessments in the Otter Creek Mine study area in 2013. Stagliano (2014) retained the sampling stations established for baseline and monitoring sampling (Stagliano 2012, 2013): four sampling stations on Otter Creek (one “control” station upstream of Tract 2, two “impact” stations adjacent to Tract 2, and one “downstream” station below the Otter Creek Mine area), and one station each on Home Creek, Threemile Creek and Tenmile Creek (Figure 4). Habitat at each station was evaluated to characterize stream reach geomorphology, riparian and in-stream habitat, and characteristics that influence aquatic community integrity. Sites with higher ranks under these protocols were considered to have higher quality local-scale habitat.

Macroinvertebrate communities were sampled qualitatively using the EMAP Reach-Wide protocol (Lazorchak et al. 1998, cited in Stagliano 2014). Samples were sorted and identified in the office, and biological metrics were calculated from the resulting data for each sample using MDEQ’s multimetric macroinvertebrate (MMI) protocols. These metrics measure attributes of benthic macroinvertebrate communities that are sensitive to condition changes in the stream. The results were then scored; the score represented the condition of the macroinvertebrate community at the time the sample was collected, and each sample was categorized as either nonimpaired or impaired, based on its score (Stagliano 2014).

Fish were sampled by seining and/or baited minnow traps at each station (Stagliano 2014). Captured fish were identified, counted, and total length was measured before release. Fish communities were analyzed using Integrated Biotic Indices (IBI) for wadeable prairie streams (Bramblett et al. 2005, cited in Stagliano 2014) and Observed/Expected Fish Models (Stagliano 2011, cited in Stagliano 2014) to detect biological integrity impairment at each site. The resulting scores were used to rank the biological integrity at each site as poor (severely degraded), poor to fair, fair to good, and good to excellent (Stagliano 2014).

In addition to habitat, macroinvertebrates and fisheries, Stagliano (2014) identified herpetofauna (amphibians and reptiles) observed at each site. Results were presented in a report which is included as Appendix C.

3.3 TERRESTRIAL INVERTEBRATES

Farmer (2012) reported that for the purposes of the baseline study, the only terrestrial invertebrates inventoried in the field were those considered to be Species of Concern by MTNHP and FWP (2013). The only completely terrestrial invertebrate Species of Concern potentially found in the Otter Creek Mine study area was the gray comma, a butterfly. Farmer (2012) determined that habitat quality for the gray comma in Tract 2 was limited, and did not observe this species. Therefore no further searches for the gray comma were conducted in 2011-2012 (Farmer 2013).

Although still a Species of Concern, the gray comma is no longer included on the Species of Concern lists for Powder River and Rosebud Counties (MTNHP and FWP 2014). Therefore no further searches for the gray comma were conducted in 2012-2013.

3.4 BIG GAME

For the purposes of this study, big game animals were considered to be those species defined as “game animals” by FWP (87-2-101(6) MCA): pronghorn, mule deer, white-tailed deer, elk, mountain lion and black bear.

Observations of big game were recorded during aerial surveys (Figure 1). These flights provided information on distribution, habitat use and minimum numbers of animals. All surveys were flown in a Piper SuperCub. Altitude was usually 150-300 feet above the ground, but varied depending on topography, presence of livestock or buildings, etc. Aircraft speed was as slow as safely practicable. As in the baseline study (Farmer 2012) and first year of monitoring (Farmer 2013), most aerial surveys were flown on a grid of north-south flight lines, beginning in the northeast corner of the aerial survey area. Flight lines over gentle to rolling open habitats, where animals could be observed at greater distances, were spaced about 0.5 mile apart, while flight lines over forested or rugged habitats were about 0.25 mile apart. All major species (big game, raptors, grouse, coyotes, etc.) observed during the flight were mapped on 1" = 2000' aerial photographs, and were recorded by species, time, habitat, activity, group size, age and sex composition, if applicable.

There were three flights, each lasting about 2.5 hours, in autumn 2012. All surveys were used to identify big game occurrence, distribution, habitat use and minimum numbers. Flights began along the east border of the aerial survey area. Strict flight lines (transects) were not used during these surveys; rather, the flight path followed ridges and drainages, circled hills, etc., in an effort to observe as many animals as possible.

The first survey, on the morning of October 10, was before the opening of general big game hunting seasons; there was no snow cover. Age and gender of big game animals were classified during this flight.

The second and third flights (one in the morning, the other in late afternoon), on December 20, were after the close of all big game hunting seasons. There was 100 percent snow cover during these flights, except on the steepest, unforested slopes of King Mountain. Two surveys were flown in a single day because: 1) depending on air temperature, wind, etc., big game might be more active later in the day (Biggins 1982); and 2) for the purposes of estimating the minimum known number of animals in the area, it was assumed that mule deer, white-tailed deer and elk would not move more than one mile between the two flights. Therefore any sightings from the afternoon flight that were within one mile of a sighting mapped during the morning flight were recorded and mapped for purposes of distribution and habitat use, but were discarded for use in estimating minimum numbers of animals in the area. For pronghorn, this distance was increased to three miles. Although these distances were considered sufficient for most animals during winter, they were not absolute limits; therefore, any animals/groups that appeared to be the same (e.g., recognizable individuals, groups of identical size and composition) from one flight to the next were discarded even if they were beyond the separation distance.

There were four flights in winter. Two surveys each were flown on January 17 and March 15, 2013. One flight began at dawn and the other began in mid-afternoon in order to be completed by sunset.

On January 17, there was 50 percent snow cover in forested areas in the east side of the aerial survey area, none on the west (King Mountain) side, and 25 percent patchy snow on north slopes and drainages in between. There was almost no snow cover on March 15. These conditions were in sharp contrast to those of the baseline winter (2010-2011), when there was usually 100 percent snow cover on winter flights (Farmer 2012), but similar to conditions encountered during the winter 2011-2012 flights (Farmer 2013)

In addition to aerial surveys, observations of big game or their evidence were recorded during vehicle and pedestrian routes, and through opportunistic observations during other aspects of the study. Vehicle routes included driving public, all-season roads (Highway 212, Otter Creek and Tenmile Creek roads) throughout the year, and two-track trails in accessible portions of all three tracts during all seasons. Pedestrian surveys were confined to private lands in Tract 2 and lands managed by the USFS, Bureau of Land Management (BLM) or State of Montana in or adjacent to Tract 2. Observations were recorded by species, date, time of day, habitat, number of animals, age and gender (if possible), and activity, and were mapped on 1" = 2000' base maps.

3.5 UPLAND GAME

For the purposes of this study, upland game animals were considered to be those species defined as "upland game birds" by FWP (87-2-101(13) MCA): ring-necked pheasant, gray partridge, wild turkey, greater sage-grouse and sharp-tailed grouse. Throughout the year, observations of upland game birds were recorded by species, date, time of day, habitat, number of animals, age and gender (if possible), and activity, and were mapped on 1" = 2000' base maps.

A 16-station ring-necked pheasant crow count route was established along the Otter Creek and Tenmile Creek roads (Figure 5). Stations were located approximately one mile apart at locations within 0.5 mile of riparian habitat along East Fork Otter Creek, Otter Creek and Tenmile Creek. These routes/stations were also used to locate calling male turkeys and grouse leks in spring, and for owl surveys in winter and spring. For upland game, surveys began 0.5 hour before sunrise and ended 2.0 hours after sunrise on days with no precipitation and little wind from April 24 through June 7. At each station, the surveyor stopped the vehicle, turned the engine off, stepped out of the vehicle and listened for calling/displaying birds for five minutes. Ring-necked pheasant calls were recorded for the first two minutes, while turkeys and grouse were noted throughout the five minute stop. No specific survey methods were employed for gray partridge; rather, they were recorded whenever observed.

Grouse lek searches were also conducted in upland habitats in Tracts 1 and 2 by stopping the vehicle approximately every 0.5 mile along two-track trails and listening for displaying birds for 3-5 minutes.

3.6 RAPTORS

For the purposes of this study, raptors were considered to be members of the Accipitriformes (vultures, eagles and hawks), Falconiformes (falcons) and Strigiformes (owls). Throughout the year, raptor sightings were recorded by species, date, time of day, habitat, number of animals, age and gender (if possible), and activity, and were mapped on 1" = 2000' base maps.

Surveys for breeding owls were conducted along the ring-necked pheasant crow count route and portions of Tract 2 on January 17, March 15, and April 25 and 26. After several minutes of listening, recorded calls of species most likely to occur in the area in winter/early spring (eastern screech-owl, northern saw-whet owl, long-eared owl and great horned owl) were played in ascending order of bird size, to solicit responses. Locations of calling birds were triangulated, mapped and recorded in field notes.

Searches for nests of owls and diurnal raptors in accessible portions of the Primary and Secondary Study Areas were conducted in April-June by: 1) driving accessible roads and trails in the area, stopping at vantage points to look for nests and listen for calling adults; and 2) walking through appropriate habitats and looking for nests (stick nests, ground nests, tree cavities and rock ledges/cavities) or breeding/territorial behavior of adult birds. Nests were photographed, mapped and recorded in field notes.

3.7 WATERFOWL AND SHOREBIRDS

For the purposes of this study, waterfowl were defined as members of the order Anseriformes (geese, ducks and swans) while shorebirds were members of the orders Gaviiformes (loons), Podicipediformes (grebes), Pelecaniformes (pelicans and cormorants), Ciconiiformes (herons, bitterns, ibises, etc.), Gruiformes (cranes, rails, coots, etc.), Charadriiformes (plovers, snipe, sandpipers, avocets, phalaropes, gulls, terns, etc.) and Coraciiformes (kingfishers).

Aquatic habitats are limited throughout the Otter Creek Mine wildlife study area, and particularly in the Primary Study Area. The portion of Otter Creek in the Primary Study Area, as well as several ponds, was examined in March-June for use by waterfowl and shorebirds. Shorebirds that might occur in upland habitats (e.g., killdeer, upland sandpiper and long-billed curlew) were inventoried with landbird plots and opportunistic observations.

3.8 LANDBIRDS

For the purposes of this study, landbirds were defined as all species except upland game, raptors, waterfowl and shorebirds. Throughout the study, all landbirds were recorded by the habitat in which they were observed.

Farmer (2012, 2013) sampled a total of 21 landbird plots in Tract 2 over the first two years of study. In early June 2013 breeding landbirds were inventoried on two more circular plots placed in the potential mine facilities area (Figure 5) per the protocol contained in MDEQ (2001) guidelines to determine species richness and relative abundance in major habitat types. One change was made to the method. Instead of dividing the plot into two areas (0-50 m and >50 m), plots were divided into three areas (0-50 m, 50-100 m and >100 m). Plot radius was measured with a tape and pin flags. Notes were taken on canopy height, canopy cover, etc.

Plots were surveyed from about 0.5-hour after sunrise until mid-morning. Counts lasted 10 minutes. Birds were recorded by distance (0-50 m, 50-100 m, >100 m) and time (0-5 minutes, 5-6 minute, 6-7 minute, 7-8 minute, 8-9 minute and 9-10 minute). Each plot was run three times (once on three different mornings), with the three samples divided throughout the sampling period, i.e., a plot was run once early in the morning, once during the middle of the sampling period, and once late in the sampling period (mid-morning).

3.9 MEDIUM-SIZED MAMMALS

For the purposes of this study, medium-sized mammals were defined to be animals from the size of a black-tailed prairie dog to the size of a coyote, and included some species that have legal status as “non-game species in need of management” (prairie dog, on public lands only; ARM 12.2.501(1)(e)), furbearers (beaver, muskrat, American mink and bobcat; 87-2-101(3) MCA) or predators (coyote, weasel and striped skunk; 87-2-101(11) MCA). All medium-sized mammals observed by direct sightings or evidence during all aspects of the baseline inventory were recorded by the habitat in which they were observed. Sightings of medium-sized mammals that have legal status were recorded by species, date, time of day, habitat, number of animals, age and gender (if possible), and activity, and were mapped on 1" = 2000' base maps.

3.10 SMALL MAMMALS (EXCLUDING BATS)

For the purposes of this study, small mammals were defined as mammals up to the size of a ground squirrel (i.e., smaller than a black-tailed prairie dog). Throughout the monitoring year, small mammals or their evidence (e.g., tracks, skulls in raptor casts, burrows) were recorded by the habitat in which they were observed.

3.11 BATS

Fifteen species of bats potentially occur in Montana; of these, 12 have been recorded in Powder River and/or Rosebud Counties (MTNHP 2014). As discussed by Farmer (2012), Continental Divide Wildlife Consulting (2011) inventoried bats in Tract 2 in 2011, and documented eight species, while WESTECH's biologist observed a ninth species. Since 9 of 12 potential species were recorded in the area in 2011, no further bat sampling was conducted in 2012 (Farmer 2013). In 2013 MTNHP, in cooperation with MDEQ, establish a long-term bat acoustic monitoring station along Otter Creek near Tract 2. Consequently no further bat sampling was undertaken as part of the wildlife monitoring program.

3.12 AMPHIBIANS AND REPTILES

Throughout the 2012-2013 monitoring year all amphibians and reptiles were recorded by the habitat in which they were seen. Opportunistic searches were conducted at water sources for amphibians (listening for displaying adults, looking for adults, egg masses or larvae) and at rock outcrops for reptiles (looking for basking adults, turning over rocks). In addition, Stagliano (2014) recorded amphibians and reptiles during the 2013 aquatics assessments.

3.13 ENDANGERED OR THREATENED SPECIES

Most of the Otter Creek Mine wildlife study area is in Powder River County, although the western portion of the aerial survey area is in Rosebud County (Figure 1). The U.S. Fish and Wildlife Service (FWS; 2014) maintains county lists of species that are listed, proposed or candidates under the Endangered Species Act (ESA) of 1973, as amended. Three species are listed for Powder River County: black-footed ferret (Listed Endangered), greater sage-grouse (Candidate) and Sprague's pipit (Candidate). Six species are listed for Rosebud County: black-footed ferret, greater sage-grouse, Sprague's pipit, interior least tern (Listed Endangered), pallid sturgeon (Listed Endangered) and red knot (Proposed Threatened). The red knot was added to the list in 2013.

The red knot is a long-distance migrant shorebird whose primary migration route is well east of Montana; there are no records from Rosebud or Powder River Counties (MTNHP 2014). In the interior of North America, some red knots appear to use saline lakeshores during northward migration through the Prairie Provinces of Canada (Baker et al. 2013). Such habitat for migrating red knots is not available in the Otter Creek Mine fish and wildlife resources inventory area.

Farmer (2012) reported that potential habitat for only greater sage-grouse and Sprague's pipit is available in the Otter Creek Mine fish and wildlife resources inventory area. The Otter Creek Mine study area is on the border of currently occupied greater sage-grouse range, and there are no known active leks in Tract 2. Sprague's pipit habitat is very limited in Tract 2, and it is considered unlikely that this species would occur in the study area (Farmer 2012).

3.14 SPECIES OF CONCERN

Montana has established a list of vertebrate animal Species of Concern (MTNHP and MFWP 2014). This list changes irregularly, as species are added or deleted. The current list is given in [Table 2](#), as are USFS and BLM sensitive species, and USFS Management Indicator Species. All such species observed during the study were recorded by the habitat in which they were observed and, if appropriate, their locations were mapped.

4.0 RESULTS AND DISCUSSION

4.1 SPECIES LISTS

ARM 17.24.304(1)(j)(i) requires that the fish and wildlife narrative include "...a listing of all fish and wildlife species." One of the objectives of this study (Section 1.2), reflecting MDEQ's (2001) guidelines, was to "...determine fish and wildlife species present on and adjacent to the proposed permit area."

Fish and wildlife species occurring in the region encompassing the Otter Creek Mine, as reported in Farmer (2012) and revised according to MTNHP (2014), are listed in [Appendix A](#). A total of 377 species (22 fish, 6 amphibians, 13 reptiles, 61 mammals and 275 birds) potentially occur in this area, while the Otter Creek Mine study area contains preferred and/or breeding habitat for 284 species (16 fish, 6 amphibians, 13 reptiles, 58 mammals and 192 birds), or about 75 percent of the potential list.

Despite the reduced field effort, a total of 127 species (10 fish, 4 amphibians, 5 reptiles, 20 mammals and 88 birds) were recorded during the 2012-2013 monitoring year ([Appendix A](#)). In comparison, a total of 162 species (9 fish, 4 amphibians, 8 reptiles, 37 mammals and 104 birds) were recorded during the 2010-2011 baseline inventory (Farmer 2012; [Appendix A](#)), and a total of 122 species (10 fish, 4 amphibians, 8 reptiles, 14 mammals and 86 birds) were recorded during the 2011-2012 monitoring year (Farmer 2013; [Appendix A](#)).

Seven species (1 mammal and 6 birds) were added to the Otter Creek Mine species list in the 2012-2013 monitoring year ([Appendix B](#)). The mammal (white-tailed jackrabbit) would be expected to occur in the study area, but Farmer (2012) reported that jackrabbit numbers in the study area vicinity have been low for many years. One bird (northern shrike) was considered a migrant/winter resident, four birds (redhead, Swainson's hawk, willet and Wilson's phalarope) were considered migrants, and one bird (red-headed woodpecker) may have nested in the study area.

4.1.1 Three-Year Summary

Farmer (2012) reported that about 57 percent of the species with preferred and/or breeding habitat in the study area were recorded in the 2010-2011 baseline year. In comparison, about 43 percent of the species with preferred and/or breeding habitat in the study area were recorded in the 2011-2012 monitoring year (Farmer 2013), while about 45 percent of the species with preferred and/or breeding habitat in the study area were recorded in 2012-2013.

About 63 percent, 67 percent, 69 percent, 67 percent and 65 percent of fish, amphibians, reptiles, mammals and birds, respectively, expected to occur in the Otter Creek study area have been recorded in the last three years ([Appendix A](#); [Figure 6](#); [Figure 7](#); [Figure 8](#)). Long-term monitoring studies at other mines (e.g., WESTECH 2014) have recorded similar percentages for these species groups during the first few years of monitoring; percentages increase very gradually in subsequent years, unless sampling methods are changed.

4.2 FISH AND WILDLIFE HABITAT USE

Farmer (2012) identified six wildlife habitat types comprising 18 habitat subtypes in the study area. Fish and wildlife/habitat relationships in the Otter Creek Mine study area, with particular emphasis on Tract 2, were discussed extensively by Farmer (2012). There are differences in habitat availability between Tract 2 and the aerial survey area, as well as differences in habitat availability, slope and aspect on either side of Otter Creek that may influence wildlife seasonal occurrence and habitat use.

4.2.1 Three-Year Summary

The number of fish and wildlife species recorded by habitat subtype during the 2010-2011 baseline inventory (Farmer 2012), 2011-2012 (Farmer 2013) and 2012-2013 are compared in [Figure 9](#). Although there are sometimes pronounced differences in the number of species recorded in a single habitat, the trend in species richness by habitat subtype between years is similar.

It is recognized that fish and wildlife species would not be expected to be distributed and/or detected equally in all habitats (Farmer 2012). Nevertheless, a comparison of species richness (calculated by dividing the number of species recorded in a habitat by the total of 162 species recorded during 2010-2011 (Farmer 2012), 122 species in 2011-2012 (Farmer 2013) and 127 species in 2012-2013) and habitat availability (Farmer 2012) can be used as a general indicator of habitat “value.” [Figure 10](#) shows that rock outcrops (subtype 001), ponds/impoundments/streams (subtype 002), the riparian habitat complex (subtypes 110 and 413) and the conifer complex (subtypes 123, 124 and 130) contributed considerably more species than would be expected, based solely on availability.

4.3 AQUATIC ASSESSMENTS

Results of the 2013 aquatic assessments of the Otter Creek Mine study area (Stagliano 2014) are presented in [Appendix C](#). Stagliano (2014) documented 10 species of fish, four amphibians and five reptiles ([Appendix A](#)), as well as 78 aquatic macroinvertebrate taxa, and collected one macroinvertebrate Species of Concern (a mayfly (*Caenis youngi*)) and one vertebrate Potential Species of Concern (the brassy minnow). Stagliano (2014) concluded that:

“Otter Creek mainstem reaches within the area proposed for the future mine site (i.e. Impact Zone sites) continue to show higher impairment levels in biological integrity than the Control or Downstream reaches. Spatial and temporal patterns of aquatic community composition and biotic integrity were similar between the 2013 and 2012 surveys, with a notable increase in the percentage of non-native fish occurring across most sites... macroinvertebrates show no discernible pattern of integrity spatially, but temporally are reporting higher integrity scores during the spring samples.”

4.3.1 Three-Year Summary

Despite substantially different flow regimes over the three years of study, Stagliano (2012, 2013, 2014) noted that patterns of aquatic community species and biotic integrity were similar between years. Biotic integrity, as measured by fish parameters, of mainstem Otter Creek was consistently highest in the upstream control reach (station 22; [Figure 4](#)) and decreased downstream. Macroinvertebrates showed no discernible pattern of integrity spatially (i.e., from station to station), but highest integrity scores were recorded in either spring or summer, while lowest scores were recorded in autumn. The macroinvertebrate Species of Concern (a mayfly (*Caenis youngi*)) and vertebrate Potential Species of Concern (the brassy minnow) were collected in all three years.

4.4 BIG GAME

As discussed in Section 3.4, big game species in the Otter Creek Mine fish and wildlife resources inventory area were pronghorn, mule deer, white-tailed deer, elk, black bear and mountain lion. Only pronghorn, mule deer and elk were recorded in 2012-2013 ([Appendix A](#)).

4.4.1 Pronghorn

For the year there were 76 observations totaling 703 pronghorn in the Otter Creek Mine inventory area, compared to 64 sightings totaling 667 pronghorn in the 2010-2011 baseline year (Farmer 2012) and 62 observations totaling 661 pronghorn in 2011-2012 (Farmer 2013). Seasonal distribution of these sightings is shown in [Figure 11](#). Habitat use is presented in [Table 3](#).

4.4.1.1 Autumn

4.4.1.1.1 Distribution and Habitat Use

In autumn 2012 there were 15 observations totaling 128 pronghorn, compared to 12 observations totaling 157 pronghorn in autumn 2011 (Farmer 2013), and 15 observations totaling 189 pronghorn in autumn 2010 (Farmer 2012).

The distribution of sightings in autumn 2012 ([Figure 11](#)) was similar to that of autumn 2010 (Farmer 2012) and autumn 1979 (Martin 1980). In contrast, in autumn 2011 most sightings were east of Otter Creek (Farmer 2013). As discussed by Farmer (2013), the reason for the difference between autumn 2011 distribution compared to other years is not readily apparent; it did not appear to be weather/snow related, since most sightings in all four years were recorded before snowfall.

In autumn 2012, about 66 percent of all groups and 68 percent of all individuals were recorded in sagebrush and grassland habitats ([Table 3](#)). In contrast, in autumn 2011, 100 percent of all groups and all individuals were recorded in sagebrush and grassland habitats (Farmer 2013); in autumn 2010 about 93 percent of all groups and 99 percent of all individuals were recorded in sagebrush and grassland habitats (Farmer 2012); and about 97 percent of all pronghorn seen in autumn 1979 came from

sagebrush and grassland habitats (Martin 1980). Thus, autumn 2012 habitat use was more diverse than in the other years. The reason for this disparity is not readily apparent. It may be an artifact of comparatively small sample sizes; however, it is possible that autumn 2012 habitat use was influenced by the drought of summer 2012, i.e., pronghorn habitat use was more diverse in response to forage scarcity.

4.4.1.1.2 Population Characteristics

As discussed by Farmer (2012), population characteristics (size and density, age and sex ratios, etc.) are dynamic and may fluctuate considerably from year to year, depending on influences such as climate (precipitation, winter severity), predation (human and animal), land use and habitat changes.

In October 2012 there was a minimum of 128 pronghorn in the Otter Creek Mine aerial survey area (Table 4). In comparison, in October 2011 there was a minimum of 121 pronghorn in the aerial survey area (Farmer 2013) and in October 2010, Farmer (2012) counted 90 pronghorn in the aerial survey area.

The Otter Creek wildlife study area is in FWP's Hunting District (H.D.) 704. FWP (2014a) estimated there were approximately 1600 pronghorn in H.D. 704 in 2011, and FWP (2011a) reported that pronghorn numbers in Region 7 were 57 percent below the 10-year average, reflecting the harsh 2010-2011 winter. FWP (2014a) estimated there were about 6,000 pronghorn in H.D. 704 in 2012, and about 10,400 pronghorn in 2013. Therefore the Otter Creek Mine aerial survey area counts did not reflect either the sharp decrease in 2011 or the substantial increases in 2012 and 2013. This difference may have been due to comparatively small sample sizes from the Otter Creek study area, or it is possible that the Otter Creek area population, which appears to be somewhat localized (Farmer 2012), did not experience the dramatic decline in winter 2010-2011. For example, Farmer (2012) observed only two winter mortalities in the area in Tract 2 used by wintering pronghorn.

In October 2012, 51 pronghorn were counted east of Otter Creek and 77 were counted west of the creek (Table 4). In comparison, in October 2011, 105 were counted east of Otter Creek and 16 were counted west of the creek (Farmer 2013) and in October 2010 Farmer (2012) counted 29 pronghorn east of Otter Creek and 61 west of the creek. Thus, while the total number of pronghorn counted in October in the aerial survey area was generally similar from year to year, the number on either side of the creek varied considerably.

It was not possible to fly a late autumn (i.e., prior to December 15) aerial survey in 2012, but early winter (December 20) flights provided comparable results. On December 20, a minimum of 60 pronghorn were counted west of Otter Creek, and a minimum of 74 were counted east of the creek (Table 4). In contrast, in mid-December 2011 all 31 pronghorn observed were west of Otter Creek (Farmer 2013), while in December 2010 Farmer (2012) counted 35 pronghorn west of the creek and 64 pronghorn east of Otter Creek. As in October, pronghorn numbers on either side of the creek varied considerably in December from year to year.

In October 2012 (15 groups totaling 128 pronghorn), group sizes ranged from 1 to 20 and averaged 8.5 (Table 4). In October 2011 (8 groups totaling 121 pronghorn), group sizes ranged from 5 to 37 and averaged 15.1 (Farmer 2013). In October 2010 (13 groups totaling 90 pronghorn), group sizes ranged from 1 to 23 and averaged 6.9 (Farmer 2012).

The October 2012 sample was classified by age and gender (Table 4), and comprised 21.1 percent males, 63.3 percent females and 15.6 percent fawns. In comparison, the October 2011 sample comprised 10.7 percent males, 62.8 percent females and 26.4 percent fawns (Farmer 2013), while the October 2010 sample comprised of 22.2 percent males, 51.1 percent females and 26.7 percent fawns (Farmer 2012).

The October 2012 data yielded a male:female ratio of 33:100 and a fawn:female ratio of 25:100 (Table 4). FWP (2012a) reported that the fawn:female ratio for Administrative Region 7 was “fair” at 47:100, the same ratio reported for autumn 2011 FWP (2011a), but well below the long-term average of 73:100 for the region. Farmer (2012) reported that the October 2011 fawn:female ratio calculated from the Otter Creek area was 42:100 (Table 4). Thus the fawn:female ratio derived from the comparatively small sample from the Otter Creek Mine aerial survey area in past years was similar to the region-wide ratio calculated by FWP, suggesting that the small ratio calculated in October 2012 was an artifact of small sample size.

No mortality was observed in autumn 2012.

4.4.1.2 Winter

4.4.1.2.1 Distribution and Habitat Use

In the 2012-2013 winter there were 28 observations totaling 474 pronghorn, compared to 21 observations totaling 418 pronghorn in the mild 2011-2012 winter (Farmer 2013), and 11 sightings totaling 354 pronghorn in the severe 2010-2011 winter (Farmer 2012). Pronghorn distribution was not restricted in the 2012-2013 winter (Figure 11), and was similar to that reported for the mild 2011-2012 winter (Farmer 2013) and the mild 1979-1980 winter (Martin 1980).

Farmer (2012) reported that by the middle of the severe 2010-2011 winter, pronghorn were generally confined to two areas: 1) west of Otter Creek between Gene Creek and Chromo Creek, and 2) east of Otter Creek within two miles north of Tenmile Creek. Both these areas have been classified as high value pronghorn winter range by FWP’s Crucial Areas Planning System (CAPS; FWP 2014b), a GIS-based planning tool which depicts Montana native fish and wildlife species and habitat information.

In the mild 2011-2012 winter, however, pronghorn movement and distribution were generally not restricted. About 43 percent of winter sightings were in the high value winter range between Gene Creek and Chromo Creek, while the remaining 57 percent were widely scattered, primarily east of Otter Creek; none were in the area two miles north of Tenmile Creek (Farmer 2013). In the 2012-2013 winter,

approximately 38 percent of observations were in or adjacent to the two high value areas, while the remaining 63 percent were widely distributed (Figure 11).

In winter 2012-2013, 100 percent of all pronghorn groups and individuals were recorded in sagebrush and grassland habitats (Table 3). In comparison, in winter 2011-2012, about 99 percent of all pronghorn groups and 99.9 percent of all individuals were recorded in sagebrush and grassland habitats (Farmer 2013), and in winter 2010-2011 100 percent of all groups and individuals were recorded in grassland habitats (Farmer 2012). Consequently there appeared to be little difference in habitat use between the three years, despite the differences in distribution.

4.4.1.2.2 Population Characteristics

The minimum known number of pronghorn in the aerial survey area was 99 in mid-December 2010 (Farmer 2012), 31 in mid-December 2011 (Farmer 2013), and 134 in mid-December 2012 (Table 4).

The minimum known number of pronghorn in the aerial survey area was 0 on January 25, 2011 (Farmer 2012), January 27, 2012 (Farmer 2013) and January 17, 2013 (Table 4). Martin (1980) documented the same decline in January in the mild 1979-1980 winter, and noted that "... many antelope appeared to have left the Otter Creek area during January..." As discussed by Farmer (2013), the reason for this emigration, if it actually occurred, is unknown.

The minimum known number of pronghorn in the aerial survey area was 162 on March 10, 2011 (Farmer 2012), 186 on March 9, 2012 (Farmer 2013) and 194 on March 15, 2013 (Table 4). Thus it appears that if pronghorn actually leave the study area in late January, they return by mid-March in both mild and severe winters. Assuming that most or all of the pronghorn in the Otter Creek Mine aerial survey area actually left the area in January and then returned, these counts suggested that additional pronghorn immigrated to the study area as winter progressed.

Although pronghorn were observed on both sides of Otter Creek during winter, they were usually more numerous east of the creek, as measured by both the number of sightings (Figure 11) and the total number of counted pronghorn (Table 4). This trend was consistent from year to year:

West of Otter Creek:

- December 2010: 35
December 2011: 5
December 2012: 60
- January 2011: 0
January 2012: 0
January 2013: 0

East of Otter Creek:

- December 2010: 64
December 2011: 26
December 2012: 74
- January 2011: 0
January 2012: 0
January 2013: 0

- | | |
|--|--|
| <ul style="list-style-type: none"> February 2011: 35 February 2012: 80 February 2013: no survey | <ul style="list-style-type: none"> February 2011: 83 February 2012: 85 February 2013: no survey |
| <ul style="list-style-type: none"> March 2011: 72 March 2012: 69 March 2013: 47 | <ul style="list-style-type: none"> March 2011: 90 March 2012: 117 March 2013: 164 |

Farmer (2012) examined satellite imagery (GoogleEarth and Bing Maps) of the region surrounding the Otter Creek Mine aerial survey area and suggested that the most likely source area for pronghorn immigrating into the Otter Creek Mine study area during winter is the Paget Creek/Cow Creek area several miles upstream. However, such movement could not be confirmed during the three winters.

As in the previous two years, pronghorn were not classified by age and gender during winter 2012-2013. Although sample sizes were small in all years, in March 1980 the average group size was 13.4 pronghorn (Martin 1980); on March 10, 2011 it was 25.9 (Farmer 2012); on March 9, 2012 it was 16.9 (Farmer 2013); and on March 15, 2013 it was 12.4 (Table 4). As might be expected, average group sizes were smaller in mild winters (1980, 2012 and 2013) than in the severe 2011 winter, when pronghorn were more concentrated.

No mortalities were observed during winter 2012-2013.

4.4.1.3 Spring

4.4.1.3.1 Distribution and Habitat Use

In spring 2013 there were 33 observations totaling 101 pronghorn (Figure 11; Table 3). Fourteen sightings totaling 48 pronghorn were recorded during an April 25 aerial survey. As in the previous two years, pronghorn were widely distributed, with 6 observations totaling 25 pronghorn mapped west of Otter Creek, and 8 sightings totaling 23 pronghorn recorded east of the creek.

In spring 2013 about 82 percent of all groups and about 83 percent of all individuals were recorded in sagebrush and grassland habitats (Table 3). In comparison, in spring 2012 90 percent of all groups and 94 percent of all individuals were recorded in sagebrush and grassland habitats, although these percentages were somewhat skewed by repeated observations of certain pronghorn (Farmer 2013); in spring 2011 89 percent of all groups and 88 percent of all individuals were recorded in sagebrush and grassland habitats (Farmer 2012); in spring 1980 91 percent of all pronghorn were recorded in sagebrush and grassland habitats (Martin 1980), and in spring 1979 84 percent of all pronghorn observed came from sagebrush and grassland habitats (Martin 1980). Thus, pronghorn habitat use in spring 2013 closely resembled that of previous years.

4.4.1.3.2 Population Characteristics

Farmer (2012) reported that the minimum known number of pronghorn in the Otter Creek Mine survey area in spring, as measured by aerial surveys, seems to fluctuate considerably between years. In April 2013 the minimum known number of pronghorn in the aerial survey area was 48 (Table 4). The minimum known number recorded by ground surveys (no aerial surveys were flown) in spring 2012 (April) was 14, which was undoubtedly low (Farmer 2013), while the minimum known number in spring 2011 was 38 (Farmer 2012).

Although sample sizes were small, average group size declined from April through early June, which would be expected as pronghorns dispersed as fawning approached. While natality was not directly observed, fawns were seen in Tract 2 in early June, as were single does (suggesting that these does had fawns nearby). Farmer (2012, 2013) and Martin (1980) also recorded fawns in June, suggesting that fawning occurs in the study area.

No mortality was observed in spring 2013.

4.4.1.4 Summer

As discussed previously, there was no field work in summer 2013.

4.4.1.5 Three-Year Summary

In all three years of study, pronghorn were the most commonly recorded big game species in the Otter Creek Mine fish and wildlife resources inventory area. They were present year round on both sides of Otter Creek and were primarily found from low to mid-elevations, particularly in the dissected, gently-to-moderately rolling uplands between drainage bottoms and the rugged hills to the east and west. Habitat use in all seasons was dominated by the sagebrush and grassland habitat complexes.

Seasonal distribution was very similar between years, except for winter. Pronghorn distribution and movement did not appear to be restricted in the 2011-2012 and 2012-2013 winters. In contrast, the 2010-2011 winter was considered severe, and by mid-winter pronghorn were concentrated in two areas, one on each side of the creek (Farmer 2012). In all winters, there appeared to be movement into and out of the study area in mid-winter.

Pronghorn numbers in the Otter Creek Mine study area may fluctuate considerably between seasons and between years. Based on observations of fawns in early June of each year, fawning was believed to have occurred in the Otter Creek Mine study area. The only mortalities observed in three years appeared to be associated with the severe 2010-2011 winter.

4.4.2 Mule Deer

In 2012-2013 there were 41 observations totaling 220 mule deer in the Otter Creek Mine inventory area. In comparison, in 2010-2011 there were 71 observations totaling 303 mule deer in the study area (Farmer 2012), and in 2011-2012 there were 56 observations totaling 296 mule deer (Farmer 2013).

Seasonal distribution of 2012-2013 sightings is shown in [Figure 12](#). Habitat use is presented in [Table 5](#).

4.4.2.1 Autumn

4.4.2.1.1 Distribution and Habitat Use

In autumn 2012 there were 10 observations totaling 36 mule deer ([Figure 12](#); [Table 5](#)). In comparison, in autumn 2011 there were 12 observations totaling 44 mule deer (Farmer 2013), and in autumn 2010 there were 23 observations totaling 113 mule deer (Farmer 2012). Sightings were widely distributed ([Figure 12](#)) but followed the same distribution pattern as the previous two autumns (Farmer 2012, 2013). There was no evidence that the wildfires of summer 2012, which burned large areas outside the aerial survey area, affected autumn mule deer distribution in the study area.

In autumn 2012 three sightings (30 percent of all autumn observations) were west of Otter Creek and seven sightings (70 percent) were east of the creek. In comparison, in autumn 2011 33 percent of all observations were west of the creek and 67 percent were east of the creek (Farmer 2013), and in autumn 2010 26 percent of all sightings were west of the creek and 74 percent were east of the creek (Farmer 2012). Sightings in all years generally conformed to the east-west distribution pattern observed by Farmer (2012).

Autumn 2012 habitat use is presented in [Table 5](#) and compared to autumn 2010 and 2011 habitat use in [Figure 13](#), using the habitat complexes described by Farmer (2012). The general trend in the use of habitat complexes was similar between the three years; variations are attributed to comparatively small sample sizes in each year.

4.4.2.1.2 Population Characteristics

As discussed previously, population characteristics (size and density, age and sex ratios, fawn recruitment, etc.) are dynamic and may fluctuate considerably from year to year, depending on influences such as climate (precipitation, winter severity, etc.), predation (human and animal), land use, changes in habitat, etc.

In mid-October 2012 only 36 mule deer were counted in the Otter Creek Mine aerial survey area ([Table 6](#)); 27 were east of the creek and 9 were west of the creek. In comparison, in mid-October 2011 20 mule deer were counted in the aerial survey area; 13 were east of Otter Creek and seven were west of the creek (Farmer 2013). In mid-October 2010 there was a minimum of 84 mule deer in the Otter Creek Mine aerial survey area; 48 were observed east of Otter Creek and 36 were west of the creek (Farmer

2012). In all years, more mule deer were seen east of the creek than west of the creek. This may have been influenced by the greater amount and distribution of the conifer habitat complex (habitat subtypes 123/124/130) east of the creek, despite the difficulty of seeing deer in this habitat complex (Farmer 2012).

The October 2011 and 2012 counts were subjectively believed to be low because FWP usually counts considerably more mule deer during its spring aerial surveys of its long-term trend area that overlays much of the Otter Creek Mine aerial survey area (Farmer 2012), and there were no reports of substantial mortality during summers 2011 or 2012 that would suggest that the study area mule deer population had declined dramatically. However, FWP (2011b) reported that the mule deer population across Administrative Region 7 was 12 percent below the long-term average, and several Ashland/Otter Creek Mine area residents reported that mule deer numbers in autumn 2011 were well below their past peaks (Farmer 2013). FWP (2012b) reported that mule deer numbers in Administrative Region 7 were "...still more than 40 percent below the long-term average..." in autumn 2012.

The October 2012 minimum density of mule deer in the Otter Creek Mine aerial survey area was 0.34/mi² (0.13/km²), compared to 0.19/mi² (0.07/km²) in October 2011 (Farmer 2013), 0.80/mi² (0.31/km²) in October 2010 (Farmer 2012) and 1.12/mi² (0.43/km²) in October 1979 (Martin 1980). These densities were on the lower end of the range of densities for mule deer in southeastern Montana districts (0.1-3.3/km²) reported by Youmans and Swenson (1982; cited in Mackie et al. 1998). However, mule deer densities in upland breaks and prairie-badlands habitats often fluctuate dramatically (Mackie et al. 1998).

Based on a very small sample (10 groups totaling 36 mule deer), in October 2012 group sizes ranged from 1 to 7 and averaged 3.6 (Table 6). In comparison, in October 2011 (7 groups totaling 20 mule deer) group sizes ranged from 2 to 5 and averaged 2.9 (Farmer 2013); in October 2010 (16 groups totaling 84 mule deer), group sizes ranged from 2 to 13 and averaged 5.3 (Farmer 2012); and in October 1979 (23 groups totaling 103 mule deer), group size averaged 4.5 (Martin 1980).

All 36 mule deer observed during the October 2012 aerial survey were classified by age and gender. This total comprised 30.6 percent males, 41.7 percent females and 27.8 percent fawns. In comparison, the October 2011 aerial survey sample of 20 mule deer comprised 20.0 percent males, 55.0 percent females and 25.0 percent fawns; and the October 2010 sample of 71 mule deer comprised 7.0 percent males, 60.6 percent females and 32.4 percent fawns (Farmer 2012). Martin (1980) classified a sample of 103 mule deer in October 1979 that comprised 8.7 percent males, 41.7 percent females and 49.5 percent fawns.

Based on very small samples, the male:female ratio in October 2012 was 73:100 and the fawn:female ratio was 67:100 (Table 6). In comparison, the October 2011 data yielded a male:female ratio of 31:100 and a fawn:female ratio of 38:100 (Farmer 2013), and the October 2010 data yielded a male:female ratio of 12:100 and a fawn:female ratio of 53:100 (Farmer 2012). Percent composition and age/sex ratios of a mule deer population may vary greatly in response to many factors. Mackie et al. (1998)

noted "...use and interpretation of ratios as indices of population status or for management prescription requires knowledge of actual numbers of adult males and females in a population." Given the small sample sizes in each year, it seems likely that the calculation of age and sex ratios for mule deer in the Otter Creek Mine aerial survey area may be inaccurate.

No mortality was observed in autumn 2012. However, study area residents reported that both private and public lands in the Otter Creek Mine aerial survey area received hunting pressure.

4.4.2.2 Winter

4.4.2.2.1 Distribution and Habitat Use

In winter 2012-2013 there were 22 observations totaling 162 mule deer (Figure 12; Table 5). In comparison, in winter 2011-2012 there were 26 observations totaling 204 mule deer (Farmer 2013), and in winter 2010-2011 there were 19 observations totaling 128 mule deer (Farmer 2012).

As in previous years, more observations were recorded east of Otter Creek than west of the creek. Only six (27 percent of the total) 2012-2013 winter sightings were west of Otter Creek, while 16 sightings (73 percent) were east of the creek (Figure 12). In comparison, 12 percent of the total 2011-2012 winter sightings were west of Otter Creek, while 88 percent were east of the creek (Farmer 2013); 47 percent of the total winter 2010-2011 winter sightings were west of Otter Creek and 53 percent were east of the creek (Farmer 2012); and in winter 1979-1980 45 percent were west of Otter Creek and 55 percent were east of the creek (Martin 1980).

Mule deer distribution in winter 2012-2013 (Figure 12) did not appear to be influenced by snow accumulation, and conformed to distribution in the mild 2011-2012 (Farmer 2013) and 1979-1980 (Martin 1980) winters. In contrast, in the severe 2010-2011 winter Farmer (2012) identified many comparatively small (most were less than 0.25 mi²) patchy areas characterized by moderate to very steep slopes, primarily in ponderosa pine and breaks habitats, that were used by mule deer during the most severe part of the winter.

Farmer (2012) reported that 52 percent of all the severe winter 2010-2011 sightings came from ponderosa pine/grass, ponderosa pine/shrub and juniper habitats (subtypes 123, 124 and 130), 26 percent from breaks habitat (subtype 280) and 10 percent from big sagebrush and silver sagebrush habitats (subtypes 212 and 222). In comparison, during the mild 2011-2012 winter, 19 percent of all sightings came from the conifer complex, 15 percent from breaks, and 19 percent from sagebrush habitats (Farmer 2013). During the 2012-2013 winter, 13 percent of all sightings came from the conifer complex, 19 percent from breaks, and 37 percent from sagebrush habitats (Table 5).

Thus the three habitat complexes that dominated (88 percent) sightings in the severe 2010-2011 winter contributed only 53 percent of observations in the mild 2011-2012 winter (Farmer 2013) and 69 percent in the 2012-2013 winter (Table 5). Habitat use in the three winters is compared in Figure 14, which

demonstrates that while pine, breaks and sagebrush habitats are important in all years, more open habitats receive more use in mild winters. Use of open areas supports Martin's (1980) observation that during mild winters, mule deer in the Otter Creek area are "quite widespread."

4.4.2.2 Population Characteristics

In mid-December 2012 only 24 mule deer were counted in the study area; 15 were east of Otter Creek and nine were west of the creek (Table 6). As in December 2011 (Farmer 2013), this count was subjectively believed to be low.

As in the two previous winters (Farmer 2012, 2013), the number of deer counted during aerial surveys increased as winter progressed (Table 6). A total of 109 mule deer were counted on March 15, 2013, with 62 east of the creek and 47 west of the creek.

Mule deer were not classified by age or gender during winter. Average mule deer group size was 5.3 in December 2012, 4.6 in January and 9.9 in mid-March 2013 (Table 6)

No mortality was observed in winter 2012-2013.

4.4.2.3 Spring

4.4.2.3.1 Distribution and Habitat Use

In spring 2013 there were nine observations totaling 22 mule deer (Figure 12). In comparison, In spring 2012 there were 17 observations totaling 47 mule deer (Farmer 2013), and in spring 2011 there were nine observations totaling 33 mule deer (Farmer 2012).

There were only four observations during the April 25 aerial survey; three were west of Otter Creek and one was east of the creek. There were five sightings in early June. All were made during ground surveys, and all were east of Otter Creek. As in spring 2012 (Farmer 2013), therefore, the distribution of mule deer sightings in spring was skewed towards the east side of the creek, and accessible roads and vehicle trails (Figure 12).

Martin (1980) reported that in spring 1980 "...most observations are located in a band across the center of the study area between Threemile and East Fork Otter Creeks..." i.e., incorporating both sides of the stream. Such a distribution pattern was not evident in spring 2011 (Farmer 2012), 2012 (Farmer 2013) or 2013 (Figure 12).

Mule deer habitat use in spring 2013 is given in Table 5 and compared to spring 2011 and 2012 in Figure 15. Spring 2011 habitat use may have been influenced by the "delayed" development of herbaceous vegetation (Farmer 2012), while spring 2012 (Farmer 2013) and 2013 habitat use may have been influenced by the skewed distribution of sightings (Figure 12). Nevertheless, over the three years of study, the conifer complex (habitat subtypes 123/124/130), sagebrush complex (subtypes 212/222),

breaks (subtype 280 and grassland complex (subtypes 411/412/530) contributed substantially more observations than other habitats (Figure 15).

4.4.2.3.2 Population Characteristics

The largest count (no duplicate counts of individual deer) from a single day in spring 2013 was 14, recorded during the April 25 aerial survey. This count obviously underestimated the study area population, since the March aerial survey yielded 109 mule deer (Table 6). FWP's long-term average count in its trend area, which overlays much of the Otter Creek Mine aerial survey area, is about 99 mule deer but often shows considerable fluctuations between years (Farmer 2012). As discussed by Farmer (2012), FWP's count is obviously more representative of spring mule deer populations.

FWP's Otter Creek trend area's long-term recruitment average of fawns per 100 adults is about 62:100 (Farmer 2012). As discussed previously, FWP (2011b) reported that the typical average ratio of fawns per 100 adults in Region 7 is 60:100, but in 2011 it was 41:100 adults, well below average. In spring 2012 it was 47:100 adults (FWP 2012b) and in spring 2013 it was 53:100 (FWP 2013a).

No mortality was observed in spring 2013. As expected (despite very small sample sizes), average group size in spring 2013 declined in early June as females dispersed for fawning (Table 6). Natality was not observed, but an observation of a doe with a fawn in early June suggested that fawning occurred in the study area.

4.4.2.4 Summer

As discussed previously, there was no field work in summer 2013.

4.4.2.5 Three-Year Summary

Mule deer were the second most commonly recorded big game species in the Otter Creek Mine fish and wildlife resources inventory area during the three years of study. They were present year round on both sides of Otter Creek, at all elevations, but generally preferred forested and/or more topographic relief than more open, gentle areas.

Seasonal distribution was similar in all years, except for winter. During the most severe portion of the 2010-2011 winter, mule deer were confined to comparatively small patches of ponderosa pine and breaks habitat with moderate to steep slopes (Farmer 2012). In the open 2011-2012 and 2012-2013 winters, however, mule deer movement was not restricted and they were much more widely distributed, similar to that observed by Martin (1980) during the mild 1979-1980 winter.

Conifer (primarily ponderosa pine), breaks and sagebrush habitats were important in all seasons. Use of grassland and agricultural habitats increased in 2011-2012 and 2012-2013 over the baseline year. Hay fields received substantially more use in 2012, perhaps because upland habitats were more desiccated in the very dry summer 2012.

Sample sizes in most seasons in all years were too small to accurately characterize populations (size, density, age and sex ratios). Fawn production/survival was lower in all three years than the long-term regional average, possibly as a function of the severe 2010-2011 winter (FWP 2013).

Natality was not observed but was believed to have occurred in the Otter Creek Mine study area each year. Mortality was not observed, but winter coyote predation was reported by area residents.

4.4.3 White-tailed Deer

White-tailed deer were not observed during 2012-2013.

4.4.3.1 Three-Year Summary

As discussed by Farmer (2012), white-tailed deer appear to be uncommon in the Otter Creek Mine study area, possibly due to the absence of well-developed riparian forest along Otter Creek, coupled with the distance between the creek bottom and coniferous forest upland habitats. There have been only five sightings in the aerial survey area in three years of study: two in 2010-2011 (Farmer 2012), three in 2011-2012 (Farmer 2013), and none in 2012-2013. Farmer (2012) reported that white-tailed deer were apparently also uncommon in the study area in 1979-1980 (Martin 1980), and noted that the paucity of sightings from FWP's long-term monitoring area, which overlays part of the Otter Creek Mine aerial survey area, also suggests that white-tailed deer are uncommon.

Of the five white-tailed deer observations, three have been at the south end of the aerial survey area. There is more riparian forest along Otter Creek upstream (i.e., south) of the study area and it is possible that there are more white-tailed deer to the south.

4.4.4 Elk

There were four observations of elk in 2012-2013: one in autumn 2012, two in winter 2012-2013, and one in spring 2013 (Figure 16). The autumn and winter sightings were recorded during aerial surveys, while the spring sighting was recorded along a pedestrian route in Tract 2. Study area residents reported that elk were seen at lower elevations in summer and autumn, possibly displaced by wildfires during summer 2012.

The single autumn observation was a group of 28 elk in bunchgrass habitat (subtype 411) in the southeast corner of the aerial survey area (Figure 16). This area had once been ponderosa pine habitat but burned in a wildfire sometime in the past.

The two winter sightings comprised 22 elk, one group of 16 observed in bunchgrass (subtype 411) habitat along the King Mountain divide in the southwest corner of the aerial survey area, and one group of six elk in ponderosa pine/grass (subtype 123) habitat in the southeast corner of the aerial survey area (Figure 16). Both sightings came from areas of elk winter distribution identified by Farmer (2012).

The single spring sighting was a lone female, observed in ponderosa pine/shrub habitat (subtype 124) near Fortune Spring along the east edge of Tract 2 (Figure 16).

4.4.4.1 Three-Year Summary

There were only six elk sightings during the three years of study: two in 2010-2011, none in 2011-2012 and four in 2012-2013. Farmer (2012) reported that elk are found primarily in the rugged hills and are rarely seen in the creek bottom or adjoining rolling uplands of the Otter Creek Mine study area. FWP's Critical Areas Planning System (CAPS) mapping (FWP 2014b) does not identify any of the Otter Creek Mine aerial survey area as elk winter range. Farmer (2012) speculated that elk used the aerial survey area irregularly during winter.

USFS (2011) summarized the history of elk in the Ashland Ranger District (RD) as:

“Elk were present in minimal numbers and not considered in detail for the Ashland RD in the Forest Plan (1986)...the elk herd has been increasing in distribution and numbers since 1992...the 2007 estimated minimum population is 500 head in Hunting District (HD) 704, which includes Ashland RD. Essentially, the entire RD is currently thought to be used by elk.”

H.D. 704 is part of FWP's Custer Forest Elk Management Unit (EMU), which also includes H.D.s 702 and 705. FWP's (2004) population objective for this EMU is 500 elk post-hunting season, but the EMU population has been consistently above this objective. For example, in 2013 FWP (2014c) counted 1500 elk and estimated that 1875 elk were present in the EMU, and population status charts (FWP 2014c) indicate that the EMU population has been growing steadily.

4.4.5 Black Bear

No black bears were recorded by sightings or evidence in 2012-2013.

4.4.5.1 Three-Year Summary

Black bears have increased in southeast Montana in recent years, even though appropriate habitat is limited. Mace and Chilton-Radant (2011) estimated there were 30+ black bears in FWP's Administrative Region 7. FWP has instituted a limited (a quota of two bears) hunting opportunity in Region 7.

Otter Creek Mine study area residents interviewed during the baseline study reported that black bears were rare, but were more common than in the past (Farmer 2012). Farmer (2012) did not observe black bears during the baseline year (2010-2011), but found evidence (tracks or scats) at two locations, both in or near coniferous forest habitat near the east boundary of Tract 2. In July 2012 WESTECH vegetation ecologists found a desiccated bear scat in riparian habitat along Otter Creek (Farmer 2013). Given the low number of observations of animals or evidence, it seems likely that black bears are transient in the Otter Creek Mine wildlife study area.

4.4.6 Mountain Lion

No mountain lions or their evidence were recorded in 2012-2013.

4.4.6.1 Three-Year Summary

No mountain lions or their evidence were recorded during the three years of study, but this secretive species would be difficult to document with the methods employed during this study. However, mountain lions have been observed in and adjacent to the Otter Creek Mine aerial survey area in recent years (MTNHP 2014), and therefore could have been present at least occasionally during the study.

4.5 UPLAND GAME

Five upland game birds have been recorded in the Otter Creek Mine area in the past: wild turkey, gray partridge, ring-necked pheasant, greater sage-grouse and sharp-tailed grouse (Appendix A). Only wild turkey, ring-necked pheasant and sharp-tailed grouse were recorded in 2012-2013.

4.5.1 Wild Turkey

There were three observations of wild turkeys in 2012-2013 (Figure 17): there was one sighting of 11 birds in a hay field (habitat subtype 510) along Home Creek in winter 2012-2013, and two sightings of displaying males in ponderosa pine/grass (habitat subtype 123) in Tract 1 in spring 2013.

4.5.1.1 Three-Year Summary

Wild turkeys were released in the Ashland area in 1956 and 1957, and localized releases of turkeys continued in the vicinity until at least the late 1970s (Farmer 2012). Although MTNHP's (2014) data base contains many records of wild turkey sightings in and near the Otter Creek Mine study area, turkey numbers in much of southeast Montana (including the Ashland area) were reported to have substantially declined from 2008-2010. Farmer (2012) did not record wild turkeys or their evidence (feathers, dropping, tracks) during the 2010-2011 baseline study, and stated that study area residents reported that turkeys were rare in the area for several years.

No turkeys were observed in 2011-2012 (Farmer 2012). However, turkey scats were found in riparian tree habitat (habitat subtype 110) on lower Threemile Creek in October 2011 (Farmer 2013), indicating that wild turkeys were present in the study area. This was the same general area as the 2012-2013 sightings (i.e., Tract 1 between Home Creek and Threemile Creek). A study area resident in Tract 1 said that turkeys were gradually increasing, but several other residents of other portions of the study area reported that turkeys were still comparatively rare.

4.5.2 Gray Partridge

There were no observations of gray partridge in 2012-2013.

4.5.2.1 Three-Year Summary

Farmer (2012) reported that there are comparatively few records of gray partridge in the region surrounding the Otter Creek Mine study area, and that the study area does not contain substantial amounts of preferred habitat for gray partridge (a mixture of cultivated crops, particularly grains, and uncultivated grasslands and shrublands, often near farm/ranch residences). No partridge were observed during 2010-2011, although a study area resident reported seeing one or two small coveys of partridge in his ranch yard along Tenmile Creek (Farmer 2012). There were two sightings during the 2011-2012 monitoring year, one in autumn 2011 (five birds) and one in May 2012 (six birds), both near the confluence of Tenmile Creek and Otter Creek (Farmer 2013), and appeared to be associated with the ranch yard. Therefore gray partridge were considered to be uncommon in the Otter Creek Mine wildlife study area during the three years of study.

4.5.3. Ring-necked Pheasant

Ring-necked pheasants were the most commonly observed upland game bird in 2012-2013. For the year, there were 28 observations totaling 40 ring-necked pheasants (Figure 17). As in past years, field effort to observe ring-necked pheasants was primarily allocated in spring. Therefore the number of sightings in other seasons is not indicative of pheasant numbers in the study area.

There were two observations in autumn 2012. One was a group of three birds in tame pasture (habitat subtype 530) along Tenmile Creek, while the other was a single bird in a ranch yard (subtype 021) on lower Tenmile Creek. As in previous years, the low number of sightings in autumn was attributed to the emphasis in field effort, rather than a paucity of birds. A pheasant hunter interviewed along Otter Creek in Tract 2 stated that pheasant numbers were considerably higher than in autumn 2011.

There was one sighting in winter 2012-2013, when a group of 10 pheasants were seen in a hay field on the East Fork Otter Creek along the Otter Creek Road (Figure 17).

Ring-necked pheasants were primarily surveyed by the 16-station pheasant crow count route (Figure 5) in spring 2013. Locations of displaying males were mapped (Figure 17), either from actual sightings or triangulation from the route. The average number of calls per stop in early June 2013 was 8.2. In contrast, FWP (2013b) reported that "...spring crow counts in Region 7 were 40% below the all-time high counts last year, and 5 to 25% above the long term average."

There was no field work in summer 2013.

4.5.3.1 Three-Year Summary

FWP began a pheasant crow count route south on Otter Creek Road from Highway 212 in 1974 (Farmer 2012). In the late 1970s the average number of calls per two minute stop over the 20 mile route was 18.9, ranging from a low of 14.5 in 1978 to a high of 24.4 in 1977 (Martin 1980). Knapp (1977) considered an average of 10-20 calls per stop to be indicative of fair to good pheasant numbers in the Birney-Decker area in the late 1970s.

In comparison, Farmer (2012) recorded an average number of calls per stop on the 16-mile Otter Creek Mine pheasant crow count route of 0.6 in April and 1.1 in June 2011. Farmer (2012) reported that these results suggested very low pheasant numbers, and speculated that 2011 breeding activity along Otter Creek was suppressed by the wet, cold spring, coupled with high water in May which flooded large portions of the creek bottom. FWP (2011c) also reported lower production in 2011.

In spring 2012 the average of three counts on consecutive days in late April was 3.4, and the average of three counts on consecutive days in May was 2.4 (Farmer 2013). While these results suggested a substantial increase in spring male pheasant numbers from 2011 to 2012, they were still well below Knapp's (1977) average.

The spring 2013 average of three counts on consecutive days was 8.2 in early June, which suggested a substantial increase over spring 2012, but was still slightly below Knapp's (1977) average.

4.5.4 Greater Sage-grouse

No greater sage-grouse were observed in 2012-2013. None were heard from the pheasant crow count route. An old lek location north of Tract 1 (Figure 17), mapped by FWP in the 1980s, was examined from both the air (aerial survey) and ground in late April. No sage-grouse or their evidence were observed. The landowner reported that he had never seen sage-grouse at this site during his lifetime.

4.5.4.1 Three-Year Summary

There was only one observation of greater sage-grouse in the Otter Creek Mine wildlife study area in three years of study. Farmer (2012) reported that the Otter Creek Mine fish and wildlife inventory area has areas of sagebrush habitat capable of sustaining sage-grouse seasonally, but in the last 30 years the area appears to have been used by only small numbers of sage-grouse. There are no known active leks in the study area, but the occasional observation of sage-grouse in the area suggests that there may be a lek present within 10 miles.

4.5.5 Sharp-tailed Grouse

There were only six observations (excluding leks) totaling 44 sharp-tailed grouse in 2012-2013. In comparison, there were 18 sightings (excluding leks) totaling 135 sharp-tailed grouse during the 2011-

2012 monitoring year (Farmer 2013), and 11 sightings (including leks) totaling 62 sharp-tailed grouse in 2010-2011 (Farmer 2012). The lower number of sightings in 2012-2013 was considered a coincidence, rather than a reflection of a declining sharp-tailed grouse population.

There were two sightings in autumn 2012, three in winter 2012-2013, and one (excluding leks) in spring 2013. The 2012-2013 observations came from ponderosa pine (habitat subtype 123; two sightings), big sagebrush (subtype 212; one sighting), tall mesophytic shrub (subtype 310; one sighting), sod-forming grassland (subtype 412; one sighting) and hay (subtype 510; one sighting). In comparison, all 2011-2012 sightings came from ponderosa pine, sagebrush, grassland and hay habitats (Farmer 2013) and all 2010-2011 sightings came from ponderosa pine, sagebrush and grassland habitats (Farmer 2012).

The pheasant crow count route (Figure 5) and accessible vehicle trails in all three tracts were used to search for leks in spring by listening for displaying male grouse. The April 25, 2013 aerial survey was also used to search for leks. Known lek locations identified by FWP or Farmer (2013) were examined, as well as potential lek sites based on habitat and topography. Most leks were accessible only by air. Leks PO-040, PO-056, PO-057, PO-148, PO-151, PO-152, PO-157 and PO-158 were also accessible by ground. In total, 19 past or present lek locations were monitored.

Lek survey results are given in Table 7. No new leks were found. Most leks were inactive, and many of these leks have been inactive for years (Farmer 2012). Six leks (PO-045, 9 males; PO-079, 6 males; PO-080, 7 males; PO-149, 11 males; PO-151, 13 males; and OC-1, 2 males) were verified to be active in spring 2013. Leks PO-056 (2 males), PO-058 (15 males), PO-079 (11 males), PO-149 (12 males), PO-151 (27 males), PO-157 (1 male, probably an alternate to PO-151) and OC-1 (unknown number of males) were active in spring 2012 (Farmer 2013).

4.5.5.1 Three-Year Summary

Sharp-tailed grouse were considered to be common in the Otter Creek Mine wildlife resources inventory area in all three years of study. Farmer (2012) discussed lek persistence over the last ± 40 years and speculated that in most years there appear to be four to six active leks in the study area. There were six active leks in each of the three years of study.

Study area residents indicated that sharp-tailed grouse numbers had been quite low in the mid-2000s, but were recovering during the last three years. Two residents reported that there were "lots" of sharp-tailed grouse in the study area in the last two years.

No grouse nests were found during field work, but broods were observed in summer, indicating that successful nesting occurred. Mortality was not observed; study area residents indicated that some recreational hunting occurred in most years.

4.6 RAPTORS

As discussed in Section 3.6, for the purposes of this study, raptors were considered to be members of the Accipitriformes (vultures, eagles and hawks), Falconiformes (falcons) and Strigiformes (owls).

Ten species (bald eagle, golden eagle, rough-legged hawk, Swainson's hawk, red-tailed hawk, northern harrier, prairie falcon, American kestrel, burrowing owl and great horned owl) were recorded in 2012-2013, and 16 species (the 10 above, as well as turkey vulture, Cooper's hawk, merlin, eastern screech-owl, long-eared owl and short-eared owl) were recorded during the three years of study (Appendix A).

4.6.1 Turkey Vulture

No turkey vultures were recorded in 2012-2013.

4.6.1.1 Three-Year Summary

Although no turkey vultures were recorded in 2012-2013, there was one sighting of a single turkey vulture in 2011-2012 (Farmer 2013), and four sightings totaling 14 turkey vultures in 2010-2011 (Farmer 2012), all in spring and summer. Few turkey vultures overwinter in Montana; they generally arrive in April and leave in September (MTNHP 2014). Farmer (2012) reported that there was no evidence of nesting in the Primary and Secondary study areas, and that the nearest potential nesting habitat in the aerial survey area was the King Mountain vicinity in the aerial survey area.

4.6.2 Bald Eagle

There were only two sightings totaling two bald eagles during 2012-2013, both in riparian tree habitat (subtype 100) habitat along Otter Creek winter (Figure 18). Both were considered to be migrants/winter residents.

4.6.2.1 Three-Year Summary

There were two sightings totaling two bald eagles in 2012-2013, 11 sightings totaling 12 bald eagles during 2011-2012, and six sightings totaling eight bald eagles during 2010-2011 (Farmer 2012), all from autumn or winter. All were considered to be migrants/winter residents. Most sightings came from riparian tree habitat (subtype 110) along Otter Creek, although there were sightings from upland habitat subtypes away from the creek.

Bald eagles generally nest where there is maximum food availability (fish and carrion), adequate nest substrates (tall, mature trees that are large enough to support the nest) and minimum human disturbance (Montana Bald Eagle Working Group 1994), although some bald eagle pairs tolerate more human activity than others. Bald eagles nest along the Tongue River within 10 miles of the Otter Creek Mine study area, but there are no nesting records from Otter Creek (MTNHP 2014), and there are very few potential nest trees in the Otter Creek Mine study area, suggesting that nesting probability is low.

4.6.3 Golden Eagle

There were four sightings of golden eagles in 2012-2013 (Figure 18), one in autumn and three in spring. The autumn sighting was in the eastern aerial survey area, while the spring sightings all came from Tract 2.

There were one active and one inactive golden eagle nests in Tract 2 (Figure 18). These two nest locations were first reported in 1979 (Martin 1980), but were inactive. One nest was active in 2004 but was not active in spring 2011 (Farmer 2012) or spring 2012 (Farmer 2013). A female golden eagle was observed on this nest during the April 25, 2013 aerial survey, and two chicks were in the nest in early June. It is not known if fledging was successful.

4.6.3.1 Three-Year Summary

Golden eagles were seen only twice in 2010-2011 (one in winter, one in summer; Farmer 2012) and twice in 2011-2012 (both in winter; Farmer 2013). There was no evidence of nesting in either year. Nesting in 2013 was the first time nesting had been documented in the study area since 2004.

4.6.4 Rough-legged Hawk

There were 19 observations totaling 19 rough-legged hawks (Figure 19); one was recorded in autumn (October 2012) and the rest were sighted in winter 2012-2013. The largest known number (no multiple observations of individuals) of rough-legged hawks in the study area was six, recorded during a January 2013 aerial survey.

In comparison, there were 13 observations totaling 14 hawks in 2011-2012, all during winter (Farmer 2013), and 10 sightings totaling 10 hawks, all in autumn and winter, during 2010-2011 (Farmer 2012).

Most rough-legged hawk sightings were recorded along drainages (Otter Creek, East Fork Otter Creek, Threemile Creek and Tenmile Creek), but some were observed in upland areas within one mile of a drainage. Of 19 observations, 12 were recorded in riparian tree habitat (subtype 110), two were birds perched on rock outcrops (habitat subtype 001), two were perched in ponderosa pines (subtype 123), and three were recorded in/over grassland habitats (subtypes 411 and 412). Farmer (2012, 2013) recorded observations in these same habitats, as well as breaks (subtype 280) and prairie dog colonies (subtype 430). Farmer (2013) also noted that all sightings were within one mile of a major drainage, but Farmer (2012) reported that sightings were more widespread.

4.6.4.1 Three-Year Summary

Rough-legged hawks are common migrants/winter residents in the Otter Creek Mine wildlife resources inventory area. They being to arrive in the study area in October, and leave in mid-to-late-March. As discussed by Farmer (2012), rough-legged hawks are common in winter in the region encompassing the Otter Creek Mine study area.

4.6.5 Swainson's Hawk

There was a single sighting of a Swainson's hawk, recorded in a hay field along Otter Creek in October (Figure 19). This was the only sighting in three years of study (Appendix A). Consequently Swainson's hawks are considered to be migrants through the Otter Creek Mine wildlife resources inventory area.

4.6.6 Red-tailed Hawk

There were 19 observations of red-tailed hawks in 2012-2013, including two active and four inactive nests. As in past years, sightings were generally grouped along drainages and adjacent uplands (Figure 19). In comparison, in 2011-2012 there were 21 observations, including four active and two inactive nests (Farmer 2013), and in 2010-2011 there were 16 observations, including two active and two inactive nests (Farmer 2012).

There were four sightings in autumn 2012, all of single birds. Two were perched in riparian tree habitat (subtype 110, one in ponderosa pine (subtype 123) and two were flying over hay fields (subtype 510). There were no observations in winter.

There were 15 observations in spring, including active and inactive nests. Non-nest sightings were located in/over deciduous riparian tree (subtype 110), ponderosa pine (subtypes 123 and 124), bunchgrass (subtype 411), sod-forming grass (subtype 412), hay (subtype 510) and tame pasture (subtype 530) habitats.

Characteristics of active and inactive red-tailed hawk nests are given in Table 8. Nest identification (ID) numbers are keyed to nest locations in Figure 20. No new active nests were found in spring 2013. Since there was no field work in summer, nest production was not monitored in 2013.

- Nest OC-RTH-01 (Figure 20) was active in 2011, 2012 and 2013 (Table 8). There were no vantage points that would allow an observer to look down into this nest; it was only visible from Otter Creek Road through a spotting scope. Although the nest was partially obscured by leaves, two chicks were seen in the nest in early June 2013. Fledgling success was not monitored.
- Nest OC-RTH-02 had been in a boxelder in 2011; it was active in early spring, but was lost in late May-early June flooding (Farmer 2012). Nest OC-RTH-02 was apparently rebuilt in a cottonwood during summer 2012 (Farmer 2013), and may have been an alternate to nest OC-RTH-05, which was only about 0.75 mile away (Figure 20). It could be observed from the bluff to the east, but was inactive in 2012 and 2013 (Table 8).
- Nest OC-RTH-03 was in a cottonwood along Otter Creek, south of Tenmile Creek (Figure 20). It could be seen with a spotting scope from the Otter Creek road. It was inactive in 2011 (Farmer 2012). A bird was seen at the nest in early May 2012, and it was considered to be active. It was destroyed by spring 2013 (Table 8).

- Nest OC-RTH-04 was in a cottonwood on lower Brian Creek (Figure 20), and was visible with a spotting scope from the Otter Creek road. It was inactive in all three years, and was badly deteriorated in spring 2013 (Table 8).
- Nest OC-RTH-05 was found in spring 2012. It may have been an alternate to nest OC-RTH-02 (Figure 20). An adult was seen at the nest tree in early May, but there was no access to the site and it could not be monitored further (Farmer 2013). An adult was seen on the nest during the April 25, 2013 aerial survey, but because there was no access, the nest could not be monitored further.
- Nest OC-RTH-06 was in a cottonwood along lower Threemile Creek (Figure 20). There was no access to the site in spring 2011 (Farmer 2012), and it was not visible from the Otter Creek road. Two adults were at the nest in spring 2012, and it was considered active (Farmer 2012). The nest was destroyed by spring 2013 (Table 8).

4.6.6.1 Three-Year Summary

Over the three years of study, red-tailed hawks were the most commonly recorded buteo (broad-winged hawk) in the Otter Creek Mine study area. Martin (1980) also reported that red-tailed hawks were the most common buteo observed in his Otter Creek study area in 1979 and 1980.

Red-tailed hawks generally left the study area in late October and returned in late March, although there were occasional winter sightings (Farmer 2013). In all years, most sightings were recorded in or near drainages.

Six nests were located during the three years of study. Of these, one nest was never active; one nest was active one of three years; three nests were active two of three years; and one nest was active every year. By 2013, three of the six nests were destroyed or badly deteriorated.

4.6.7 Cooper's Hawk

There were no observations of Cooper's hawks in 2012-2013. There was only one sighting during the three years of study, and Farmer (2012) noted that preferred nesting habitat was very limited in the study area.

4.6.8 Northern Harrier

There were only three observations of northern harriers in 2012-2013, all in autumn 2012 (Figure 21). All three sightings were single birds. One was hunting over big sagebrush (habitat subtype 212) along Highway 212, one was hunting over a hay field (subtype 510) along Otter Creek, and the third was hunting over breaks habitat (subtype 280) in the southeast corner of Tract 2 (Figure 21).

4.6.8.1 Three-Year Summary

Northern harriers may be present year round in the Otter Creek Mine wildlife resources inventory area, but numbers appear to fluctuate from year to year, perhaps in response to nesting habitat availability. Northern harriers nest on the ground, generally in patches of dense, often tall vegetation, and usually near water; thus the best nesting habitat in the Otter Creek Mine study area is in creek bottoms (Farmer 2012).

There was only one sighting of a northern harrier in 2010-2011, but Farmer (2012) speculated that nesting harriers were displaced from the study area in spring 2011 because much of the preferred nesting habitat was flooded in May.

In contrast, there were 12 sightings in 2011-2012, including in winter (Farmer 2013). While harriers were seen in the uplands, most sightings were clustered along Otter Creek, and Farmer (2013) postulated that nesting may have occurred in the study area, perhaps influenced by the residual cover from 2011 that was available in spring 2012. No nests were found in 2012, but most sightings (8 of 12) were recorded in spring, so harriers were present during breeding/nesting season (Farmer 2013).

There were no sightings in spring 2013, but there was comparatively little residual nesting cover available after the summer 2012 drought.

4.6.9 Prairie Falcon

There was a single prairie falcon observation in 2012-2013, of a single bird flying over tame pasture (habitat subtype 530) along Otter Creek in October 2012 (Figure 21). The eyrie that had been active in the past was inactive in spring 2013 (Figure 20, Figure 21).

4.6.9.1 Three-Year Summary

Prairie falcons were observed in all three years of study, and the eyrie in Tract 2 was active in 2011 and 2012. The eyrie produced one fledgling in 2011 (Farmer 2012), but 2012 nest success could not be determined (Farmer 2013). This same nest site had been active in 1979 and 1980 (Martin 1980). There are no other eyries in or near the Otter Creek Mine wildlife resources inventory area. The MTNHP (2014) data base contains locations for two other eyries, found in 2004, but both are more than two miles outside the Otter Creek Mine aerial survey area.

4.6.10 American Kestrel

There were only two observations of American kestrels in 2012-2013 (Figure 21), one in winter and one in spring. Both were birds perched in riparian tree habitat (subtype 110) along creek bottoms. Nesting/production was not observed in spring 2013.

4.6.10.1 Three-Year Summary

American kestrels were seen infrequently in all three years of study. There were only five sightings each in 2010-2011 and 2011-2012 (Farmer 2012, 2013) and only two observations in 2012-2013. Farmer (2012) noted that both Martin (1980) and OEA (1980) reported that the kestrel was the most abundant raptor in their study areas. Kestrels nest in a variety of sites, including cavities in trees, banks, cliffs and buildings (MTNHP 2014). As noted by Farmer (2012), potential nest sites were available throughout the study area, so lack of nest sites does not explain the low numbers of American kestrels observed in the Otter Creek Mine study area in 2010-2011, 2011-2012 or 2012-2013. Farmer found one American kestrel nest in spring 2011; no nests were found in the other two years.

4.6.11 Merlin

There was one observation of a merlin during the three years of study, a single bird perched on a fence post in bunchgrass habitat (subtype 411) along the Otter Creek road. Merlins are widespread but uncommon throughout the state (MTNHP 2014). Breeding pairs in eastern Montana usually nest in sparse conifer stands adjacent to prairie habitats, shelterbelts or river bottom forests (MTNHP 2014). There is preferred habitat in the Otter Creek Mine wildlife resources inventory area ([Appendix A](#)).

4.6.12 Eastern Screech-owl

There was one record of an eastern screech-owl during the three years of study, in December 2010 (Farmer 2012). In Montana, preferred eastern screech-owl habitat is primarily cottonwood (habitat subgroup 110). Preferred habitat is very limited in the Otter Creek Mine wildlife resources inventory area, and the single observation came from marginal habitat (Farmer 2012). No eastern screech-owls were heard during subsequent surveys during the winter-early spring in any of the three years.

4.6.13 Long-eared Owl

Farmer (2012) found a long-eared owl nest in ponderosa pine habitat (subtype 123) in Tract 2 in June 2011. The nest was in a mistletoe “witch’s broom” in a live ponderosa pine, and contained three partly-feathered chicks. Long-eared owls nest in mistletoe but this substrate is apparently less preferred than abandoned stick nests built by other birds (Marks et al. 1994). This nest site was not used in 2012 or 2013, and no other long-eared owls were heard or seen during the three years of study.

4.6.14 Short-eared Owl

Short-eared owls were not recorded in 2012-2013. There was one observation during the three years of study, of a single bird in sod-forming grass (subtype 412) habitat near the south end of the pheasant crow count route in spring 2012; breeding was not verified (Farmer 2013). Preferred short-eared owl habitat is open grasslands, plains, and agricultural areas with suitable vegetation and food (voles; MTNHP 2014), and preferred habitat is available in the Otter Creek Mine study area.

4.6.15 Burrowing Owl

There were three observations of burrowing owls in 2012-2013, each from a different black-tailed prairie dog colony (Figure 22). There were repeated sightings of a pair at a burrow (possibly a natal burrow) in April and early June. This site was about 0.25 mile from a 2012 natal burrow (Farmer 2013) and about 0.25 mile from a 2011 natal burrow (Farmer 2012). It is not unusual for burrowing owls to remain in the same general area for many years/generations (Poulin et al. 2011); thus it is possible that the 2013 birds were the same pair, or were related to the 2011 and 2012 birds.

4.6.15.1 Three-Year Summary

Burrowing owls were recorded in all three years of study, and at several black-tailed prairie dog colonies in the Otter Creek Mine wildlife resources inventory area. In addition, in 1980 Martin (1980) recorded burrowing owls in a prairie dog colony along Home Creek, and the MTNHP (2014) data base contains a recent record of burrowing owls in a prairie dog colony in Tract 3. Thus it appears that burrowing owls have benefited from the number and distribution of prairie dog colonies in and near the Otter Creek Mine study area.

4.6.16 Great Horned Owl

There were five observations of great horned owls in 2012-2013. All five were recorded during owl surveys in winter. Four were triangulated to riparian tree habitat (subtype 110) along Home Creek, Threemile Creek and Otter Creek, and one was recorded in ponderosa pine habitat (subtype 123) adjacent to Otter Creek (Figure 22). No nests were discovered in 2012-2013.

4.6.16.1 Three-Year Summary

Great horned owls were the most frequently observed owl in all three years of study. They were considered to be common in the Otter Creek Mine wildlife resources inventory area, were present year round and were widely distributed.

Great horned owls are adaptable “to any habitat” (MTNHP 2014), and in the Otter Creek Mine study area they were recorded in rock outcrops (habitat subtype 001), building sites (subtype 021), riparian tree (subtype 110), ponderosa pine (subtypes 123 and 124), juniper (subtype 130), bunchgrass (subtype 411), sod-forming grass (subtype 412) and hay (subtype 510) habitats. Only two nests were found during the three years of study, both in sandstone outcrops, but given the distribution and numbers of owls seen/heard in the study area, it seems likely that there were great horned owl nests in the inventory area that were not found.

4.7 WATERFOWL AND SHOREBIRDS

As discussed previously, for the purposes of this study, waterfowl were defined as members of the order Anseriformes (geese, ducks and swans) while shorebirds were members of the orders Gaviiformes

(loons), Podicipediformes (grebes), Pelecaniformes (pelicans and cormorants), Ciconiiformes (herons, bitterns, ibises, etc.), Gruiformes (cranes, rails, coots, etc.), Charadriiformes (plovers, snipe, sandpipers, avocets, phalaropes, gulls, terns, etc.) and Coraciiformes (kingfishers).

Seven species of waterfowl and nine species of shorebirds were recorded in 2012-2013 (Appendix A). One species of waterfowl, ring-necked duck, had not been recorded in previous years. The ring-necked duck occurs in southeastern Montana only during migration (MTNHP 2014); preferred nesting habitat is not available in the study area (Appendix A).

Two new species of shorebirds, willet and Wilson's phalarope, were recorded in 2012-2013 (Appendix A). Willets are found in short, sparse cover in wetlands and grasslands; on semiarid plains near bodies of water; and in grasslands associated with shallow wetlands (MTNHP 2014). Preferred habitat is available in the Otter Creek Mine wildlife resources inventory area (Appendix A), but nesting was not verified.

During spring migration, Wilson's phalaropes are widespread in lakes, ponds and flooded fields. In summer, however, they are restricted to marshy borders of lakes and ponds (MTNHP 2014). The 2012-2013 sightings comprised several phalaropes in an ephemeral pond along the Otter Creek road in early June. These birds were believed to be migrants. There have been no records of phalaropes during the nesting season in all three years.

There were three sightings of great blue herons along Otter Creek near the confluence of Tenmile Creek in spring 2013 (Figure 23). There was a small rookery in cottonwoods in this same area (Figure 20); the rookery supported eight active nests in early June 2013. This rookery was active in 2011 and 2012 (Farmer 2012, 2013). Farmer (2012) speculated that the Tongue River heron population was the source of birds for this site.

There were two sightings of sandhill cranes in spring 2013, both along Tenmile Creek (Figure 23). One sighting was a pair of birds, and nesting may have occurred but was not verified.

There were five observations totaling 17 Canada geese, recorded in autumn 2012, late winter 2012-2013 and spring 2014. Mated pairs of Canada geese were seen in spring, and nesting may have occurred but was not verified.

4.7.1 Three-Year Summary

Aquatic habitats are limited throughout the Otter Creek Mine wildlife study area, and particularly in the Primary Study Area. Consequently, waterfowl and shorebird species richness is limited by habitat availability.

Eleven species of waterfowl and 12 species of shorebirds were recorded during the three years of study (Appendix A). Nesting in the study area was verified for seven species of waterfowl (Canada goose, wood duck, mallard, blue-winged teal, northern shoveler, gadwall and American wigeon) and seven

species of shorebirds (pied-billed grebe, great blue heron, American coot, sandhill crane, killdeer, upland sandpiper, Wilson's snipe).

The number of waterfowl species recorded in the three years of study was near the total expected to occur in the study area, based on habitat availability (Figure 8). However, the total number of shorebirds recorded in the study area was well below the expected number (Figure 8).

Great blue herons were occasionally seen along Otter Creek and/or Tenmile Creek in all three years of study. There was a small great blue heron rookery in two adjacent cottonwood trees along Otter Creek near the confluence of Tenmile Creek. This rookery was active in all three years, and appeared to gradually increase in size from six active nests in spring 2011 to eight active and one inactive nests in spring 2013.

Otter Creek Mine study area residents reported that they began seeing sandhill cranes along Otter Creek and Tenmile Creek in spring and summer, beginning about 2000; chicks have been seen "for several years" (Farmer 2012). MTNHP (2014) data base records follow a similar time line. Nesting is believed to have occurred in all three years of study, based on sightings of mated pairs of cranes in spring and/or chicks in summer.

Canada geese were recorded in all seasons during the three years of study, but were most abundant in spring-autumn. Nesting was verified, based on sightings of broods in 2011 and 2012 (Farmer 2012, 2013).

Farmer (2012) reported that the pond/impoundment located in Section 11, T4S R45E in the northern part of Tract 2 was an important nesting/brood rearing area for several species of waterfowl and shorebirds, and contributed records of several species that were not observed elsewhere in the study area. This pond supported several species of waterfowl and shorebirds from April through early June 2012, but was dry by late June and remained dry through the rest of the summer (Farmer 2013). The pond again had water in spring 2013.

4.8 LANDBIRDS

As discussed previously, for the purposes of this study, landbirds were defined as all species except upland game, raptors, waterfowl and shorebirds.

Landbirds were inventoried in the proposed mine facilities area using two circular plots. Results are given in Table 9. A total of 13 species (including flyovers and incidentals) were recorded on these two plots, with 5 species (excluding flyovers and incidentals) per plot.

4.8.1 Three-Year Summary

Results from the 23 landbird plots run in spring 2011, 2012 or 2013 are given in [Table 10](#). A total of 57 species (including flyovers and incidentals were recorded on these 23 plots, ranging from 2 to 17 species (excluding flyovers and incidentals) per plot.

As discussed by Farmer (2012), it would be expected that the bird species richness would increase in response to more complex vertical and horizontal structure in a plot. Plots in forested habitat subtypes ranged from 5 to 17 species, and averaged 9.6 species. Plots in shrub habitats (excluding breaks, habitat subtype 280) ranged from 3 to 7 species, and averaged 4.5 species. Grassland and agricultural habitats ranged from 2 to 6 species, and averaged 4.2 species. Breaks habitat (which often had little vegetative cover) ranged from 2 to 4 species, and averaged 3.0 species.

4.9 MEDIUM-SIZED MAMMALS

As discussed previously, for the purposes of this study, medium-sized mammals were defined to be animals from the size of a black-tailed prairie dog to the size of a coyote ([Appendix A](#)).

There were 16 observations totaling 19 coyotes in 2012-2013. Most were recorded during aerial surveys. They were widespread ([Figure 24](#)), were observed in all seasons, and coyotes or their evidence (tracks, droppings, bones, hair) were recorded in most of the available habitats in the study area ([Appendix B](#)). In comparison, there were 14 sightings totaling 19 coyotes during 2011-2012 (Farmer 2013) and 27 sightings totaling 46 coyotes during 2010-2011 (Farmer 2012). The largest number of coyotes seen in a single day (no multiple sightings of the same individual) in 2012-2013 was eight, during the April aerial survey. In comparison, the largest numbers seen in a single day in 2011-2012 and 2010-2011 were seven and 11, respectively.

There was one observation of a red fox in 2012-2013, of a single fox in a hay field along Highway 212 in late December 2012 ([Figure 24](#)). In comparison, no red fox were observed in 2011-2012 (Farmer 2013), and there were two sightings in 2010-2011 (Farmer 2012).

There was a single observation of bobcat during 2012-2013. One bobcat was seen in ponderosa pine/shrub habitat (subtype 124) near Fortune Spring in April 2013 ([Figure 24](#)). In comparison, there were no sightings in 2011-2012 (Farmer 2013) and two records in 2010-2011 (Farmer 2012).

Badgers were not seen in 2012-2013 but their excavations were recorded in several habitats ([Appendix B](#)); therefore they were considered common.

There was one record of a striped skunk in 2012-2013, of a dead skunk on the Otter Creek road. As in past years, skunks were considered to be uncommon.

Raccoon tracks and dropping were observed at several locations on Otter Creek.

4.9.1 Three-Year Summary

Cottontails were considered to be common in the Otter Creek Mine study area during the three years of study. There was only one observation of white-tailed jackrabbit during the same period. As discussed previously, jackrabbits are rare in the Otter Creek Mine study area vicinity, for unknown reasons.

Porcupines or their evidence were commonly observed in forested habitats.

Bushy-tailed woodrat stick nests were occasionally found in rock outcrops in ponderosa pine habitat; this species was considered uncommon in the study area.

Muskrats and American mink were considered to be common in Otter Creek. Beaver were considered uncommon; Farmer (2012) suggested that the paucity of suitable food (deciduous trees and willows) appeared to be a limiting factor in the study area.

Farmer (2012) reported that in autumn 2010 there were about 1278 acres of active black-tailed prairie dog colonies in the Otter Creek Mine baseline inventory area but there were substantial reductions in the acreages of active prairie dog colonies from winter 2010 to summer 2011. Many prairie dog colonies appeared to be completely extirpated, while others contained a few prairie dogs and some colonies appeared to be unaffected. Within Tract 2 there were about 375 acres of active prairie dog colonies in October 2010; by July 2011 only about 80 acres remained active (Farmer 2012). Prairie dog colonies in Tract 2 were visited in spring 2012, and there appeared to be little change from summer 2011. By autumn, however, it appeared that some colonies had increased slightly. In spring, 2013 some colonies remained completely extirpated, some appeared unchanged from 2012, and several colonies appeared to be recovering. There was an estimated total of about 100 acres of active prairie dog colonies in spring 2013.

Coyotes were considered to be common in the Otter Creek Mine fish and wildlife resources inventory area in all three years of study.

Red fox were considered to be uncommon during all three years of study. Farmer (2012) suggested that red fox numbers were low due to interspecific conflicts with coyotes.

Bobcats were considered to be uncommon in the Otter Creek Mine study area throughout the study. However, bobcats are comparatively secretive, and relative abundance is difficult to estimate from sightings and evidence.

Badgers were never seen during the three years of study but their excavations were recorded in many habitats throughout Tract 2; therefore they were considered common.

Striped skunks were considered to be uncommon in all three years of study.

Raccoons were considered common in appropriate habitats (in stream drainages) in the study area.

4.10 SMALL MAMMALS (EXCLUDING BATS)

As discussed previously, for the purposes of this study, small mammals were defined as mammals smaller than a black-tailed prairie dog. Only four species (northern pocket gopher, deer mouse, thirteen-lined ground squirrel and least chipmunk) were recorded during the 2012-2013 monitoring year (Appendix A).

Northern pocket gopher evidence (mounds) was observed in several habitats (Appendix B) with dry, comparatively loose soils throughout Tract 2; based on this evidence pocket gophers were considered to be common.

A deer mouse was seen in habitat subtype 412 (sod-forming grass) in early June 2013 (Appendix B).

Thirteen-lined ground squirrels were recorded in sod-forming grass (habitat subtype 412) and black-tailed prairie dog colony (subtype 430) habitats in Tract 2 (Appendix B).

Least chipmunks were regularly observed in forested habitats and rock outcrops (Appendix B), and were considered common in the study area.

4.10.1 Three-Year Summary

Small mammals were trapped during the baseline study year (2010-2011) but were not trapped in the latter two years of study. All 10 species of small mammals recorded during the three years of study (Appendix A) would be expected in the habitats of the study area. No shrews were recorded during the three years of study, but may have been difficult to detect with the sampling methods used in 2010-2011.

4.11 BATS

Bats were not sampled in 2011-2012 or 2012-2013 because sampling results in 2011 (Farmer 2012) were considered adequate to address species richness and habitat use in the study area. Ten of 12 species of bats potentially occurring in the study area were recorded.

4.12 AMPHIBIANS AND REPTILES

WESTECH biologists did not observe any amphibians during the 2012-2013 monitoring year. However, Stagliano (2014) recorded the same four species (tiger salamander, Woodhouse's toad, boreal chorus frog and northern leopard frog) that were recorded by WESTECH and/or MTNHP personnel in each of the previous years (Appendix A). Consequently all were considered common in appropriate habitats in the study area.

Only five reptiles (snapping turtle, painted turtle, gophersnake, terrestrial gartersnake and prairie rattlesnake) were recorded in 2012-2013, all by Stagliano (2014; [Appendix A](#)). All were recorded in the previous two years of study ([Appendix A](#)), and all were considered common.

The greater short-horned lizard was recorded in the first two years of study ([Appendix A](#)), and was considered common in appropriate habitats but patchily distributed in the study area (Farmer 2012). The eastern racer was also recorded during the first two years of study ([Appendix A](#)), and was considered common (Farmer 2013).

The western hog-nosed snake and common gartersnake were each recorded in only one of the three years ([Appendix A](#)), and were therefore considered uncommon.

4.13 ENDANGERED OR THREATENED SPECIES

As discussed in section 3.13, only two species that are listed, proposed or candidates for listing under the ESA could occur in the Otter Creek Mine fish and wildlife resources inventory area: greater sage-grouse and Sprague's pipit. Neither was recorded in 2012-2013. There has been only one sighting of greater sage-grouse in three years of study ([Appendix A](#)); consequently sage-grouse are considered occasional in the study area. Sprague's pipit was not recorded in three years. As discussed previously, preferred habitat for Sprague's pipit is limited in the study area.

4.14 SPECIES OF CONCERN

Farmer (2012) estimated relative abundance for many Species of Concern in the Otter Creek Mine fish and wildlife resources inventory area based on habitat availability, literature review and results of field work. It was not possible to estimate relative abundance for some species from this information. Farmer (2012) recognized that many species may have been more (or less) common than estimated, depending on their ease of detection and/or distribution within the study area; and that relative abundance for some species, particularly birds, could change seasonally and/or from year to year. This information was revised, based on the addition/deletion of species by MTNHP and FWP (2014) and results of three years of study, and is presented in [Table 11](#).

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