OPERATING PERMIT APPLICATION

MONTANA LIMESTONE RESOURCES

APPENDIX A-3

BASELINE TERRESTRIAL WILDLIFE REPORT

Revised March 2018

TERRESTRIAL WILDLIFE RESOURCES,

MONTANA LIMESTONE RESOURCES PROJECT,

GRANITE COUNTY, MONTANA

Prepared for:

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1.0 INTRODUCTION

In February 2013 Montana Limestone Resources LLC (MLR) contracted WESTECH Environmental Services, Inc. (WESTECH) to characterize terrestrial wildlife resources at MLR's proposed limestone mine approximately one mile west/southwest of Drummond, in Granite County, Montana. The study area (Figure 1) is located in all or portions of Sections 1 and 2, T10N R13W; Section 31, T11N R12W; and Sections 23, 25-28 and 34-36, T11N R13W, comprising about 3540 acres of the former Bar-Four-Bar Ranch.

Study area topography varies from very gentle in the Clark Fork River valley, to gently to steeply rolling in the uplands. Elevations range from about 3900 feet along the Clark Fork River, to about 4400 feet in the potential mine area, to about 4650 along the west edge of the study area. One named drainage, Tigh Creek (ephemeral), flows north to the river along the west edge of the study area.

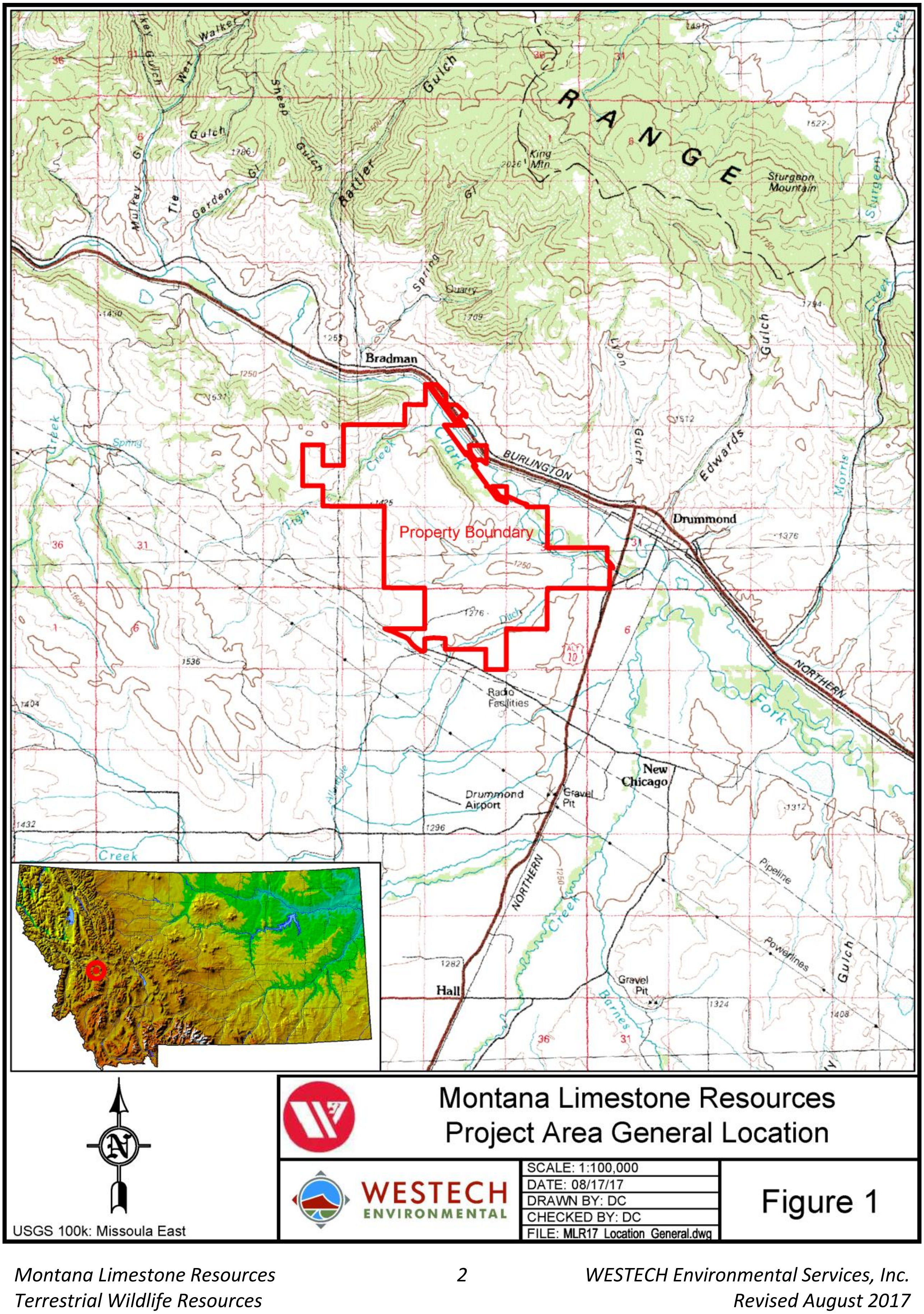
The study area climate is continental, with cold winters, warm summers, and a comparatively short (April-September) growing season. Average temperatures range from a minimum of about 11°F in January to a maximum of about 84°F in July (Scow 2014). Seasonal extreme temperatures may be considerably colder or warmer. Average precipitation is about 13 inches, with most falling as rain in May and June (Scow 2014).

Field work was conducted irregularly from mid-February through early October 2013, with most effort expended in April-June. The primary field investigator was Patrick Farmer; Ken Scow, Drake Barton, Dean Culwell and Corey Baker recorded several wildlife sightings while they conducted other studies. Rancher Charles Moody provided his insights on wildlife use of the area. Ray Vinkey and Kristi Dubois of Montana Fish, Wildlife and Parks (FWP) generously shared their information and knowledge from the study area vicinity. The Montana Natural Heritage Program (MTNHP) provided locations of sightings of Species of Concern from the vicinity; Bryce Maxell summarized MTNHP's data of bats acoustically recorded along the Clark Fork River near Bearmouth, about 10 miles downstream from the study area. This report was written by Patrick Farmer; Dan Culwell prepared the wildlife habitat map and all figures for the report.

2.0 METHODS

2.1 HABITAT DELINEATION AND MAPPING

Wildlife habitats in the Montana Limestone Resources Project terrestrial wildlife resources study area are a function of geology, climate, topography, soils, vegetation and land use. A wildlife habitat map was prepared using WESTECH's (1993) system, which was derived from Coenenberg *et al.* (1977) and is based on dominant existing vegetation and physical features such as rock outcrops and ponds. In order to ensure consistency with the vegetation baseline study, vegetative wildlife habitat subtype map unit boundaries were derived from the vegetation community map (Scow 2014) and were mapped at a scale of 1" = 600'.



Property Boundary
Bradman
Drummond
New Chicago
Drummond Airport
Gravel Pit
Radio Facilities
Hall
R A N G E
King Mtn
Sturgeon Mountain
BURLINGTON
NORTHERN
Clark
Fork
Quarry
Pipeline
Powerlines
Montana Limestone Resources
Project Area General Location
WESTECH ENVIRONMENTAL
SCALE: 1:100,000
DATE: 08/17/17
DRAWN BY: DC
CHECKED BY: DC
FILE: MLR17 Location General.dwg
Figure 1
USGS 100k: Missoula East

2.2 SPECIES LIST

A list of terrestrial wildlife species potentially occurring in the Montana Limestone Resources Project study area was derived from general literature sources (MTNHP 2014). This list was further refined by legal status (listed, proposed or candidate species under the Endangered Species Act of 1973; USFWS 2014), occupational status (resident vs. migrant), and whether or not preferred/primary habitats were available in the study area. During field work all species documented by sightings or evidence were recorded by the habitat in which they were observed. These records were compared to habitat availability to describe habitat use by species, and species richness by habitat.

2.3 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 (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), moose (*Alces americanus*), mountain lion (*Puma concolor*) and black bear (*Ursus americanus*). Big game sightings were recorded throughout the study by species, date, time of day, habitat, number of animals, age and gender (if possible) and activity, and GPS locations were mapped on an aerial photographic base via an IPad.

FWP has developed the Crucial Areas Planning System (CAPS), a GIS-based analysis of the relative importance for wildlife of each square mile. CAPS mapping has identified the study area as mule deer and moose winter range; moose and white-tailed deer are present in the Clark Fork River bottom year round. The river bottom is assigned a rank of Class 2 (high) for winter range quality, while the upland portion of the study area is assigned to Class 1 (moderate value).

The study area is also elk winter range. FWP includes the study area in its Harvey Creek-North Fork Willow Creek winter aerial survey area. FWP's survey area is (obviously) much larger than the Montana Limestone Resources Project study area. Several hundred elk are counted in FWP's survey area each winter, some of which winter in the Montana Limestone Resources Project study area (Ray Vinkey, area biologist, Montana Fish, Wildlife and Parks, personal communication, February 20, 2013).

In terms of overall terrestrial game quality, CAPS mapping assigns the upland portion of the study area to Rank 4 (lowest on a scale of 1 to 4), while the river bottom is assigned to Class 2.

2.4 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) that could also occur in the vicinity of the study area: gray partridge (*Perdix perdix*), wild turkey (*Meleagris gallopavo*), sharp-tailed grouse (*Tympanuchus phasianellus*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Falcipennis canadensis*) and dusky grouse (*Dendragapus obscurus*).

Throughout field work, 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 an aerial photographic base via an IPad. In April and May an effort was made to hear displaying male birds from vantage points in appropriate habitat throughout the study area.

2.5 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 study, 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 an aerial photographic base via an IPad.

Surveys for breeding owls were conducted along the Clark Fork River bottom in late April, May and early June. After several minutes of listening, recorded calls of species most likely to occur in the area in winter/early spring (western screech-owl (*Megascops kennicottii*), northern saw-whet owl (*Aegolius acadicus*), long-eared owl (*Asio otus*) and great horned owl (*Bubo viginianus*) were played in ascending order of bird size, to solicit responses.

Searches for nests of owls and diurnal raptors in the study area were conducted in May, June and July 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.

2.6 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.*) and Charadriiformes (plovers, snipe, sandpipers, avocets, phalaropes, gulls, terns, *etc.*).

Aquatic habitats in the study area are essentially limited to the Clark Fork River bottom; developed springs in the study area do not provide appropriate habitat for waterfowl and shorebirds. Aquatic habitats in the Clark Fork River bottom were examined in spring and summer for use by waterfowl and shorebirds. Shorebirds that might occur in upland habitats (*e.g.*, killdeer (*Charadrius vociferus*) were inventoried via opportunistic observations.

2.7 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.

Breeding landbirds were inventoried in June using four circular plots to determine species richness in major habitat types (Plate 1). Landbird plots were placed at sites of potential mine-related disturbance, identified by MLR in February 2013. 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 once.

2.8 MEDIUM-SIZED MAMMALS

For the purposes of this study, medium-sized mammals were defined to be animals from the size of a Columbian ground squirrel (*Urocitellus columbianus*) to the size of a coyote (*Canis latrans*), and included some species that have legal status as furbearers (beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), American mink (*Mustela vison*), northern river otter (*Lontra canadensis*) and bobcat (*Lynx rufus*); 87-2-101(3) MCA) or predators (coyote, weasel (*Mustela* spp.) and striped skunk (*Mephitis mephitis*); 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 an aerial photographic base via an IPad.

2.9 SMALL MAMMALS (EXCLUDING BATS)

For the purposes of this study, small mammals were defined as mammals up to the size of a ground squirrel. No effort was made to quantitatively sample small mammals. Throughout the study, small mammals or their evidence (*e.g.*, tracks, skulls in raptor casts, burrows) were recorded by the habitat in which they were observed.

2.10 BATS

Fifteen species of bats possibly occur in Montana; of these, 12 potentially occur in the vicinity of the Montana Limestone Resources Project study area (MTNHP 2014). An attempt was made to inventory bat species richness via acoustic surveys in July, using a Wildlife Acoustics SM2 bat detector. The detector was placed on a fence post overlooking a pond/side channel of the Clark Fork River. Cattle were reportedly no longer in this pasture, and none were seen on the day the detector was set out.

Unfortunately, at least one cow remained in the pasture, and the detector was severely damaged that night. No further sampling was attempted.

The MTNHP is conducting a long-term acoustic study of bat occurrence throughout the state, and has established a sample site near Bearmouth, about 10 miles downstream from the study area. The riparian habitat at this site is similar to that of the study area; therefore it was assumed that bats recorded at the Bearmouth site might also occur in the study area vicinity. For the purposes of this study, MTNHP summarized the data from this site and provided it for this report.

2.11 AMPHIBIANS AND REPTILES

All amphibians and reptiles were recorded by the habitat in which they were seen. In addition, 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).

2.12 ENDANGERED OR THREATENED SPECIES

The USFWS (2014) identified three terrestrial wildlife species that are listed, proposed or candidates for listing under the Endangered Species Act of 1973, as amended (ESA): Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos*) and wolverine (*Gulo gulo*).

The USFWS (2013) has proposed revised Designated Critical Habitat for the Canada lynx in Montana. Under the proposed revision, portions of northern Granite County would be Designated Critical Habitat. The Montana Limestone Resources Project study area is near the southern boundary of this proposal.

The dominant vegetation that constitutes lynx habitat in the Northern Rocky Mountains is subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*) and lodgepole pine (*Pinus contorta*); dry forest types (*e.g.*, ponderosa pine (*Pinus ponderosa*) and dry Douglas-fir (*Pseudotsuga menziesii*)) do not provide lynx habitat (USFWS 2013). Consequently, preferred habitat for the Canada lynx is not available in the Montana Limestone Resources Project study area vicinity, and the probability of a sighting in the study area is considered to be very low.

The current distribution of grizzly bears in Montana includes northern Granite County and there is a 2005 record of a grizzly bear sighting within about 15 miles of the study area (MTNHP 2014). Grizzly bears may use a wide variety of habitats, and therefore it is possible that a transient grizzly bear could travel through the study area. However, given the proximity of human activity (I-90, Drummond, Highway 1, many residences and ranches), it is unlikely that grizzly bears would be endemic to the vicinity. Grizzly bears have not been seen in or near the Montana Limestone Resources Project study area (Charles Moody, rancher, personal communication, October 1, 2013).

The range of the wolverine includes all of western Montana, and there are records from Granite County. However, preferred wolverine habitat is large, mountainous and essentially roadless areas, generally at or above timberline (MTNHP 2014). The Montana Limestone Resources Project study area does not

constitute preferred wolverine habitat, and the probability of a sighting in the study area is considered to be very low.

2.13 SPECIES OF CONCERN

Montana has established a list of vertebrate animal Species of Concern (MTNHP and MFWP 2014); these species are listed in Appendix A. All such species observed during the study were recorded by the habitat in which they were observed and, if appropriate, their locations were mapped.

3.0 RESULTS AND DISCUSSION

3.1 HABITAT AVAILABILITY

Hall *et al.* (1997) defined "habitat" as "…the resources and conditions present in an area that produce occupancy – including survival and reproduction – by a given organism." This definition is useful when applied to a single species or a small species group (*i.e.*, "a given organism"). However, terrestrial wildlife resource inventories usually must also address a broad range of species groups (*i.e.*, amphibians, reptiles, mammals and birds), some of which may be migrants (*i.e.*, "reproduction" may not be a consideration), that are present in a comparatively small geographic area (the study area) (States *et al.* 1978). For the purposes of this study, wildlife habitat is considered to be the combination of biotic (*e.g.*, vegetation, other animal species) and abiotic (*e.g.*, topography, climate) conditions preferred or used (temporarily, seasonally or year round) by a particular terrestrial wildlife species or species group.

Wildlife habitat components can be broadly defined as food, water, cover and space. The type, quantity and distribution of these components determine the kinds of wildlife present in a given area; thus habitat components can be used to determine the species potentially occurring in the area. Some of these factors (Morrison *et al.* 2006) that are relevant to the Montana Limestone Resources Project study area include:

- Geology and soils: Geology (affected by factors such as wind and water erosion) creates topography and soils that help determine the use of an area by wildlife. Soils create conditions to support vegetation communities, as well as microsite habitat conditions that determine use by some wildlife species.

- Vegetation: Vegetation communities provide forage, thermal cover, nesting substrate, *etc.*;

- Vertical and horizontal structure: Vertical structure of habitat in the Montana Limestone Resources Project study area encompasses abiotic conditions such as rock outcrops, and biotic conditions such as tree species (coniferous vs. deciduous), and presence and density of shrubs in the understory. Horizontal structure provides cover and forage (*e.g.*, dense sagebrush vs. open sagebrush; bunchgrass habitat with considerable bare ground vs. sod-forming grass with less bare ground);

- Size, arrangement and interspersion of habitats: some wildlife species prefer comparatively large areas of a single habitat, while others prefer edges and ecotones between habitat types;

- Surrounding landscape: viewed from satellite imagery, the Montana Limestone Resources Project study area is a small part of a broad, open area bounded by three mountain ranges, and dissected by the Clark Fork River and Flint Creek. Thus there is considerable habitat diversity in or near (within 10 miles of) the study area, which could potentially contribute to terrestrial wildlife species richness of the study area.

- Time of year: some of the bird species that might be encountered in the Montana Limestone Resources Project study area are spring and autumn migrants through the area, rather than breeding residents. Big game distribution may change seasonally, depending on habitat availability and weather severity; and

- Habitat features: small areas or microsite habitats created by impoundments, temporary ponds created by snowmelt or rainfall, cliffs, snags, *etc.*, may allow certain wildlife species to use an area where they would otherwise be less likely to occur.

For the purposes of this study, habitat delineation was based on dominant existing vegetation and physical features. Six major wildlife habitat types, comprising 17 habitat subtypes, were identified in the Montana Limestone Resources Project terrestrial wildlife resources study area (Plate 1). Habitat types and subtypes are described in Appendix B. Acreages of habitat subtypes are presented in Table 1. Terrestrial wildlife species recorded by habitat are given in Appendix C. Habitat availability is compared to species richness in Figure 2.

Habitat Type 000 (Miscellaneous Features) comprised only about three percent of the study area (Table1), but wildlife species richness for these habitat subtypes was comparatively high (Figure 2). Subtypes 001 (rock outcrop) and 002 (pond/impoundment/river/stream) were particularly important for certain species/species groups (Appendices B and C).

Habitat Type 100 (Woodland) comprised seven habitat subtypes (Appendix B), but for purposes of comparisons of wildlife species richness with habitat availability, some subtypes were grouped into complexes (Figure 2). The riparian habitat complex along the Clark Fork River bottom totaled less than eight percent of the study area, but almost 61 percent of the wildlife species observed during the study were recorded at least once in this habitat. Similarly, the Douglas-fir complex totaled about 10 percent of the study area, but almost 44 percent of the wildlife species observed during the study were recorded at least once in this habitat (Figure 2).

Table 1. Habitat types and subtypes, Montana Limestone Resources Project terrestrial wildlife study area, 2013.

Map Unit	Habitat		Amount	
	Type	Subtype	Approx. Acres	Percent
	000. Miscellaneous Features			
001		Rock Outcrop	5	0.1
001/163		Rock Outcrop/Douglas-fir/Grass	4	0.1
002		Water	40	1.1
020		Road	38	1.1
021		Buildings	16	0.5
		Sub-total	**103**	**2.9**
	100. Woodland			
110		Riparian Tree	193	5.4
123		Ponderosa Pine/Grass	4	0.1
130		Juniper	117	3.3
130/163		Juniper/Douglas-fir/Grass	8	0.2
130/212		Juniper/Big Sagebrush	5	0.1
160		Douglas-fir	168	4.7
163		Douglas-fir/Grass	99	2.8
164		Douglas-fir/Shrub	93	2.6
		Sub-total	**687**	**19.3**
	200. Xeric Shrub			
212		Big Sagebrush	705	19.9
212/530		Big Sagebrush/Tame Pasture	24	0.7
		Sub-total	**729**	**20.6**
	300. Mesophytic Shrub			
320		Low Mesic shrub	9	0.3
		Sub-total	**9**	**0.3**
	400. Grassland			
411		Bunchgrass	1442	40.7
411/212		Bunchgrass/Big Sagebrush	3	0.1
412		Sod-forming Grass	132	3.7
412/530		Sod-forming Grass/Tame pasture	12	0.3
413		Riparian Grass	14	0.4
413/002		Riparian Grass/Water	5	0.1
		Sub-total	**1608**	**45.4**
	500. Agriculture			
510		Hay	66	1.9
530		Tame Pasture	319	9.0
		Sub-total	**385**	**10.9**
NS	Not Surveyed		21	0.6
		Sub-total	**21**	**0.6**
		TOTAL	**3542**	**100.0**

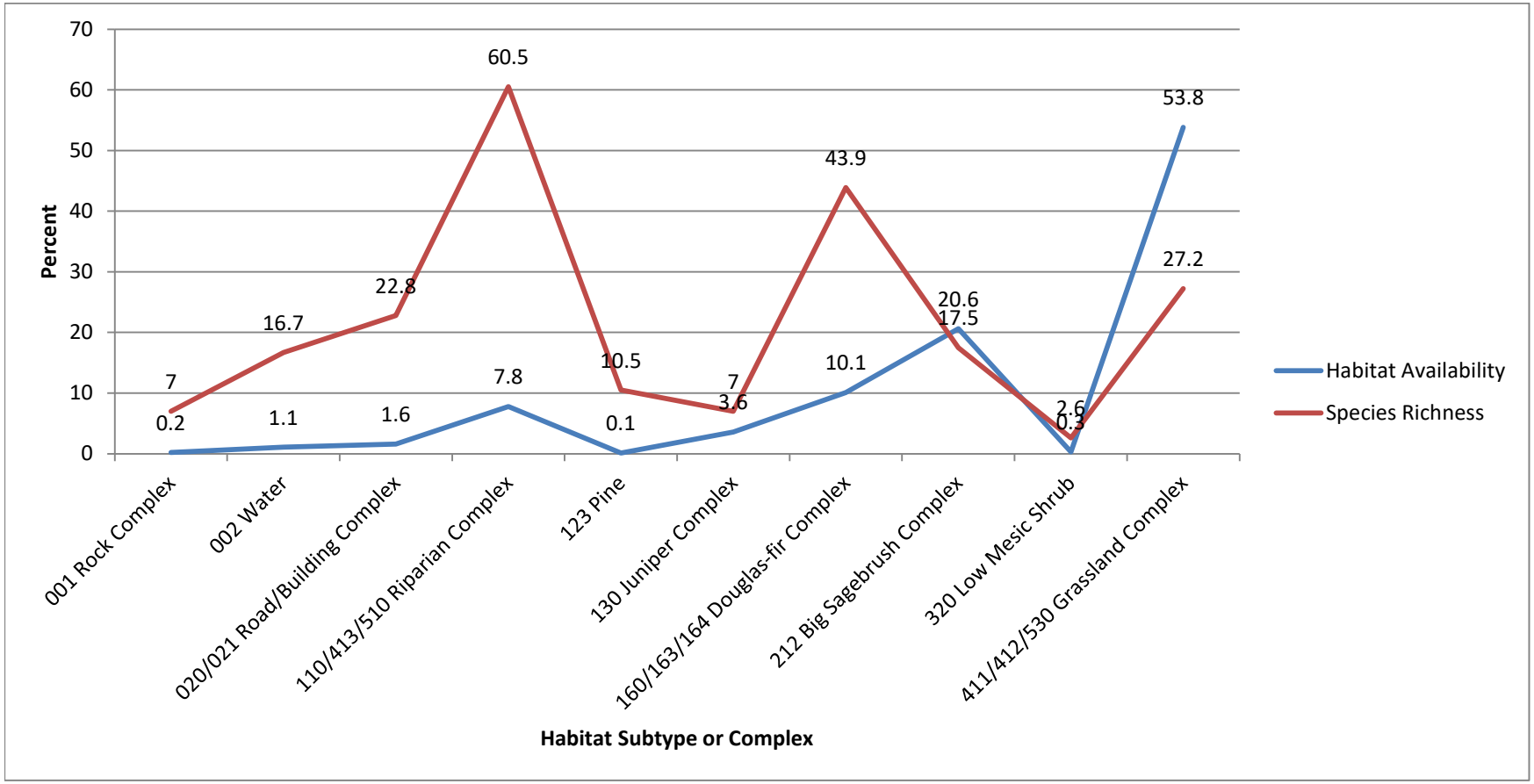


Fig. 2. Comparison of habitat availability (Table 2) with terrestrial wildlife species richness (as a percentage of 114 total species, Appendix C), Montana Limestone Resources Mine study area, 2013.

Habitat Type 200 (Xeric Shrubland) was represented by a single subtype, big sagebrush (subtype 212), but totaled almost 21 percent of the study area (Table 1), and formed a mosaic with upland grassland habitat subtypes, particularly bunchgrass (subtype 411; Plate 1). However, only about 18 percent of all wildlife species observed during the study were recorded at least once in this habitat (Figure 2).

Habitat Type 300 (Mesophytic Shrub) was a very minor component of the study area, totaling less than one percent of the area (Table 1). It contributed a comparably small number (Appendix C) and percentage (Figure 2) of wildlife species. Mesic shrubs were also an understory component in habitat subtype 110 (riparian tree).

Habitat Type 400 (Grassland) was the dominant habitat in the study area, totaling about 46 percent of the area (Table 1). Two subtypes (411 bunchgrass, 412 sod-forming grass) were grouped along with subtype 530 (tame pasture) to form an upland grass habitat complex. Most of the wildlife species recorded in one of these subtypes could be expected to occur in the other two (Appendix C). The upland grassland complex totaled almost 54 percent of the study area, but only about 27 percent of all the terrestrial wildlife species recorded during the study were observed at least once in this complex (Figure 2; Appendix C). The poor vertical and horizontal structure of grasslands, combined with a considerable amount of bare ground and a generally low diversity of microhabitat sites, contributed to the comparatively low wildlife species richness of this habitat.

Habitat Type 500 (Agriculture) was represented by two subtypes. Subtype 510 (hay) comprised fields that were harvested for hay, totaled about two percent of the study area (Table 1), and were considered part of the riparian habitat complex (Figure 2). Subtype 530 (tame pasture) were fields that had been planted to non-native grasses. This subtype totaled nine percent of the study area (Table 1) and was a major component of the potential mine area (Plate 1). For the purposes of wildlife/habitat comparisons, it was grouped into the upland grass habitat complex (Figure 2).

3.2 SPECIES LIST

Terrestrial wildlife species occurring in the Montana Limestone Resources Project study area, as derived from MTNHP (2014), are listed in Appendix A. A total of 379 species (5 amphibians, 9 reptiles, 73 mammals and 292 birds) potentially occur in the region encompassing the study area, reflecting the surrounding landscape (discussed in Section 3.1 above). The study area contains preferred and/or breeding habitat for 290 species (4 amphibians, 9 reptiles, 63 mammals and 214 birds), or about 77 percent of the potential list, reflecting habitat availability in and near the study area. A total of 114 species (0 amphibians, 1 reptile, 20 mammals (not including bats recorded within 13 miles of the study area by Maxell (2014)) and 93 birds) were recorded during 2013 field work (Appendix A), or 39 percent of the species with preferred and/or breeding habitat in the study area. None of the species recorded during the study were unexpected, based on habitat availability (Appendix C). The total is undoubtedly low because many species may be difficult to observe by the methods employed during the study. Nevertheless, the Montana Limestone Resources Project study area supports good wildlife species richness, particularly in wooded habitats.

3.3 BIG GAME

As discussed previously, big game species potentially occurring in the Montana Limestone Resources Project terrestrial wildlife resources study area were pronghorn, mule deer, white-tailed deer, elk, moose, black bear and mountain lion. All except pronghorn and mountain lion were recorded in 2013.

Pronghorn are found along the Clark Fork River valley above Drummond, and there is general/winter range several miles southeast of the Montana Limestone Resources Project study area (MTNHP 2014). Although there is suitable pronghorn habitat in the study area, there has been only one sighting in the area in the last 20 years (Charles Moody, rancher, personal communication, October 1, 2013).

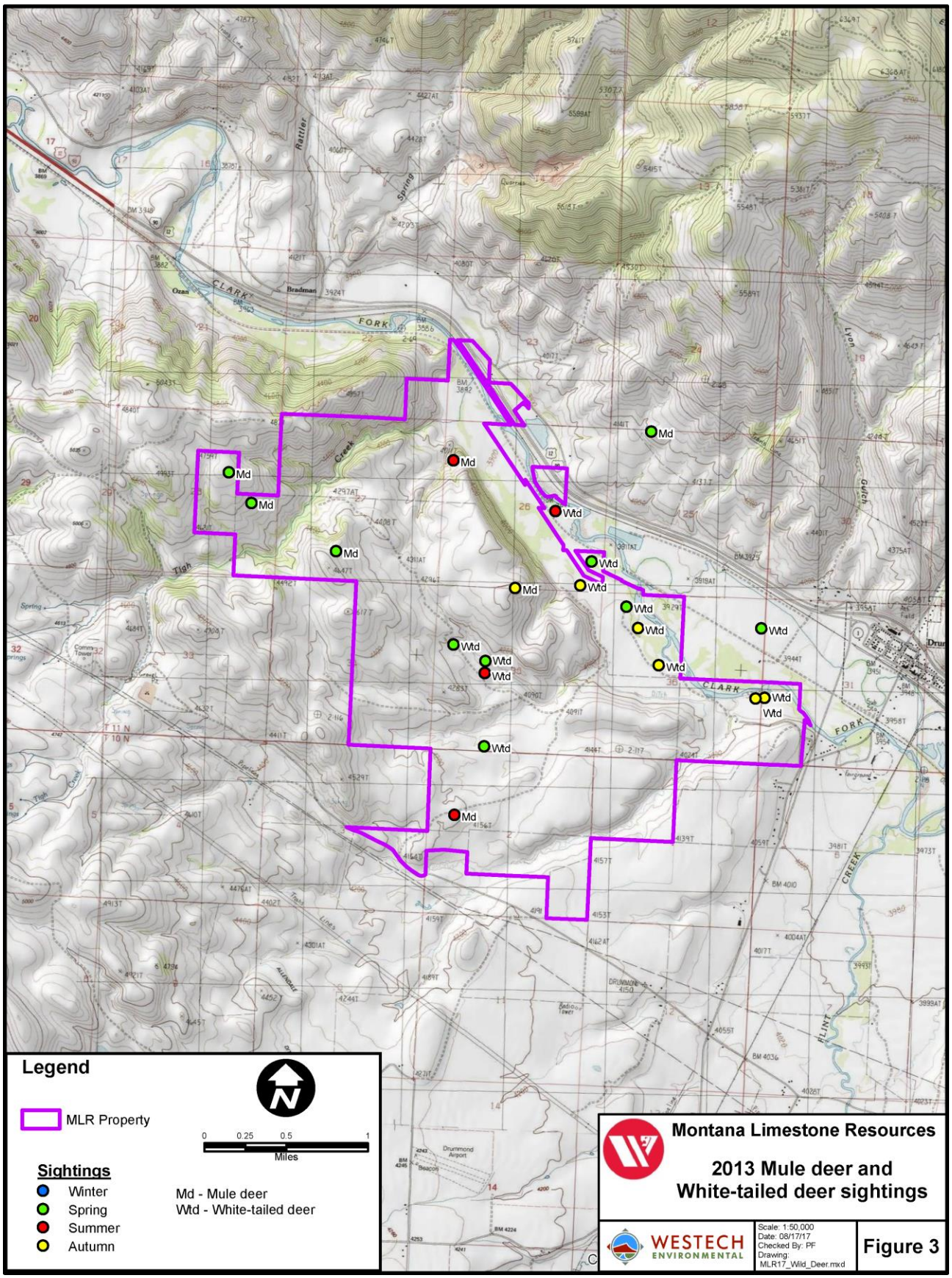
Mountain lion have been observed near the Montana Limestone Resources Project study area in recent years (MTNHP 2014) and therefore could occur at least occasionally in the study area, but this secretive species was not recorded by sightings or evidence in 2013.

3.3.1 Mule Deer

Mule and white-tailed deer sightings are shown in Figure 3. Mule deer were seen less commonly than white-tailed deer. There were seven sightings: four in spring, two in summer and one in autumn. As discussed in Section 2.3, FWP CAPS mapping has identified the study area as mule deer winter range, and mule deer are reported to be more common in the study area during winter than in other seasons (Charles Moody, rancher, personal communication, October 1, 2013). No mule deer were observed in the study area in winter, but the lack of sightings was attributed to allocation of field effort, rather than absence of animals. Evidence (tracks, pellet groups) was observed on bare, upper elevation grasslands, often intermixed with elk evidence.

The four spring observations came from late March, April and early May. Two sightings were recorded in big sagebrush (habitat subtype 212) and two in subtype 411 (bunchgrass). Group size ranged from 1 to 8, and averaged 4.0. It was not possible to differentiate gender in the March and April sightings; the May sighting was two females. Three of the four spring sightings were from the Tigh Creek vicinity (Figure 3).

The two summer sightings both came in late June, and each was a single deer (one male, one female). One observation came from habitat subtype 212 (big sagebrush) in the southern part of the study area, while the other came from bunchgrass habitat (subtype 411) on a steep slope surrounded by Douglas-fir (Figure 3). It was subjectively believed that few mule deer were present in the study area for much of the summer. It was reported that mule deer are “scarce” in most summers (Charles Moody, rancher, personal communication, October 1, 2013). In addition, in summer 2013 there was considerable human activity in the study area associated with pre-mine environmental surveys, core drilling, *etc.* Several of these people were interviewed and none reported seeing mule deer in summer.


Legend
MLR Property
Sightings
Winter
Spring
Summer
Autumn
0 0.25 0.5 1
Miles
Md - Mule deer
Wtd - White-tailed deer
Montana Limestone Resources
2013 Mule deer and White-tailed deer sightings
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Deer.mxd
Figure 3

The single autumn sighting came in early October, in bunchgrass habitat near the center of the study area (Figure 3). Mule deer numbers in the study area increase in late autumn/early winter (Charles Moody, rancher, personal communication, October 1, 2013).

3.3.2 White-tailed Deer

There were 13 sightings totaling 51 white-tailed deer during 2013 (Figure 3). There were no sightings in winter. As with mule deer, the lack of sightings was attributed to allocation of field effort, rather than absence of animals. Evidence (tracks, pellet groups) was seen in hay fields along the Clark Fork River bottom, and white-tailed deer were reported to be present in the study area year round (Charles Moody, rancher, personal communication, October 1, 2013).

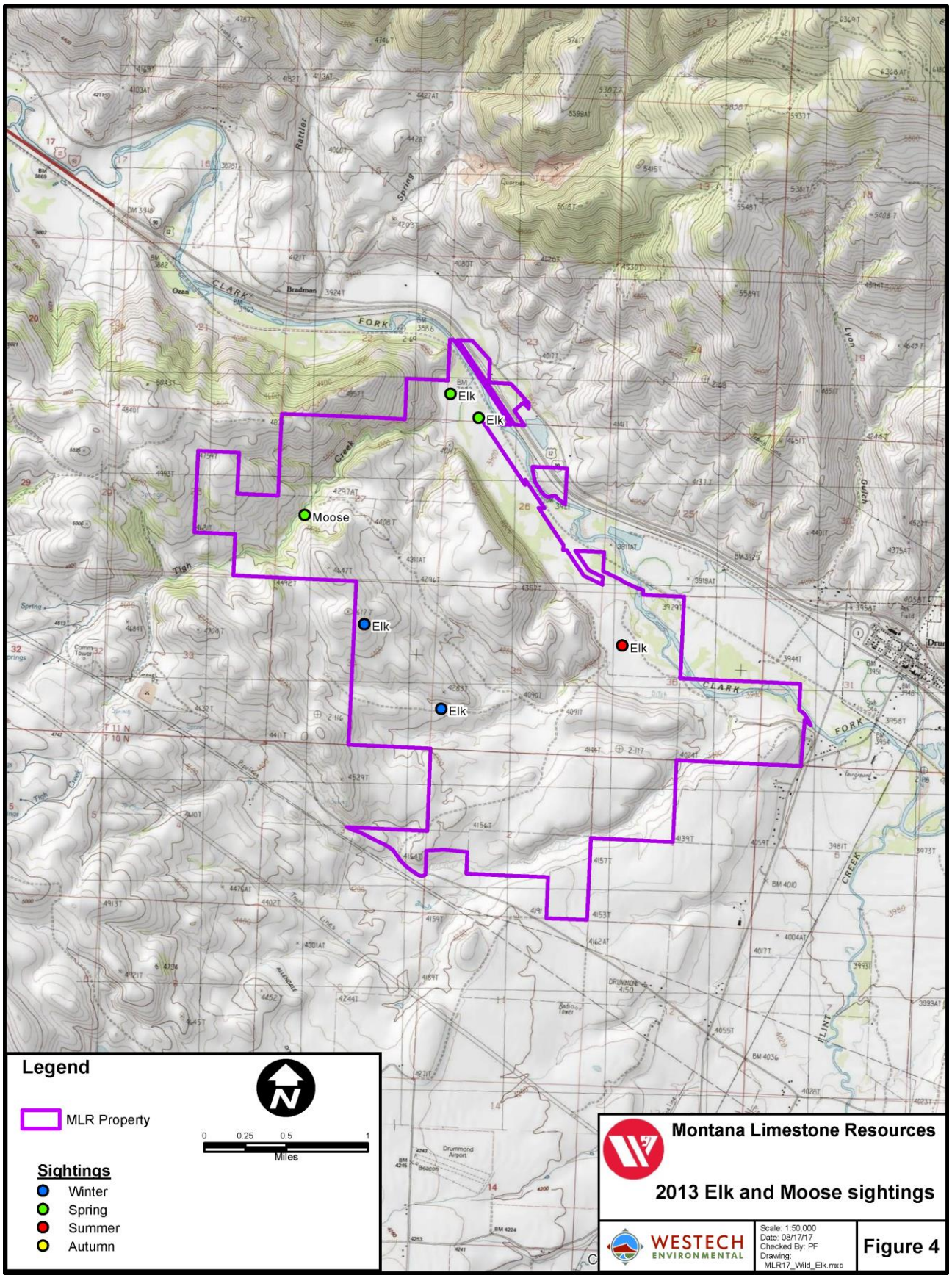
There were six sightings totaling 28 white-tailed deer in spring; group size ranged from 2 to 11 and averaged 4.7. Sightings varied from the river bottom to the uplands in the central part of the study area (Figure 3). Of the three river valley sightings, two were in hay fields (habitat subtype 511) and one in a tame pasture (subtype 530). Of the three upland sightings, one was in a stand of Rocky Mountain juniper (habitat subtype 130), one in big sagebrush (subtype 212) and one in bunchgrass (subtype 411). Three of the spring sightings were in late March, one in April and two in May. It appeared that some white-tailed deer left the river bottom to forage in upland areas in early spring, possibly in response to earlier spring "green up" in upland habitats.

Similarly, one of the summer sightings was in early June in bunchgrass habitat (subtype 411) in the uplands, but by mid-June it appeared that white-tailed deer were largely restricted to river bottom habitats. All mid-summer to autumn sightings were in the river bottom (Figure 3). There were five observations in autumn, ranging from 1 to 12 and averaging 3.8 white-tailed deer. A fawn was observed in August, and it is subjectively believed that fawns were born in the study area in 2013.

3.3.3 Elk

Elk and moose sightings are shown in Figure 4. As discussed previously, the study area lies within a larger unit of elk winter range supporting several hundred elk, and moose are present in or near the study area (river bottom) year round.

There were five sightings totaling 20 elk in 2013 (Figure 4). There were two winter observations (groups of 4 and 11 animals), both from big sagebrush habitat (subtype 212) on windswept ridges in the central portion of the study area (Figure 4). Evidence (tracks, pellet groups) was present on every open ridge in the study area, and elk tracks in the snow were observed leading from the highest ridge in the north central part of the area, west across Tigh Creek to the ridges farther west, and southwest generally following the Tigh Creek drainage south out of the study area. Tracks also led down Tigh Creek to the Clark Fork River bottom. In late February, approximately 200 elk along the Clark Fork River bottom were counted from I-90 between Bradman (just northwest of the study area, Figure 4) and Bearmouth, about 10 miles downstream.


Legend
MLR Property
Sightings
Winter
Spring
Summer
Autumn
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Miles
Elk
Elk
Moose
Elk
Elk
Elk
CLARK
FORK
Montana Limestone Resources
2013 Elk and Moose sightings
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Elk.mxd
Figure 4

The two spring sightings (groups of 2 and 12 elk) both came from the Clark Fork River bottom, one in tame pasture (habitat subtype 530) in late March and the other in sod-forming grass (subtype 412) in late April. Most elk were reported to have left the study area by mid-April in many years (Charles Moody, rancher, personal communication, October 1, 2013).

The single summer observation was a lone female recorded in a hay field in July (Figure 4). Several other people working in the study area reported a single female in this same area in July, but did not observe other elk. In many summers elk move into the river bottom to feed in hay fields (Charles Moody, rancher, personal communication, October 1, 2013), but this use was apparently limited in 2013, perhaps affected by human activity associated with pre-mine studies in the area.

3.3.4 Moose

Moose are present in the Clark Fork River Valley year round (Ray Vinkey, area biologist, Montana Fish, Wildlife and Parks, personal communication, February 20, 2013). There was a single sighting in 2013, of an adult female in Douglas-fir habitat (subtype 160) in upper Tigh Creek in early May (Figure 4). Evidence (pellet groups) from winter was seen at several locations in riparian tree habitat (subtype 110) along the Clark Fork River bottom, and skeletal remains of an adult female were found in Douglas-fir/shrub habitat (subtype 164; Appendix C).

3.3.5 Black Bear

There was one sighting of a black bear in 2013, of a single adult grazing in a small meadow (habitat subtype 411) in a drainage west of Tigh Creek on May 7 (Figure 5). Evidence (scats) from the spring was also observed in Douglas-fir (habitat subtype 160) and Douglas-fir/shrub (subtype 164) subtypes. There were no further sightings or reports of black bears or their evidence, suggesting that black bear use of the study area was occasional rather than consistent.

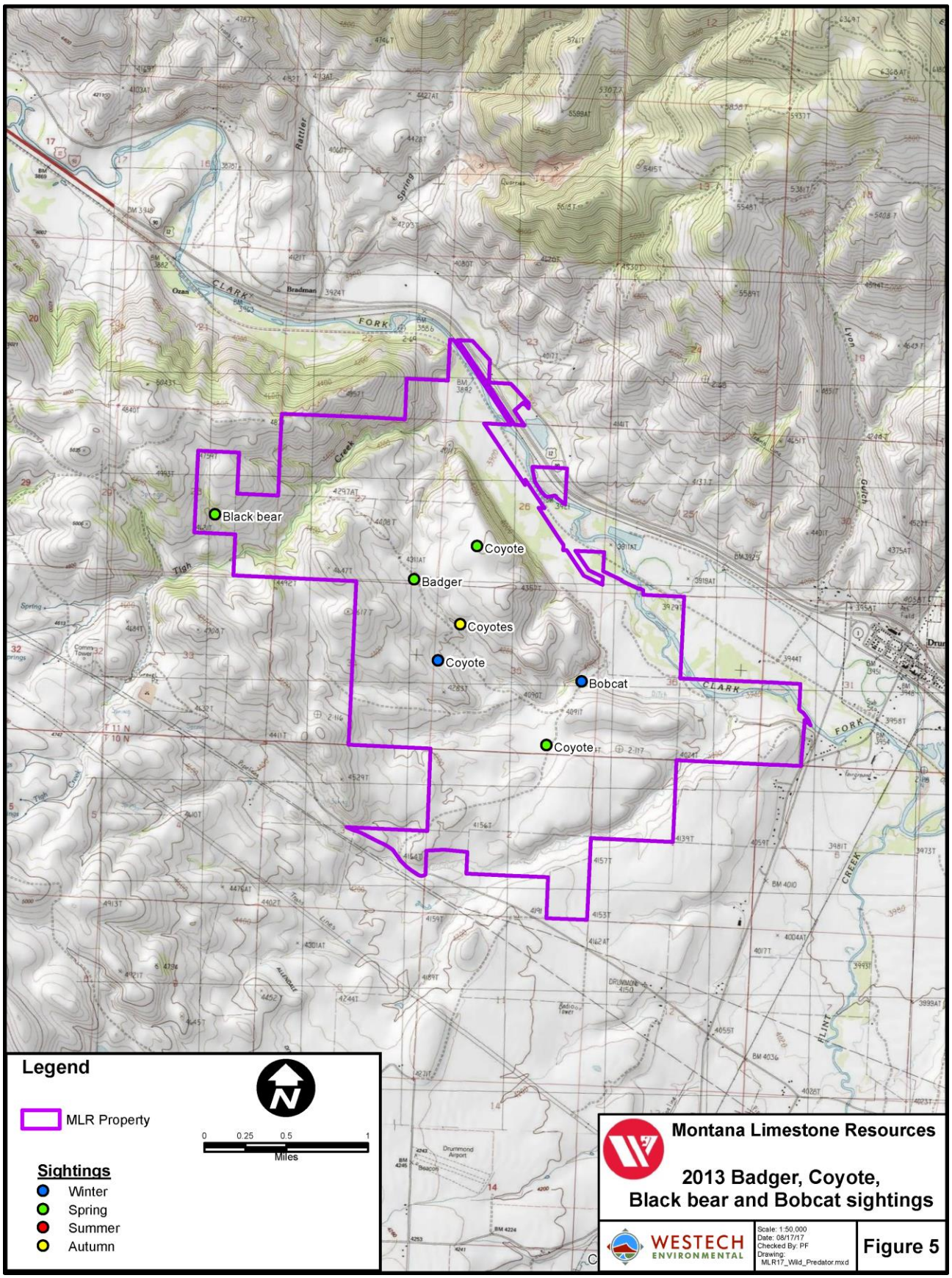
3.4 UPLAND GAME

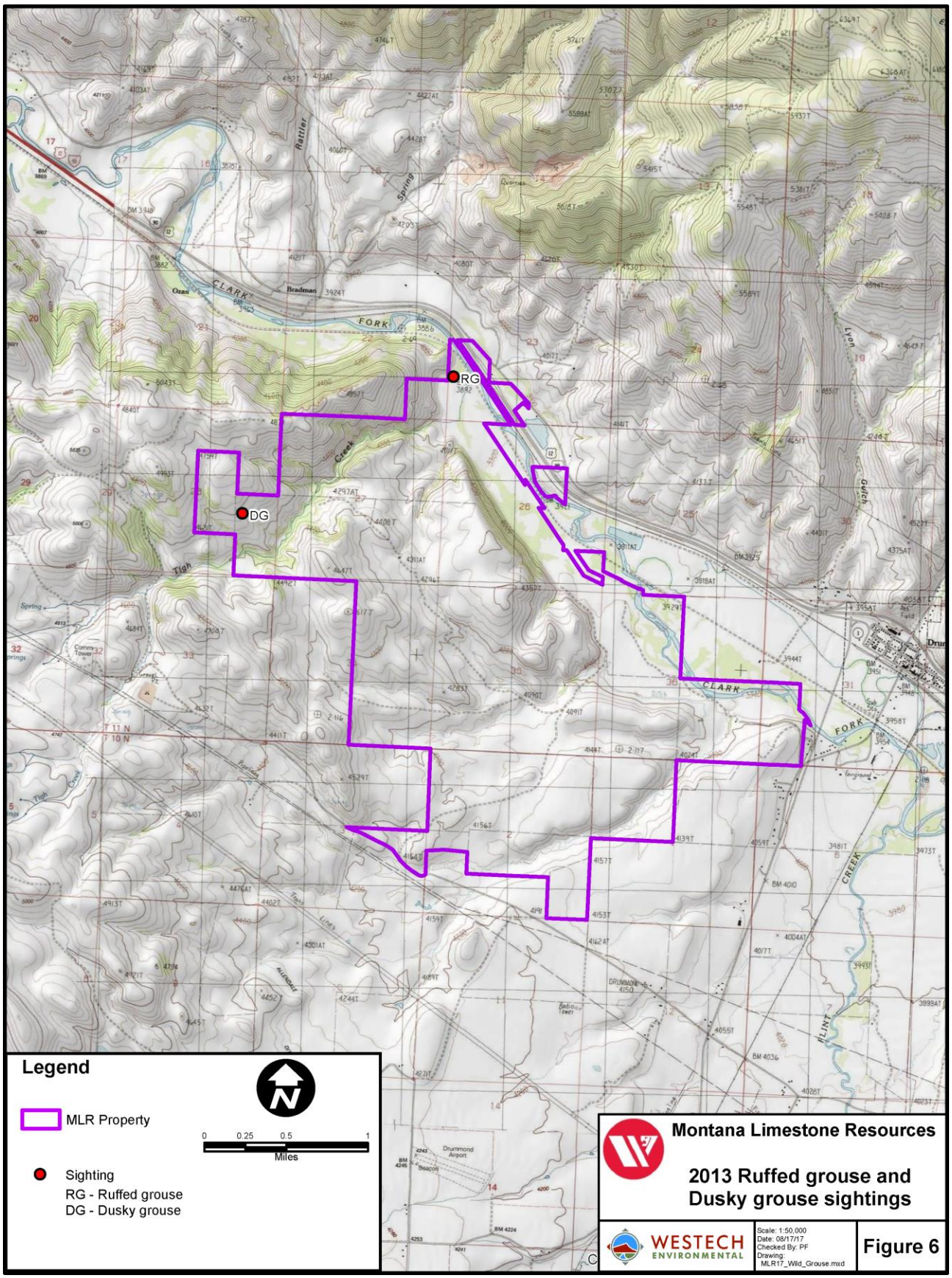
There were single sightings of dusky grouse and ruffed grouse in 2013 (Figure 6). A displaying male dusky grouse was seen in Douglas-fir habitat (subtype 160) above Tigh Creek on May 7. No other dusky grouse were observed during the study, despite several visits to the general vicinity of this sighting.

A single ruffed grouse (gender unidentified) was flushed in riparian tree habitat (subtype 110) along the Clark Fork River in early August (Figure 6). There were no other sightings or reports of ruffed grouse during the study period, despite the presence of several field investigators in the vicinity of this sighting.

3.5 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). Ten species (turkey vulture (*Cathartes aura*), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila*


Black bear
Coyote
Badger
Coyotes
Coyote
Bobcat
Coyote
Legend
MLR Property
Sightings
Winter
Spring
Summer
Autumn
0 0.25 0.5 1
Miles
Montana Limestone Resources
2013 Badger, Coyote, Black bear and Bobcat sightings
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Predator.mxd
Figure 5


Legend
MLR Property
Sighting
RG - Ruffed grouse
DG - Dusky grouse
0 0.25 0.5 1
Miles
RG
DG
CLARK FORK
Montana Limestone Resources
2013 Ruffed grouse and Dusky grouse sightings
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Grouse.mxd
Figure 6

chrysaetos), rough-legged hawk (*Buteo lagopus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipter cooperii*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*) and great horned owl (*Bubo virginianus*)) were recorded during 2013 field work.

There were four sightings of turkey vultures (Figure 7), one each in early May, June, July and September. Few turkey vultures overwinter in Montana; they generally arrive in April and leave in September (MTNHP 2014). All sightings were adults. There was no evidence of nesting (*e.g.*, frequent sightings of adults, sightings of juveniles in summer) in the study area. In the western US, 87 percent of nests were in various types of rock outcrops; the most important requirement of nest sites appears to be isolation from human disturbance (Kirk *et al.* 1998). The Montana Limestone Resources Project study area did not meet this requirement.

There were two active osprey nests on artificial platforms along the Clark Fork River near Drummond (Figure 7). Chicks were observed in both nests. Interestingly, ospreys were never observed along the Clark Fork River in or near the study area, although the presence of two nests nearby suggests that ospreys must have foraged in the study area at times.

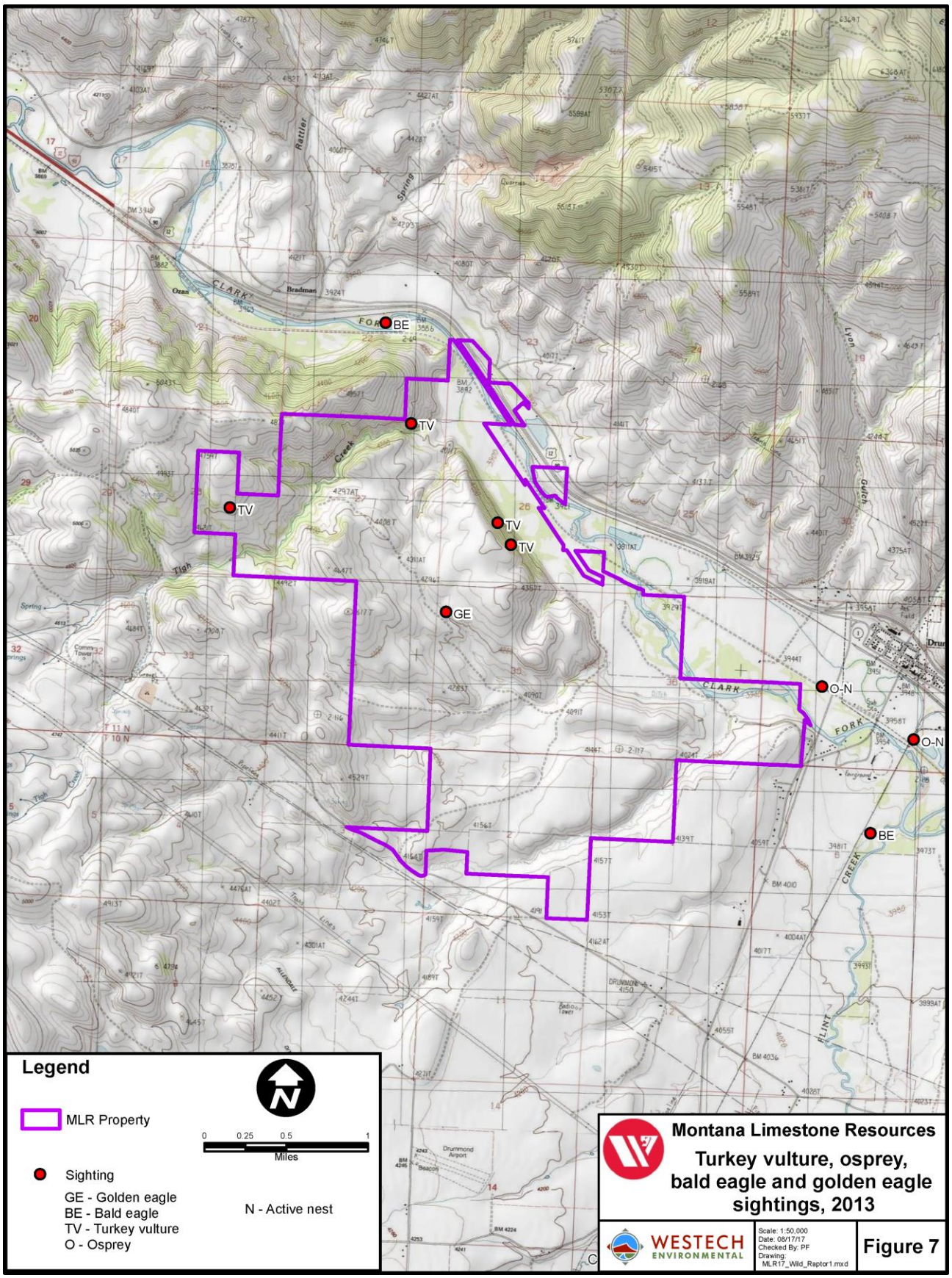
There were two observations of bald eagles during the study (Figure 7). One was a young bird (estimated to be two years old) perched in riparian tree habitat (subtype 110) along the Clark Fork River in late February, while the other was an adult bird perched in riparian tree habitat along Flint Creek in late March. There were no nests along the Clark Fork River in the study area, although there are records of nests within 10 miles (MTNHP 2013).

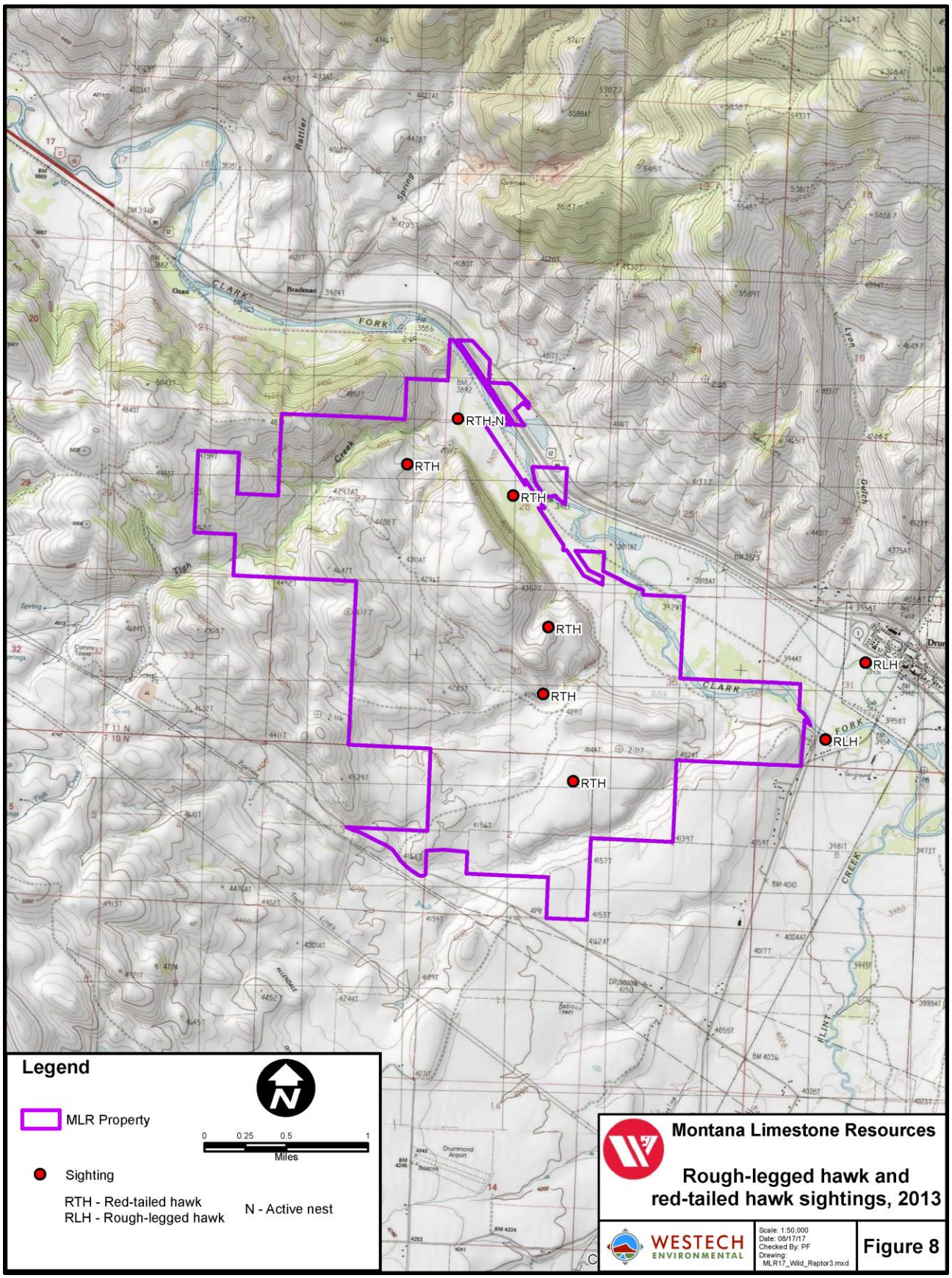
There was one sighting of a single adult golden eagle, perched in a Douglas-fir in mid-May (Figure 7). The lack of further sightings suggests that this bird was transient. The records of known golden eagle nests within 10 miles of the study area are old (MTNHP 2013).

Rough-legged hawks were a migrant/winter resident in the Montana Limestone Resources Project study area. There were two sightings totaling two hawks (Figure 8), both in riparian tree habitat (subtype 110) in late February. In most years, rough-legged hawks arrive in Montana in October and leave in March (MTNHP 2014). Thus the low number of sightings in 2013 is attributed to the allocation of field effort.

Red-tailed hawks were the most commonly observed buteo (broad-winged) raptor during the study. There were six sightings, including an active nest in riparian tree habitat (subtype 110) along the Clark Fork River (Figure 8). Red-tailed hawks were recorded from mid-April through mid-September, but in only three habitats (Appendix C) although they undoubtedly used many of the habitats in the study area. One bird, an adult flushed from the ground in big sagebrush (habitat subtype 212) in early June, was carrying a dead Columbian ground squirrel and flew towards the nest site.

The nest was about 75 feet high in a cottonwood estimated to be about 100 feet tall. There were no vantage points that would allow visibility into the nest. One chick and one adult could be seen at the nest on June 28; by mid-July the nest was inactive, and it was assumed that the chick(s) had fledged.


BE
TV
TV
TV
TV
GE
O-N
O-N
BE
CLARK
FORK
Legend
MLR Property
Sighting
GE - Golden eagle
BE - Bald eagle
TV - Turkey vulture
O - Osprey
N - Active nest
0 0.25 0.5 1
Miles
Montana Limestone Resources
Turkey vulture, osprey, bald eagle and golden eagle sightings, 2013
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Raptor1.mxd
Figure 7


RTH-N
RTH
RTH
RTH
RTH
RTH
RLH
RLH
CLARK FORK
Legend
MLR Property
Sighting
RTH - Red-tailed hawk
RLH - Rough-legged hawk
N - Active nest
0 0.25 0.5 1
Miles
Montana Limestone Resources
Rough-legged hawk and red-tailed hawk sightings, 2013
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Raptor3.mxd
Figure 8

There was a single observation of a Cooper's hawk in 2013 (Figure 9), of a single bird flying over Douglas-fir/grass habitat (subtype 163) in early October. Cooper's hawks nest in dense deciduous and coniferous forest cover, often in draws or riparian areas, and hunt in these areas or in adjacent open country; there are occurrence records within 10 miles of the study area (MTNHP 2014). There is appropriate nesting habitat in the Montana Limestone Resources Project study area, but the lack of sightings during nesting season suggests that Cooper's hawks did not nest in the study area.

Prairie falcons were recorded twice in 2013, in mid-May and early August. The May sighting was a single adult perched in a snag in Douglas-fir/grass habitat (subtype 163) in the central part of the study area, while the August observation was a single bird flying over tame pasture (subtype 530) along the Clark Fork River bottom (Figure 9).

Prairie falcons nest on cliffs. Leedy (1972) reported that most nests (eyries) in western Montana were on cliffs averaging 125 feet high, while the mean height above the cliff base was 80 feet. Most eyries faced south or east. Appropriate nest habitat in the Montana Limestone Resources Project study area was limited to a single rock outcrop (habitat subtype 001) above Tigh Creek (Plate 1). Nesting was not observed at this site. The lack of consistent observations over the 2013 nesting season suggests that prairie falcons did not nest in or near the study area.

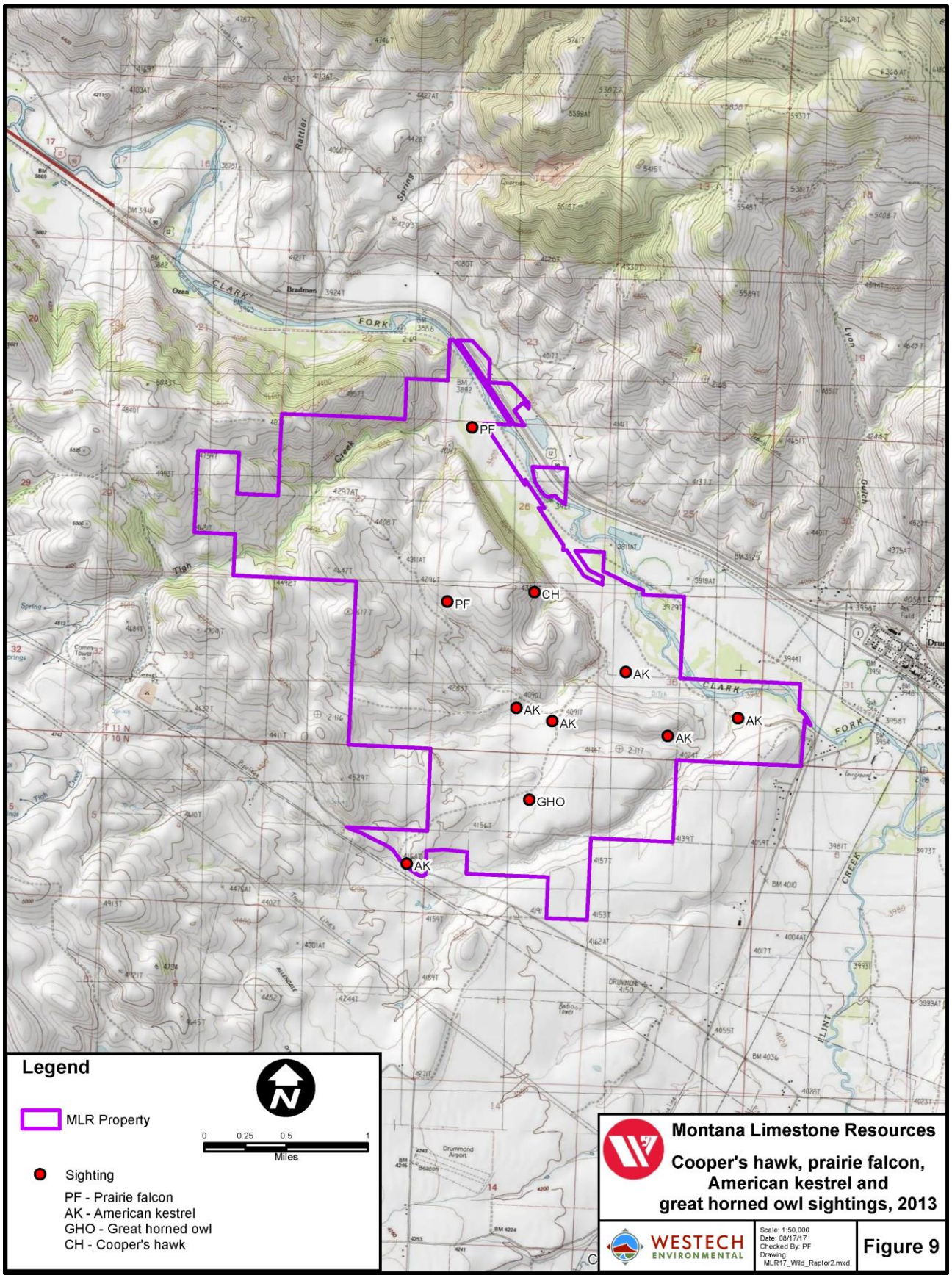
American kestrels were the most commonly recorded falcon during 2013 field work. There were six sightings (Figure 9) from five habitats (Appendix C): buildings (subtype 021), Douglas-fir/grass (subtype 163), big sagebrush (subtype 212), bunchgrass (subtype 411) and hay (subtype 510). Most observations came from the eastern third of the study area (Figure 9). They were observed from early May through late September, *i.e.*, throughout the nesting season; therefore it is possible that kestrels nested in the study area. However, a nest site (cavities in trees or rock outcrops) was not found, and no fledglings were observed in summer.

There was a single observation of a great horned owl, a single adult perched on the roof of an abandoned building in the southern third of the study area (Figure 9). No owls were recorded during surveys along the Clark Fork River bottom in late April, May and early June. This was somewhat surprising, since the river bottom provided suitable habitat for several owl species (Appendix A).

3.6 WATERFOWL AND SHOREBIRDS

As discussed previously, 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.*) and Charadriiformes (plovers, snipe, sandpipers, avocets, phalaropes, gulls, terns, *etc.*).

Aquatic habitats in the study area are essentially limited to the Clark Fork River bottom. As expected, therefore, most observations of waterfowl and shorebirds came from this area.


Legend
MLR Property
Sighting
PF - Prairie falcon
AK - American kestrel
GHO - Great horned owl
CH - Cooper's hawk
0 0.25 0.5 1
Miles
PF
PF
CH
AK
AK
AK
AK
AK
GHO
AK
Montana Limestone Resources
Cooper's hawk, prairie falcon, American kestrel and great horned owl sightings, 2013
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Raptor2.mxd
Figure 9

Seven waterfowl species were recorded during 2013 field work (Appendix C). Of these, nesting was verified for four species (Figure 10):

Canada geese were common along the Clark Fork River in early spring. Four active nests were found in April. Two were along the river, and two were built near ponds off the river. One nest was flooded by spring river flow, while the other three nests were abandoned for unknown reasons. Adults were occasionally seen along the river throughout summer, but no broods were observed.

A female wood duck and one duckling were seen emerging from a cavity in a cottonwood on the bank of a small side channel of the Clark Fork River on June 28 (Figure 10). It was assumed this was the nest tree. However, no other ducklings were observed during approximately 15 minutes of observation.

A female hooded merganser and a brood of six young were seen at the same location on the same day. Hooded mergansers also nest in tree cavities, and hatch in early to mid-June (MTNHP 2014). Therefore it is likely that this species nested in the vicinity.

Similarly, a brood of four common merganser chicks and an adult female were recorded on the same date in the same area (Figure 10). Common mergansers may nest in tree cavities, on the ground or on rock outcrops. Therefore it is likely that this species nested in the vicinity.

Four species of shorebirds were recorded in 2013 (Appendix A). Nesting was verified for one species (great blue heron) and was suspected for two other species (killdeer and Wilson's snipe). A pair of sandhill cranes was observed in early April in a hay field along Flint Creek, east of the study area, but cranes were not seen or heard thereafter.

Great blue herons were regularly seen along the river and at some of the ponds in the study area. There was an active great blue heron rookery just east of the study area (Figure 10). Adults were observed in 16 of 21 nests in mid-April just before leaf-out. Some of these nests were visible later in spring; chicks were observed in four nests.

Parker (1980; cited in MTNHP 2014) reported that nesting great blue herons are sensitive to human disturbance. The rookery near the study area, however, was only about 600-700 feet from Highway 1, and was readily visible from the highway.

3.7 LANDBIRDS

As discussed previously, landbirds were defined as all species except upland game, raptors, waterfowl and shorebirds. Most of the birds recorded in 2013 were landbirds, and most of these were recorded in riparian tree habitat (subtype 110) along the Clark Fork River (Appendix A, C).

Landbirds were inventoried at four upland plots located in areas of potential mine-related disturbance, as identified by MLR in February 2013. Results are presented in Table 2. As expected, breeding landbird

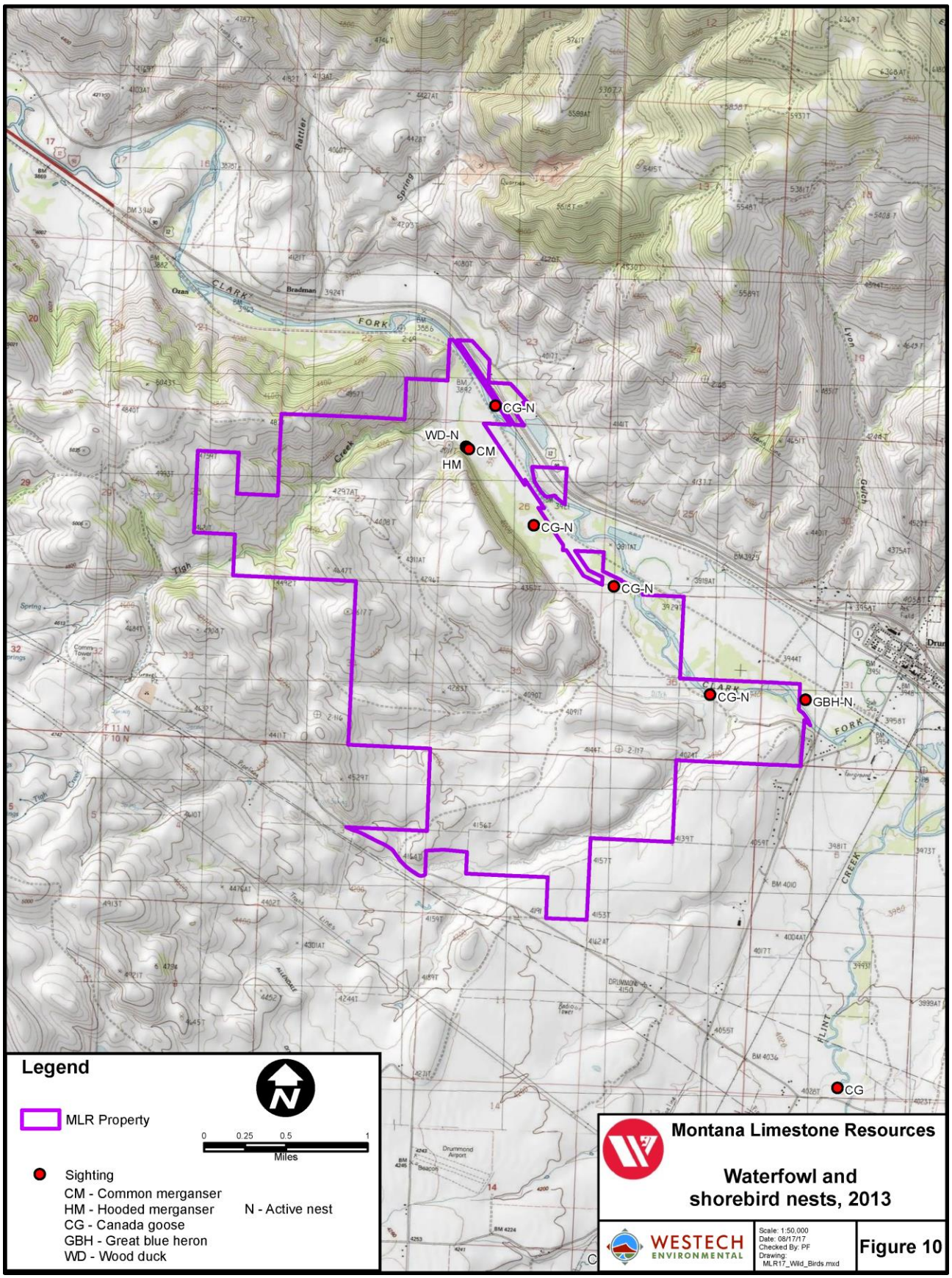

CG-N
WD-N
CM
HM
CG-N
CG-N
CG-N
GBH-N
CG
Legend
MLR Property
0 0.25 0.5 1
Miles
Sighting
CM - Common merganser
HM - Hooded merganser
CG - Canada goose
GBH - Great blue heron
WD - Wood duck
N - Active nest
Montana Limestone Resources
Waterfowl and shorebird nests, 2013
WESTECH ENVIRONMENTAL
Scale: 1:50,000
Date: 08/17/17
Checked By: PF
Drawing: MLR17_Wild_Birds.mxd
Figure 10

Table 2. Landbird plot results, Montana Limestone Resources Project study area, 2013.

Species	Plot[a]/Habitat Subtype[b]			
	1/411	2/411-530	3/163	4/212
Mourning dove			(5)[d]	
Killdeer		1[c]		
Common nighthawk	(2)			
Northern flicker			1	
Western wood-pewee			1	
Western kingbird				(1)
Eastern kingbird		(1)		
Black-billed magpie			(1)	
Common raven	(1)	(1)		(1)
Horned lark	2	4		1
Tree swallow			1	
Mountain chickadee			2	
House wren			1	
Mountain bluebird		(1)	1	
American robin	(1)	(1)	3	(1)
Chipping sparrow			2	
Brewer's sparrow				1
Vesper sparrow	2	3		2
Dark-eyed junco			1	
Western meadowlark	1	1	1	3
Brown-headed cowbird		(8)		
Total No. Species	**3/(3)**	**4/(5)**	**10/(2)**	**4/(3)**

[a]Plate 1

[b]163 = Douglas-fir/grass; 212 = big sagebrush; 411 = bunchgrass; 530 = tame pasture

[c]Maximum number of displaying males counted at this plot.

[d]() = Flocks, flyovers

species richness was comparatively low in the arid bunchgrass, bunchgrass/tame pasture and sagebrush plots, and all the breeding species recorded in these plots would be expected in these habitats. Also as expected, breeding bird species richness was considerably larger in Douglas-fir/grass habitat, with its more complex vertical and horizontal structure. Nevertheless, many species that could potentially have occurred in this habitat (Appendix A) were not observed in this plot. The lower species richness may at least partly be a function of small sample size (*i.e.*, there was only one plot in Douglas-fir habitat).

3.8 MEDIUM-SIZED MAMMALS

Medium-sized mammals were defined to be animals from the size of a Columbian ground squirrel to the size of a coyote, and included some species that have legal status as furbearers or predators. Sightings of species with legal status are shown in Figure 5. Three species (badger, coyote and bobcat) were observed; two other species (beaver, American mink) were recorded by evidence (Appendices A and C).

There was one badger sighting, of a single animal in big sagebrush habitat (subtype 212; Figure 5). However, badger diggings were commonly encountered in big sagebrush and bunchgrass (subtype 411) habitats (Appendix C), particularly in Columbian ground squirrel colonies.

Coyotes were recorded four times (Figure 5), in Douglas-fir (subtype 160), big sagebrush (subtype 212) and bunchgrass (subtype 411) habitats. Evidence (tracks, scats, hair) was recorded in most of the habitats in the study area (Appendix C). Coyotes were reported to be common in the study area (Charles Moody, rancher, personal communication, October 1, 2013).

There was one bobcat observation, of a single animal seen in juniper (subtype 130) habitat in the eastern third of the study area (Figure 5). The MTNHP (2014) data base contains recent records of bobcats from this region, derived from FWP's furbearer harvest data.

Brainerd (1985; cited in MTNHP 2014) reported that female bobcats in western Montana have average annual home ranges of about 60 km^2 (about 23 mi^2) while males have average annual home ranges of about 80 km^2 (about 31 mi^2). Thus, while the study area could lie within the home ranges of one or more bobcats, the Montana Limestone Resources Project study area (about 5.5 mi^2) would comprise less than 25 percent of the average home range of a single bobcat.

3.9 SMALL MAMMALS (excluding bats)

As discussed previously, small mammals were not quantitatively sampled during the study. Consequently, only those small mammals which were large enough to be readily observed were recorded (Appendix C). Most of these species were considered to be common in their preferred habitats. Eastern fox squirrels are present in Missoula and the Bitterroot River valley, but their reported range does not extend east along the Clark Fork River valley to the Drummond area (MTNHP 2014). A fox squirrel leaf nest was observed in a cottonwood along the river in February 2013, and a single fox squirrel was seen in riparian tree (subtype 110) habitat in early April. There were no further sightings during the study; therefore fox squirrels were considered rare (and perhaps only temporary) in the study area.

3.10 BATS

As discussed previously, 12 bat species potentially occur in the vicinity of the Montana Limestone Resources Project study area (MTNHP 2014). MTNHP is conducting a long-term acoustic monitoring bat study across the state, and has a sample station in riparian tree habitat near Bearmouth, about 10 miles from the Montana Limestone Resources Project study area. Eight species have been verified at this site

since 2011; these and two other species were previously documented within 13 miles of the sample site (Maxell 2014). All these species could potentially occur in the Montana Limestone Resources Project study area (Appendix A).

3.11 AMPHIBIANS AND REPTILES

No amphibians were recorded during the study (Appendix A). Appropriate breeding habitat was available in several ponds along the Clark Fork River bottom; however, no adults, egg masses or larvae were observed at any of these sites.

The only reptile observed during 2013 was the prairie rattlesnake. There were three sightings from three habitats (Appendix C), all in July and August. MLR personnel reported that rattlesnakes had been observed in the study area in previous years, and it was reported that rattlesnakes were common in the study area (Charles Moody, rancher, personal communication, October 1, 2013).

3.12 ENDANGERED OR THREATENED SPECIES

As discussed in Section 2.12, the USFWS (2014) identified three terrestrial wildlife species that are listed, proposed or candidates for listing under the ESA: Canada lynx, grizzly bear and wolverine. The probability of any of these species occurring in the study area is considered very low, and any such occurrences would likely be transient individuals. No endangered or threatened species were recorded by sightings or evidence during the 2013 study. None have been observed in or near the study area by local residents (Charles Moody, rancher, personal communication, October 1, 2013).

3.13 SPECIES OF CONCERN

The Montana Limestone Resources Project study area has preferred habitat for 48 Species of Concern (1 amphibian, 2 reptiles, 11 mammals and 34 birds; Appendix A). Of these, eight species (all birds) were recorded in 2013 field work:

The hooded merganser and great blue heron were discussed in Section 3.6.

The bald eagle and golden eagle were discussed in Section 3.5.

The rufous hummingbird is a Potential Species of Concern (a native species "…for which current, often limited, information suggests potential vulnerability. Also included are animal species [for] which additional data are needed before an accurate status assessment can be made" (MTNHP 2014)). It is assigned a global rank of G5 ("common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range" (MTNHP and FWP 2014)) and a state rank of S4B (breeding species; "apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining" (MTNHP and FWP 2014)). In the Montana Limestone Resources Project study area, it was recorded in August in riparian tree habitat (subtype 110) and at buildings (subtype 021). It was not observed during the breeding season, and it was suspected that the birds observed in the study area were immigrants/transients from more preferred, cooler mountainous habitats.

The pileated woodpecker is a Species of Concern (a native species that is "…at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors" (MTNHP 2014)). It is assigned a global rank of G5 and a state rank of S3 ("potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas;" (MTNHP and FWP 2014)). No pileated woodpeckers were observed in the Montana Limestone Resources Project study area in 2013. However, several of the species' characteristic excavations were found in cottonwood trees (habitat subtype 110) along the Clark Fork River, indicating that this species is at least occasionally present in the study area.

The Clark's nutcracker is a Species of Concern that is assigned a global rank of G5 and a state rank of S3 (MTNHP and FWP 2014). It is dependent on conifer seeds, particularly pine seeds. Loss of pines (whitebark, limber, ponderosa) to fire, disease, and bark beetle outbreaks could impact populations (MTNHP 2014). Clark's nutcrackers were regularly seen in the Montana Limestone Resources Project study area, always in Douglas-fir habitats (Appendix C).

The Brewer's sparrow is a Species of Concern, assigned a global rank of G5 and a state rank of S3B (MTNHP and FWP 2014). It is considered to be a characteristic species of sagebrush habitat; loss of sagebrush habitat is a threat (MTNHP 2014). Brewer's sparrows were observed in big sagebrush habitat (subtype 212) in the Montana Limestone Resources Project study area, including in a landbird plot (Table 2).

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Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Silver-haired bat (*Lasionycteris noctivagans*)		Mature conifer and deciduous forests with nearby water; riparian woodlands. Day roosts include tree cavities, under loose bark, bird nests, and buildings. Hibernacula include tree cavities, under loose bark, and buildings.	Yes	Y
Hoary bat (Lasiurus cinereus)		Forests, riparian corridors; roosts in trees, sometimes in crevices.	Yes	Y
California myotis (*Myotis californicus*)		Forested habitats at lower elevations; summer day roosts include rock crevices, hollow trees and snags, under loose bark, and buildings. Hibernacula include caves and mines.	Yes	Y
Western small-footed myotis (*Myotis ciliolabrum*)		Mesic and arid conifer forest; riparian woodland. Roosts in rock outcrops, clay banks, loose bark, buildings, bridges, caves and mines. Hibernates in caves and mines.	Yes	Y
Long-eared myotis (*Myotis evotis*)		Wide variety of rocky and forested habitats; roosts in buildings, bridges, hollow trees, stumps, bark of trees, rock fissures.	Yes	Y
Little brown myotis (*Myotis lucifugus*)		Wide variety of habitats; forages over water; roosts in cliffs, caves and human-made structures.	Yes	Y
Fringed myotis (*Myotis thysanodes*)		Ponderosa pine, Douglas-fir, cottonwood, sagebrush-grassland; roosts in crevices, caves, mines, buildings.	Yes	Y
Long-legged myotis (*Myotis volans*)		Primarily in forested mountains and river bottoms. Roosts in buildings, trees, rock fissures, fissures in stream banks. Hibernacula include caves and mines.	Yes	Y
Northern myotis (*Myotis septentrionalis*)		Roots in cavities or crevices, often behind peeling bark in large, partly dead trees. Range in MT is poorly documented.	Yes	
Yuma myotis (*Myotis yumanensis*)		Near water in dry coniferous forest and shrublands. Roosts in buildings, bridges, tree, caves and mines.	Yes	
Lagomorpha				
Pika (*Ochotona princeps*)		Mid- to high elevation talus, slides, boulder fields, rock rubble near meadows.	No	
Mountain cottontail (*Sylvilagus nuttallii*)		Shrub-filled gullies and forest edges.	Yes	X
Snowshoe hare (*Lepus americanus*)		Fairly dense stands of young pole0sized timber; openings, forest edges.	Yes	X
White-tailed jackrabbit (*Lepus townsendii*)		Grassland, sagebrush-grassland.	Yes	
Rodentia				
Beaver (*Castor canadensis*)		Wide variety of aquatic habitats with woody riparian vegetation.	Yes	X
Western jumping mouse (*Zapus princeps*)		Tall, lush grass and forbs, often near water. Mesic forests with sparse understory.	Yes	
Porcupine (*Erethizon dorsatum*)		Coniferous and deciduous forests, brushy and riparian habitats.	Yes	
Northern pocket gopher (*Thomomys talpoides*)		Wide variety of habitats; avoids dense forest and areas with shallow, rocky soils.	Yes	X
Heather vole (*Phenacomys intermedius*)		Most common in subalpine spruce-fir forest with shrubby ground cover; also alpine, timberline krummholz, montane yellow pine/Douglas-fir forests with bearberry/twinflower understory.	Yes?	
Long-tailed vole (*Microtus longicaudus*)		Wide variety of habitats from grassland to boreal forest.	Yes	
Meadow vole (*Microtus pennsylvanicus*)		Moist to wet grasslands.	Yes	

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Montane vole (*Microtus montanus*)		Usually dry grassland or sagebrush/grassland. Will use wet meadows and marshes if meadow vole is not present.	Yes	
Water vole (*Microtus richardsoni*)		Near streams and lakes, usually above 5000 ft.	No	
House mouse (*Mus musculus*)		Buildings, agricultural fields, grassy meadows, marsh.	Yes	
Bushy-tailed woodrat (*Neotoma cinerea*)		Rock slides, outcrops, crevices, badlands and buildings in a variety of habitats.	Yes	
Southern red-backed vole (*Myodes gapperi*)		Usually dense subalpine forests; more open forest types; alpine.	Yes	
Muskrat (*Ondatra zibethicus*)		Streams, rivers, ponds, marshes with herbaceous vegetation and non-freezing attributes. Usually avoids fast flowing water.	Yes?	
Deer mouse (*Peromyscus maniculatus*)		All habitats; usually not seen in wetlands.	Yes	
Norway rat (*Rattus norvegicus*)		Human-made habitats. In MT, appears to be confined to larger towns and cities.	No	
Northern flying squirrel (*Glaucomys sabrinus*)		Montane and subalpine coniferous forests; riparian cottonwood forests.	Yes	
Columbian ground squirrel (*Urocitellus columbianus*)		Intermontane valleys, open woodland, subalpine meadows, alpine tundra, clearcuts, grasslands, disturbed areas.	Yes	X
Golden-mantled ground squirrel (*Callospemophilus lateralis*)		Montane and subalpine forests wherever rocky habitat is present.	Yes	
Hoary marmot (*Marmota calligata*)		High elevation subalpine forests; alpine.	No	
Yellow-bellied marmot (*Marmota flaviventris*)		Talus slopes, rock outcrops near meadows and grasslands; avoids dense forest.	Yes	X
Least chipmunk (*Tamias minimus*)		Sagebrush, brushy grasslands, coniferous forest, alpine tundra. Habitat preference influenced by sympatric chipmunks.	Yes	X
Red-tailed chipmunk (*Tamias ruficaudus*)		Moist forest; Douglas-fir and subalpine fir.	Yes	
Yellow-pine chipmunk (*Tamias amoenus*)		Open stands of ponderosa pine and Douglas-fir.	Yes	X
Red squirrel (*Tamiasciurus hudsonicus*)		Coniferous forests.	Yes	X
Eastern fox squirrel (*Sciurus niger*)		Riparian cottonwood/deciduous forests.	Yes	X
Carnivora				
Coyote (*Canis latrans*)		Wide variety of habitats.	Yes	X
Gray wolf (*Canis lupus*)	DM	Wide variety of habitats dependent upon prey availability.	Yes	
Red fox (*Vulpes vulpes*)		Wide variety of habitats.	Yes	
Bobcat (*Lynx rufus*)		Wide variety of habitats, usually with rocky areas.	Yes	X
Canada lynx (*Lynx canadensis*)	LT,CH	Mid- to high elevation subalpine forests with snowshoe hares.	No	
Mountain lion (*Puma concolor*)		Any habitat with good cover and prey availability.	Yes	
Striped skunk (*Mephitis mephitis*)		Wide variety of habitats.	Yes	
Western spotted skunk (*Spilogale gracilis*)		Arid, rocky brushy canyons and hillsides.	Yes?	
Northern river otter (*Lontra Canadensis*)		Large streams and rivers.	No	
Long-tailed weasel (*Mustela frenata*)		Almost all habitats, usually near water.	Yes	
Short-tailed weasel (*Mustela ermina*)		Montane forest associations. Brushy or wooded areas, usually not far from water, with high prey densities.	Yes	
American mink (*Mustela vison*)		Aquatic habitats with prey.	Yes	X
Northern river otter (*Lontra canadensis*)		High flow volume water	Yes	

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Fisher (*Martes pennanti*)		Comparatively large tracts (250 acres) of dense coniferous or mixed forests. Forest structure is probably more import than tree species composition. Diversity of tree shapes ad sizes, understory vegetation, snags, fallen trees, tree limbs close to the ground.	No	
Marten (*Martes americana*)		Mature conifer or mixed forests, usually subalpine, with ≥35% canopy cover.	Yes?	
Badger (*Taxidea taxus*)		Grassland and shrub-grassland.	Yes	X
Wolverine (*Gulo gulo*)	P	Large, mountainous and essentially roadless areas.	No	
Raccoon (*Procyon lotor*)		Diverse habitats, usually near water.	Yes	X
Black bear (*Ursus americanus*)		Habitat use linked to food availability.	Yes	X
Grizzly bear (*Ursus arctos*)	LT	Wide variety of habitats	Yes	
Artiodactyla				
Pronghorn (*Antilocapra americana*)		Open, rolling grasslands and sagebrush.	Yes	
Moose (*Alces americanus*)		Variable. Coniferous forest, river valleys, mountain meadows, clearcuts, willow flats, swampy areas.	Yes	X
Mule deer (*Odocoileus hemionus*)		Pine savannah, badlands, grasslands, sagebrush, river and creek bottoms, agriculture.	Yes	X
White-tailed deer (*Odocoileus virginianus*)		River and creek bottoms, particularly with woody riparian habitat.	Yes	X
Elk (*Cervus elaphus*)		Highly adaptable to a wide variety of habitats.	Yes	X
BIRDS[6]				
Anseriformes				
Tundra swan (*Cygnus columbianus*)		Migrant; large lakes and ponds.	No	
Trumpeter swan (*Cygnus buccinator*)		Migrant; lare lakes and ponds.	No	
Snow goose (*Chen caerulescens*)		Migrant; grain fields, lakes, and marshes.	No	
Ross' goose (*Chen rossii*)		Migrant; grain fields, lakes, and marshes.	No	
Greater white-fronted goose (*Anser albifrons*)		Migrant; agricultural fields, marshes, and prairies.	No	
Canada goose (*Branta canadensis*)		Lakes, ponds, rivers with adjacent agricultural and other open lands.	Yes	X
Wood duck (*Aix sponsa*)		Creeks, rivers, marshes, swamps and ponds.	Yes	X
Green-winged teal (*Anas crecca*)		Ponds and marshes in deciduous parklands, grasslands, sedge meadows and thickets.	Yes	
Mallard (*Anas platyrhynchus*)		Highly adaptable; nests in dense cover near water.	Yes	X
Northern pintail (*Anas acuta*)		Wetlands in prairie grasslands.	No	
Blue-winged teal (*Anas discors*)		Nests in herbaceous vegetation near shallow ponds.	Yes	
Cinnamon teal (*Anas cyanoptera*)		Large marshes, reservoirs, slow streams, ditches and ponds.	Yes	
Northern shoveler (*Anas clypeata*)		Marsh areas of lakes and ponds.	Yes?	
Gadwall (*Anas strepera*)		Wetlands, nests in dense cover near water.	Yes	
American wigeon (*Anas americana*)		Shallow wetlands, nests in brushy and grassy uplands.	Yes	X
Eurasian wigeon (*Anas penelope*)		Migrant; shallow water, fields, and meadows.	Yes	
Canvasback (*Aythya valisineria*)		Small lakes and bays, deep-water marshes, ponds, potholes and shallow rivers.	No	
Redhead(*Aythya americana*)		Lakes and ponds.	Yes?	
Ring-necked duck (*Aythya collaris*)		Open water, wetlands abundant aquatic vegetation.	No	
Greater scaup (*Aythya marila*)		Winter resident; lakes, ponds and large wetlands with no flowing water.	No	

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Lesser scaup (*Aythya affinis*)		Lakes, rivers and large wetlands.	Yes	
Harlequin duck (*Histrionicus histrionicus*)		Fast moving, low gradient, clear mountain streams.	No	
Surf scoter (*Melanitta perspicillata*)		Migrant; large lakes and reservoirs.	No	
White-winged scoter (*Melanitta fusca*)		Migrant, large lakes, reservoirs and rivers.	Yes?	
Long-tailed duck (*Clangula hyemalis*)		Migrant; lakes, large rivers.	Yes	
Common goldeneye (*Bucephala clangula*)		Forested wetlands, lakes and rivers.	Yes	X
Barrow's goldeneye)*Buchephala islandica*)		Forested alkaline to freshwater lakes and ponds, beaver ponds, small sloughs.	Yes	
Bufflehead (*Bucephala albeola*)		Ponds and small lakes.	Yes	
Hooded merganser (*Lophodytes cucullatus*)		Rivers with adjacent riparian forests.	Yes	X
Common merganser (*Mergus merganser*)		Lakes and rivers.	Yes	X
Red-breasted merganser (*Mergus serrator*)		Migrant; lakes, ponds, and rivers.	Yes	
Ruddy duck (*Oxyura jamaicensis*)		Breeds in shallow marshes.	Yes?	
Galliformes				
Gray partridge (*Perdix perdix*)		Grasslands interspersed with cultivated fields.	Yes	
Ring-necked pheasant (*Phasianus colchicus*)		Brushy and/or herbaceous cover near open grasslands and agricultural fields.	Yes	
Ruffed grouse (*Bonasa umbellus*)		Dense forested or brushy areas, often along streams.	Yes	X
Spruce grouse (*Falcipennis canadensis*)		Dense coniferous forest.	Yes	
Dusky grouse (*Dendragapus obscurus*)		Conifer forest edges and openings.	Yes	X
Sharp-tailed grouse (*Tympanuchus phasianellus*)		Native grasslands with shrub-filled coulees; historically present, but probably extirpated west of Continental Divide.	Yes	
Wild turkey (*Meleagris gallopavo*)		Open riparian, coniferous and deciduous forests.	Yes	
Gaviiformes				
Common loon (*Gavia immer*)		Migrant; lakes with adequate prey (small fish).	No	
Pacific loon (*Gavia pacifica*)		Migrant; lakes with adequate prey (small fish).	No	
Podicipediformes				
Pied-billed grebe (*Podilymbus podiceps*)		Marshes and open waterbodies.	Yes?	
Horned grebe (*Podiceps auritus*)		Migrant; marshes and shallow ponds with emergent vegetation.	Yes?	
Red-necked grebe (*Podiceps grisegena*)		A variety of smaller waterbodies.	Yes	
Eared grebe (*Podiceps nigricollis*)		Shallow lakes/ponds with emergent vegetation.	Yes	
Western grebe (*Aechmophorus occidentalis*)		Large lakes and marshes with emergent vegetation.	No	
Clark's grebe (*Aechmophorus clarkii*)		Migrant; large lakes and rivers.	No	
Suliformes				
Double-crested cormorant (*Phalacrocorax auritus*)		Large-bodied aquatic habitats with fish and suitable roosting sites (large dead trees, bare branches, etc.).	Yes	
Pelecaniformes				
American white pelican (*Pelecanus erythrorhynchos*)		Migrant; rivers, lakes and other waterbodies.	Yes	
American bittern (*Botaurus lentiginosus*)		Large wetlands with tall emergent vegetation.	No	
Great blue heron (*Ardea herodias*)		Riparian and aquatic habitats; usually nest in cottonwoods.	Yes	X
Great egret (*Ardea alba*)		Transient; lakes, marshes, low gradient, slow flowing rivers.	No	
Snowy egret (*Egretta thula*)		Migrant; wetlands and flooded fields; low gradient, slow flowing rivers.	No	
Cattle egret (*Bubulcus ibis*)		Transient; wide variety of aquatic and terrestrial habitats.	Yes	
Black-crowned night-heron (*Nycticorax nycticorax*)		Migrant; marshes, swamps or low gradient, wooded streams.	No	

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Ciconiiformes				
White-faced Ibis (*Plegadis chihi*)		Migrant; wetlands with islands of emergent vegetation. Feeds in grasslands and marshes, flooded hay meadows and agricultural fields.	Yes?	
Accipitriformes				
Turkey vulture (*Cathartes aura*)		Nests on cliffs or rock outcrops. Forages in grasslands, badlands, farmlands, open woodlands.	Yes	X
Osprey (*Pandion haliaetus*)		Lakes, reservoirs and rivers. Large, flat stable surface for nesting.	Yes	X
Bald eagle (*Haliaeetus leucocephalus*)	DM	Nests in riparian forests surrounding lakes and rivers; forages in all habitats with suitable prey or carrion.	Yes	X
Northern harrier (*Circus cyaneus*)		Nests on ground in grasslands and shrublands. Forages in a wide variety of habitats.	Yes	
Sharp-shinned hawk (*Accipiter striatus*)		Coniferous and deciduous forests; sometimes hunts in open areas.	Yes	
Cooper's hawk (*Accipter cooperii*)		Dense coniferous and deciduous forests, often in draws or riparian areas.	Yes	X
Northern goshawk (*Accipiter gentilis*)		Mature coniferous forests with limited undergrowth.	Yes	
Broad-winged hawk (*Buteo platypterus*)		Migrant; deciduous or mixed forests.	Yes	
Swainson's hawk (*Buteo swainsoni*)		Nests in stream bottoms and brushy coulees, hunts in grasslands, agricultural land and riparian areas.	Yes	
Red-tailed hawk (*Buteo jamaicensis*)		Highly adaptable; nests in cliffs and trees, hunts in grasslands, open woodlands and agricultural fields.	Yes	X
Ferruginous hawk (*Buteo regalis*)		Migrant; shrub-grasslands, grasslands, sagebrush steppe.	Yes	
Rough-legged hawk (*Buteo lagopus*)		Migrant/winter resident; grassland, agricultural land.	Yes	X
Golden eagle (*Aquila chrysaetos*)		Prairies, sagebrush/grassland and open woodlands; nests on cliffs or in large trees.	Yes	X
Falconiformes				
American kestrel (*Falco sparverius*)		Wide variety of habitats; nests in cavities of trees, banks, cliffs and buildings.	Yes	X
Merlin (*Falco columbarius*)		Riparian and coniferous stands adjacent to open habitats.	Yes	
Gyrfalcon (*Falco rusticolus*)		Migrant/winter resident; found near concentrations of waterfowl or upland gamebirds.	Yes	
Peregrine falcon (*Falco perigrinus*)	DM	Nests on cliffs with a wide view, near water and plentiful prey.	Yes	
Prairie falcon (*Falco mexicanus*)		Nests in cliffs near grasslands.	Yes	X
Gruiformes				
Virginia rail (*Rallus limicola*)		Shallow wetlands with emergent vegetation.	Yes?	
Sora (*Porzana carolina*)		Marshes with grassy vegetation.	Yes?	
American coot (*Fulica americana*)		Broad variety of wetlands; requires heavy stands of emergent vegetation and deeper standing water.	No	
Sandhill crane (*Grus canadensis*)		Grasslands near marshes, ponds and streams.	Yes	X
Charadriiformes				
Black-bellied plover (*Pluvialis squatarola*)		Migrant; lakes and reservoirs, plowed fields, short meadows and pastures.	No	
American golden-plover (*Pluvialis dominica*)		Migrant; lakes and reservoirs, plowed fields, short meadows and pastures.	No	

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Semipalmated plover (*Charadrius semipalmatus*)		Migrant; open, sandy or gravelly areas along rivers and lakes.	No	
Killdeer (*Charadrius vociferous*)		Open areas such as sandbars, pastures and human-modified habitats.	Yes	X
Black-necked stilt (*Himantopus mexicanus*)		Migrant; medium to large wetland complexes.	No	
American avocet (*Recurvirostra americana*)		Migrant; through study area; marshes, ponds, mudflats and alkaline lakes.	No	
Spotted sandpiper (*Actitis macularius*)		Rocky shores of ponds and streams.	Yes	
Solitary sandpiper (*Tringa solitaria*)		Migrant; sloughs and mudflats.	No	
Greater yellowlegs (*Tringa melanoleuca*)		Migrant; marsh edges, slow moving rivers and mudflats.	No	
Willet (*Catoptrophorus semipalmatus*)		Migrant through study area; sparse cover in wetlands and wet grasslands.	No	
Lesser yellowlegs (*Tringa flavipes*)		Migrant; mudflats, shallow ponds, flooded fields.	No	
Upland sandpiper (*Bartramia longicauda*)		Migrant; upland grasslands.	Yes	
Whimbrel (*Numenius phaeopus*)		Migrant; grassy wetlands.	No	
Long-billed curlew (*Numenius americanus*)		Dry grasslands.	Yes	
Hudsonian godwit (*Limosa haemastica*)		Migrant; shores of prairie marshes.	No	
Marbled godwit (*Limosa fedoa*)		Migrant through study area; grasslands associated with shallow wetlands.	No	
Ruddy turnstone (*Arenaria interpres*)		Migrant; stubble fields, sand shorelines of lakes and reservoirs.	No	
Red knot (*Calidris canutus*)		Migrant; marshes, flooded fields.	No	
Sanderling (*Calidris alba*)		Migrant; larger lakes with windswept beaches.	No	
Semipalmated sandpiper (*Calidris pusilla*)		Migrant; wet and dry mudflats.	No	
Western sandpiper (*Calidris mauri*)		Migrant; wet and dry mudflats.	No	
Least sandpiper (*Calidris minutilla*)		Migrant; wet and dry mudflats.	No	
Baird's sandpiper (*Calidris bairdii*)		Migrant; wet meadows and shallow ponds.	No	
Pectoral sandpiper (*Calidris melanotos*)		Migrant; grassy prairie marshes and potholes.	No	
Dunlin (*Calidris alpina*)		Migrant; mudflats and sandy beaches.	No	
Stilt sandpiper (*Calidris himantopus*)		Migrant; shallow ponds with muddy bottoms.	Yes?	
Buff-breasted sandpiper (*Tryngites subruficollis*)		Migrant; short grass plains, dry uplands, human-altered habitats.	Yes	
Short-billed dowitcher (*Limnodramus griseus*)		Migrant; grassy marshes.	No	
Long-billed dowitcher (*Limnodromus scolopaceus*)		Migrant; grassy marshes.	No	
Wilson's snipe (*Gallinago delicata*)		Creek bottoms, marshes, wet fields and wetlands with ample cover.	Yes	X
Wilson's phalarope (*Phalaropus tricolor*)		Marshy borders of lakes and ponds; flooded fields.	No?	
Red-necked phalarope (*Phalaropus lobatus*)		Migrant; lakes, less commonly ponds.	No	
Sabine's gull (*Xema sabini*)		Migrant; usually large lakes and reservoirs.	No	
Bonaparte's gull (*Chroicocephalus philadelphia*)		Migrant; larger lakes, ponds.	No	
Franklin's gull (*Leucophaeus pipixcan*)		Migrant through study area; relatively large prairie marshes with emergent vegetation.	No	
Mew gull (*Larus canas*)		Migrant; large lakes and reservoirs.	No	
Ring-billed gull (*Larus delawarensis*)		Lakes, wetlands and human-modified habitats, including inland.	Yes?	
California gull (*Larus californicus*)		Large lakes, ponds and rivers.	Yes	
Herring gull (*Larus argentatus*)		Migrant; islands and areas near water.	Yes?	
Thayer's gull (*Larus thayeri*)		Migrant; large lakes, reservoirs and rivers.	No	
Glaucous gull (*Larus hyperboreus*)		Migrant; large lakes and reservoirs.	No	
Caspian tern (*Hydroprogne caspia*)		Migrant through study area; large lakes and reservoirs.	No	

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Black tern (*Chlidonias niger*)		Wetlands, ponds, prairie potholes and reservoirs with emergent vegetation; nests on islands.	No	
Common tern (*Sterna hirundo*)		Islands of large lakes and reservoirs.	No	
Arctic tern (*Sterna paradisaea*)		Migrant through study area; islands of large lakes and reservoirs.	No	
Forster's tern (*Sterna forsteri*)		Large marshes with reed beds and muskrat houses.	No	
Columbiformes				
Rock pigeon (*Columba livia*)		Variety of habitats, often human-modified.	Yes	X
Band-tailed pigeon (*Petageoenas fasciata*)		Montane and mixed-species forests.	Yes	
Eurasian collared-dove (*Stretopelia decaocto*)		Non-native; open woodlands and human-modified habitats.	Yes	X
Mourning dove (*Zenaida macroura*)		Very adaptable; open woodlands, forest edges and human-modified habitats.	Yes	X
Cuculiformes				
Yellow-billed cuckoo (*Coccyzus americanus*)		Riparian woodland with dense shrubby understory.	Yes	
Strigiformes				
Barn owl (*Tyto alba*)		Grassland, shrub-steppe, marshes, pastures, croplands, hay fields.	Yes	
Flammulated owl (*Otus flammeolus*)		Mature and old-growth xeric ponderosa pine/Douglas-fir forest.	No	
Western screech-owl (*Megascops kennicottii*)		Cottonwood bottoms and fringe of coniferous forests.	Yes	
Great horned owl (*Bubo virginianus*)		Highly adaptable; variety of habitats.	Yes	X
Snowy owl (*Bubo scandiacus*)		Migrant/winter resident; open fields and marshes.	Yes	
Northern hawk owl (*Surnia ulula*)		Post-fire habitat; tall trees in open habitats.	No	
Northern pygmy-owl (*Glaucidium gnoma*)		River bottoms to timber line, often in mixed forests.	Yes	
Barred owl (*Strix varia*)		Large, unfragmented blocks of mature and old growth forest.	No	
Great gray owl (*Strix nebulosa*)		Dense coniferous and hardwood forest.	Yes?	
Long-eared owl (*Asio otus*)		Woody draws, juniper thickets and forest edges.	Yes	
Short-eared owl (*Asio flammeus*)		Grasslands, plains and agricultural areas.	Yes	
Boreal owl (*Aegolius funereus*)		High-elevation spruce/fir forest with lodgepole pine.	No	
Northern saw-whet owl (*Aegolius acadicus*)		Coniferous forests, deciduous riparian areas.	Yes	
Caprimulgiformes				
Common nighthawk (*Chordeiles minor*)		Prairies, river valleys, marshes, farmlands.	Yes	X
Common poorwill (*Phalaenoptilus nuttallii*)		Grasslands, shrublands, rocky foothills.	Yes	
Apodiformes				
Black swift (*Cypseloides niger*)		Nest behind or next to waterfalls and wet cliffs; forage over forests and open areas.	No	
Vaux's swift (*Chaetura vauxi*)		Late stages of coniferous and mixed deciduous/coniferous forest.	No	
White-throated swift (*Aeronautes saxatalis*)		Wide variety of habitats; nests in cliffs and canyons.	Yes	X
Black-chinned hummingbird (*Archilochus alexandri*)		Floodplain riparian communities.	Yes	X
Anna's hummingbird (*Calypte anna*)		Deciduous trees, brush, human-built structures.	Yes?	
Calliope hummingbird (*Stellula calliope*)		Montane environments, thicket hillsides and forest openings.	Yes	
Rufous hummingbird (*Selasphorus rufus*)		Generally cool environments, second growth and mature forests.	Yes	X

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Coraciiformes				
Belted kingfisher (*Megaceryle alcyon*)		Waterbodies with nesting habitat in earthen banks.	Yes	X
Piciformes				
Lewis's woodpecker (*Melanerpes lewis*)		River bottoms, mature ponderosa pine, forest edges, burned areas.	Yes	
Williamson's sapsucker (*Sphyrapicus thyroideus*)		Mid to high elevation montane and subalpine coniferous forest, usually in mature to old growth forest.	No	
Red-naped sapsucker (*Sphyrapicus nuchalis*)		Deciduous and mixed woodlands, including aspen.	Yes	X
Downy woodpecker (*Picoides pubescens*)		Deciduous and coniferous woodlands.	Yes	X
Hairy woodpecker (*Picoides villosus*)		Mature woodlands.	Yes?	X
American three-toed woodpecker (*Picoidesdorsalis*)		Spruce/fir/larch forests.	No	
Black-backed woodpecker (*Picoides arcticus*)		Early successional burned coniferous forest.	No	
Northern flicker (*Colaptes auratus*)		Open woodlands.	Yes	X
Pileated woodpecker *(Dryocopus pileatus)*		Late successional deciduous or coniferous forest; younger forest with large trees.	Yes	X
Passeriformes				
Olive-sided flycatcher (*Contopus cooperi*)		Highly adapted to post-fire forest, forest openings, open forest, forest edges near wetlands.	Yes	
Western wood-pewee (*Contopus sordidulus*)		Deciduous and coniferous forest edges.	Yes	X
Alder flycatcher (*Empidonax alnorum*)		Willow thickets, dogwood or birch along the edges of wetlands, streams, lakes and forests.	Yes?	
Willow flycatcher (*Empidonax traillii*)		Moist shrubby areas; brushy wetlands.	Yes	X
Least flycatcher (*Empidonax minimus*)		Diverse habitats from coniferous forest to shrub fields.	Yes	X
Hammond's flycatcher (*Empidonax hammondii*)		Cool, dense mature coniferous or mixed forests.	Yes	
Dusky flycatcher (*Empidonax oberholseri*)		Brushy habitats, logged slopes, open coniferous forests, aspen groves.	Yes	X
Cordilleran flycatcher (*Empidonax occidentalis*)		Cool, shady areas along water courses.	Yes	X
Say's phoebe (*Sayornis saya*)		Open habitat, sagebrush, badlands, and barren foothills.	Yes	X
Western kingbird (*Tyrannus verticalis*)		Open habitats, prairies, and farmland.	Yes	X
Eastern kingbird (*Tyrannus tyrannus*)		Open areas along forest edges and fields.	Yes	X
Scissor-tailed flycatcher (*Tyrannus forficatus*)		Open country with scattered trees and shrubs; accidental in Montana.	Yes	
Loggerhead shrike (*Lanius ludovicianus*)		Migrant; willows, sagebrush, bitterbrush, greasewood.	Yes	
Northern shrike (*Lanius excubitor*)		Migrant/winter resident; forest edges, shrubs.	Yes	X
Cassin's vireo (*Vireo cassinii*)		Dry, open coniferous, mixed and deciduous forest.	Yes	X
Solitary vireo (*Vireo solitaries*)		Mixed coniferous-deciduous forest; humid montane forest.	Yes	
Warbling vireo (*Vireo gilvus*)		Large trees with semi-open canopy, especially along streams, ponds, marshes and lakes.	Yes	X
Red-eyed Vireo (*Vireo olivaceus*)		Deciduous or mixed forests with limited understory.	Yes	X
Gray jay (*Perisoreus canadensis*)		Boreal and subalpine coniferous forests	Yes	X
Steller's jay (*Cyanocitta stelleri*)		Coniferous and mixed forests, open woodlands, orchards.	Yes	X
Blue jay (*Cyanocitta cristata*)		Coniferous/deciduous trees, particularly in towns.	Yes	
Clark's nutcracker (*Nucifraga columbiana*)		Coniferous forests.	Yes	X

Appendix A (continued).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
Black-billed magpie (*Pica hudsonia*)		Thickets, particularly near water and/or human activity.	Yes	X
American crow (*Corvus brachyrhynchos*)		Highly adaptable; wide variety of habitats.	Yes	X
Common raven (*Corvus corax*)		Highly adaptable; wide variety of habitats.	Yes	X
Horned lark (*Eremophila alpestris*)		Open, barren habitat; shortgrass prairie.	Yes	X
Purple martin (*Progne subis*)		Migrant; open woodlands, human areas	Yes	
Tree swallow (*Tachycineta bicolor*)		Open fields, meadows, marshes, wetland fringes. Nests in tree cavities or nest boxes.	Yes	X
Violet-green swallow (*Tachycineta thalassina*)		Deciduous, coniferous and mixed forests.	Yes	X
Northern rough-winged swallow (*Stelgidopteryx serripennis*)		Nests in cliffs, sandbanks and crevices. Forages over water.	Yes	
Bank swallow (*Riparia riparia*)		Low elevation habitats with eroded banks for nesting.	No	
Cliff swallow (*Petrochelidon pyrrhonota*)		Sites with overhangs near mud source.	Yes	
Barn swallow (*Hirundo rustica*)		Under roofs or eves with nearby water.	Yes	X
Black-capped chickadee (*Poecile atricapillus*)		Open woodlands, thickets.	Yes	
Mountain chickadee (*Poecile gambeli*)		Montane coniferous forests; mixed deciduous/coniferous forest.	Yes	X
Chestnut-backed chickadee (*Poecile refescens*)		Dense coniferous forest where there are even temperatures and considerable shade.	No?	
Red-breasted nuthatch (*Sitta canadensis*)		Coniferous and mixed forest edges.	Yes	X
White-breasted nuthatch (*Sitta carolinensis*)		Coniferous and mixed forest edges.	Yes	X
Pygmy nuthatch (*Sitta pygmae*)		Mature ponderosa pine forests with mature trees, little affected by logging or snag removal	No	
Brown creeper (*Certhia americana*)		Mature coniferous and mixed forests with large trees and snags.	Yes?	
Rock wren (*Salpinctes obsoletus*)		Rocky outcrops, crevices.	Yes	X
Canyon wren (*Catherpes mexicanus*)		Limited to rocky cliffs, canyons, usually in arid areas.	Yes?	
House wren (*Troglodytes aedon*)		Inhabits woodlands and human-modified landscapes.	Yes	X
Pacific wren I*Troglodytes pacificus*)		Riparian areas within large, uncut stands mature and old growth spruce/fir forest	No	
Marsh wren (*Cistothorus palustris*)		Marshes with dense emergent vegetation and relatively deep water.	No	
American dipper (*Cinclus americanus*)		Fast moving, clear streams; waterfalls	Yes?	
Golden-crowned kinglet (*Regulus satrapa*)		Forests with closed or open canopies; edges of clearings; near water	Yes	
Ruby-crowned kinglet (*Regulus calendula*)		Coniferous and deciduous forests, floodplain forests, willows.	Yes	X
Western bluebird (*Sialia mexicana*)		Open coniferous and deciduous forests.	Yes	
Mountain bluebird (*Sialia currucoides*)		Open areas with scattered trees.	Yes	X
Townsend's solitaire (*Myadestes townsendi*)		Open coniferous forests.	Yes	X
Veery (*Catharus fuscescens*)		Riparian forests with dense understory; willows.	Yes	
Swainson's thrush (*Catharus ustulatus*)		Mature coniferous, deciduous riparian and aspen forests.	Yes	
Hermit thrush (*Catharus guttatus*)		Interior forest, edges.	Yes	
American robin (*Turdus migratorius*)		Diverse woodland habitats.	Yes	X
Varied thrush (*Ixoreus naevius*)		Humid interior montane forest; deciduous forest with thick understory.	No	
Gray catbird (*Dumetella carolinensis*)		Dense shrubs, early successional forest, abandoned buildings, tree rows.	Yes	X
Northern mockingbird (*Mimus polyglottos*)		Low elevation forest edges, urban, cultivated lands.	Yes	
Sage thrasher (*Oreoscoptes montanus*)		Dense sagebrush.	Yes	
European starling (*Sturnus vulgaris*)		Wide variety of habitats at lower elevations.	Yes	X

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
American pipit (*Anthus rubescens*)		Nests at or above timberline in sparsely vegetated, open habitat; during migration, found at low elevations	No?	
Bohemian waxwing (*Bombycilla garrulous*)		Migrant/winter resident; open coniferous and mixed forests.	Yes	
Cedar waxwing (*Bombycilla cedrorum*)		Open forests, riparian areas, human-made habitats..	Yes	X
Lapland longspur (*Calcarius lapponicus*)		Migrant/winter resident; open areas, grasslands.	Yes	
Snow bunting (*Plectrophenax nivalis*)		Migrant/winter resident; open grasslands and fields, roadsides, stubble.	Yes	
Northern waterthrush (*Parkesia noveboracensis*)		Wooded swamps, bog thickets, willows and alders along rivers.	No?	
Tennessee warbler (*Oreothlypis peregrine*)		Migrant; open woodlands.	Yes	
Orange-crowned warbler (*Oreothlypis celata*)		Aspen, riparian forests with low shrubs.	Yes	
Nashville warbler (*Oreothlypis ruficapilla*)		Open deciduous and coniferous forest; edges.	Yes	
MacGillivray's warbler (*Geothlypis tolmiei*)		Riparian habitat and clearcuts in conifer forests; dense second growth.	Yes	X
Common yellowthroat (*Geothlypis trichas*)		Dense shrubby vegetation.	Yes?	
American redstart (*Setophaaa ruticilla*)		Shrubby deciduous woodlands near water; willows.	Yes	X
Cape May warbler (*Setophaga tigrina*)		Migrant; variety of forest habitats with shrubs and thickets.	Yes?	
Magnolia warbler (*Setophaga magnolia*)		Migrant; coniferous forests and brushy areas.	Yes	
Yellow warbler (*Setophaga petechia*)		Wet or mesic brushy habitat.	Yes	X
Chestnut-sided warbler (*Setophaga pensylvanica*)		Migrant; variety of shrubby habitats and open woodlands.	Yes	
Blackpoll warbler (*Setophaga striata*)		Migrant; riparian areas.	Yes	
Palm warbler (*Setophaga pamarum*)		Migrant; open areas in various woodlands.	Yes	
Yellow-rumped warbler (*Setophaga coronata*)[7]		Mature coniferous and mixed forests.	Yes	X
Townsend's warbler (*Setophaga townsendi*)		Tall coniferous and mixed coniferous-deciduous forests; prefers old growth or late successional forests.	No?	
Wilson's warbler (*Cardellina pusilla*)		Riparian habitat with willows; dense mesic shrubs.	Yes?	
Yellow-breasted chat (*Icteria virens*)		Low, dense shrubs, without a tree canopy.	Yes; limited	
Green-tailed towhee (*Pipilo chlorurus*)		Thick, shrubby habitats, usually shrub—steppe habitats.	Yes	
Spotted towhee (*Pipilo maculatus*)		Tall shrubs, open forest.	Yes	X
American tree sparrow (*Spizella arborea*)		Migrant/winter resident; open areas with scattered trees, human-modified landscapes.	Yes	X
Chipping sparrow (*Spizella passerina*)		Open woodlands, particularly coniferous.	Yes	X
Clay-colored sparrow (*Spizella pallida*)		Second-growth areas, open shrublands.	Yes	
Brewer's sparrow (*Spizella breweri*)		Sagebrush.	Yes	X
Vesper sparrow (*Pooecetes gramineus*)		Grasslands and sagebrush.	Yes	X
Lark sparrow (*Chondestes grammacus*)		Widespread in open habitats.	Yes	
Bell's (sage) sparrow (*Artemisiospiza belli*)		Study area outside range in MT, but reecorded nearby; positively correlated with big sagebrush	Yes	
Savannah sparrow (*Passerculus sandwichensis*)		Open meadows, marshes, agricultural fields.	Yes	
Grasshopper sparrow (*Ammodramus savannarum*)		Open prairie with intermittent brush.	Yes	
Fox sparrow (*Passerella iliaca*)		Thick cover, forest edges.	Yes	
Song sparrow (*Melospiza melodia*)		Wide habitat range, often near water.	Yes	X
Lincoln's sparrow (*Melozpiza lincolnii*)		Boggy shrubs, willows, sedges, mossy areas; aspen, cottonwoods.	Yes	
Swamp sparrow (*Melospiza georgiana*)		Migrant; wetlands, forest edges, dense brush.	Yes?	

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]
White-throated sparrow (*Zonotrichia albicollis*)		Migrant; brushy habitats near or within woodlands.	Yes	
Harris' sparrow (*Zonotrichia querula*)		Migrant; deciduous shrubs and trees, often along streams.	Yes	
White-crowned sparrow (*Zonotrichia leucophrys*)		Grasslands; bare ground for forage, dense cover for nesting; surface water; tall conifers.	Yes	X
Golden-crowned sparrow (*Zonotrichia atricapilla*)		Accidental species in MT, has been recorded near study area. Dense brush, thickets along streams.	Yes	
Dark-eyed junco (*Junco hyemalis*)[8]		Open coniferous forests, parks, farms, rural roadsides and stream edges.	Yes	X
Western tanager (*Piranga ludoviciana*)		Open woodlands.	Yes	X
Rose-breasted grosbeak (*Pheucticus ludovicianus*)		Migrant; deciduous forests.	Yes	
Black-headed grosbeak (*Pheucticus melanocephalus*)		Diverse forested habitats, including riparian.	Yes	X
Lazuli bunting (*Passerina amoena*)		Mesic shrublands; forest openings.	Yes	
Indigo bunting (*Passerina cyanea*)		Migrant; shrubby and weedy habitats.	Yes	
Bobolink (*Dolichonyx oryzivorus*)		Tall and mixed grass prairies; old fields.	No	
Red-winged blackbird (*Agelaius phoeniceus*)		Variety of wetland and upland habitats.	Yes	X
Western meadowlark (*Sturnella neglecta*)		Native grasslands, pastures, hay, alfalfa.	Yes	X
Yellow-headed blackbird (Xanthocephalus xanthocephalus)		Wetlands with emergent vegetation.	No?	
Rusty blackbird (*Euphagus carolinus*)		Migrant; moist woodlands (primarily coniferous), wooded edges of water courses.	Yes	
Brewer's blackbird (*Euphagus cyanocephalus*)		Open, human-modified habitats.	Yes	X
Common grackle (*Quiscalus quiscula*)		Open woodland and edges, marshes, human-altered landscapes.	Yes	
Brown-headed cowbird (*Molothrus ater*)		Prairie, agricultural fields, forest edges, pastures.	Yes	X
Hooded oriole (*Icterus cucullatus*)		Accidental in MT but recorded near study area; riparian woodland, deciduous forest.	Yes	
Bullock's oriole (*Icterus bullockii*)		Open deciduous woodlands, especially riparian.	Yes	X
Gray-crowned rosy-finch (*Leucosticte tephrocotis*)		Nests in crevices above timberline; in winter, open fields	Yes	
Black rosy-finch (*Leucosticte atrate*)		Nests above timber line; in winter, open fields.	Yes	
Pine grosbeak (*Pinicola enucleator*)		Open coniferous forest.	Yes	
Purple finch (*Haemorhous purpureus*)		Migrant; coniferous and deciduous forests.	Yes	
Cassin's finch (*Haemorhous cassinii*)		Most forest types (including riparian), particularly ponderosa pine.	Yes	
House finch (*Haemorhous mexicanus*)		Open, semi-open and human-modified habitats.	Yes	X
Red crossbill (*Loxia curvirostra*)		Mature coniferous forests.	No?	
White-winged crossbill (*Loxia leucoptera*)		Mature coniferous and mixed forests.	No?	
Common redpoll (*Acanthis flammea*)		Migrant/winter resident; open woodlands, scrub, field edges, towns.	Yes	
Hoary redpoll (*Acanthis hornemanni*)		Migrant/winter resident; open woodlands, scrub, towns.	Yes	
Pine siskin (*Spinus pinus*)		Open coniferous and deciduous forests.	Yes	X
American goldfinch (*Spinus tristis*)		Weedy fields, flood plains, human-altered land.	Yes	X
Evening grosbeak (*Coccothraustes vespertinus*)		Mixed conifer, spruce-fir and deciduous forests.	Yes	
House sparrow (*Passer domesticus*)		Human-modified habitats.	Yes	X

[1]FWS (2014): LT = Listed threatened; LE = Listed endangered; C = Candidate; CH = Designated critical habitat; DM = Delisted, monitored.
[2] X=species recorded during 2013 baseline study.
[3]Distribution and nomenclature from MTNHP (2014).
[4]? = Habitat availability uncertain.
[5]Species in bold text are Montana Species of Concern, Potential Species of Concern or Special Status Species (MTNHP and FWP 2014).
[6] Distribution and nomenclature from MTNHP (2014) and Montana Bird Distribution Committee (2012).

Species	Legal Status[1]	Preferred and/or Breeding Habitat	Preferred and/or breeding habitat in the Mine area	Recorded in or near the Mine area[2]

[7]Includes Audubon's warbler (*Setophaga coronata auduboni*) and myrtle warbler (*Setophaga coronata coronata*).
[8]Includes pink-sided junco (*Junco hyemalis mearnsi*) and slate-colored junco (*Junco hyemalis hyemalis/cismontanus*).
[9]Reported within 13 miles of the study area (Maxell 2014) in similar habitats.

APPENDIX B. WILDLIFE HABITAT DESCRIPTIONS, MONTANA LIMESTONE RESOURCES MINE STUDY AREA.

Six major wildlife habitat types comprising 17 habitat subtypes were identified in the Montana Limestone Resources Mine terrestrial wildlife resources inventory area. Habitats were mapped as a single habitat subtype, or were grouped into combinations of subtypes when it was not possible to differentiate individual subtypes within a mapping polygon.

Habitat Type 000. Miscellaneous Features

Habitat Subtype 001. Rock Outcrop

Habitat subtype 001 comprised exposed, steep outcrops on the bluffs above the Clark Fork River and Tigh Creek. Some outcrops had steep colluvial toe slopes that increased their effective height. Some outcrops had vertical crevices. Rock outcrops were used as perches by raptors and nesting by white-throated swifts, and may have provided roost sites for bats. Only the largest rock outcrops could be mapped at the scale (1" = 600') used for the habitat map; therefore some outcrops were encompassed within the map unit for the surrounding habitat (Plate 1). Consequently the acreage of rock outcrops (Table 1) may have been underestimated.

Habitat Subtype 002. Pond/Impoundment/River/Stream

Three water body types were mapped as subtype 002:

- Natural ponds formed by oxbows and side channels of the Clark Fork River. Most of these were too small to be mapped at the scale used for the habitat map. Some held water throughout the study period, while others were seasonally dry. Some had emergent and submergent vegetation, at least seasonally. Canada geese, great blue herons, wood ducks, hooded mergansers and common mergansers were recorded in these ponds;

- Small, man-made ponds/impoundments created when gravel was excavated from the floodplain of the Clark Fork River. These sites did not have a surface connection to the Clark Fork River. Canada geese were recorded at these ponds;

- The Clark Fork River. Most species of waterfowl and shorebirds recorded during the study (Appendix A) were observed in the river; and

- A small, unnamed perennial stream that flowed generally east along the south boundary of the study area, then flowed north/northeast through the east third of the area. This stream supported very little deciduous riparian vegetation. Red-winged blackbirds were recorded along this stream.

There were several unnamed, ephemeral drainages through the area. In addition, Tigh Creek was ephemeral, containing water only during snowmelt. Tigh Creek's channel ended where the drainage reached the Clark Fork River floodplain, so there was no surface connection with the river. There were several small, developed springs in the upper reaches of the Tigh Creek drainage, but none contributed surface flow to the creek channel.

Habitat Subtype 020. Roads

For the purposes of this study, road habitat was comprised of permanent, all-season roads (e.g. I-90, the access road into two occupied residences), active and abandoned railroad grades, and certain two-track vehicle trails. Professional judgment was used to classify a wildlife sighting as associated with either roads (i.e., the animal(s) were actually using the habitat created by the road surface) or with the adjoining habitat (e.g., a deer crossing a road). Sightings associated with barrow pits (e.g., a western meadowlark foraging in a barrow pit) were assigned to grassland habitat subtypes 411 (bunchgrass) or 412 (sod-forming grass). For the purposes of comparisons of wildlife habitat use (Appendix C, Figure 2), wildlife sightings assigned to road habitat were grouped with those assigned to building sites (habitat subtype 021), since both habitats were man-made with a high probability of frequent human-wildlife interaction.

Habitat Subtype 021. Buildings

Building sites consisted of occupied and unoccupied residences and/or outbuildings. Most of the wildlife species recorded at building sites (Appendix C) were passerine birds that could be considered adaptable to and/or tolerant of human activities.

Habitat Type 100. Woodland

Habitat Subtype 110. Riparian Tree

Riparian tree habitat was present along the Clark Fork River bottom. It formed a mosaic with other river bottom habitats, including grassland subtypes 412 and 413, and agricultural habitat subtypes 510 and 530. It comprised about five percent of the entire Montana Limestone Resources Mine study area, but almost 54 percent of all species recorded in the study area were recorded at least once in subtype 110 (Appendix C). When combined with other river bottom habitats into a riparian habitat complex, the percentage of all wildlife species recorded at least once rose to almost 61 percent (Figure 2).

Riparian tree habitat along the Clark Fork River was characterized by stands of cottonwood, and/or quaking aspen, and/or Rocky Mountain juniper, with variable canopy cover and shrub understory, along with open areas dominated by willows or western snowberry. Riparian tree habitat was used as nesting sites by red-tailed hawks, great blue herons, wood ducks, hooded and common mergansers, and a considerable variety of passerine birds.

Habitat Subtype 123. Ponderosa Pine/Grass

Although ponderosa pine was seral to Douglas-fir in many forested stands in the study area, habitat subtype 123 was characterized by small forest stands dominated by ponderosa pine with a comparatively open understory. Rocky Mountain Juniper was usually present. Comparatively few wildlife species were recorded in this habitat (Appendix C), primarily because of its scarcity.

Habitat Subtype 130. Juniper

Rocky Mountain juniper was commonly associated with all coniferous and riparian forest habitat subtypes. There were stands, usually on east or south aspects, where Rocky Mountain juniper was the predominant conifer. Juniper was also encroaching on some big sagebrush areas. Most wildlife species recorded in juniper habitat were also recorded in coniferous habitat subtypes 123, 160, 163 and/or 164 (Appendix C).

Habitat Subtypes 160 (Douglas-fir), 163 (Douglas-fir/grass) and 164 (Douglas-fir/shrub)

Habitat subtypes 160, 163 and 164, all dominated by Douglas-fir, comprised the primary conifer habitat in the study area. The three Douglas-fir subtypes were grouped for the analysis of wildlife/habitat relationships (Figure 2), since most species recorded in Douglas-fir stands of one subtype were also present in the others.

Habitat 160 was identified by aerial photography interpretation, and was mapped when it could not be readily differentiated into subtypes 163 or 164. Rocky Mountain juniper was common in all three subtypes. The understory of subtype 163 was dominated by grasses including bluebunch wheatgrass, Idaho fescue and rough fescue; this subtype was usually found on dryer sites and had a more open overstory than subtype 164. The understory of subtype 164 was dominated by shrubs such as ninebark and snowberry.

Habitat Type 200. Xeric Shrubland

Habitat type 200 comprised a single subtype:

Habitat Subtype 212. Big Sagebrush

Scow (2014) documented five big sagebrush vegetation communities in his study area, all identified by their primary understory grass. These communities were grouped into a single wildlife habitat subtype. Habitat subtype 212 was a dominant habitat in open portions of the study area, particularly on gently rolling hills and broad drainages, where it formed a matrix with grassland subtypes. About 21 percent of the study area was mapped as this subtype (Table 1). It formed a mosaic with the upland grass habitat complex (subtypes 411, 412 and 530). Most wildlife species recorded in subtype 212 were also observed in upland grassland habitats (Appendix C).

Habitat Type 300. Mesophytic Shrub

Habitat Subtype 320. Low Mesophytic Shrub

Habitat subtype 320 was a very minor component of the study area, comprising less than one percent of the area (Table 1). The dominant shrub was western snowberry, although Woods' rose was often present. It was generally restricted to swales and drainage bottoms. Low mesophytic shrubs were also an understory component of habitat subtype 110 along the Clark Fork River bottom.

Habitat Type 400. Grassland

Grasslands formed the third (along with xerophytic shrubland and woodland) predominant habitat in the Montana Limestone Resources wildlife study area, comprising about 46 percent of the study area (Table 1). Habitat type 400 comprised three subtypes: bunchgrass (subtype 411), sod-forming grass (subtype 412) and riparian grass (subtype 413). For the purposes of wildlife/habitat comparisons, subtypes 411 and 412 were grouped; in addition, habitat subtype 530 (tame pasture) was considered to be part of an upland grassland habitat complex.

Habitat subtype 411. Bunchgrass

For the purposes of the Montana Limestone Resources Mine terrestrial wildlife inventory, bunchgrass habitats were characterized by dominant native grasses that grow in discrete clumps rather than sod-like carpets. Scow (2014) identified four vegetation community types defined by bluebunch wheatgrass, Idaho fescue or rough fescue. Bunchgrass habitat was primarily mapped on uplands, and totaled almost 41 percent of the study area (Table 1). Most wildlife species recorded in subtype 212 were also observed in upland grassland habitats (Appendix C).

Habitat Subtype 412. Sod-forming Grass

Habitat subtype 412 was usually represented by Kentucky bluegrass and/or smooth brome stands in drainages and along the Clark Fork River bottom. It formed a mosaic with other river bottom habitats, and most species that were recorded in subtype 412 would also be expected in adjacent habitats in the mosaic.

Habitat subtype 413. Riparian Grass

Riparian grass was a diverse (Scow 2014) but restricted habitat subtype, totaling only about 0.5 percent of the study area (Table 2), usually found in association with subtypes 002 (water) and 110 (riparian tree). The stands were often wet or subject to seasonal flooding. It was considered part of the riparian habitat complex.

Habitat Type 500. Agriculture

For the purposes of the Montana Limestone Resources Mine wildlife resources inventory, agricultural habitats were defined as those areas that appeared to have been cultivated and/or partially or entirely disturbed for hay production.

Habitat Subtype 510. Hay

Hay fields were limited to perennial stream drainages, primarily the Clark Fork River. Some fields were sprinkler irrigated. Most fields appeared to be seeded with alfalfa, alfalfa/introduced grass, or introduced grasses.

Habitat Subtype 530. Tame Pasture

Tame pasture habitat was characterized by past cultivation and seeding with non-native grasses, usually crested wheatgrass, smooth brome or Russian wildrye. Tame pastures were found in association with stream bottom habitats and in upland fields near abandoned homesteads. Most of the wildlife species recorded in association with habitat subtype 530 were common and were also recorded in other grassland habitats (Appendix C).

Appendix C. Wildlife species recorded by habitat in the Montana Limestone Resources Mine terrestrial wildlife study, 2013.

Species	Habitat Subtype																	Total
	001 Rock	002 Water	020 Road	021 Bldg.	110 Riparian Tree	123 Ponderosa Pine-Grass	130 Juniper	160 Douglas-fir	163 Douglas-fir-Grass	164 Douglas-fir-Shrub	212 Big Sage	320 Low Mesic Shrub	411 Bunch-grass	412 Sod-forming Grass	413 Rip. Grass	510 Hay	530 Tame Pasture	
AMPHIBIANS																		
None																		**0**
REPTILES																		
Squamata																		
Prairie rattlesnake (*Crotalus viridis*)										X	X		X					**3**
MAMMALs																		
Chiroptera																		
Townsend's big-eared bat (*Corynorhinus townsendii*)																		
Big brown bat (*Eptesicus fuscus*)																		
Silver-haired bat (*Lasionycteris noctivagans*)																		
Hoary bat (Lasiurus cinereus)																		
California myotis (*Myotis californicus*)																		
Western small-footed myotis (*Myotis ciliolabrum*)																		
Long-eared myotis (*Myotis evotis*)																		
Little brown myotis (*Myotis lucifugus*)																		
Fringed myotis (*Myotis thysanodes*)																		
Long-legged myotis (*Myotis volans*)																		
Northern myotis (*Myotis septentrionalis*)																		
Yuma myotis (*Myotis yumanensis*)																		
Lagomorpha																		
Mountain cottontail (*Sylvilagus nuttallii*)	X			X	X			X		X	X							**6**
Snowshoe hare (*Lepus americanus*)	X									X								**2**
Rodentia																		
Beaver (*Castor canadensis*)		X			X													**2**
Northern pocket gopher (*Thomomys talpoides*)				X		X					X		X	X		X	X	**7**
Columbian ground squirrel (*Urocitellus columbianus*)											X		X	X			X	**4**
Yellow-bellied marmot (*Marmota flaviventris*)	X															X		**2**
Least chipmunk (*Tamias minimus*)	X				X													**2**
Yellow-pine chipmunk (*Tamias amoenus*)								X	X	X								**3**
Red squirrel (*Tamiasciurus hudsonicus*)								X		X								**2**
Eastern fox squirrel (*Sciurus niger*)					X													**1**
Carnivora																		
Coyote (*Canis latrans*)	X	X	X			X	X	X	X	X	X		X	X				**11**

Appendix C (continued).

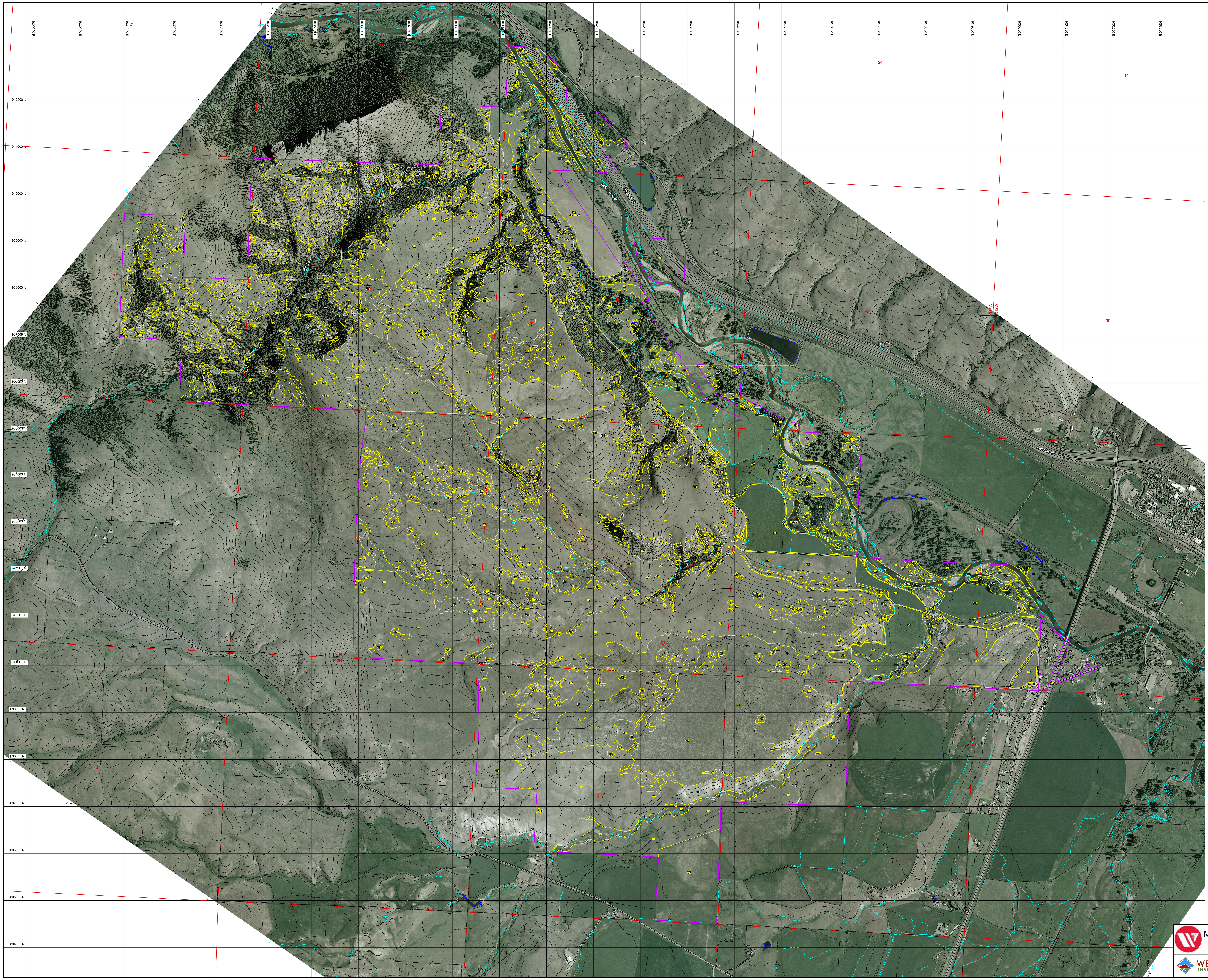
Species	Habitat Subtype																	Total
	001 Rock	002 Water	020 Road	021 Bldg.	110 Riparian Tree	123 Ponderosa Pine-Grass	130 Juniper	160 Douglas-fir	163 Douglas-fir-Grass	164 Douglas-fir-Shrub	212 Big Sage	320 Low Mesic Shrub	411 Bunch-grass	412 Sod-forming Grass	413 Rip. Grass	510 Hay	530 Tame Pasture	
Bobcat (*Lynx rufus*)							X											**1**
American mink (*Mustela vison*)		X																**1**
Badger (*Taxidea taxus*)											X		X					**2**
Raccoon (*Procyon lotor*)		X			X													**2**
Black bear (*Ursus americanus*)								X		X			X					**3**
Artiodactyla																		
Moose (*Alces americanus*)					X			X		X								**3**
Mule deer (*Odocoileus hemionus*)								X			X	X	X					**4**
White-tailed deer (*Odocoileus virginianus*)					X		X				X		X	X	X	X	X	**8**
Elk (*Cervus elaphus*)					X			X			X		X	X		X	X	**7**
BIRDS																		
Anseriformes																		
Canada goose (*Branta canadensis*)		X												X	X	X	X	**5**
Wood duck (*Aix sponsa*)		X																**1**
Mallard (*Anas platyrhynchus*)		X																**1**
American wigeon (*Anas americana*)		X																**1**
Common goldeneye (*Bucephala clangula*)		X																**1**
Hooded merganser (*Lophodytes cucullatus*)		X																**1**
Common merganser (*Mergus merganser*)		X																**1**
Galliformes																		
Ruffed grouse (*Bonasa umbellus*)					X													**1**
Dusky grouse (*Dendragapus obscurus*)								X										**1**
Pelecaniformes																		
Great blue heron (*Ardea herodias*)		X			X													**2**
Accipitriformes																		
Turkey vulture (*Cathartes aura*)	X								X	X	X							**4**
Osprey (*Pandion haliaetus*)		X			X												X	**3**
Bald eagle (*Haliaeetus leucocephalus*)					X													**1**
Cooper's hawk (*Accipter cooperii*)									X									**1**
Red-tailed hawk (*Buteo jamaicensis*)					X						X		X					**3**
Rough-legged hawk (*Buteo lagopus*)					X													**1**
Golden eagle (*Aquila chrysaetos*)									X									**1**
Falconiformes																		
American kestrel (*Falco sparverius*)				X					X		X		X			X		**5**
Prairie falcon (*Falco mexicanus*)									X								X	**2**
Gruiformes																		
Sandhill crane (*Grus canadensis*)																X		**1**
Charadriiformes																		
Killdeer (*Charadrius vociferus*)		X	X	X										X			X	**5**
Wilson's snipe (*Gallinago delicata*)					X										X			**2**
Columbiformes																		
Rock pigeon (*Columba livia*)				X	X													**2**
Eurasian collared-dove (*Streptopelia decaocto*)				X	X													**2**
Mourning dove (*Zenaida macroura*)				X	X			X										**3**
Strigiformes																		
Great horned owl (*Bubo virginianus*)				X														**1**
Caprimulgiformes																		
Common nighthawk (*Chordeiles minor*)													X			X		**2**
Apodiformes																		

Appendix C (continued).

Species	Habitat Subtype																	Total
	001 Rock	002 Water	020 Road	021 Bldg.	110 Riparian Tree	123 Ponderosa Pine-Grass	130 Juniper	160 Douglas-fir	163 Douglas-fir-Grass	164 Douglas-fir-Shrub	212 Big Sage	320 Low Mesic Shrub	411 Bunch-grass	412 Sod-forming Grass	413 Rip. Grass	510 Hay	530 Tame Pasture	
White-throated swift (*Aeronautes saxatalis*)	X				X			X	X	X								**4**
Black-chinned hummingbird (*Archilochus alexandri*)					X													**1**
Rufous hummingbird (*Selasphorus rufus*)				X	X													**2**
Coraciiformes																		
Belted kingfisher (*Megaceryle alcyon*)		X			X													**2**
Piciformes																		
Red-naped sapsucker (*Sphyrapicus nuchalis*)					X													**1**
Downy woodpecker (*Picoides pubescens*)					X			X		X								**3**
Hairy woodpecker (*Picoides villosus*)										X								**1**
Northern flicker (*Colaptes auratus*)					X	X	X	X	X	X						X		**7**
Pileated woodpecker *(Dryocopus pileatus)*					X													**1**
Passeriformes																		
Western wood-pewee (*Contopus sordidulus*)					X			X										**2**
Willow flycatcher (*Empidonax traillii*)					X													**1**
Least flycatcher (*Empidonax minimus*)					X					X								**2**
Dusky flycatcher (*Empidonax oberholseri*)									X									**1**
Cordilleran flycatcher (*Empidonax occidentalis*)					X													**1**
Say's phoebe (*Sayornis saya*)				X														**1**
Western kingbird (*Tyrannus verticalis*)						X					X		X				X	**4**
Eastern kingbird (*Tyrannus tyrannus*)					X											X	X	**3**
Northern shrike (*Lanius excubitor*)					X													**1**
Cassin's vireo (*Vireo cassinii*)					X				X	X								**3**
Warbling vireo (*Vireo gilvus*)					X													**1**
Red-eyed Vireo (*Vireo olivaceus*)					X													**1**
Gray jay (*Perisoreus canadensis*)								X										**1**
Steller's jay (*Cyanocitta stelleri*)										X								**1**
Clark's nutcracker (*Nucifraga columbiana*)								X										**1**
Black-billed magpie (*Pica hudsonia*)			X	X	X		X		X		X	X	X	X		X	X	**11**
American crow (*Corvus brachyrhynchos*)					X								X			X		**3**
Common raven (*Corvus corax*)				X	X			X		X	X		X			X	X	**8**
Horned lark (*Eremophila alpestris*)													X				X	**2**
Tree swallow (*Tachycineta bicolor*)		X			X			X			X			X	X	X	X	**8**
Violet-green swallow (*Tachycineta thalassina*)	X								X									**2**
Barn swallow (*Hirundo rustica*)		X		X														**2**
Mountain chickadee (*Poecile gambeli*)					X	X		X	X	X								**5**
Red-breasted nuthatch (*Sitta canadensis*)								X	X	X								**3**
White-breasted nuthatch (*Sitta carolinensis*)					X			X	X	X								**4**
Rock wren (*Salpinctes obsoletus*)	X																	**1**
House wren (*Troglodytes aedon*)				X	X	X		X										**4**
Ruby-crowned kinglet (*Regulus calendula*)					X					X								**2**
Mountain bluebird (*Sialia currucoides*)								X	X		X		X	X		X		**6**
Townsend's solitaire (*Myadestes townsendi*)								X		X								**2**
American robin (*Turdus migratorius*)		X	X	X	X	X	X	X	X				X				X	**10**
Gray catbird (*Dumetella carolinensis*)					X													**1**
European starling (*Sturnus vulgaris*)			X	X	X								X			X	X	**7**
Cedar waxwing (*Bombycilla cedrorum*)				X	X			X										**3**
MacGillivray's warbler (*Geothlypis tolmiei*)					X					X								**2**

Appendix C (continued).

Species	Habitat Subtype																	Total
	001 Rock	002 Water	020 Road	021 Bldg.	110 Riparian Tree	123 Ponderosa Pine-Grass	130 Juniper	160 Douglas-fir	163 Douglas-fir-Grass	164 Douglas-fir-Shrub	212 Big Sage	320 Low Mesic Shrub	411 Bunch-grass	412 Sod-forming Grass	413 Rip. Grass	510 Hay	530 Tame Pasture	
American redstart (*Setophaaa ruticilla*)					X													**1**
Yellow warbler (*Setophaga petechia*)					X							X						**2**
Yellow-rumped warbler (*Setophaga coronata*)[7]					X			X	X	X								**4**
Spotted towhee (*Pipilo maculatus*)					X	X		X		X								**4**
American tree sparrow (*Spizella arborea*)				X	X													**2**
Chipping sparrow (*Spizella passerina*)					X	X	X	X	X	X								**6**
Brewer's sparrow (*Spizella breweri*)											X							**1**
Vesper sparrow (*Pooecetes gramineus*)											X		X					**2**
Song sparrow (*Melospiza melodia*)					X													**1**
White-crowned sparrow (*Zonotrichia leucophrys*)					X	X				X								**3**
Dark-eyed junco (*Junco hyemalis*)			X					X	X	X								**4**
Western tanager (*Piranga ludoviciana*)									X									**1**
Black-headed grosbeak (*Pheucticus melanocephalus*)					X			X										**2**
Red-winged blackbird (*Agelaius phoeniceus*)		X	X		X									X	X	X		**6**
Western meadowlark (*Sturnella neglecta*)			X			X	X	X	X		X		X				X	**8**
Brewer's blackbird (*Euphagus cyanocephalus*)				X	X													**2**
Brown-headed cowbird (*Molothrus ater*)													X			X	X	**3**
Bullock's oriole (*Icterus bullockii*)					X													**1**
House finch (*Haemorhous mexicanus*)				X	X													**2**
Pine siskin (*Spinus pinus*)						X		X	X	X								**4**
American goldfinch (*Spinus tristis*)			X														X	**2**
House sparrow (*Passer domesticus*)				X														**1**
Total	**8**	**19**	**8**	**21**	**61**	**12**	**8**	**33**	**24**	**29**	**20**	**3**	**23**	**11**	**4**	**18**	**19**	



LEGEND

- Study Area
- Wildlife Habitat Type Boundary
- Landbird Plots

MAP SYMBOL	HABITAT SUBTYPE
001	Rock Outcrop
002	Pond / Impoundment / River / Stream
020	Road
021	Building
110	Riparian Tree
123	Ponderosa Pine / Grass
130	Juniper
160	Douglas-fir
163	Douglas-fir / Grass
164	Douglas-fir / Shrub
212	Big Sagebrush
320	Low Mesophytic Shrub
411	Bunchgrass
412	Sod-forming Grass
413	Riparian Grass
510	Hay
530	Tame Pasture
NS	Not Surveyed

0 300 600 1200
Feet

Montana Limestone Resources
Wildlife Habitat

WESTECH ENVIRONMENTAL

SCALE: 1"=600'
DATE: 4/24/14 | Rev 2. 2/16/18
DRAWN BY: DC
CHECKED BY: PF
FILE: MLR17_Habitat.dwg

Plate 1
SHEET: 1 of 1