INVENTORY OF SENSITIVE ANIMAL SPECIES IN THE FERRIS MOUNTAIN WILDERNESS STUDY AREA, WYOMING

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Abstract

The Ferris Mountain Wilderness Study Area (WSA) is one of 42 WSAs in Wyoming managed by the Bureau of Land Management (BLM) as part of the National Landscape Conservation System (NLCS). To date, no WSA in Wyoming has been elevated to Wilderness Area status under the NLCS. Information about the characteristics that make a WSA eligible for Wilderness Area designation is needed during the evaluation process. The Ferris Mountain WSA is of particular interest to many because of its remoteness, ruggedness, and historic significance as a landmark for settlers, as well as its unique ecosystems. The Ferris Mountain WSA lies in the transition zone between eastern and western ecosystems. This unique mountain range rises out of the sagebrush-steppes of central Wyoming to over 10,000 feet and is dominated by mixed conifer forests. A number of sensitive species are suspected to occur in the Ferris Mountains, but due to the relative inaccessibility of the landscape, no formal studies of the fauna of the Ferris Mountain WSA have previously been conducted.

The Wyoming Natural Diversity Database conducted a species inventory of the fauna of the Ferris Mountain WSA in June 2011. We used a number of survey techniques, including small mammal traps, Anabat® units, trail cameras, mammal track and scat surveys, visual and auditory surveys for birds and amphibian, surveys of rock outcrops for reptiles, and surveys for butterflies and land snails. We documented at least 77 species of mammals, birds, amphibians, and invertebrates in the Ferris Mountain WSA. We also documented the first occurrence in the WSA of 8 species listed as sensitive or "of concern" by the BLM and the Wyoming Game and Fish Department. Due to the short duration of this study, we only were able to survey parts of 3 drainages in the Ferris Mountain WSA, yet we compiled a list of almost 80 species of animals. We expect this species list to increase if further attention is given to this remote, rugged, and ecologically important WSA.

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Introduction

Wyoming has 42 Wilderness Study Areas (WSAs) on Bureau of Land Management (BLM) lands. As part of the National Landscape Conservation System (NLCS) these WSAs are currently managed to preserve the characteristics that make these areas suitable for designation as wilderness areas. In 1991, the Wyoming BLM recommended that 21 WSAs, including all of the Ferris Mountain WSA, be designated as wilderness; however, no WSAs have been elevated to Wilderness Area designations under the NLCS in Wyoming to date.

The Ferris Mountain WSA is of particular interest to many because of its remoteness, ruggedness, and historic significance as a landmark for settlers, as well as its unique ecosystems. The Ferris Mountain WSA lies in the transition zone between eastern and western ecosystems, and the Ferris Mountains mark the eastern or western-most range limit of numerous taxa. This unique mountain range rises out of the sagebrush-steppes of central Wyoming to over 10,000 feet, resulting in an isolated "sky island" (Heald 1967) dominated by lodgepole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*), and spruce-fir cover types (Jones 2004). The Ferris Mountains are known for their more charismatic wildlife (bighorn sheep (*Ovis canadensis*), mountain lions (*Felis concolor*), elk (*Cervus elaphus*) , mule deer (*Odocoilius hemionus*), and northern goshawks (*Accipiter gentilis*)); however, much less is known about a number of less-charismatic species thought to occur within the Ferris Mountain WSA, many of which are on the BLM sensitive species list, are designated as Species of Greatest Conservation Need by the Wyoming Game and Fish Department (WGFD), and are noted as species of concern by the Wyoming Natural Diversity Database (WYNDD), the state's Natural Heritage Program.

WYNDD is a service and research unit of the University of Wyoming dedicated to the collection and dissemination of unbiased data on the biology and conservation status of sensitive species in Wyoming (http://uwadmnweb.uwyo.edu/wyndd/). The core of our mission is to generate information that helps organizations like the BLM make effective management decisions. Along these lines, WYNDD has worked with the Wyoming Game and Fish Department and other state and federal experts to develop revised range maps and predictive distribution maps for sensitive species in Wyoming. These projects have allowed WYNDD to identify information gaps in our knowledge of sensitive species distributions across the state. The fauna of the Ferris Mountains are one of those information gaps and the BLM Rawlins Field Office expressed interest in learning more about BLM sensitive species thought to occur in the Ferris Mountain WSA.

Purpose & Objectives

The purpose of this project was to fill information gaps for sensitive species suspected to occur in the Ferris Mountain WSA. This was accomplished by conducting a brief but intensive inventory of local fauna using a suite of survey methods at key locations in the Ferris Mountain WSA.

Specific objectives for the project were to:

1) Identify gaps in our knowledge regarding the fauna of the Ferris Mountain WSA.
2) Design and implement a field sampling strategy to fill in the key gaps in our knowledge of Ferris Mountain WSA fauna.
3) Provide the Rawlins Field Office and the Wyoming State Office of the BLM with an inventory of sensitive animal species found to occur in the Ferris Mountain WSA that will support informed management decisions.
4) Use results to update species range maps and predictive distribution models in Wyoming.

Methods

Study Area

The Ferris Mountain WSA covers approximately 9,000 hectares of the Ferris Mountains in central Wyoming (Figure 1). The WSA includes a diversity of ecosystems ranging from sagebrush-dominated foothills to mixed-conifer forests. Streams within the WSA generally are narrow, fast-flowing mountain streams except in the foothills where the streams spread out and are joined by numerous seeps and springs. Aspen (*Populus tremuloides*) and willow (*Salix* spp.) are common in riparian areas, especially at lower elevations.

Identification of Target Species & Sample Sites

Due to constraints imposed by time and accessibility, we identified a set of target species and selected sample sites that maximized the likelihood of detecting those species. We first identified BLM designated sensitive species and WGFD Species of Greatest Conservation Need (SGCN) whose ranges include the Ferris Mountains. We then targeted those species thought to possibly occur in the WSA but for which no records exist. These species primarily included shrews and bats. The BLM Rawlins Field Office was also particularly interested in determining which bat species occur in the Ferris Mountains since wind energy development is increasing in the region. The WGFD listed the Pygmy Nuthatch (*Sitta pygmaea*) and the Bighorn Sheep as primary species of interest. Furthermore, because there has been no formal documentation of reptiles and amphibians in the WSA we included these taxa in our target species group.

We identified accessible drainages for surveys that maximized the probability of detecting target species based on predicted distribution (Keinath et al. 2010) and habitat requirements. We conducted species inventories in 3 drainages in the WSA: Cherry Creek, Pete Creek, and Muddy Creek (Figure 1). Cherry Creek and Pete Creek drainages are located on the north side of the mountain range and are characterized by black sagebrush (*Artemisia nova*) steppe, mixed-grass prairie, and limber pine (*Pinus flexilis*) at lower elevations, with increasing amounts of lodgepole pine, Douglas fir, and subalpine fir (*Abies lasiocarpa*) at higher elevations. Aspen groves exist along both creeks. Exposed bedrock and cliffs are primarily granite, however, limestone cliffs and outcrops were also present west of Cherry Creek. Muddy Creek is located on the south side of the mountain range and is characterized by mature and old-growth fir and lodgepole pine forests. Substantial mature aspen forests also exist along the foothills of this drainage. Tall limestone cliffs run east/west along the south side of the Ferris Mountains and are prominent landscape features.

We conducted field surveys for 3 to 4 days in each drainage, for a total of 10 days. A 2-person field crew was assisted by 1-3 volunteers in both the Cherry Creek and Muddy Creek drainages. Pack llamas were used to carry equipment to backcountry camps and to carry small mammal traps to remote transects.

Field Surveys

We used a number of field survey techniques to document target species and to compile comprehensive species lists for the Ferris Mountain WSA. We detected birds using visual and auditory surveys in different vegetation cover-types (e.g. mature aspen forest, riparian, sagebrush, mixed conifer forest). Bird surveys were conducted in the mornings before 10:00 AM, but we also recorded birds seen or heard during other survey activities throughout the day.

Because a number of shrews were identified as target species, we live-trapped small mammals in each drainage. We used standard Sherman® (H. B. Sherman Traps, Inc., Tallahassee, FL) live-traps as well as Havahart® traps (Model # 1020; www.havahart.com) recommended for trapping shrews. The treadle of the Havahart trap is more sensitive than that of a Sherman trap and can easily be tripped by small mice and shrews. Traps were set in transects of 20 – 60 traps and were placed along streams as well as in conifer forests (Figure 2). Polyester fiberfill was placed in each trap to aid thermoregulation of captured animals and minimize trap mortality due to thermal stress. All traps were baited with a mixture of oats and peanut butter. We also experimented with bacon grease and commercial grub paste, both recommended to attract shrews. Trapping procedures were approved by the University of Wyoming's Institutional Animal Care and Use Committee.

In order to document medium and large carnivores, we also placed 2 infrared trail cameras at different locations in each drainage (Figure 2). Trail cameras were placed along obvious animal trails, especially those near red-squirrel middens. Squirrel middens are often targeted by mustelids (weasels, martens, etc.) and bears. Camera traps were baited with commercial predator scent lures spread on scraps of carpet and tied to tree trunks.

We used Anabat® units to record bat calls for identification. Two units were placed in each drainage for 1-3 nights each (Figure 2). We targeted wetland areas with pools or wide, slow-moving water. When possible, we set Anabat® units at water sources adjacent to cliffs. Recorded calls were identified to species by a trained WYNDD zoologist.

We also conducted informal surveys for a number of other taxa in the Ferris Mountain WSA. Mammal scat and tracks were identified to species, when possible. We searched streams for amphibians and snakes and conducted auditory and Visual Encounter Surveys (VES) at all wetlands, springs, and ponds detected. Cliffs and rock outcrops were also searched for lizards and snakes. Scientists at the Wyoming Chapter of The Nature Conservancy (TNC) assisted with capture and identification of butterfly species in the Cherry Creek and Pete Creek drainages. We also collected land-snail specimens that were identified by WYNDD Invertebrate Zoologist, Lusha Tronstad.

Results & Discussion

We identified 77 species of birds, mammals, amphibians, butterflies, and land snails in the Ferris Mountain WSA. These included the first recorded occurrence of 8 BLM sensitive species or WGFD SGCN species in the WSA. Surveys were conducted in riparian areas, sagebrush shrublands, conifer forests of varying ages and densities, mountain meadows, springs and seeps, and along cliffs and rock outcrops.

We detected 38 bird species either by song or by sight (Table 1). Cherry Creek and Pete Creek drainages had the largest number of bird species, however, we spent more time surveying these drainages than Muddy Creek. Species that prefer conifer forests were common in all three drainages and included Hermit Thrush (*Catharus guttatus*), Ruby-crowned Kinglet (*Regulus calendula*), Dark-eyed Junco (*Junco hyemalis*), Pine Siskin (*Spinus pinus*), and Mountain Chickadee (*Poecile gambeli*). We failed to detect one of our target conifer specialist species, the Pygmy Nuthatch. This species prefers ponderosa pine (*Pinus ponderosa*) and we found no ponderosa pine stands in the drainages surveyed. Furthermore, ponderosa pine is not currently known to occur in the Ferris Mountains. We did, however, detect the Brown Creeper (*Certhia Americana*), a U. S. Forest Service Region 2 Sensitive Species. Brown Creepers depend on mature and old-growth conifer forests and prefer forest interiors, making them sensitive to forest fragmentation (Faulkner 2010).

Small mammal traps were set out for 2 to 4 nights in each of the 3 drainages for a total of 627 trap nights (# Traps x # Nights). We captured 53 small mammals, for an 8.5% capture rate. We captured only 3 species of small mammals, deer mouse (*Peromyscus maniculatus;* 92% of captures), southern red-backed vole (*Clethrionomys gapperi*; 4%), and western jumping mouse (*Zapus princeps*; 4%). Deer mice were captured in all drainages and on 4 of 5 transects. Southern red-backed voles were captured in the Cherry Creek drainage in mixed limber pine/lodgepole pine and in the Muddy Creek drainage in aspen/fir adjacent to the creek. Both jumping mice were caught in the Muddy Creek drainage in dense aspen/fir along the creek. No shrews were captured. Increasing the length of time traps were left out might have increased trap success and allowed us to capture shrews. Trap success generally increases over several nights after traps are set. Because of the short duration of this study and the large area being surveyed, we were unable to leave traps out in any drainage for more than 4 nights.

We did not photograph any animals with infrared trail cameras; however, trail cameras are most effective when they are left out for several weeks. Due to the short duration of this project and the remoteness of the study area, we were unable to leave cameras out in any drainage for more than 4 days. Although camera traps yielded no animals, we were able to document evidence of 16 terrestrial mammal species (Table 1) through visual observation, scat, tracks, or other sign (middens, scrapings, alarm calls, etc.).

Because the Ferris Mountain WSA includes ecosystems ranging from sagebrush steppes to dense conifer forests and has prominent granite and limestone cliffs, over 10 species of bat could occur in the WSA, though most have not been documented. We deployed Anabat® units in each drainage for 2 to 3 days. Despite a lack of ideal sampling locations (i.e., areas of open pools or flat, slow-moving water), we were able to confirm calls from 7 species of bats (Table 1). All 7 species of bats have not previously been documented in the Ferris Mountain WSA, and 6 of those species are SGCN. The most common species recorded was the long-legged myotis (*Myotis volans*), an SGCN which was recorded at 5 of 6 locations. Many species were detected in drainages on both the north and south sides of the Ferris Mountains. However, we only recorded the hoary bat (*Lasiurus cinereus*) and pallid bat (*Antrozous pallidus*) in the Muddy Creek drainage on the south side of the mountains. Only a single hoary bat call was recorded, suggesting that this species may be rare or accidental in the area. We also may have recorded a silver-haired bat (*Lasionycteris noctivagans*) call in the Muddy Creek drainage, but the call was of relatively poor quality and we were unable confirm species from the call. Overall, the West Muddy Creek and Lower Pete Creek sites (Figure 2) were the most active sites for bats, with approximately 500 calls recorded at both sites.

Although several amphibian and reptile species are predicted to occur in the Ferris Mountains, the only record of herpetofauna in the WSA is from an anecdotal observation of a Northern Leopard Frog (*Lithobates pipiens*) by Reid Miller (BLM Visitor Information Specialist) and his son. Our surveys confirmed Northern Leopard Frogs at several locations in the Pete Creek drainage within the WSA. The majority of leopard frogs were detected in active and inactive beaver ponds along a tributary west of the main stem of Pete Creek (Figure 3). The area was dominated by aspen and willow and surrounded by sagebrush-covered foothills. One Northern Leopard Frog was also detected along the upper reaches of Pete Creek in a small bog surrounded by dense lodgepole pine forest. Northern Leopard Frogs were recently petitioned for but denied listing as a threatened species under the Endangered Species Act (USFWS 2011), and are listed as a sensitive species by the BLM and a Species of Greatest Conservation Need by the Wyoming Game and Fish Department. This survey confirms the presence of Northern Leopard Frogs in the Ferris Mountain WSA, and conditions in the beaver ponds where the majority of the leopard frogs occur should be preserved if possible.

In general, most potential amphibian habitat in the WSA occurs in the foothills regions where streams are less steep and allow formation of small ponds in a few areas. Foothills in the WSA also have a number of springs and seeps which could potentially provide amphibian habitat, however, we found no amphibians in the seeps and springs we searched within the WSA boundary. We did detect Northern Leopard Frogs on BLM lands in a spring northeast of Pete Creek while searching for possible locations to set up an Anabat unit (Figure 3). Surprisingly, we found no evidence of Boreal Chorus Frogs, a relatively common and vocal species in Wyoming, which is easily detected by call both day and night. Foothills in the WSA also provided potential habitat for snakes and lizards. Despite surveys of riparian areas, sagebrush-steppe, and rock outcrops, we detected no reptiles in the 3 drainages we targeted in the Ferris Mountain WSA. Cool weather and the cryptic nature of some snakes and lizards, however, may have influenced the likelihood of detecting reptiles.

In addition to vertebrates, we identified 15 species of butterflies and 3 species of land snails (Table 1). Most butterflies were captured and identified in the Cherry Creek drainage by TNC volunteers. Mountain snails (*Oreohelix* sp.) were collected from one location west of Cherry Creek, but were most common in the Muddy Creek drainage on the south side of the WSA. *Oreohelix* species are, collectively, designated as an SGCN by the WGFD. These snails are found in moist soils in mountainous areas, typically in association with soils and rocks containing calcium carbonate, such as limestone, that provide calcium for shell development (Burch and Pearce 1990). Bedrock on the south side of the Ferris Mountains is primarily limestone, while the north side of the range is dominated by granite with only small outcroppings of limestone. As expected, the snails located on the north slopes were near limestone outcrops. Further study of invertebrates in the Ferris Mountains would probably result in a large number of new species records for the WSA. All invertebrates documented during this project were the result of generous volunteer efforts by TNC and WYNDD staff.

Conclusion

The Ferris Mountain WSA is a unique but understudied area managed by the BLM's National Landscape Conservation System. Although treasured for its solitude and hunting opportunities, little is known about non-game wildlife species in this remote mountain range. In the 3 areas surveyed during this short-duration study, we compiled a list of almost 80 species of vertebrates and invertebrates including 8 species listed as sensitive or "of concern" by the BLM and WGFD. Studies targeting the eastern and interior portions of the Ferris Mountain WSA will, undoubtedly, expand this species list.

A number of sensitive species predicted to occur in the Ferris Mountain WSA remain undocumented in that area. Further surveys in the WSA would likely confirm occurrence of a least some of these species. For example, a number of shrew species considered sensitive by state and federal agencies in Wyoming are likely occur in the Ferris Mountains. Although shrews are often caught in live-traps, pitfall traps typically are the most successful method for catching shrews. Additional small-mammal trapping, especially if done with pitfall traps, will likely increase our knowledge of shrews in the Ferris Mountains. The Ferris Mountains also offer excellent roosting habitat for both cliff and tree-roosting bat species. Given that the mountain range is one of only a few sky islands in the central basins of Wyoming, the area is likely critical to local bat populations. Although Anabat® units record bat calls, species identification from calls must be made by a trained observer and is imperfect. Confirmation of questionable species (e.g. silver-haired bat) through mist-netting is recommended. Further studies, including mist-netting of bats, in the Ferris Mountain WSA would provide insight to the importance of this area to bats in Wyoming.

Lastly, we found the greatest species diversity in stringers of aspen and mixed-conifer that followed creeks and moist drainages out of mountains and into the sagebrush foothills. These stringers were generally structurally diverse, containing an assortment of shrubs and other understory species, and occasionally provided areas of pooled water or bogs. The stringer along a small tributary east of Cherry Creek where we conducted small mammal trapping was particularly impressive in that it contained some of the largest and oldest limber pines and Douglas firs we encountered during our surveys (Figure 4). Bird and mammal diversity was higher in these stringers than any other habitat type we surveyed, attracting forest species as well as sagebrush steppe and grassland species. The largest population of Northern Leopard Frogs was also found in a stringer west of Pete Creek (Figure 4). Thus, these stringers provide excellent biodiversity 'hotspots' within the Ferris Mountain WSA and maintaining the integrity of the stringers would benefit the NLCS and BLM by also maintaining the biotic integrity of this unique sky island ecosystem in central Wyoming.

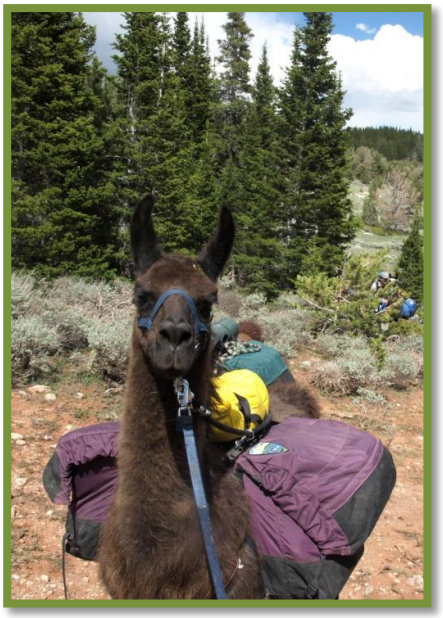

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TABLE 1. Species detected during biological inventory surveys in the Ferris Mountain Wilderness Study Area. Common name, scientific name, and drainage name where the species was located are provided. Actual locations could be anywhere within a drainage. Lack of detection in a drainage does not indicate that a species is absent from the drainage but that the species was simply not detected during surveys.

BIRDS				
Common Name	**Scientific Name**	**Cherry Creek**	**Pete Creek**	**Muddy Creek**
American Robin	*Turdus migratorius*	Yes	Yes	
Broad-tailed Hummingbird	*Selasphorus platycercus*	Yes	Yes	
Brown creeper	*Certhia americana*	Yes		
Chipping Sparrow	*Spizella passerina*	Yes	Yes	Yes
Clark's Nutcracker	*Nucifraga columbiana*		Yes	Yes
Cliff Swallow	*Petrochelidon pyrrhonota*	Yes		
Common Nighthawk	*Chordeiles minor*	Yes	Yes	Yes
Common Raven	*Corvus corax*	Yes	Yes	
Dark-eyed Junco	*Junco hyemalis*	Yes	Yes	Yes
Dusky-flycatcher	*Empidonax oberholseri*	Yes		
Empidonax flycatcher sp.	*Empidonax* sp.	Yes		
Golden Eagle	*Aquila chrysaetos*		Yes	Yes
Great-horned Owl	*Bubo virginianus*		Yes	
Green-tailed Towhee	*Pipilo chlorurus*	Yes		
Hairy Woodpecker	*Picoides villosus*		Yes	
Hermit Thrush	*Catharus guttatus*	Yes	Yes	Yes
House Wren	*Troglodytes aedon*	Yes		
MacGillivray's Warbler	*Geothlypis tolmiei*	Yes	Yes	
Mallard	*Anas platyrhynchos*		Yes	
Mountain Bluebird	*Sialia currucoides*		Yes	
Mountain Chickadee	*Poecile gambeli*	Yes	Yes	Yes
Northern Flicker	*Colaptes auratus*	Yes	Yes	
Pine Siskin	*Spinus pinus*	Yes	Yes	Yes
Prairie Falcon	*Falco mexicanus*	Yes		
Red Crossbill	*Loxia curvirostra*			Yes
Red-breasted Nuthatch	*Sitta canadensis*		Yes	Yes
Red-naped Sapsucker	*Sphyrapicus nuchalis*	Yes	Yes	Yes
Red-tailed Hawk	*Buteo jamaicensis*	Yes	Yes	
Ruby-crowned kinglet	*Regulus calendula*	Yes	Yes	Yes
Sharp-shinned hawk	*Accipiter striatus*	Yes	Yes	
Townsend's Solitaire	*Myadestes townsendi*	Yes		
Turkey Vulture	*Cathartes aura*	Yes		
Vesper Sparrow	*Pooecetes gramineus*	Yes	Yes	
Violet-green Swallow	*Tachycineta thalassina*	Yes	Yes	

Warbling Vireo	*Vireo gilvus*	Yes	Yes	Yes
Western Tanager	*Piranga ludoviciana*	Yes		
Western Wood-pewee	*Contopus sordidulus*	Yes		
Woodpecker sp.	-	Yes		
Yellow Warbler	*Setophaga petechia*			Yes
Yellow-rumped Warbler	*Setophaga coronata*	Yes	Yes	Yes

MAMMALS

Common Name	Scientific Name	Cherry Creek	Pete Creek	Muddy Creek
Beaver	*Castor canadensis*	Yes	Yes	
Bighorn sheep*	*Ovis canadensis canadensis*	Possible[1]		
Chipmunk sp.	*Tamias* sp.	Yes	Yes	Yes
Deer mouse	*Peromyscus maniculatus*	Yes	Yes	Yes
Elk	*Cervus elaphus*	Yes	Yes	Yes
Fringed myotis*†	*Myotis thysanodes*		Yes	Yes
Hoary bat	*Lasiurus cinereus*			Yes
Little brown myotis*	*Myotis lucifugus*	Yes	Yes	Yes
Long-eared myotis*†	*Myotis evotis*		Possible[1]	Yes
Long-legged myotis*	*Myotis volans*	Yes	Yes	Yes
Microtis sp.	*Microtus* sp.	Yes		
Mountain lion	*Felis concolor*		Yes	
Mule deer	*Odocoilius hemionus*		Yes	Yes
Pallid bat*	*Antrozous pallidus*			Yes
Pocket gopher sp.	*Thomomys clusius*			Yes
Porcupine	*Erethizon dorsatum*		Possible[1]	
Pronghorn	*Antilocapra americana*	Yes	Yes	
Red squirrel	*Tamiasciurus hudsonicus*	Yes	Yes	Yes
Silver-haired bat	*Lasionycteris noctivagans*			Possible[1]
Southern red-backed vole	*Clethrionomys gapperi*	Yes		Yes
Western jumping mouse	*Zapus princeps*			Yes
Western small-footed myotis*	*Myotis ciliolabrum*	Possible[1]	Possible[1]	Yes
White-tailed Deer	*Odocoilius virginianus*	Possible[1]		
Yellow-bellied marmot	*Marmota flaviventris*	Yes		Yes

AMPHIBIANS & REPTILES

Common Name	Scientific Name	Cherry Creek	Pete Creek	Muddy Creek
Northern Leopard Frog*†	*Lithobates pipiens*		Yes	

INVERTEBRATES

Common Name	Scientific Name	Cherry Creek	Pete Creek	Muddy Creek
Butterflies				
Silvery blue	*Glaucopsyche lygdamus*	Yes		
Arrowhead blue	*Glaucopsyche piasus*	Yes		
Greenish blue	*Plebejus saepiolus*	Yes		
Spring azure	*Celastrina ladon*	Yes		
Western pine elfin	*Callophrys eryphon*	Yes		
Stella's orange tip	*Anthocharis stella*	Yes		
Clouded sulfur	*Colias philodice*	Yes		
Mourning cloak	*Nymphalis antiopa*	Yes	Yes	
Milbert's tortoiseshell	*Aglais milberti*	Yes		
Green comma	*Polygonia faunus*	Yes		
Variegated fritillary	*Euptoieta claudia*	Yes		
Two-banded checkered skipper	Pyrgus ruralis	Yes		
Dreamy duskywing	*Erynnis icelus*	Yes		
Persius duskywing	*Erynnis persius*	Yes		
Red admiral	*Vanessa atalanta*		Yes	
Mollusks				
Mountain snail*	*Oreohelix* sp.	Yes		Yes
Disc Snail	*Discus* sp.			Yes
Glass snail	*Vitrina* sp.			Yes

* Species designated as WGFD Species of Greatest Conservation Need

† Species designated as sensitive by the BLM.

[1] Possible = Evidence was found but was inconclusive

FIGURE 1. Map of the Ferris Mountain WSA in central Wyoming. Species inventory surveys were conducted in three drainages by the Wyoming Natural Diversity Database in 2011. Colored polygons depict the approximate area surveyed in the Cherry Creek, Pete Creek, and Muddy Creek drainages.

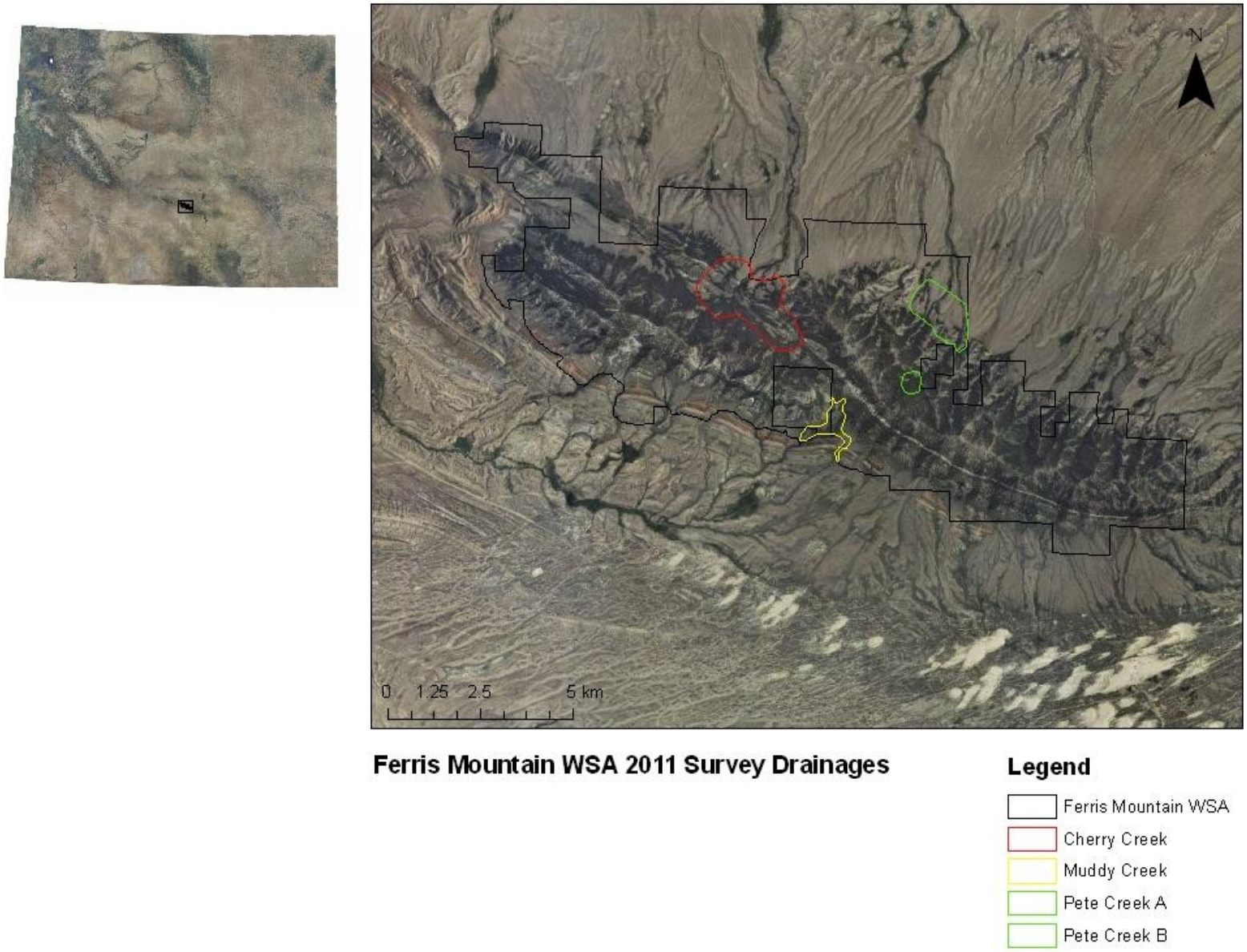

FIGURE 2. Locations of wildlife surveys conducted in 2011 by the Wyoming Natural Diversity Database in the Ferris Mountain WSA. Colored circles depict the locations of different survey types (Anabat® units, small mammal trap transect start points, and trail cameras). General mammal, bird, and invertebrate surveys were conducted throughout the survey areas in the 3 drainages.

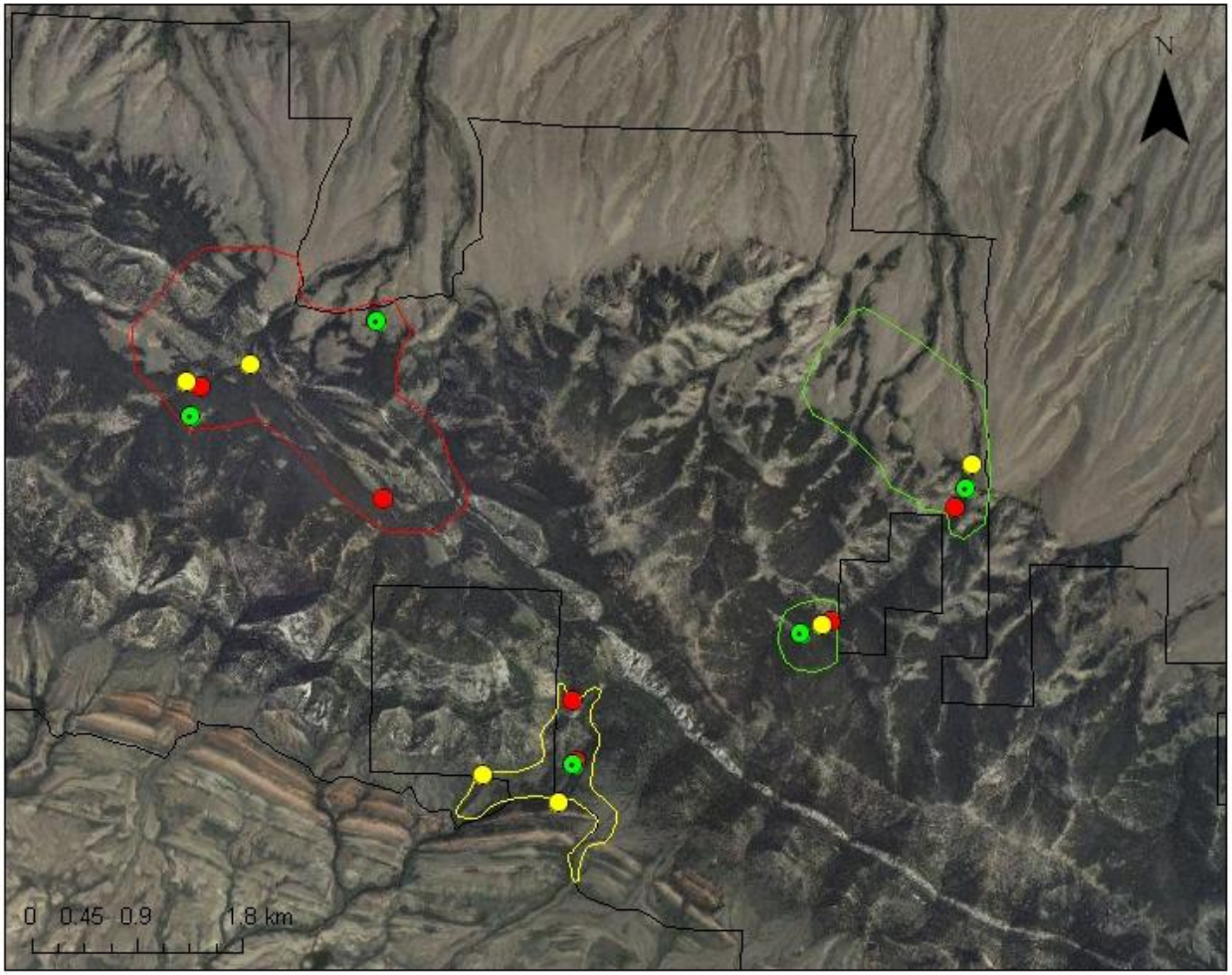

FIGURE 3. Locations of Northern Leopard Frogs found in the Pete Creek drainage and adjacent areas during surveys in the Ferris Mountain WSA in 2011.

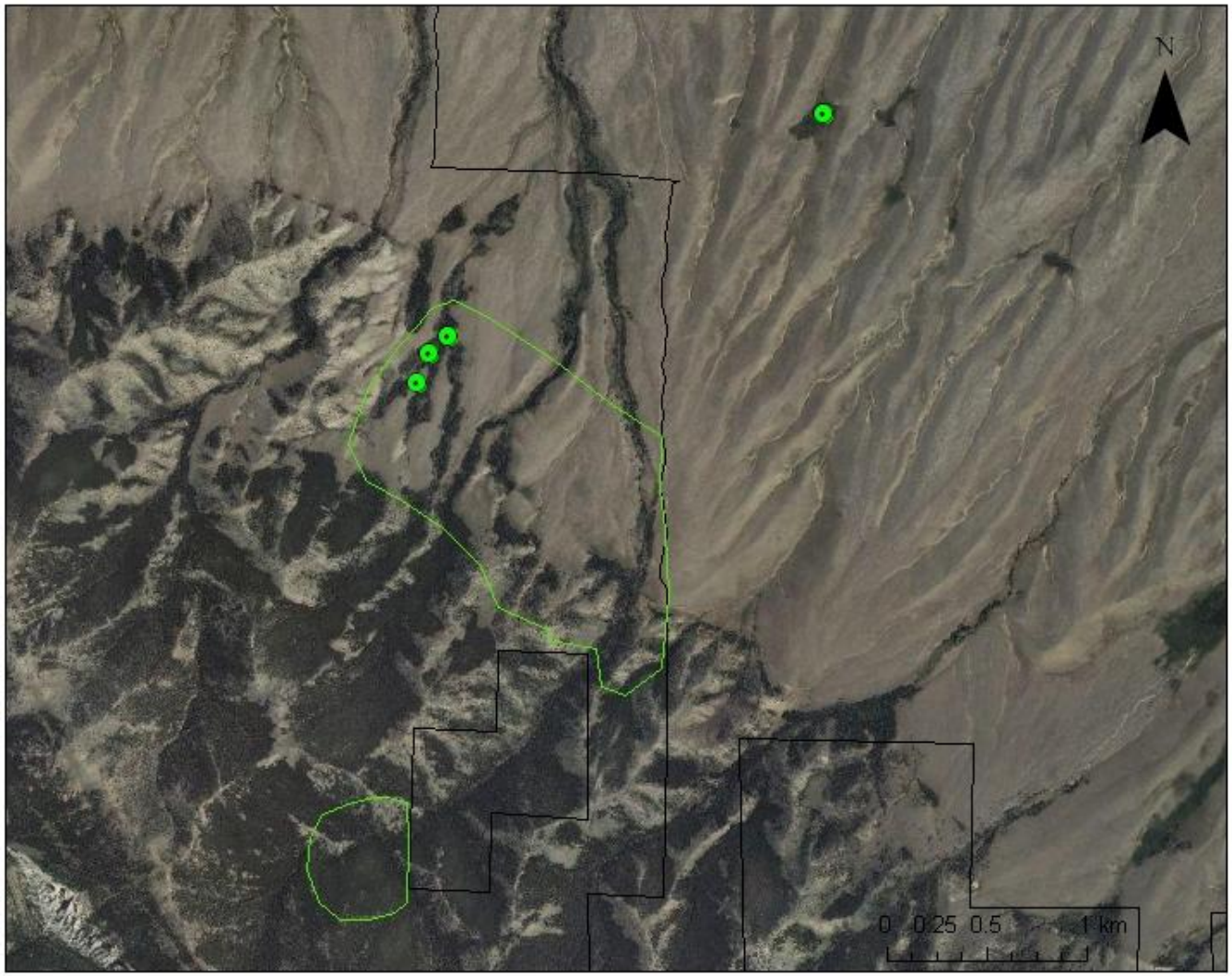

FIGURE 4. Locations of two important riparian stringers surveyed in the Ferris Mountain WSA in 2011. Stringers are outlined in yellow. The western-most stringer is located in the Cherry Creek drainage and contained old-growth limber pine and Douglas fir. The eastern stringer is located in the Pete Creek drainage and contained multiple beaver ponds occupied by Northern Leopard Frogs.