



Pygmy Rabbit Inventory at Craters of the Moon National Monument and Preserve

Final Report

Natural Resource Report NPS/NRSS/IMD/NRR—2023/2503



ON THE COVER

Pygmy rabbit in the snow.

NPS

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Abstract

The Craters of the Moon National Monument has historically supported northern pygmy rabbits (*Brachylagus idahoensis*) within the Area of Interest (AOI). Northern pygmy rabbits have a State Rank of S3, indicating that this species is rare or uncommon, but not imperiled (IDFG 2022). Surveys were approved for the AOI to determine what habitat features pygmy rabbits are selecting for or against within the AOI to better inform future development plans. Given historical accounts of pygmy rabbit presence within the AOI, it was assumed that pygmy rabbits were present in high enough density to perform an RSF analysis.

However, during the burrow survey, it became clear that adjustments were needed to account for the small number of burrows and the lack of any sign of pygmy rabbits occupying those burrows, specifically pellets. Burrows were only found in 9 sampling units, and confidence that the burrows were pygmy rabbit burrows, and not burrows of another species, was low based on observer expertise. The goal of the project shifted from identifying which habitat features pygmy rabbits were selecting for or against, to determining if any pygmy rabbits were present within the AOI. Surveys were added for the winter months to further confirm whether pygmy rabbits were currently present within the AOI.

To determine if any pygmy rabbits were present within the AOI, two observers walked the AOI searching for signs of burrows or burrow complexes. A total of 35 burrow complexes were identified within the AOI. At the end of the census, a camera was placed at the opening that appeared to be the most active of each burrow complex for two weeks to maximize the chance of identifying what species were using the burrows. No pygmy rabbits were identified at any of the burrows. Twelve species were identified using at least one of the burrows or the area in front of the burrows over the course of the survey.

Photo analysis confirmed that the burrows present within the AOI were not pygmy rabbit burrows, a result that was corroborated by the winter sign surveys. The size, character, and location of the burrows combined with their frequent presence at the burrow suggests that these burrow complexes were originally constructed and maintained by Columbian ground squirrels. No pygmy rabbits or signs were found by the census, remote camera efforts, or winter sign surveys.

Introduction

The Craters of the Moon National Monument has historically supported northern pygmy rabbits (*Brachylagus idahoensis*) within the Area of Interest (AOI). Northern pygmy rabbits have a State Rank of S3, indicating that this species is rare or uncommon, but not imperiled (IDFG 2022). Surveys were approved for the AOI to determine what habitat features pygmy rabbits are selecting for or against within the AOI to better inform future development plans.

Initially, the approved methodology was to complete a burrow census and collect covariate data within the AOI, identify which burrows were occupied by pygmy rabbits using remote cameras, and to create a Resource Selection Function (RSF) to determine what habitat features pygmy rabbits are selecting for/against within the AOI (Cirrus Ecological Solutions 2020). Given historical accounts of pygmy rabbit presence within the AOI, it was assumed that pygmy rabbits were present in high enough density to perform an RSF analysis.

However, during the burrow survey, it became clear that adjustments were needed to account for the small number of burrows and the lack of any sign of pygmy rabbits occupying those burrows, specifically pellets. The assumption listed in Cirrus Ecological Solutions (2020) of at least 10 sampling units occupied by pygmy rabbits was not going to be met, as burrows were only found in 9 sampling units, and confidence that the burrows were pygmy rabbit burrows, and not burrows of another species, was low based on observer expertise.

The goal of the project shifted from identifying which habitat features pygmy rabbits were selecting for or against, to determining if any pygmy rabbits were present within the AOI. Vegetation sampling progressed concurrently with burrow surveys. Therefore, some vegetation surveys were completed prior to the adjustments in protocols.

As reported in the literature, surveys for pygmy rabbits can also be successful during the winter months, where tracks and burrow entry points are can be identified in fresh snow, and Cirrus personnel have had success with this method on past projects. Therefore, surveys were added for the winter months to further confirm whether pygmy rabbits were currently present within the AOI.

Methods

Census and Remote Cameras

To determine if any pygmy rabbits were present within the AOI, two observers walked the AOI searching for signs of burrows or burrow complexes. Each observer walked transects spaced 50-meters apart, meandering between the transects to be certain all burrows within the AOI were discovered. Given the higher-quality habitat noted in the flat portions of the AOI, and more difficult observation conditions due to vegetation density, extra time was spent in these areas searching for burrows.

The initial census for pygmy rabbit burrows was completed during the week of June 7th to June 11th, 2021. Each potential burrow complex was marked with a GPS unit and biodegradable flagging for remote camera placement and recovery. At the end of the census, a camera was placed at the opening that appeared to be the most active of each burrow complex for two weeks to maximize the chance of identifying what species were using the burrows. The cameras were placed low to the ground and pointing at each burrow to ensure any use of the burrow was captured.

Given the limited number of cameras available for surveys, the cameras were placed over the course of four separate visits. The memory card in each camera was collected and each camera was moved to the next burrow complex with a new memory card. The first round of cameras were placed on June 7th, a second round was placed on June 23rd, a third round on July 8th, and the final round on July 22nd. Due to the limited number of burrows identified within the AOI, after the completion of the fourth round all burrow complexes had been surveyed for two weeks.

Vegetation Surveys

Vegetation surveys were initially required to collect covariate data for the RSF. While the RSF has been removed from the protocols, some vegetation data was collected before changes were made. Therefore, some habitat information is available in the low-lying areas of the AOI.

Vegetation surveys were completed within the AOI during the week of June 7th to June 11th, 2021. The AOI was divided into 200 by 200-meter grid cells for a total of 114 sampling units. A center point was placed within each 4-ha sampling unit, off which four 25-meter transects were placed at 90-degree angles, creating four 25-meter transects per sampling unit.

Vegetation height was measured along each transect in 2-meter increments. At each 2-meter increment, the height of the vegetation was recorded as one of six covariates (sagebrush, non-sagebrush shrub, perennial grass, annual grass, forb, or other). Vegetation cover was then estimated using a line-intercept method. Every centimeter of the transect was classified into one of the six covariates. The total length of the transect that overlaps with each covariate was calculated, providing an estimate of percent cover for each covariate. The height and cover measurements were then summarized for the length of all four transects to create a single average for each covariate per sampling unit.

Winter Sign Surveys

Winter surveys consisted of travel through the AOI by snowmobile and on foot to search for sign of pygmy rabbit use of the AOI. Over the snow surveys were completed on accessible portions of the AOI on January 10th and February 23rd, 2022, following periods of fresh snowfall. Sign visible during winter consists of tracks, burrow openings, and pellets. Transects were traversed through the low-angle-topography portions AOI and all potential sign was inspected to determine if it was left by pygmy rabbits or some other animal. Particular attention was paid to the portion of the AOI near the well-head and other water infrastructure, since that area is where pygmy rabbits have been observed in the past and it represents the best habitat in the AOI, based on our previous experience.

Results

Census and Remote Cameras

A total of 35 burrow complexes were identified within the AOI (Figures 1 and 2).

No pygmy rabbits were identified at any of the burrows (Table 1). Twelve species were identified using at least one of the burrows or the area in front of the burrows over the course of the survey. It is possible more species were using the burrows, as some photographs were blurry, or the location of the camera made it difficult to identify to species (i.e., the low placement of the camera to the ground captured only the hoof of an ungulate, which could not be confidently identified to species). These pictures were placed into an unknown category (Table 1). However difficult to identify to species, none of the unknown pictures in the rodent category could have been a pygmy rabbit given the size and shape of the individuals within the photos.

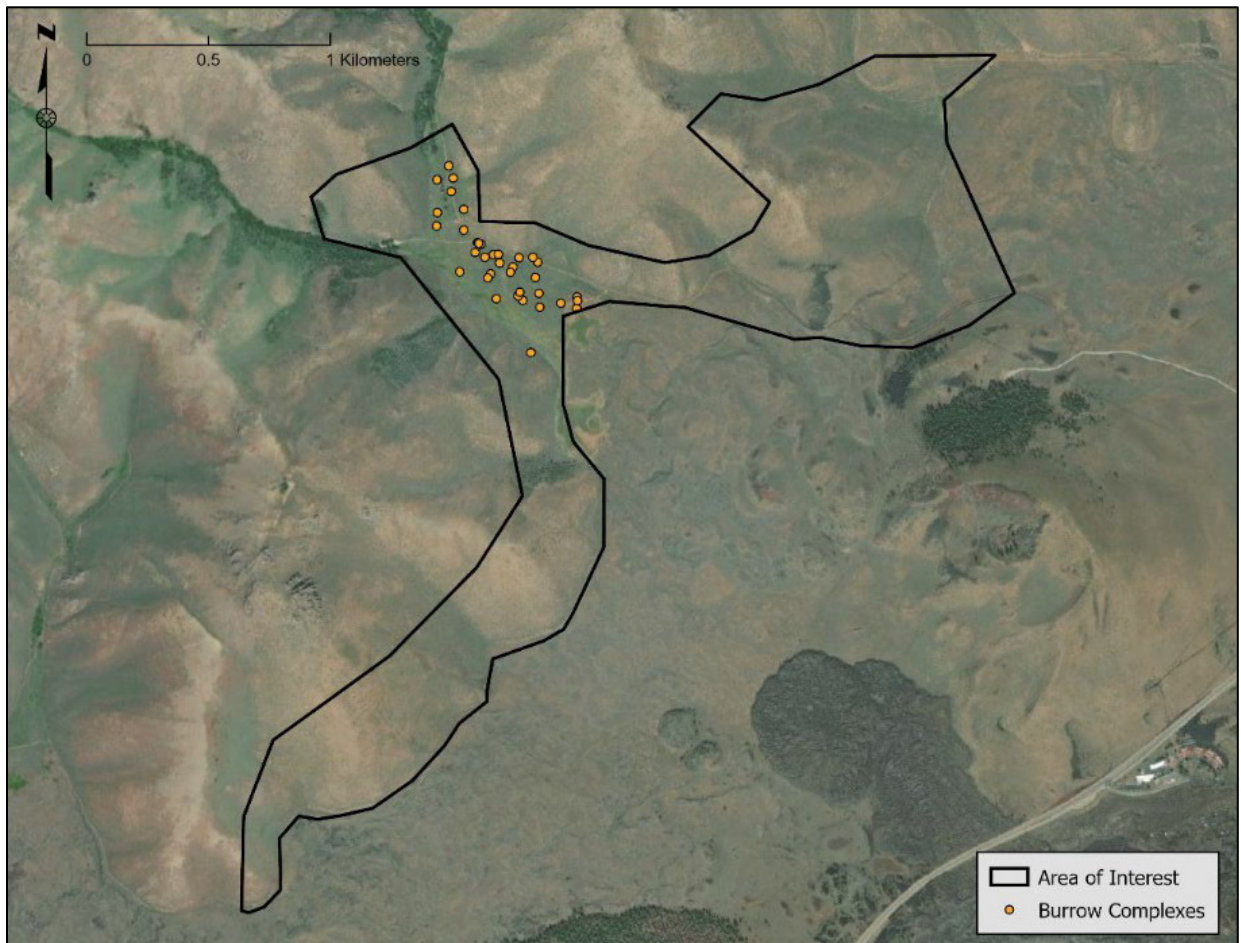


Figure 1. Burrow complexes identified within the Area of Interest (AOI) after completion of the burrow census.

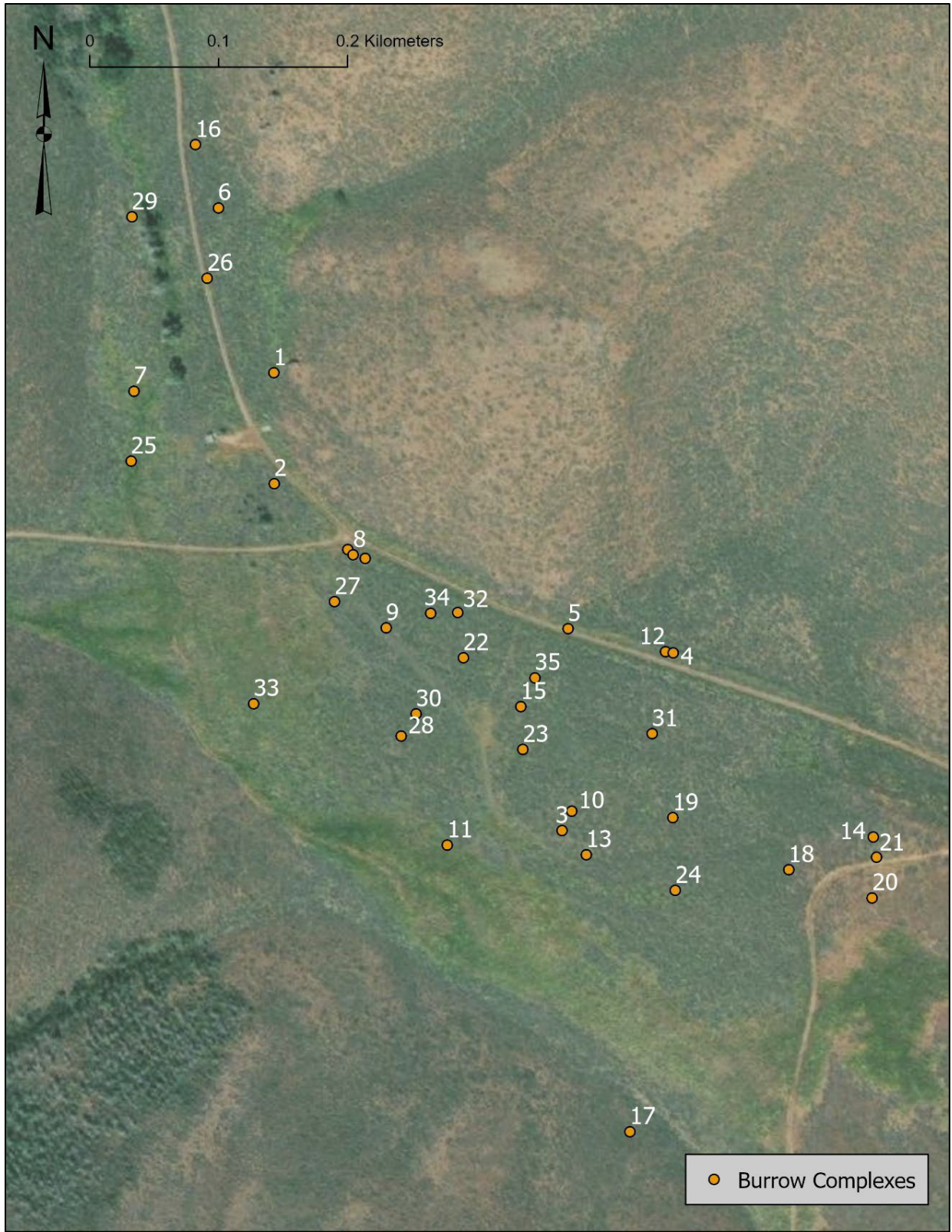


Figure 2. Detailed map of burrow complexes identified within the Area of Interest.

Table 1. The species identified at the most active opening of each burrow complex during the two-week survey period.

Burrow Complex	Survey Round	Number of Species Identified	Brewer's sparrow	Columbian ground squirrel	Green-tailed towhee	Least chipmunk	Sage thrasher	Spotted towhee	Shira's moose	Unknown grouse	Unknown mustelid	Unknown small bird	Unknown small rodent	Unknown ungulate
1	1	3	X	X	-	-	-	-	-	-	-	-	X	-
2	1	4	-	X	-	X	-	X	-	-	-	-	X	-
3	1	4	X	X	-	X	-	-	-	-	X	-	-	-
4	1	2	-	X	-	X	-	-	-	-	-	-	-	-
5	2	4	X	X	-	X	-	-	-	-	-	-	X	-
6	3	7	-	X	X	X	-	X	-	-	X	X	X	-
7	3	3	-	-	X	-	-	-	-	X	X	-	-	-
8	3	4	-	X	-	X	-	-	-	-	X	-	X	-
9	3	3	X	X	-	-	-	-	-	-	-	-	X	-
10	3	2	-	-	-	X	-	-	-	-	-	-	X	-
11	3	3	-	X	-	-	-	-	-	-	X	-	X	-
12	3	4	-	X	X	X	-	-	-	-	X	-	-	-
13	3	3	-	-	-	X	-	-	-	-	X	-	X	-
14	3	5	X	-	-	X	X	-	-	-	X	-	X	-
15	3	5	X	X	-	X	-	-	-	-	X	-	X	-
16	3	6	X	X	X	X	-	-	X	-	-	-	-	X
17	3	2	-	-	-	X	-	-	-	-	-	-	X	-
18	3	3	-	X	-	X	-	-	-	-	-	-	X	-
19	3	2	-	-	-	X	X	-	-	-	-	-	-	-
20	3	3	X	-	-	-	-	-	-	-	X	-	X	-

Table 1 (continued). The species identified at the most active opening of each burrow complex during the two-week survey period.

Burrow Complex	Survey Round	Number of Species Identified	Brewer's sparrow	Columbian ground squirrel	Green-tailed towhee	Least chipmunk	Sage thrasher	Spotted towhee	Shira's moose	Unknown grouse	Unknown mustelid	Unknown small bird	Unknown small rodent	Unknown ungulate
21	3	4	-	-	-	X	X	-	-	-	X	-	X	-
22	3	4	X	X	-	X	-	-	-	-	-	-	X	-
23	3	2	-	X	-	-	-	-	-	-	-	-	X	-
24	3	5	X	X	-	X	-	-	-	-	X	-	X	-
25	4	5	-	-	-	-	X	-	-	-	X	X	X	X
26	4	7	-	X	X	-	-	X	X	-	-	X	X	X
27	4	8	X	-	X	X	X	X	-	X	-	X	X	-
28	4	2	-	-	-	-	-	-	-	-	X	X	-	-
29	4	5	-	-	X	-	-	X	-	-	X	X	X	-
30	4	4	X	-	-	X	-	-	-	-	X	-	X	-
31	4	5	-	-	X	X	-	-	-	-	X	X	X	-
32	4	3	-	-	-	X	-	-	-	-	X	-	X	-
33	4	2	-	-	-	X	-	-	-	-	-	-	X	-
34	4	3	-	-	-	X	-	-	-	-	X	-	X	-
35	4	3	-	-	-	-	-	-	-	-	X	X	X	-

Vegetation Surveys

Forty-two vegetation surveys were completed within the AOI (Figure 3). The vegetation data collected for this project is submitted separately with this report for use with other projects or future reference.

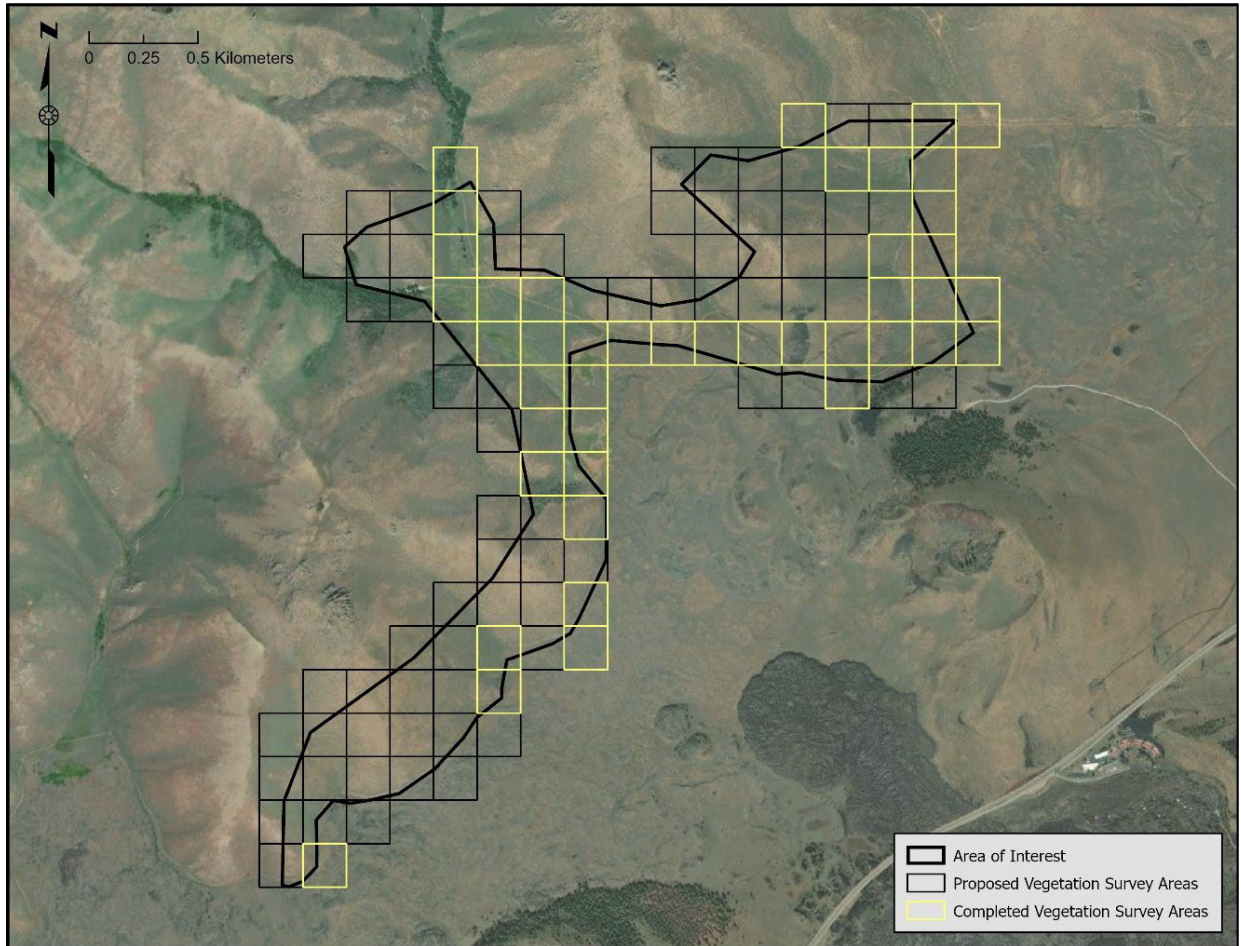


Figure 3. Map of areas where vegetation surveys were completed within the Area of Interest.

Winter Sign Surveys

Two surveys were conducted due to somewhat hard snow conditions present on the first visit making tracks difficult to detect, particularly tracks of an animal the weight of a pygmy rabbit. During the second visit there were 3.5 inches of fresh, soft snow and conditions for detecting tracks were ideal.

While sign of several other species, including other leporids, was present during both surveys, no pygmy rabbit sign of any kind was detected.

Conclusions

The photo analysis confirmed that the burrows present within the AOI were not pygmy rabbit burrows, a result that was corroborated by the winter sign surveys. The size, character, and location of the burrows combined with their frequent presence at the burrow suggests that these burrow complexes were originally constructed and maintained by Columbian ground squirrels (*Urocitellus columbianus*; NatureServe 2022). No pygmy rabbits or signs were found by the census, remote camera efforts, or winter sign surveys. While Columbian ground squirrels were extremely common in the first, second, and third survey rounds, they were hardly identified in the fourth survey round (starting July 22nd). This is likely because Columbian ground squirrels are only active for approximately four months of the year, hibernating in their burrows the remaining eight months to avoid the hot, dry summer and cold winters (NatureServe 2022).

One point of interest was the common occurrence of a weasel (a common pygmy rabbit predator) at many of the burrows. It appears that one or two weasels occupy the AOI, and commonly investigate and/or use burrows during their nightly activities. Given their night-time activity, it was difficult to determine whether each mustelid was a long-tailed weasel or short-tailed weasel. Therefore, each occurrence was classified as unknown mustelid.

The lack of sign during the winter surveys indicates that pygmy rabbits are not likely present in the area and using alternate denning sites, such as lava features. Although pygmy rabbits are known to use subnivean tunnels to move about during the winter, in our experience, they are frequently active above the snow as well. Were pygmy rabbits present and exhibiting such behavior, tracks in the snow would have been present around lava areas where rabbits emerged to sun themselves, defecate, or move between denning crevices and winter foraging areas with sagebrush.

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