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February 8, 2024

**Subject: Comprehensive Submission of 2022 and 2023 Mexican Spotted Owl (MSO) Survey Reports for the Summa Silver Mogollon Exploration Project - Permit No. CA027EM**

Dear Mr. Barnes,

I am writing to submit the completed 2022 and 2023 Mexican Spotted Owl (MSO) reports for Summa Silver's Mogollon Project in New Mexico. Everett Ecological and NV5 conducted the surveys in 2022 and AtoZec in 2023. These reports methodically examine local MSO populations in relation to potential impacts of Project activities, underscoring our unwavering commitment to ecological conservation and regulatory adherence.

The 2022 survey, conducted across diverse habitats within the Project buffer zone, concluded with the significant finding that no MSO breeding territories were located within the immediate vicinity of Project operations. However, the discovery of two occupied territories in adjacent riparian habitats provided critical data for understanding the spatial distribution of MSOs in relation to the Project area and surrounding habitats. This information is instrumental in guiding Summa's operational strategies to mitigate potential impacts on these species.

Building on this foundation, the 2023 survey by AtoZec offered a more granular perspective on the MSO's ecological presence in the area. Detailed observations of specific roost locations and breeding evidence were meticulously recorded, offering invaluable insights into the species' habitat preferences and behaviors. This level of detail is pivotal for formulating effective conservation strategies and ensuring that Project operations align with the best management practices for MSO preservation.

Collectively, both survey reports represent a comprehensive effort to understand and mitigate potential impacts on the MSO populations in the Mogollon Project area. The findings and data accrued from these surveys are critical for Project planning and execution and contribute significantly to the broader efforts in MSO conservation and research.

The complete reports are enclosed for your review and consideration. We believe that these findings will substantially aid in the regional efforts to conserve the MSO, and we eagerly anticipate any feedback or opportunities for collaboration to enhance these conservation endeavors.

Thank you for your continued partnership and support in wildlife conservation and environmental stewardship.

Respectfully,

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# Mexican Spotted Owl – Mogollon, NM

## 2023 Survey Report



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## Definitions

Action Area – area of mineral exploration and reclamation

AtoZec – AtoZ Environmental Consulting

MSO – Mexican spotted owl

MMD – New Mexico Mining and Minerals Division

NMDGF – New Mexico Department of Game and Fish

PAC – Protected Activity Center

PCE – Primary Constituent Element

Permit – Minimal Impact Exploration Operation Permit No.CA027EM

Summa – Summa Silver Corporation

Survey Area – 0.5-mile buffer around the Action Area

Survey Protocol – *Mexican Spotted Owl Survey Protocol, 2012 (Updated 3/15/2022)*

USFS – United States Forest Service

USFWS – U.S. Fish and Wildlife Service

## 1. Project Overview

### 1.1 Introduction

Summa Silver Corp (Summa) received Minimal Impact Exploration Operation Permit No.CA027EM (Permit) from the New Mexico Mining and Minerals Division (MMD) on September 8, 2021 (MMD 2021). Section 10, Part E, Mexican Spotted Owl Mitigations to be Performed, of the Permit states:

“To minimize potential impacts to Mexican Spotted Owl, all drilling and disturbance activities should be performed outside of the breeding and fledgling-dependency period of March 1 through August 31 when possible. If drilling activities cannot be avoided during the breeding and fledgling-dependency period, spotted owl surveying shall be conducted within a 0.5-mile buffer zone prior to any road work, drill pad construction, and drilling. Surveys shall be conducted by qualified biologists using the U.S. Fish and Wildlife Service (USFWS) *Mexican Spotted Owl Survey Protocol, 2012 (Updated 3/15/2022)* (hereafter Survey Protocol) and in accordance with New Mexico Department of Game and Fish (NMDGF) recommendations. If an occupied breeding territory is located within the 0.5-mile buffer zone, drilling activities shall not occur until the young have fully fledged and dispersed from the area (MMD 2021).”

Summa contracted with AtoZ Environmental Consulting (AtoZec) to perform Mexican spotted owl (*Strix occidentalis lucida*; MSO) surveys in compliance with their Permit. Experienced AtoZec biologist Eric Herman performed the surveys under a USFWS Section 10(a)(1)(a) research and recovery permit and NMDGF Authorization For Taking Protected Wildlife for Scientific Purposes.

This Survey Report summarizes the 2023 MSO survey results and provides recommendations; a continuation of MSO surveys performed in 2022.

### 1.2 Project Area

The area of mineral exploration and reclamation (Action Area) is located within in the historic Mogollon Mining District in the vicinity of Mogollon, NM (Figure 1) within the Gila National Forest; approximately 75 miles north of Silver City. The Action Area includes the drill pads, work areas, current roads, 10 feet to either side of roads requiring modification, and 10 feet to either side of new roads. This area of disturbance totals 1.35 acres (MMD 2021). The Survey Area includes a 0.5-mile buffer around the Action Area.

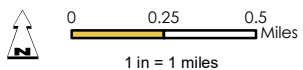
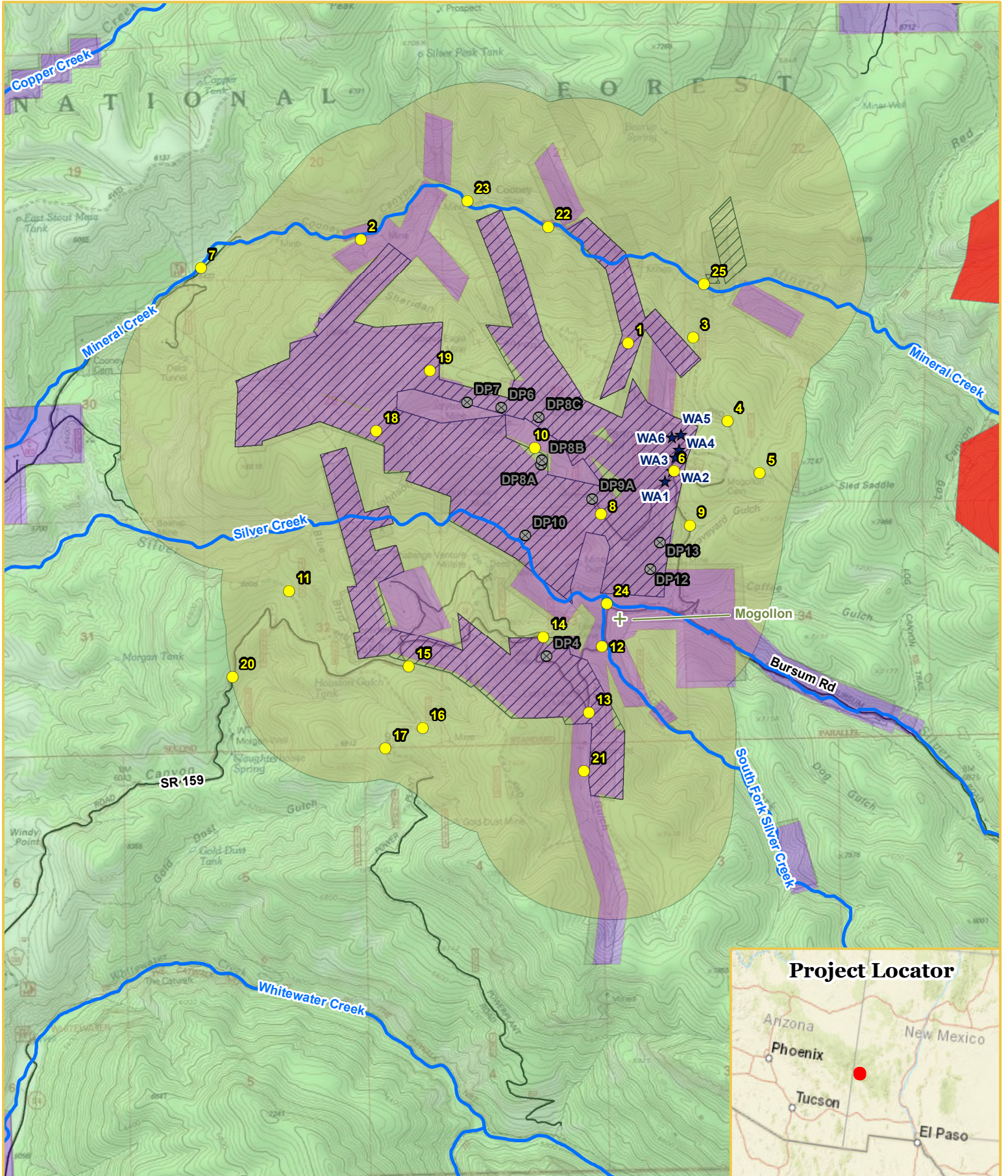
Over several decades, numerous underground mining activities have extracted high-grade gold and silver veins from three primary mines: Fanney, Last Chance, and Consolidated (Cision PR Newswire 2020; The Assay 2022). Mining activities ceased in 1942, and the district has since been largely inactive, except for a few exploratory drilling projects conducted in the 1980s and 2010 (Cision PR Newswire 2020). The property hosts approximately 21 miles of near-continuous epithermal-associated veins and faults (Cision PR Newswire 2020; Summa Silver 2022a, b). Approximately 1 mile of veins and faults in the Action Area have been drill tested.

## 2. Mexican Spotted Owl

### 2.1 Life History

The MSO is a medium sized owl without ear tufts, an average length of 16.1-18.9 inches long, and a wingspan of 39.8 - 44.9 inches. They are brown colored with large, irregular and numerous white spots on the head, neck, back, and underparts. The tail has about ten light bands. The large, round, brownish facial disks are concentrically barred with dark brown, with a dark brown border. Their eyes appear almost black. The sexes are nearly identical, but females are slightly larger, have darker head and face color, and breeding females have brood patches. Juvenile spotted owls (hatchling to approximately 5 months)

Figure 1. Mexican Spotted Owl Survey Area



- MSO Callpoints
- MSO Critical Habitat
- ⊗ Drill Pads
- PRIVATE
- ★ Work Areas
- USFS
- Stream or River
- Summa Action Area
- Road



have a white downy appearance. Subadults (5 to 26 months) possess adult plumage but have pointed rectrices with white tips. The rectrices of adults (>27 months) have rounded and mottled tips. Adults are generally long-lived; however, there is a low survival of young to breeding age. Based on banding studies, the species often live for 16-17 years (AGFD 2023).

MSOs do not build their nests; they use cavity or abandoned platform nests, ledges on cliffs, and mistletoe clusters. They are monogamous, breeding sporadically, and generally not nesting every year (USFWS 2012). In good years most of the population will nest, whereas in other years only a small proportion of pairs will nest (USFWS 2012). They have one brood, with egg laying peaking as early as early March. They lay 1-3 (usually 2) faintly buff, unmarked. Incubation by female lasts 28-32 days with hatching in late April to early May. Females leave nest only to regurgitate pellets, defecate, and receive prey from male during the incubation period and first half of the brooding period. Male feeds the female and young until young are two weeks old, when both parents begin prey delivery. Young leave the nest at about 5 weeks (June), and fly at about 6-7 weeks of age. They stay near the nest for several weeks, and are fed by the adults until late summer, typically staying with adults through August (AGFD 2023). Adults breed at 2-3 years of age, but may not breed every year. Reproductive success is generally low with the average number of young fledged per pair at about 1.0 (USFWS 2012).

MSOs are mostly solitary outside the breeding season. Seasonal migration of some individuals occurs in many or most MSO populations, and in both sexes, but not always year to year. When migration occurs to wintering areas, it is generally from higher to lower elevations, and to more open habitats (AGFD 2023). Territory fidelity is high with MSO and they return to their territories year to year after migration.

Prey is snatched from the ground in talons after a gliding descent from a perch. Their common prey includes woodrats, deer mice, lagomorphs, voles, and invertebrates, but also may prey upon various birds, bats, lizards, and snakes. MSOs will regularly cache excess food on tree branches (AGFD 2023).

The MSO is Listed Threatened by the USFWS.

## **2.2 Habitat**

### General

MSO are found amongst forested mountains and steep canyons extending from the southern Rocky Mountains in Colorado and the Colorado Plateau in southern Utah, southward through Arizona, New Mexico, and far western Texas, through the Sierra Madre Occidental and Oriental, to the mountains at the southern end of the Mexican Plateau (AGFD 2023).

They primarily roost and breed in dense old-growth mixed-conifer forests with complex structure. Forests are typically uneven-aged and multistoried (USFWS 2012). These sites have high canopy closure, high basal area, many snags, and many downed logs. For foraging, multistoried forest with many potential patches is desirable, but MSO forage in a variety of habitats: managed and unmanaged forests, pinyon-juniper woodlands, mixed-conifer and ponderosa pine forests, cliff faces and terraces between cliffs, and riparian zones (Ganey et al. 2003).

The 1995 Recovery Plan, updated in 2012 (USFWS 2012), includes the following Primary Constituent Elements (PCE) for MSO critical habitat. Critical habitat is an area occupied by the species at the time of federal listing that contains physical or biological features essential to conservation of the species and may require special management considerations or protection. Critical habitat is not present in the Survey



Area, but exists 0.5 mile to the east. While the Survey Area is not within critical habitat, these attributes are used to assess suitable MSO habitat (USFWS 2012).

**PCEs Related to Forest Structure:**

- A range of tree species, including mixed-conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30-45% of which are large trees with a trunk diameter of  $\geq 0.3$  m (12 in) when measured at 1.4 m (4.5 ft) from the ground.
- A shaded canopy created by the tree branches and foliage covering  $\geq 40\%$  of the ground.
- Large, dead trees (i.e., snags) with a trunk diameter of at least 0.3 m (12 in) when measured at 1.4 m (4.5 ft) from the ground.

**PCEs Related to Maintenance of Adequate Prey Species:**

- High volumes of fallen trees and other woody debris.
- A wide range of tree and plant species, including hardwoods.
- Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.

**PCEs Related to Canyon Habitat (one or more of the following):**

- Presence of water (often providing cooler air temperature and often higher humidity than the surrounding areas).
- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation.
- Canyon walls containing crevices, ledges, or caves
- High percentage of ground litter and woody debris.

**Project Area**

Suitable habitat for the MSO is present in several canyons of the Survey Area demonstrating the PCEs above. Large, mature coniferous species of Douglas fir, ponderosa pine, and juniper grow from canyon slopes into the uplands. The canyon bottoms contain a diverse mix of oak, sycamore, box elder, locust, and other deciduous species. These create upper, mid, and lower story canopies creating a multilayered vertical structure with ample shade. Woody debris and old tree snags are abundant throughout the canyon habitat. Ample rocky cliffs with numerous ledges and grottos extend along the length of the canyons. Water was present throughout the survey season in Mineral Creek, but not in all canyon drainages where MSO were located.

Rising up the mountainsides from the canyon tops habitat suitability degrades. Mixed tree species ranging in different sizes are not common at the higher elevations of the Survey Area, above the canyons. Cliffs, shade, and water are all lacking.

A Protected Activity Center (PAC) is an “area of at least 243 ha (600 acres) surrounding the “core area,” which is the nest site, a roost grove commonly used during the breeding season in absence of a verified nest site, or the best roosting/nesting habitat if both nesting and roosting information are lacking (USFWS 2022).” Based on information from the United States Forest Service (USFS) Glenwood Ranger District, two MSO PACs were previously documented approximately 2 miles northeast of the Survey Area in 2002 and east of the Survey Area in 2004. In 2009, two PACs were recorded within 2 miles southeast of the Survey Area (USFS 2022).

**3. Survey Methods**

The MSO survey was conducted following the protocol found in *Mexican Spotted Owl Survey Protocol, 2012 (Updated 3/15/2022)* (USFWS 2022). The survey dates can be found in Table 1 below. In brief, the

survey consists of broadcasting MSO calls from a call point for at least 15 minutes or continuously calling while hiking a route. If no response, the surveyor moves to the next call point. Depending on habitat structure, call points may be spaced between .25 and .5 mile. If an MSO response is recorded, the surveyor records pertinent data. The surveyor then moves at least .5 to .75 mile to the next call point. For MSO responses, the surveyor makes a daytime visit to the area an MSO called from through triangulated data. The surveyor searches the area for an MSO and follows the Survey Protocol to determine roosting status. This visit must be conducted within 2 days from the night the MSO was detected from the call point. Once an owl location was known, nighttime calling was not conducted from call points within 0.5 mile of the roost and a daytime visit was made.

A survey is complete once all call points have been surveyed from and day-time follow-up visits made to roosts. This is then repeated 4 times throughout the survey season from March 1 to August 31. A specific number of surveys can be completed each month with 5 days elapsing between calling from a single call point. The full survey is complete after conducting the Survey Protocol for two years. More details on timing, daytime surveys, follow-up visits, and alternative call methods can be found in the Survey Protocol (USFWS 2022).

Call point locations are established to obtain complete coverage of the survey area so owls will be able to hear a surveyor calling and a surveyor will be able to hear the owl responding (USFWS 2022). Call points are placed to obtain satisfactory coverage of an area up to 0.5 mile away, taking topography and background noise into consideration. Call points from 2022 were largely used in 2023. Through reconnaissance some call points were moved or added to obtain additional coverage. Call points were added at the bottom of Mineral Creek to further investigate the area.

**Table 1. MSO Nighttime Survey Dates, 2023**

Date	Call Point Numbers
<b>Survey 1</b>	
3/6	8, 6, 9, 20
3/7	21, 13, 12, 24, 14
3/8	17, 16, 15, 11
3/9	1, 3, 4, 5
3/10	18, 19, 10
4/18	25, 22, 23, 2, 7
<b>Survey 2</b>	
4/12	17, 16, 15, 11
4/13	8, 6, 9, 20
4/14	21, 13, 12, 24, 14
4/15	1, 3, 4, 5
4/16	18, 19, 10
5/8	25, 22, 23, 2, 7
<b>Survey 3</b>	
4/19	11, 15, 16, 17
4/20	8, 6, 9, 20
4/21	21, 13, 12, 24, 14
4/22	10, 19, 18
4/23	1, 3, 4, 5
5/16	25, 22, 23, 2, 7

Date	Call Point Numbers
<b>Survey 4</b>	
5/9	17, 16, 15, 11
5/10	21, 13, 12, 24, 14
5/11	18, 19, 10, 8
5/13	1, 3, 4, 5
5/15	6, 9, 20
6/1	25, 22, 23, 2, 7

Notes: Some call points not used if in proximity to roost.

#### 4. Survey Results and Analysis

All owls detected during daytime and nighttime surveys were part of a roost in the Survey Area. Survey results are discussed by each established roost below. Photos of each roost are located in Appendix A.

##### 4.1 Silver Creek Roost 1

**Table 2. Silver Creek Roost 1, 2023**

MSO	Date						
	3/8	4/14	4/21	5/10	6/1	7/12	8/4
# of MSO	1	0	1	2	0	0	0
Sex	?	-	M	M, F	-	-	-
Stage	A	-	A	A, A	-	-	-

Notes: M=male, F=female, A=adult, J=juvenile, ?=unknown

In 2022 a breeding pair of MSO with 2 juveniles was confirmed in Silver Creek Roost 1. In 2023 the pair of MSO were again confirmed, but breeding was not. The pair was observed together during the first 3 visits; however, fresh whitewash, pellets, and small downy feathers were extensive in the presumed nesting ledge area and beneath trees in the roost. On the 4/21 visit, additional feathers, whitewash, and pellets were observed beneath the ledge and the male was observed outside in the roost. On 5/10 both owls were observed in the roost, along with noticeably more whitewash. If the pair bred, it could be expected the female would leave the nest roughly around mid-May. Not seeing the female in the roost with male until 5/10 and the extensive sign beneath the nest ledge indicates a potential nesting attempt. The female seen in the roost on 5/10 would be slightly early if nestlings were present, but not impossible. Based on the absence of owls in the roost or adjacent areas from June through the remainder of the season, it is unlikely a potential nesting attempt was successful. Reproductive success is generally low in MSO (USFWS 2012). Young MSO observed prior to August are usually within 0.2 mile of the nest (Ward and Salas 2000). If there were juveniles, they would be expected to be near the nest in June and July.

While breeding cannot be confirmed, it is confirmed by the extensive owl sign and the owl pair present that Silver Creek 1 is an active roost.

#### 4.2 Silver Creek Roost 2

**Table 3. Silver Creek Roost 2, 2023**

MSO	Date					
	3/7	4/13	4/19	5/12	7/12	8/4
# of MSO	0	0	0	0	2	1
Sex	-	-	-	-	F, ?	?
Stage	-	-	-	-	A, J	J

Notes: M=male, F=female, A=adult, J=juvenile, ?=unknown

In 2022 a breeding pair of MSO with 2 juveniles was confirmed in Silver Creek Roost 2. In 2023 breeding was again confirmed. Early season MSO absence data is attributed to MSOs not always responding and difficulty accessing areas of the roost due to wet and treacherous conditions. A single juvenile; however, was observed in both July and August confirming successful breeding. Once the juvenile was observed on both visits the surveyor moved out of the area without further inspection for the adults. The nest location has not been confirmed for this roost; however, the juvenile was perched adjacent to a suitable ledge and grotto on 8/4 that displayed evidence of MSO use.

Silver Creek Roosts 1 and 2 are separated by 1.1 miles in a straight line and 1.4 canyon miles. Looking at the data, the absence of an MSO at Silver Creek 2 early in the season while there was MSO presence at Silver Creek 1, and the reversal later in the season, could suggest these are the same owls. A study in Tularosa Mountains, NM (Peery et al. 1999) and the other in north-central Arizona (May and Gutiérrez 2002) determined the mean distances between pairs of MSO were 1.3 miles in New Mexico (n = 31 pairs) and 1.5 miles in Arizona (n = 42 pairs) (USFWS 2012). Additionally, juvenile MSO are typically within 0.2 mile of their nest prior to August (Ward and Salas 2000). Given this data and confirmation in 2022 of two pairs of breeding MSO at each roost, it is likely that these are two separate roosts.

The 2023 surveys confirmed successful breeding at the Silver Creek 2 roost.

#### 4.3 Mineral Creek Roost

**Table 4. Mineral Creek Roost, 2023**

MSO	Date					
	4/20	5/9	5/16	6/1	7/11	8/5
# of MSO	0	2	1	2	2	0
Sex	-	M, F	M	M, F	M, F	-
Stage	-	A, A	A	A, A	A, A	-

Notes: M=male, F=female, A=adult, J=juvenile, ?=unknown

Detections were made in Mineral Creek in 2022, but a roost was not located. The 2023 surveys confirmed the location of an active roost. Extensive owl sign was identified throughout the core area and both adult owls were observed multiple times. During the 5/9 visit the female was observed sitting on a ledge in the cliff face and the male perched in a fir tree adjacent to the cliff. Beneath the ledge was a small eggshell fragment, whitewash, and numerous downy feathers on the ground and stuck to lichen growing on the

cliff face. Nestlings were not observed; however, this evidence indicates the nest location. On the 5/16 visit the female was not sitting on the ledge nor were nestlings visible. It was noted that fresh black bear scat was beneath the nest ledge.

On subsequent visits to the roost no juvenile MSO were observed. The adult pair observed twice were extremely vocal, using the 4-note, bark, and contact call. Calling activity declines from June through November (USFWS 2012) making this aggressive calling behavior stand out. The 4-note is used by males and females as a territorial marker and the bark call used during territorial disputes (AGFD 2023). While juveniles were not observed, the MSO pair defended their territory. Whitewash was observed in higher amounts throughout the roost later in the season which could indicate juveniles were present; however, it is unlikely they would not be observed as they typically stay with the adults through August. The observation of black bear scat beneath the ledge, which was climbable, could indicate nest predation. If there were nestlings, there is a low survival rate for young MSO (AGFD 2023).

It is presumed from the evidence observed Mineral Creek is an active roost and a nesting attempt was made but failed.

**4.4 FR716B Roost**

**Table 5. FR716B Roost, 2023**

MSO	Date					
	4/16	4/22	5/13	6/1	7/12	8/4
# of MSO	1	1	1	2	2	2
Sex	M	M	M	M, F	M, F	M, F
Stage	A	A	A	A, A	A, A	A, A

Notes: M=male, F=female, A=adult, J=juvenile, ?=unknown

The 2022 surveys did not locate owls in this area; however, the 2023 surveys confirmed a pair of MSO in this active roost. The core area displayed whitewash and pellets throughout the survey season. The female was not seen or heard until the fourth visit on 6/1 and observed on all subsequent surveys. The timing of the female observations after 5/13 strongly suggests a nesting attempt was made; however, juveniles were not observed throughout the survey season. If juveniles were present, it is anticipated they would be near the adults and within 0.2 mile of the nest. Reproductive success is generally low in MSO (USFWS 2012). During the 7/12 visit both adult owls were observed on a small grotto in the cliff face. Beneath the grotto was a large amount of whitewash, pellets, and downy feathers. This grotto is a potential nest location. Both adults displayed a full array of vocalizations through the August visit, defending their territory.

While breeding cannot be confirmed, it is confirmed by the extensive owl sign and the presence of the MSO pair that FR716B is an active roost.

## 5. Recommendations

Based on the evidence through 2 years of surveys, there are 4 active roosts in the Survey Area. Two of these roosts had breeding success in 1 or 2 of the survey years. The remaining 2 roosts showed evidence of nesting attempts. Based on these observations, MSOs not breeding every year, and MSO low reproductive success, the following recommendations are made:

- The 4 known roost sites are surveyed by an MSO qualified biologist using the USFWS *Mexican Spotted Owl Survey Protocol, 2012 (Updated 3/15/2022)* through project duration.
- If an occupied breeding territory is located within the 0.5-mile buffer zone, drilling activities shall not occur until the young have fully fledged and dispersed from the area.
- Continued coordination with Summa, USFWS, USFS, NMDGF, and MMD to develop additional actions, PAC delineations, or to determine if any additional information is needed.

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## **Appendix A – Roost Photos**



**Silver Creek 1**



Photo 1. Adult MSO feather, whitewash, and pellet beneath nesting ledge.

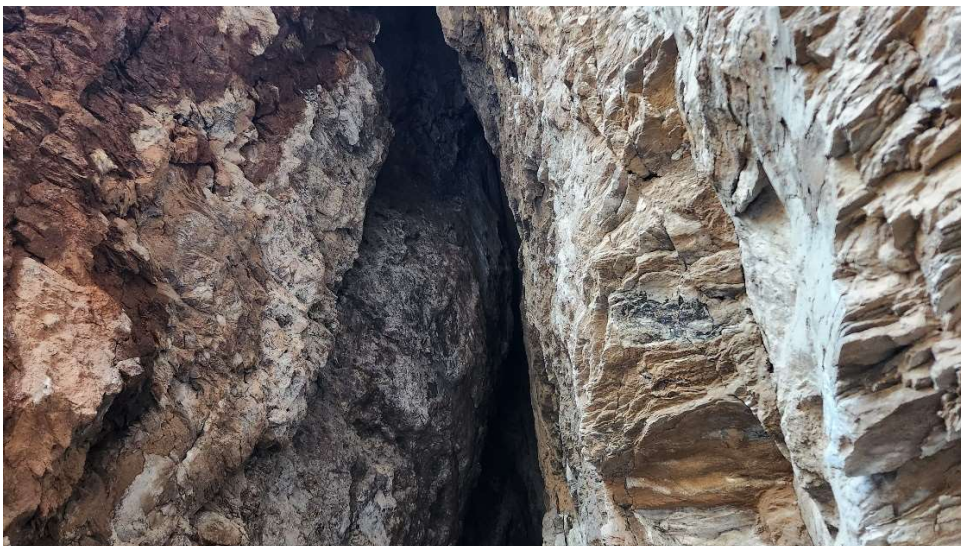


Photo 2. Adult MSO perched in grotto.



Photo 3. Adult MSO pair perched in Douglas fir.



Photo 4. Multi-layered tree structure along cliffs.

**Silver Creek 2**



Photo 5. Juvenile MSO in oak.



Photo 6. Adult female and juvenile MSOs in pinyon.



Photo 7. Juvenile MSO near possible nesting ledge.



Photo 8. Multi-layered tree structure at canyon bottom.

**Mineral Creek**



Photo 9. Adult MSO pair; female vocalizing on right side of image.

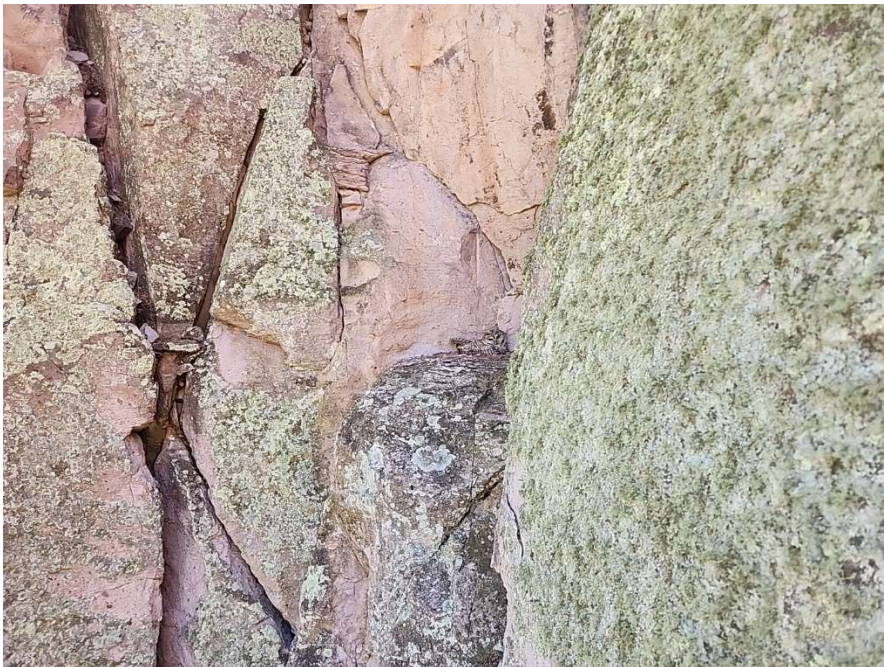


Photo 10. Adult female MSO sitting on nesting ledge.



Photo 11. Adult male MSO perched above nesting ledge.



Photo 12. Multi-layered tree structure along cliffs and canyon bottom.

**FR716B Roost**



Photo 13. Adult MSO pair amongst mid-story oak habitat.



Photo 14. Adult MSO pair perched in potential nesting grotto.



Photo 15. Adult male MSO in oak.

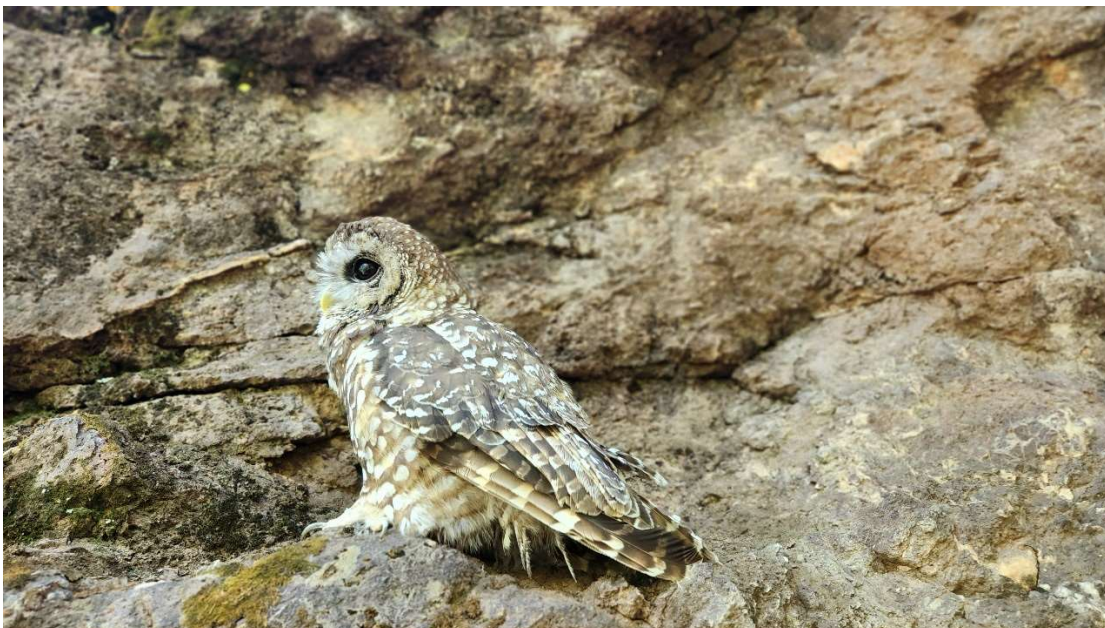


Photo 16. Adult male MSO perched near potential nesting grotto.



## BIOLOGICAL TECHNICAL MEMORANDUM

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**To:** Summa Silver Inc., - Chris York

**From:** NV5 - Jenny Lisignoli and Steve Albert and Everett Ecological - James Waddell

**Date:** May 28, 2022

**Subject:** Results of Mexican Spotted Owl Surveys for the Summa-Mogollon Silver Mining Project

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### EXECUTIVE SUMMARY

Under a U.S. Fish and Wildlife Service issued Section 10(a)(1)(a) research and recovery permit, Mexican spotted owl (*Strix occidentalis lucida*) surveys were conducted from April 4 through April 29, 2022 on behalf of Summa Silver near Mogollon, New Mexico. Summa Silver contracted NV5, with support from Everett Ecological, to perform Mexican spotted owl surveys in compliance with New Mexico Mining and Minerals Division minimal impact exploration permit requirements. Mexican spotted owl surveys have been completed across the project area, referred to as the Area of Interest, which is a 0.5-mile (0.80 kilometers [km]) buffer zone around work sites (Figure 1). Four nighttime surveys were conducted at nine calling stations established in the Area of Interest (Figure 2). Several daytime follow-up surveys occurred in areas where Mexican spotted owls were detected. Key synopses of the 2022 MSO surveys are itemized below.

### Mexican Spotted Owl Surveys – Significant Findings

- No Mexican spotted owl nests or roosts were discovered nor were known to occur within the Area Of Interest. Therefore, activities approved by the minimal impact exploration permit are not located in an area likely to result in adverse impact on the Mexican spotted owl.
- One Mexican spotted owl territory occupied by a single male was identified outside of the Area of Interest in Silver Creek. This male Mexican spotted owl is suspected of having a territory in this general area, although no female was detected during any nighttime or daytime follow-up surveys.
- One Mexican spotted owl territory occupied by a breeding pair was identified outside of the Area of Interest in Mineral Creek. Although a nest was not found following three daytime surveys, subsequent nighttime surveys elicited responses from a male Mexican spotted owl consistently heard in the same approximate area that the pair were heard together.
- Two male Mexican spotted owls were detected within the Area of Interest in Graveyard Gulch, however, no further detections occurred during subsequent surveys. During the first survey period, surveyors detected one male Mexican spotted owl, which responded to the surveyor’s calls inside of the Area of Interest. During the first follow-up survey conducted three hours after the first survey was completed, two male MSOs were detected. It is also possible that the two male owls heard are “floaters” (i.e., nonterritorial individuals). No Mexican spotted owls were detected in this area during succeeding nighttime and daytime follow-up surveys.

## INTRODUCTION

For this project area near Mogollon, New Mexico (NM) (Figure 1), Summa Silver (Summa) contracted NV5, with support from Everett Ecological, to perform Mexican spotted owl (*Strix occidentalis lucida* [MSO]) surveys in compliance with New Mexico Mining and Minerals Division (MMD) minimal impact exploration permit number CA027EM, Section 10, Part E “Mexican Spotted Owl Mitigations to be Performed” (MMD 2021). The CA027EM, Section 10, Part E states:

“To minimize potential impacts to Mexican Spotted Owl, all drilling and disturbance activities should be performed outside of the breeding and fledgling-dependency period of March 1 through August 31 when possible. If drilling activities cannot be avoided during the breeding and fledgling-dependency period, spotted owl surveying shall be conducted within a 0.5-mile (0.80 kilometers [km]) buffer zone prior to any road work, drill pad construction, and drilling. Surveys shall be conducted by qualified biologists using U.S. Fish and Wildlife Service Mexican Spotted Owl Survey Protocol (2012) and in accordance with New Mexico Department of Game and Fish recommendations. If an occupied breeding territory is located within the 0.5-mile buffer zone (0.80 km), drilling activities shall not occur until the young have fully fledged and dispersed from the area.”

## PROJECT LOCATION AND DESCRIPTION

Summa’s Mogollon Project area consists of approximately 2,400-acres in the historic Mogollon mining district of southwest NM, approximately 75 miles (121 km) north of Silver City; in Township 10 South, Range 19 West, Sections 27 and 28 on private land/patented mining claims. Starting in the late 1800s and over several decades, numerous underground mining activities have extracted high-grade gold and silver veins from three primary mines: Fanny, Last Chance, and Consolidated (The Assay 2022; Cision PR Newswire 2020). Most mining ceased in 1942, and the district has since been largely inactive, except for a few exploratory drilling projects conducted in the 1980s and in 2010 (Cision PR Newswire 2020). The project hosts approximately 21-miles (34 km) of near-continuous epithermal-associated veins and faults (Summa Silver 2022a, b; Cision PR Newswire 2020).

MSO surveys have been conducted across the project area, referred to as the Area of Interest (AOI), which is a 0.5-mile (0.80 kilometers [km]) buffer zone around work sites (Figure 2). This biological technical memorandum was prepared to provide the results of the MSO surveys conducted by NV5 in and around the AOI during the spring of 2022.

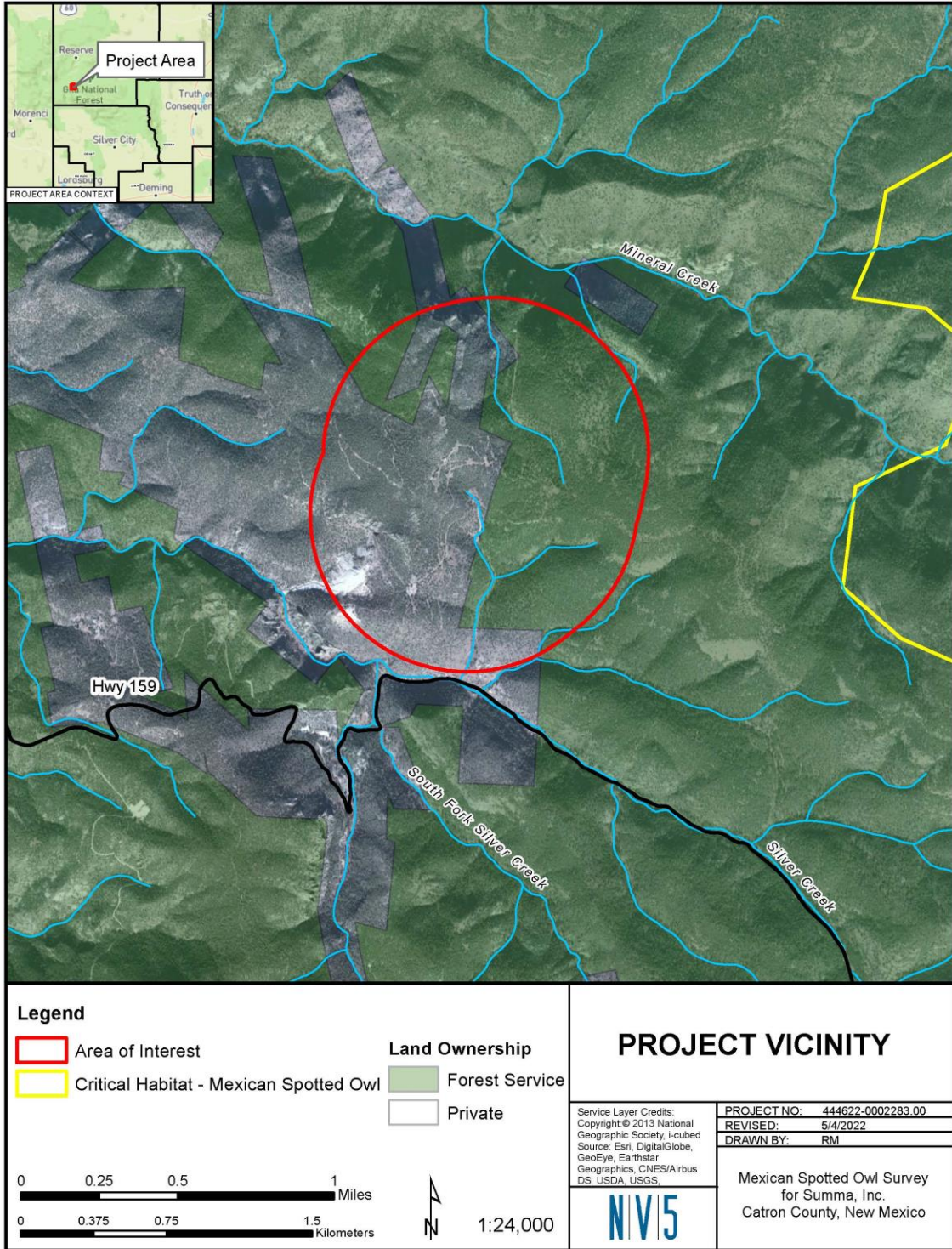


Figure 1. Map depicting the greater vicinity of the project area.

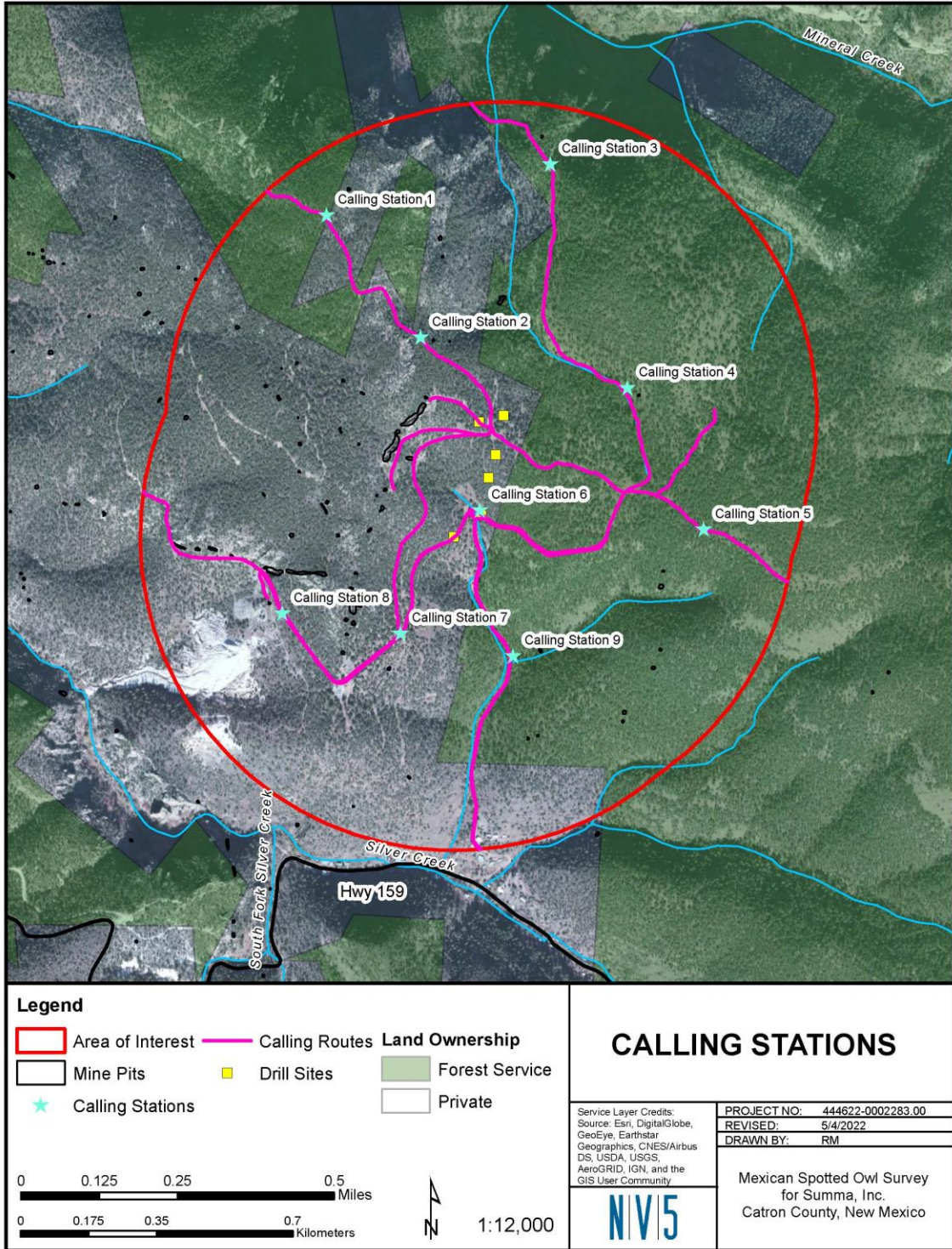


Figure 2. Map depicting calling routes and calling stations in the AOI.

## METHODS

From April 4 to 30, 2022, NV5 conducted a series of nighttime and daytime MSO surveys and daytime follow-up searches, to attempt to locate MSOs in the AOI. Surveys were conducted according to the most recent version of the MSO survey protocol (U.S. Fish and Wildlife Service [USFWS] 2022a), which includes nighttime broadcast calls of owls, documenting responses, and daytime follow-up surveys to locate roosting and potential nesting sites. Prior to conducting the MSO surveys, the revised 2022 USFWS protocol was reviewed by the surveying team. Summa and Everett Ecological provided NV5 with a map of the project area, which identified open mines shafts and access routes in AOI – the primary extent for MSO surveys in 2022. A 0.5-mile (0.8 km) buffer was identified around the proposed work area per survey requirements. The file was also used to identify land features and determine where calling routes and calling stations would be placed within the AOI.

**Prior to surveys:** The main objective of conducting surveys is to locate and observe an MSO nest and any potential young associated with that nest (USFWS 2022). Since spotted owls do not nest every year, it is important to note that it can take up to four years of compiling roost locations to “effectively delineate owl core activity areas” (USFWS 2022; Ward and Salas 2000).

**Critical Habitat and PACs:** MSO critical habitat is found approximately 0.5- to 1.0-miles (0.8 to 1.6 km) northeast, east, and southeast of the AOI (USFS 2022). The U.S. Forest Service (USFS), Glenwood Ranger District, provided Everett Ecological with the most current PAC data for this project’s MSO surveys (USFWS 2022). Based on the Glenwood Ranger District PAC information, two PACs were recorded, approximately 2-miles (3.2 km) northeast (in 2002) and east (in 2004) of the AOI. In 2009, two PACs were recorded within 2-miles (3.2 km) southeast of the AOI (USFS 2022). However, the PAC data from the Glenwood Ranger District did not identify any known PACs in the AOI nor any known nests within 1-mile of the AOI (USFS 2022).

**Reconnaissance:** NV5 biologists experienced in conducting MSO surveys in a variety of habitats over a combined total of 30 years, initially conducted daytime reconnaissance of the AOI. The goal of this reconnaissance was to locate potential habitat where this species might be found and establish call routes and calling stations where owl calls could be broadcast well, and surveyors could listen and watch for owls to respond. During the reconnaissance survey, calling stations were shifted/relocated as needed to ensure the most complete coverage of the project area per the USFWS 2022 protocol (USFWS 2022). Nine calling stations were established, which covered the potential habitat present. Mineral Creek and Silver Creek are located north and south of the AOI, respectively. Each contains important areas of riparian habitat, water, and rocky ledges/shelves that can provide MSOs with nesting sites.

**Safety Hazards:** Due to the number of abandoned mine shafts in the project area and the dangers associated with conducting nighttime surveys in these areas, for safety, calling routes were established along designated roadways in the AOI (Photograph 1). Calling routes and calling stations were delineated on Google earth, transferred to a kmz file, and uploaded to the Field Maps App for surveyors to review in the field. Calling stations were established from approximately 0.25 to 0.5 miles (0.4 to 0.8 km apart), depending on topography and habitat present (USFWS 2022).



Photograph 1. James Waddell, owner of Everett Ecological, stands where water flows through one of the many mine shafts in Mineral Creek and the project area.

**Protocol Surveys:** Per the USFWS 2022 MSO protocol, nocturnal calling surveys typically elicit responses from a territorial owl who may suspect that an intruder is present within their territory (USFWS 2022a). When a territorial owl hears an intruder at night, “most owls respond by calling to/and or approaching the intruder” (USFWS 2022). The 2022 survey protocol states that the optimal survey time to call is two hours after sunset and two hours prior to sunrise (USFWS 2022).

Four MSO nighttime surveys were conducted, spaced more than five days apart. Nighttime surveys included the use of either imitating the three main calls used by the MSO including the four-note call, contact call, and bark series. Playback recordings of the four-note call were also used at times. The four-note-call was the primary call played during the surveys (USFWS 2022).

Owl surveys included using playback calls at the calling stations and continuous calling when daytime follow-up surveys were conducted in Silver and Mineral Creeks. Surveyors remained at each calling station for 15 minutes and actively listened for owls during the surveys. The order the calling stations were visited was modified for each of the four surveys to avoid potential bias discussed in the USFWS protocol (2022).

## RESULTS

A complete inventory (four complete surveys) was conducted from April 1 to April 29 in the AOI. Surveys were spaced at least 5-days apart (USFWS 2022a). Surveys were conducted on:

- Survey 1: April 4-5
- Survey 2: April 13-14

- Survey 3: April 19-20
- Survey 4: April 27-29

When an MSO was audibly or visually detected, the type of call, time, and the sex of the owl was noted. If an MSO was heard, compass bearings and approximate distance to the owl were noted. If the owl was heard from more than one station, bearings were triangulated, and daytime follow-up surveys for each detection were conducted the following morning or evening. Follow-up surveys occurred when owls are most active and vocal and are most likely to respond to calls, which help to locate potential nests (USFWS 2022). Compass bearings compiled during the four surveys consistently placed an MSO pair in Mineral Creek and a lone male in Silver Creek.

To locate nests, surveyors obtained pet store “feeder mice” to entice an owl to bring back food to any potential nest (USFWS 2022). However, the MSOs did not respond to daytime calls conducted during the follow-up surveys. The reasons for this are unclear; however, it was noted on at least four occasions that, during the evening surveys, no MSO began calling until after dark in Mineral Creek, in Silver Creek, and on the Calling Route between Calling Station 3 and 4, even though surveyors had previously walked and surveyed at those stations a short period before - just before sundown.

During the April 19, 2022 survey, an agitated male MSO flew to within a few ponderosa pines (*Pinus edulis*) of where the surveyors had called from Calling Station 1. This was the only visual detection surveyors had during the four survey periods. Although, during the third survey, a male MSO was audibly detected north of Calling Station 4, more than likely this was the same male MSO that was visually detected at Calling Station 1. However, a follow-up survey conducted in Mineral Creek on April 28 did not detect any MSOs in the area where an owl was detected north of Calling Station 4 on April 19.

### **Summary of Owls Detected**

#### **Pair Status in Mineral Creek**

Per the USFWS protocol (2022), one of the ways to define if a pair of MSOs are present, is determined when a male and female owl are heard and/or observed within approximately 0.3 miles (500 meters [m]) from one another. Per this USFWS protocol definition, one pair of MSOs were identified outside of the AOI in Mineral Creek during the protocol surveys (USFWS 2022a). Although Mineral Creek is outside of the AOI, it is the most likely location for breeding birds to be found. Flowing water and healthy riparian stands are present in this creek (Photographs 1-2). Surveyors determined that this pair is likely nesting in the area where they were detected together in the creek bottom, as their responses were detected within minutes of each other and were less than 490 feet (150 m) apart. During this time surveyors were not calling, but actively listening. In addition, although a nest was not found following multiple daytime surveys, responses from the male MSO were consistently heard in the same approximate area that the male and female were heard together (Photographs 2-3).



Photograph 2. Surveyor, Steve Albert carries feeder mice to the site in Mineral Creek where a pair of Mexican spotted owls were detected the previous night.



Photograph 3. Facing southeast in Mineral Creek, where a pair of Mexican spotted owls were heard the previous night in April 2022.



MSO Status Unknown - Potential Single Status in Silver Creek

Surveyors detected one male MSO outside of the AOI in Silver Creek (Photograph 4-5). This lone male MSO was heard at least three times (on April 18 from Calling Station 8 on the rim overlooking Silver Creek; and on April 19 and April 30 from within Silver Creek). Bearings/detections were triangulated and compiled on Google Earth. The triangulated bearings consistently placed the male MSO in the same general area. This male MSO is suspected of having a territory in this general area, although no female was detected during any nighttime or follow-up surveys. However, per the USFWS protocol, two years of surveys are required before this male would be considered a single status owl (USFWS 2022).



Photograph 4. Facing southwest where a male MSO was heard on this southern slope of Silver Creek on April 19 and April 29, 2022.



Photograph 5. Facing southeast in Silver Creek where surveyors searched for a single MSO heard on April 19 and April 29, 2022.

#### Status unknown – Graveyard Gulch

During the first survey period, surveyors detected one male MSO, which responded to the surveyor's calls inside of the AOI. During the first follow-up survey conducted three hours after the first survey was completed, two male MSOs were detected. These two MSOs were detected within 980 feet (300 m) of each other and within a few minutes of each other. It is unclear if these two males are from Silver Creek. It is possible that the two male owls heard are "floaters" (i.e., nonterritorial individuals). No MSOs were detected in this area during the following nighttime and daytime surveys or follow-up surveys.

It was noted that during the four protocol surveys, only once did surveyors have a daytime response from an MSO in Graveyard Gulch. During the follow-up survey conducted that same morning - although no playback calls were made, two male MSOs were heard in the same area where the lone male had been heard earlier that morning. Overall, surveyors were more than likely seen or heard by the MSOs, if present in these areas, although no owls responded to the broadcast calls in Silver Creek or Mineral Creek. The lack of daytime responses made mousing and finding nests nonviable in the creeks.

Although the surveyors have conducted numerous surveys in a variety of habitats across the west and southwest US, in this project area, extensive MSO nest surveys were unproductive. Multiple day and night visits were made to each of the Calling Stations where MSOs were initially detected. Due to these repeated visits, the surveyors were able to define a concentrated area that the MSOs in both Mineral Creek and Silver Creek utilize.



Photograph 6. Habitat in Graveyard gulch where Mexican spotted owl males were heard.

## DISCUSSION

### Importance of the Canyon Habitat in the Project Area

The MSOs detected were consistently present in canyon bottoms with flowing water and a diverse mix of box elder, willow (*Salix* spp.), oak (*Quercus* spp.), and sycamores (*Platanus* spp.). The surrounding upland areas and slopes consist of ponderosa pine, Douglas fir (*Pseudotsuga menziesii*), piñon (*Pinus edulis*), juniper (*Juniperus* spp.), and oak. Based on the nighttime and daytime surveys conducted in 2022, NV5 believes the MSOs are nesting relatively close to the creek bottoms or just above the creek bottoms in upland benches. Ganey et al. (2011) documented radio-marked MSOs nesting and roosting on cliff ledges in the Gila Mountains Recovery Unit. It is our experience that this is not an uncommon situation throughout the Southwest. Cliffs are abundant in Mineral Creek where the daytime follow-up surveys were conducted. Water flowed through Mineral Creek at the end of the fourth survey. However, in Silver Creek, there was a marked decrease in surface water between the first and last survey period. The areas where water was present were noted to be much drier by the fourth survey. Based on the nighttime surveys and multiple day surveys conducted, NV5 surveyors believe there are at least two established territories outside of the AOI – one in Mineral Creek and one in Silver Creek. During the surveys, it was noted that the behavior of the two male MSOs in the two canyons was very different.

### Habitat Model of the Project Area

The USFS Rocky Mountain Research Station in collaboration with the USFWS has developed a “living map” of MSO habitat trends across Arizona and New Mexico (USFS 2020). The map is based on a model of 2,913 MSO nesting and roosting locations used to identify MSO habitat where MSOs are most likely to establish nesting and/or roosting territories. The map presents probabilities of quality habitat existing at

a given location as well as identifying if forest vegetation (cover type) is similar to vegetation types that MSOs are known to utilize.

With respect to the AOI, the map estimates a 10% probability of MSO habitat occurring in uplands (i.e., AOI) and a 50-60% probability of occurrence in canyon bottomlands (i.e., Mineral and Silver creeks) (Figure 3). Respectively, cover type similarity follows a similar trend, as the map suggests that uplands consist of “not similar” to “marginally similar” cover types whereas canyon bottomlands consist of “marginally similar” to “very similar” cover types (Figure 4). The results of our MSO surveys appear to verify the estimations suggested by the habitat map proposing that the AOI is not composed of quality MSO habitat.

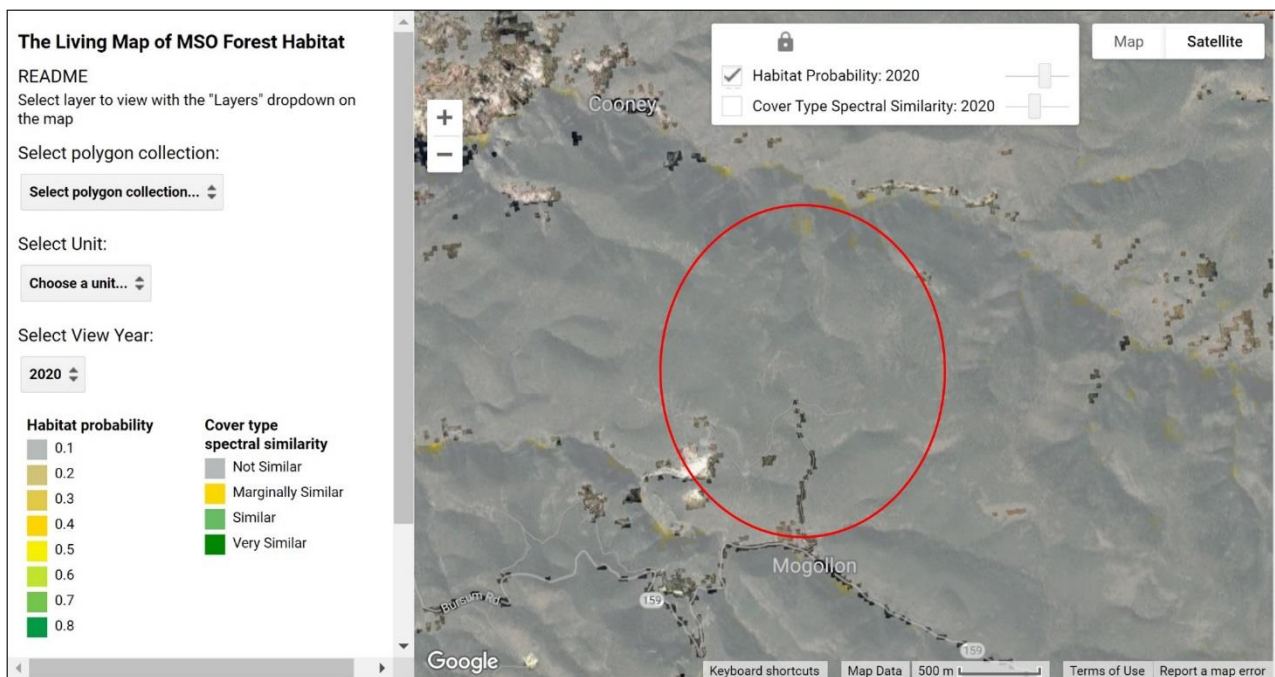


Figure 3. Screenshot of “living map” habitat probabilities present in the Mogollon area. The red ellipse represents the general location of the AOI.



Figure 4. Screenshot of “living map” vegetation cover type similarities present in the Mogollon area. The red ellipse represents the general location of the AOI.

## Important Notes for this Project Area

### Timing of Surveys

Protocol surveys were completed relatively early in the survey season. Some of the survey nights in early April were in the upper 20-30 degrees Fahrenheit (-7 to -18 Celsius), when few responses were elicited from any birds during the surveys. As the temperatures warmed up and the vegetation began to leaf out, more avian responses, including the MSOs, were heard during the surveys. It should be noted that no other owl species (i.e., great horned owl [*Bubo virginianus*], western screech owl [*Megascops kennicottii*], northern pygmy owl [*Glaucidium californicum*], etc.) were detected during any of the surveys, which is unexpected, as it is common to elicit responses from other owl species during nighttime MSO surveys.

Further surveys are planned to occur later this breeding season and next (i.e., June-July 2022 and April-July 2023), outside of the AOI, which could provide potential missing information regarding the pair in Mineral Creek and the lone male in Silver Creek.

### Mineral Creek

The Mineral Creek male MSO was seen one time at Calling Point 1. This male was very agitated and remained at the location for several minutes before moving north in search of the MSO it “heard” (our call). After three follow-up visits to Mineral Creek, we detected an MSO male with a female, which corresponded with the territorial behavior where we had a visual encounter with a male MSO at Calling Station 1.

## Silver Creek

The detected location of the Silver Creek MSO is a short walk from the town of Mogollon. At least some local residents are aware there is an MSO in the area. It is possible that some residents may visit this owl. At the end of the fourth protocol survey and follow-up survey, it is unknown if the Silver Creek male MSO is paired with a female. Surveyors did not hear a female response, even when we heard a male MSO respond from within its roosting area during a follow-up survey. It is possible this owl is considered a floater (Franklin 1992). Although floaters do not contribute to the reproductive output of a population, they can influence population dynamics because they provide a pool of birds that could colonize vacant territories or pair with single birds (Franklin 1992).

## Raptor Nest Surveys

Additionally, raptor (i.e., hawks, eagles, etc.) nest surveys occurred on two occasions under a separate contract required to satisfy other permit compliance obligations pertaining to non-federally listed species. These surveys were conducted by Everett Ecological on April 18 -20 and May 17-19, 2022 and provide further insight regarding the status of MSO territories in and around the AOI. A brief overview of methodology and findings is presented as follows:

Raptor nest surveys were conducted following procedures established in the New Mexico Department of Game and Fish (NMDGF) Habitat Handbook “Baseline Wildlife Study Guidelines” (NMDGF 2019), which suggests that methods described in British Columbia’s “Inventory Methods for Raptors” (BCRIC 2001) be adapted to inventory raptor presence/absence. Within and around the AOI, call playback surveys, roadside surveys, standwatches, and ground nest searches occurred (Figure 5). Additionally, a high-resolution aerial photography dataset of the AOI was examined before surveys to identify habitat quality and potential nest sites. Surveys occurred during the breeding season when raptor species are most prone to eliciting territorial responses in association with active nesting.

- Call playback surveys were conducted during daytime by broadcasting buteo (i.e., red-tailed hawk [*Buteo jamaicensis*]) and accipiter (i.e., Cooper’s hawk [*Accipiter cooperii*]) calls at the nine MSO calling stations along roadsides and while walking transects during ground searches. Raptors will travel long distances to respond, consequently, playback is sometimes not beneficial for directly locating nests, but it is very valuable when used in combination with ground searches (BCRIC 2001).
- Roadside surveys were conducted during daytime along roads where surveyors used high powered binoculars and a spotting scope to scan the landscape for soaring and perched raptors. Furthermore, tree stands and cliff faces were scanned for the presence of nests (active, inactive, or dilapidated) or signs of nests (i.e., fecal deposits (whitewash), prey remains, moulted feathers).
- Ground nest searches were conducted during daytime by walking transects throughout the AOI in and around low, medium and high-quality habitat types. Cliffs and trees were scanned along transects and call playbacks were also used. Surveyors searched for raptor presence, signs of nests, and presence of nests.

- Standwatches were used to supplement playback, roadside, and ground searches where a surveyor is positioned on a vantage point and uses binoculars to actively scan a slope for raptor presence, signs of nests, and presence of nests.

Raptor nest surveys did not locate the presence of any occupied raptor nests or territories, including MSO, within the AOI. Species observed include turkey vulture (*Cathartes aura*) [> 50 individuals observed (obs.)], red-tailed hawk (*Buteo jamaicensis*) [5 obs.], common black hawk (*Buteogallus anthracinus*) [1 obs.], peregrine falcon (*Falco peregrinus*) [1 obs.], Cooper's hawk (*Accipiter cooperii*) [3 obs.], and sharp-shinned hawk (*Accipiter striatus*) [1 obs.]. These species were observed soaring above or outside of the AOI. All observations occurred incidentally during landscape scanning and none elicited territorial behavior. Moreover, no responses to call playback surveys occurred over the duration of surveys.

It should be noted that the AOI does contain pockets of quality raptor nesting habitat in cliff alcoves, on ridge tops, and within sheltered canyons containing diverse vegetation assemblages. However, the presence of prey species (i.e., small mammals, reptiles, and amphibians) and recent prey sign (i.e., burrows, nests, middens, feces, latrines, etc.) in the AOI was rare, which may explain the lack of raptor occupancy in otherwise quality nesting habitat. We attribute the lack of prey abundance in the AOI to the persistent extreme drought that continues to occur in the region (NIDIS 2022).

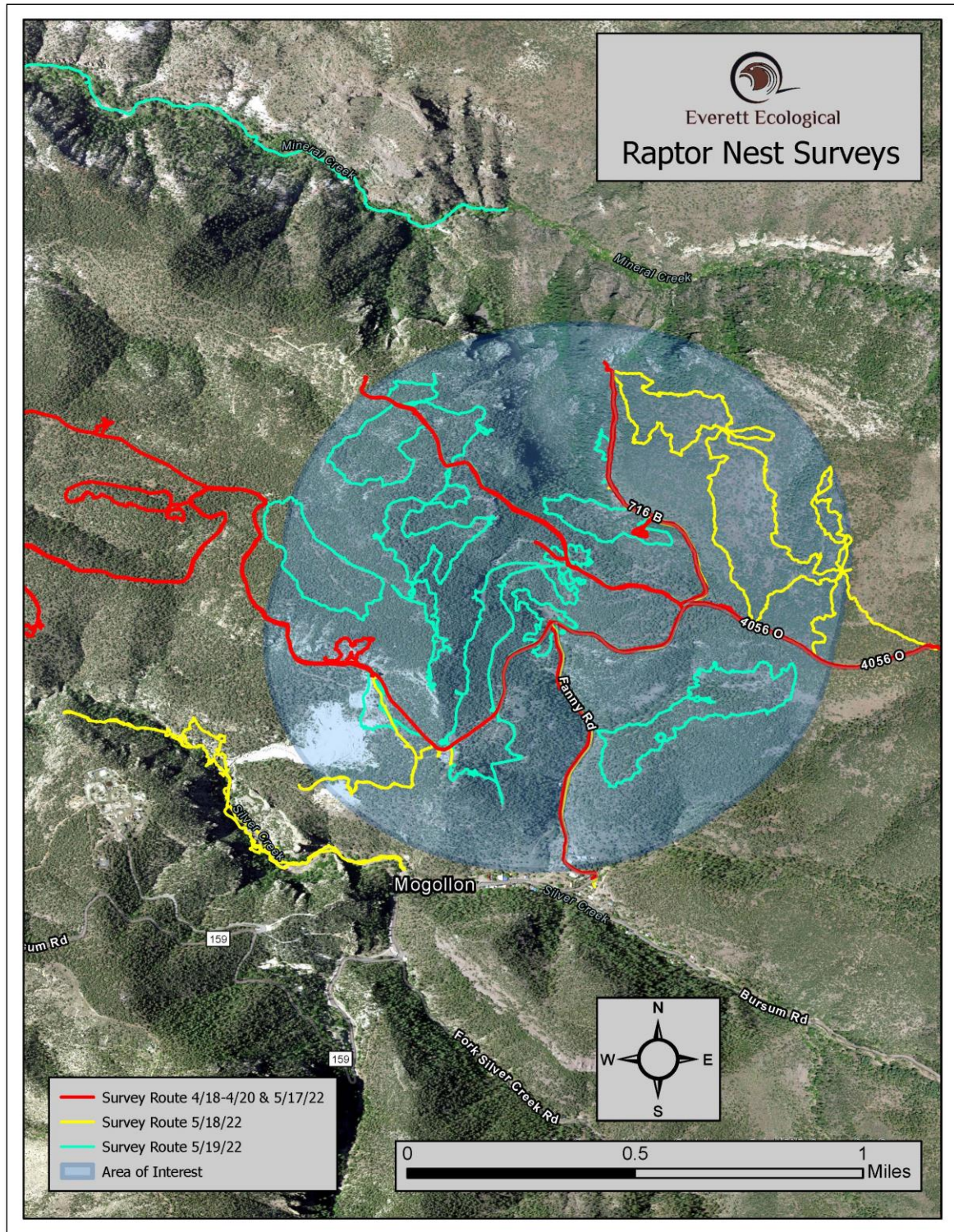


Figure 5: Map depicting survey routes traveled during raptor nest surveys. Red lines represent road survey routes. Yellow and green line represent ground survey routes.



## RECOMMENDATIONS AND CONCLUSION

MSO surveys have been completed for the AOI - year 1. Coordination with the client, the USFWS, the USFS, the NM MMD, and the NMDGF to develop a consensus on additional actions or information needed is recommended.

MSO nighttime surveys and daytime follow-up surveys conducted both within and outside of the AOI suggest that there are no occupied breeding territories located within the 0.5-mile buffer zone (0.80 km)]. Moreover, MSO habitat models developed by the USFWS and USFS suggest that the AOI is unlikely to contain MSO habitat. Consultation with the USFS Glenwood Ranger District did not identify any known PACs in the AOI nor any known nests within 1-mile of the AOI. Lastly, extensive raptor nest surveys conducted throughout the AOI did not detect occupied MSO nests.

In conclusion, it is our professional opinion that Summa's compliance obligations with respect to permit number CA027EM, Section 10, Part E has been fulfilled. We concur with CA027EM Findings of Fact, Section 4, Part B2 (MMD 2021) that the AOI is not located in an area likely to result in adverse impact on the MSO because no occupied breeding territories were located within the AOI.

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