Salt Lake City Foothills Natural Area Trails Baseline Environmental Evaluation Report

FINAL

SEPTEMBER 2023

PREPARED FOR

Salt Lake City Department of Public Lands

PREPARED BY

SWCA Environmental Consultants

SALT LAKE CITY FOOTHILLS NATURAL AREA TRAILS BASELINE ENVIRONMENTAL EVALUATION REPORT

FINAL

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1 INTRODUCTION

The Salt Lake City Foothills Natural Area (study area) consists of approximately 6,898 acres of canyons and foothills bordering the northern and eastern limits of Salt Lake City, Utah. It is bordered by Davis County and protected Salt Lake City watershed lands to the north and east and established neighborhoods to the west and south. The study area contains approximately 100 miles of formal and informal (user-created) trails that provide a space for people to bike, hike, run, and recreate. In 2020, the Salt Lake City Council adopted the 2020 *Salt Lake City Foothills Trail System Plan* (Salt Lake City Public Lands Department 2020) to provide strategic development and management and a balanced plan for land conservation and sustainable recreation in the Foothills Natural Area. Pre-existing trails in the area include the original 14 miles of Bonneville Shoreline Trail—a formally constructed trail built in the 1990s—and dozens of informal trails that tend to follow ridgelines, drainage bottoms, utility access roads, or old off-road vehicle routes. Many of these informal trails have substantial erosion issues due to establishment at steep grades and water runoff. Additionally, informal trails can exacerbate other disturbances and contribute to changes at the landscape level (Kuss 1986; Wimpey and Marion 2011). Informal trails also can result in loss of native vegetation, habitat fragmentation, displacement of wildlife, soil compaction and erosion, altered hydrology, and spread of invasive species (Van Winkle 2014; Wimpey and Marion 2011).

Construction of the trails identified under Phase I of the 2020 *Salt Lake City Foothills Trail System Plan* has largely been completed. Certain members of the public expressed concern that potential environmental impacts resulting from the trail construction carried out under Phase I were not sufficiently analyzed prior to construction. In response, Salt Lake City has contracted SWCA Environmental Consultants (SWCA) to complete this environmental evaluation report to address the potential impacts of trail corridors within the study area.

This report is a pre-National Environmental Policy Act document that lays out the existing conditions of the study area and the potential for ecologically sensitive species and habitats to occur in the study area and, at a high level, defines impacts that may be associated with the project. This report includes summaries of the existing condition of the resources in the study area and discusses regulatory considerations for resources in the study area. The purpose of this report is to help Salt Lake City identify appropriate areas to build trails and inappropriate areas where trail building should be avoided due to potential resource impacts. As part of the environmental evaluation process, Salt Lake City has engaged stakeholders with expertise in various resources in the study area. The stakeholder outreach process is described in Section 2 of this report. Summaries of the existing conditions for natural, cultural, and scenic resources are described in Section 3 of this report followed by a discussion of the potential impacts to these resources from the development and use of trails in Section 4. Section 5 includes a list of regulatory considerations for biological and cultural resources. Visual resource impacts will be analyzed once the National Environmental Policy Act process for the project begins.

Four appendices accompany this report: Appendix A: Maps; Appendix B: U.S. Fish and Wildlife Service Information for Planning and Consultation Resource List; Appendix C: Utah Natural Heritage Program Online Species Search Report; and Appendix D: Information Provided by Stakeholders.

2 EVALUATION METHODOLOGY

The study area for the environmental evaluation of the existing environment consists of approximately 6,898 acres bordering the northern and eastern limits of Salt Lake City. This area was chosen because it contains all the proposed trail corridors and areas that Salt Lake City identified and analyzed in its 2020 plan as habitat study areas.

To analyze the potential impacts of the development of trails, available resources data, existing scientific literature, and input from stakeholders has been considered. Available data resources include existing wildlife habitat spatial data, existing vegetation and land cover spatial data, existing soils and geology data, and existing cultural resources survey data. Existing scientific literature addressing the impacts of trail use on wildlife and habitat has also been considered in this environmental evaluation report. Finally, input from stakeholders with expertise on resources within the study area has also been considered and incorporated into this environmental evaluation report.

The trail system goals that were identified in the 2020 *Salt Lake City Foothills Trail System Plan* provide an important backdrop to the evaluation of the study area and are listed below (Salt Lake City Public Lands Department 2020):

- **Environmentally Sustainable:** Trails avoid sensitive habitat, minimize erosion/sedimentation and vegetation disturbance, and make efficient use of available natural lands. The wild and scenic nature of the Foothills landscape is protected. Fragile natural or cultural features are avoided and trails direct users away from closed or protected watershed areas.
- **Enjoyable:** Trails cater to a variety of recreation types, and also to a variety of desired experiences, including solitude; escape and connection to the natural world; challenge and exercise; and fun and excitement. Trail layout and construction is optimized to the intended user group(s) of any individual trail segment, and trails are routed to take users to desirable areas and points of interest.
- **Accessible:** Trails are accessible to a broad audience of beginner-to-intermediate trail users, including families, seniors, and people with disabilities. Trailheads are sited and designed to make it easy for people to get on the trails and are connected to transportation routes. Wayfinding signage and supplemental trail information makes it easy for people to understand and navigate the trail system.
- **Safe:** Trail user collisions and conflicts are mitigated and minimized through trail design and use regulations. Signage and natural barriers minimize incidences of lost or disoriented persons and make it easier for emergency personnel to respond when needed. Trails are routed to discourage trespassing on private property. *Crime prevention through environmental design* principles are incorporated in trailhead design to mitigate theft and vandalism to parked cars.
- **Low Maintenance:** Trails drain water naturally, follow contours instead of fall-lines, and effectively encourage users to remain on-trail, minimizing maintenance and reconstruction needs and costs. Thoughtful trail layout reduces the creation and use of informal trails and routes. Trails are sited to bring regular trail users through "problem areas" to reduce incidences of vandalism, graffiti, and illicit activity.

2.1 Desktop Data Collection and Analysis

Data were collected from multiple sources that provided relevant information about the study area, including federal, state, and local issues. These data were then compiled, reviewed, and used to establish baseline site conditions within the study area. Sources for biological data collection included the following:

- U.S. Geological Survey (USGS) Landscape Fire and Resource Management Planning Tools (LANDFIRE) (USGS and U.S. Department of Agriculture [USDA] 2016)
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (USFWS 2022a)
- USGS National Hydrography Dataset (NHD) (USGS 2022)

- USGS Geology Web Map Viewer (USGS 2023a)
- USFWS Information for Planning and Consultation (IPaC) online database (see Appendix B) (USFWS 2022b)
- Utah Natural Heritage Program online species search (see Appendix C) (Utah Division of Wildlife Resources [UDWR] 2022a)
- Utah Division of Wildlife Resources online wildlife geographic information system (GIS) database (UDWR 2022b)
- Sageland Collaborative
- U.S. Forest Service (USFS)
- Save Our Canyons
- Save Our Foothills
- Wasatch Wildlife Watch
- Salt Lake City Corporation
- Natural Resources Conservation Service (NRCS) Soil Survey (2019)
- Stakeholder outreach

Salt Lake City sought to engage stakeholders with expertise on the issues to be analyzed in a pre-NEPA evaluation report addressing potential impacts of trail development in the study area. Salt Lake City invited the following stakeholders to contribute information and participate in the trail evaluation process:

- U.S. Forest Service (USFS), Salt Lake Ranger District
- USFWS, Salt Lake City Regional Office
- UDWR
- Salt Lake City Public Utilities Watershed Division
- Sageland Collaborative
- University of Utah (as a landowner)
- University of Utah Biology Department
- University of Utah History Department
- University of Utah Geology Department
- Utah State Historic Preservation Office
- Ute Tribe Cultural Resource Preservation Office
- Goshute Tribe Cultural Resource Preservation Office
- Northwestern Band of the Shoshone Nation Cultural Resource Protection Office
- Utah Native Plant Society
- Preservation Utah
- Utah Open Lands
- Save Our Canyons

- Save Our Foothills
- Great Salt Lake Audubon
- Tracy Aviary
- Natural History Museum of Utah
- Utah State Parks (This Is the Place Heritage Park)
- Utah Geological Survey

Salt Lake City held four stakeholder meetings to provide stakeholders with an overview of the evaluation process, to get input from stakeholders regarding concerns specific to the study area, to gather information about potential conflict areas and impacts associated with the proposed trail corridors, and to gather site-specific anecdotal data. Meetings were held on May 5, May 25, July 5, and October 6, 2022. Input received during these meetings included concerns about increased use of new trails, disturbances to wildlife species and their habitats, the spread of invasive weeds, and off-leash dogs. Stakeholders provided information about wildlife species observed in the study area and wildlife habitat areas (see Appendix D).

3 EXISTING ENVIRONMENT

The study area consists of approximately 6,900 acres of canyons and foothills and stretches from the Tunnel Springs Wild Rose trailheads on the Salt Lake County/Davis County border on the north end of the study area to the Emigration Trailhead at the mouth of Emigration Canyon on the south end of the study area. The study area is bordered by established neighborhoods to the west and south, and protected Salt Lake City watershed lands to the east.

Nearly 100 miles of formal and informal (i.e., user-created) trails currently exist within the study area. Of these trails, the Bonneville Shoreline Trail is the most well-known. Trails in the study area are managed by the city's Trails and Natural Lands Division, including the Ensign Peak Trail and Bonneville Shoreline Trail, through maintenance crews and volunteer stewards. Because of the study area's proximity to Salt Lake City, 91% of the area is experiencing human pressures largely from urban activities (Half-Earth Project 2022).

The Nature Conservancy has a Resilient Land Mapping Tool that evaluates an area's resiliency, landscape diversity, and local connectedness (The Nature Conservancy 2022). A site's Resilience Score estimates its capacity to maintain species diversity and ecological function as the climate changes. Local connectedness refers to the degree of fragmentation and strength of barriers that create resistance to movement within a landscape. A highly connected landscape promotes resilience by allowing species to move through the landscape and find suitable microclimates where they can persist. Landscape Diversity refers to the microhabitats and climatic gradients available in the immediate neighborhood surrounding any 30-meter cell of land. The persistence of species in an area increases in landscapes with a variety of microclimates created by the topography, elevation, and hydrology. These scores are calculated within ecoregions based on all cells of the same geophysical setting and are described on a relative basis as above or below the average. These scores range from -2 to 2 with 0 being the average score. Based on the Nature Conservancy Resilient Land Mapping Tool, the study area has an average resiliency rating (0.37), a slightly below-average rating of local connectedness (-0.92), and an above-average landscape diversity (1.29) (see Appendix D).

The existing conditions of biological, cultural, and scenic resources in the study area are discussed in the sections below.

3.1 Biological Resources

3.1.1 Vegetation

An analysis was conducted using the USGS LANDFIRE database to identify the vegetation communities that overlap with the study area. The analysis revealed 55 vegetation classifications within the study area, although the landcover is predominately composed of two vegetation classifications: Rocky Mountain gambel oak (*Quercus gambelii*)-mixed montane shrubland and Rocky Mountain bigtooth maple (*Acer grandidentatum*) ravine woodland (see Appendix A, Figure A-2) (USGS and USDA 2016). Table 1 provides acreage of vegetation classifications within the study area that comprise more than 1% of the study area.

Table 1. LANDFIRE Vegetation Classifications in the Study Area

Land Cover Type	Acres	Percentage of Total
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	1,484.88	21.52%
Rocky Mountain Bigtooth Maple Ravine Woodland	1,354.82	19.64%
Interior Western North American Temperate Ruderal Grassland	709.65	10.29%
Inter-Mountain Basins Big Sagebrush Shrubland	686.09	9.95%
Inter-Mountain Basins Semi-Desert Shrub-Steppe	490.84	7.12%
Colorado Plateau Pinyon-Juniper Woodland	366.39	5.31%
Great Basin and Inter-Mountain Introduced Annual Grassland	296.49	4.30%
Rocky Mountain Subalpine-Montane Mesic Meadow	272.72	3.95%
Western Cool Temperate Pasture and Hayland	137.52	1.99%
Great Basin and Inter-Mountain Introduced Perennial Grassland and Forbland	120.77	1.75%
Developed-Roads	114.34	1.66%
Rocky Mountain Foothill Limber Pine-Juniper Woodland	100.13	1.45%
Western Cool Temperate Urban Shrubland	94.48	1.37%
Great Basin and Inter-Mountain Ruderal Shrubland	90.08	1.31%
Inter-Mountain Basins Montane Sagebrush Steppe	73.27	1.06%
Total	**6,392.46**	**92.66%**

Source: USGS and USDA (2016)

3.1.1.1 NONNATIVE SPECIES

Nonnative species can present a profound threat to natural areas. They can displace native species that provide suitable habitat and forage for wildlife species, affect shelter resources for wildlife, and affect the hydrology and soils of an area. Trails and roads are well documented as a vector in the spread of nonnative and ruderal species (Hansen and Clevenger 2005; Mount and Pickering 2009; Potito and Beatty 2005). Dispersal by humans and pets along formal and informal trails increases opportunities for invasive and noxious weed species to be introduced and transported widely within natural areas. The study area contains several invasive and state-designated noxious weed species. Species identified in this area include cheatgrass (*Bromus tectorum*), Dalmatian toadflax (*Linaria dalmatica*), dyer's woad (*Isatis tinctoria*), myrtle spurge (*Euphorbia myrsinites*), hoary cress (*Lepidium draba*), Russian olive (*Elaeagnus angustifolia*), yellow star thistle (*Centaurea solstitialis*), puncturevine (*Tribulus terrestris*), Russian thistle (*Salsola tragus*), salt cedar (*Tamarix ramosissima*), scotch thistle (*Onopordum acanthium*), and field

bindweed (*Convolvulus arvensis*) (Figure A-3) (iNaturalist 2022; SWCA 2016; Salt Lake City Public Lands Department 2023).

3.1.1.2 THREATENED AND ENDANGERED SPECIES AND CRITICAL HABITAT

The study area was assessed for special-status plant species. Threatened and endangered species are those species managed by the USFWS under the Endangered Species Act of 1973 (ESA). The purpose of the ESA is to conserve and protect endangered and threatened species and their habitats. SWCA used the USFWS IpaC database (see Appendix B) to determine if threatened or endangered plant species have the potential to occur in the study area. The IpaC report did not identify any designated critical habitat for threatened and endangered plant species within the study area (USFWS 2022b).

Based on the IpaC results, one federally listed plant species has the potential to occur within the study area. Federally threatened species include any species that are likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. These species, habitat descriptions, and the likelihood of occurrence in the study area were evaluated during a desktop analysis and are listed in Table 2 (USFWS 2022b).

Table 2. Threatened, Endangered, and Protected Plant Species with the Potential to Occur in the Study Area

Species	Federal Status	Habitat Description	Potential for Occurrence in the Study Area
Ute ladies'-tresses (*Spiranthes diluvialis*)	Threatened	This species occurs in moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4,300 and 6,850 feet. This species occurs where soils are generally well drained and vegetation cover is not overly dense.	**Low.** The study area has little to no suitable riparian habitat.

Source: USFWS (2022b).

3.1.1.3 U.S. FOREST SERVICE SENSITIVE SPECIES

In addition to federally listed plant species, SWCA coordinated with USFS botanists to assess USFS sensitive plants and their habitats that have the potential to occur within the study area. There are no documented occurrences of USFS sensitive plant species within the study area. Based on the elevation range and general location of the study area, several plant species were identified with the potential to occur in the study area (Table 3).

Table 3. U.S. Forest Service Species with Potential to Occur in the Study Area

Species	USFS Status	Habitat Description	Potential for Occurrence in the Study Area
Wheeler's angelica (*Angelica wheeleri*)	Sensitive	Bogs, very wet areas, riparian communities, and seeps/springs at elevations between 5,380 and 10,000 feet.	**Moderate.** The study area has little suitable riparian habitat but there is a known occurrence of this species above Red Butte Reservoir.
Slender moonwort (*Botrychium lineare*)	Sensitive	Marsh or spring areas, spruce forests, stabilized margins of streams. Sites tend to be partly to heavily shaded with a dense, diverse cover of forbs and graminoids. Dominant plant species may include spruce, alders, and dogwood at elevations between 4,900 and 6,600 feet.	**Unlikely to occur.** The study area has little to no suitable riparian habitat.
Wasatch fitweed (*Corydalis caseana* subsp. *Brachycarpa*)	Sensitive	Midmontane habitat growing in or along streams and nearby drainages at elevations between 6,200 and 10,100 feet.	**Moderate.** There is potentially suitable habitat within the study area, but this species is found in a very limited range.
Clustered lady's slipper (*Cypripedium fasciculatum*)	Sensitive	Found on gravel bars growing in or along streams or nearby drainages at elevations between 8,000 and 9,000 feet.	**Low.** There is potentially suitable habitat within the study area, but this species is uncommon.
Lesser yellow lady's slipper (*Cypripedium parviflorum* var. *pubescens*)	Sensitive	Usually in duff of spruce-fir or lodgepole forests and along shaded streams at elevations between 7,800 and 9,000 feet.	**Unlikely to occur.** The study area has little to no suitable habitat.
Wasatch draba (*Draba brachystylis*)	Sensitive	Moist places on rocky slopes in aspen and white fir/Douglas-fir communities at elevations between 4,400 and 9,850 feet.	**Unlikely to occur.** The study area has little to no suitable habitat.
Burke's draba (*Draba burkei*)	Sensitive	Talus slopes and rocky outcrops of quartzite, limestone, or calcareous shale and in Douglas-fir, mixed conifer, and maple/oak communities at elevations between 5,300 and 9,800 feet.	**Unlikely to occur.** The study area has little to no suitable habitat.
Wasatch Jamesia (*Jamesia americana* var. *macrocalyx*)	Sensitive	Mountain brush and spruce-fir, mostly on cliffs and rocky places at elevations between 5,700 and 12,000 feet.	**Moderate.** The study area has suitable habitat and is within species' range.
Wasatch pepper-wort (*Lepidium montanum* var. *alpinum*)	Sensitive	Typically in damp rocky crevices at high elevations in mountain brush and spruce-fir communities at elevations between 6,600 and 9,000 feet.	**Unlikely to occur.** The study area has little to no suitable habitat.
Cottam cinquefoil (*Potentilla cottamii*)	Sensitive	Rock crevices and ledges in quartzite at elevations between 7,500 and 10,400 feet. Often found in areas shaded from direct midday sun within Box Elder, Juab, and Tooele Counties.	**Unlikely to occur.** The study area is outside the range of this species.
Utah shooting star (*Dodecatheon utahense*)	Sensitive	Shady, moist, mossy cracks and crevices of limestone and quartz outcrop, often in the spray of waterfalls at elevations between 6,600 and 9,500 feet.	**Unlikely to occur.** The study area has little to no suitable habitat.
Hopkin's tower-mustard (*Arabis glabra* var. *furcatipilis*)	Watch	Sagebrush, Pinyon-Juniper woodlands. Brush, aspen, and spruce-fir communities at elevations between 5,000 and 9,600 feet.	**Moderate.** The study area has suitable habitat and is within species' range.
Wasatch daisy (*Erigeron arenarioides*)	Watch	Crevices in limestone and quartzite outcrops, in maple, oak, limber pine, ivesia, and buckwheat communities at elevations between 4,265 and 10,000 feet.	**Low.** There is potentially suitable habitat within the study area, but this species is uncommon.

Source: USDA 2023.

3.1.2 Wildlife

3.1.2.1 GENERAL WILDLIFE AND MIGRATORY BIRDS

Wildlife within the study area largely consists of generally common invertebrates, amphibians, reptiles, birds, and mammals (including game and non-game species) that are found in Salt Lake County, and a variety of habitat types that support high biodiversity. Raptors and many other bird species nest in a wide range of habitats and are likely to be found nesting within the study area (eBird 2022).

Discussions with stakeholders identified several areas of habitat in the study area that provide habitat for a variety of mammal, bird, and wildlife species. A table of the species observed in the study area is found in Appendix D (Table D-1) (Save Our Foothills 2022a). Areas of particular interest include the Black Mountain to Red Butte protected area, Dry Creek Canyon, and forested areas dominated by gambel oak and Rocky Mountain maple (*Acer glabrum*) (see Appendix A, Figure A-3) (Save Our Foothills 2022a; Save Our Foothills 2022b). Riparian areas along streams, including City Creek and Red Butte Creek, provide nesting and foraging habitat for avian species within the study area (Save Our Foothills 2023). Little Black Mountain and Upper City Creek Canyon are areas within the study area that provide patches of habitat used by large mammals, including black bear (*Ursus americanus*) and moose (*Alces alces*) (Save Our Foothills 2023). Stakeholders from Save Our Foothills have also identified areas of suitable habitat for wild turkey (*Meleagris gallopavo*), coyote (*Canis latrans*), elk (*Cervus canadensis*), cougar (*Puma concolor*), and horned lizards (*Phrynosoma hernandesi*) (see Appendix A, Figure A-4).

Additionally, the study area was assessed for big game and game bird species habitat, including mule deer (*Odocoileus hemionus*), elk, pronghorn (*Antilocapra americana*), black bear, moose, band-tailed pigeon (*Patagioenas fasciata*), California quail (*Callipepla californica*), chukar (*Alectoris chukar*), dusky grouse (*Dendragapus obscurus*), ring necked pheasant (*Phasianus colchicus*), ruffed grouse (*Bonasa umbellus*), and wild turkey habitat (Appendix A, Figures A-5 and A-6) (Table 4) (UDWR 2022b). Mule deer and elk, in particular, use the study area for overwintering when they move to lower elevations to avoid deep snow and to forage. However, there is no critical elk habitat in the study area.

Table 44. Acres of Wildlife Habitat in the Study Area

Species	Habitat Type	Acres	Percentage of Study Area
Band-tailed pigeon (*Patagioenas fasciata*)	Substantial spring-fall	3,465.34	50.24%
Black bear (*Ursus americanus*)	Crucial year-long	1,701.19	24.66%
California quail (*Callipepla californica*)	Crucial year-long	5,481.28	79.46%
Chukar (*Alectoris chukar*)	Substantial year-long	4,444.15	64.43%
Dusky grouse (*Dendragapus obscurus*)	Crucial year-long	3,182.77	46.14%
Moose (*Alces alces*)	Crucial year-long	890.10	12.90%
Mule deer (*Odocoileus hemionus*)	Crucial winter	5,190.84	75.25%
	Crucial spring/fall	62.51	0.91%
	Crucial year-long	104.63	1.52%
Ring necked pheasant (*Phasianus colchicus*)	Substantial year-long	<0.01	< 0.01%
Ruffed grouse (*Bonasa umbellus*)	Substantial year-long	1,087.64	15.77%
Wild turkey (*Meleagris gallopavo*)	Year-long	2,983.16	43.25%

Source: UDWR (2022b).

Within Utah, game species crucial habitat is defined as habitat essential to the life history requirements of a species. Continued degradation and loss of crucial habitat will lead to significant declines in carrying capacity and/or numbers of the wildlife species (UDWR 2019a). Substantial habitat is used by wildlife species but is not crucial for population survival (UDWR 2019a). Degradation of substantial habitat has the potential to lead to declines in carrying capacity and/or numbers of wildlife species. Urbanization, drought, catastrophic wildfire, and expansion of invasive plant species have all resulted in loss or degradation of wildlife habitat (UDWR 2019a). Additionally, in a human-dominated landscape such as the study area, effects of human disturbance on big game exceeds those of habitat and natural predators (Ciuti et al. 2012). An increase in people and pets can trigger increased vigilance and decreased foraging by big game species (Ciuti et al. 2012), as well as affecting patterns of wildlife distribution, animal community dynamics, and habitat use in non-game mammals and avian species and negatively impacting wildlife behavior and/or distribution (Larson et al. 2016; Moll et a. 2018).

3.1.2.2 THREATENED AND ENDANGERED SPECIES AND CRITICAL HABITAT

SWCA used the USFWS IpaC database (see Appendix B) to determine if threatened or endangered wildlife species have the potential to occur in the study area. The IpaC report did not identify any designated critical habitat for threatened and endangered species within the study area (USFWS 2022b).

Based on the IpaC results, one federally listed and one candidate wildlife species have the potential to occur within the study area. These species, their habitat descriptions, and their likelihood of occurrence in the study area were evaluated using a desktop analysis and are listed in Table 5 (USFWS 2022b).

Table 55. Federally Listed and Candidate Wildlife Species with the Potential to Occur in the Study Area

Species	Federal Status	Habitat Description	Potential for Occurrence in the Study Area
Canada lynx (*Lynx canadensis)*	Threatened	This is species is generally found in moist, boreal forests that have cold, snowy winters and a high density of snowshoe hare (*Lepus americanus*).	**Unlikely to occur.** There is potentially suitable habitat, but the study area is outside this species' range.
Monarch butterfly (*Danaus plexippus*)	Candidate	This species is known to occur within Utah during migration. Overwintering monarchs are found to roost on a variety of tree species. Breeding habitat consists of agricultural fields, pastureland, and other grassland habitat but is highly dependent on the presence of milkweed species (*Asclepias* spp.).	**May occur.** Suitable habitat and required vegetation may occur in the study area. However, as this is a candidate species, there are no ESA protections.

Source: USFWS (2022b)

3.1.2.3 SPECIES OF GREATEST CONSERVATION NEED

The State of Utah maintains a list of Species of Greatest Conservation Need (SGCN) in Utah. An inquiry report from the Utah Natural Heritage Program determining which species are likely to occur or have been documented near the study area is provided in Appendix C. Eighteen species were identified by the UDWR as having the potential to occur within a half-mile radius of the study area (Table 6) (UDWR 2022a).

Table 6. Species of Greatest Conservation Need with Potential to Occur in the Study Area

Species	Habitat Description	Potential for Occurrence in the Study Area
Birds		
Bald eagle (*Haliaeetus leucocephalus*)	Habitats include forested wetlands, riparian areas, and mixed forest.	**High.** There are several recent observations of this species and there is suitable habitat within the study area.
Black swift (*Cypseloides niger*)	This species nests on cliff ledges behind or near waterfalls and sea caves. Forages widely over a variety of habitat types but is local in its occurrence, probably limited to regions with suitable nesting sites.	**Unlikely to occur.** Populations have declined in recent years and this species is extremely uncommon. There is also a lack of suitable nesting habitat within the study area.
Lewis's woodpecker (*Melanerpes lewis*)	The preferred breeding habitat is open ponderosa pine forests, burned-over Douglas-fir, and mixed conifer, riparian, or pinyon-juniper woodlands. Dead trees and stumps are required for nesting.	**Moderate.** There is some suitable habitat and there are some recent occurrences within the study area. However, the study area lacks large swaths of suitable habitat.
Peregrine falcon (*Falco peregrinus*)	This species prefers areas near marshlands and nests on cliffs, hollows of tree snags, hilltops, or old stick nests of other large birds often near water.	**High.** There are several recent occurrences of this species, and there is suitable habitat within the study area.
Snowy plover (*Charadrius nivosus*)	This species prefers sand, dry mud, or salt flats on the edges of ocean beaches, rivers, lakes, or ponds in widespread areas around the world. It nests in shallow nooks in the sand.	**Unlikely to occur.** The study area lacks suitable habitat.
Fish		
Bonneville cutthroat trout (*Oncorhynchus clarki Utah*)	This species prefers cold streams with gravelly, cobbly substrates. Streams with a functional riparian area providing structure, cover, bank stability, and shade are ideal.	**Low.** The study area lacks are streams with functional riparian areas to support this species.
June sucker (*Chasmistes liorus*)	This species occurs only in Utah Lake and its major tributary, the Provo River.	**Unlikely.** June suckers occur in Red Butte Reservoir near the study area where they were first introduced in 1992; however, Red Butte Creek below the reservoir does not provide suitable habitat for the species.
Least chub (*Iotichthys phlegethontis*)	These fish are found in freshwater springs, ponds, marshes, and streams only in Snake Valley, Clear Lake, Mills Valley, and Mona Springs. They prefer somewhat shallow pools with moderate to dense vegetation and minimal current.	**Unlikely.** The study area is outside this species' range.
Mollusks		
Coarse rams-horn (*Planorbella binneyi*)	This species prefers lakes with stagnant water, but has been found in creeks, canals, and ponds within Utah.	**Low.** There are historical occurrences of this species in Salt Lake County, but there is a lack of suitable habitat within the study area.
Deseret mountainsnail (*Oreohelix peripherica*)	This species is found in limestone outcrops with mountain maple, scrub oak, and balsam root. There are 13 colonies within Box Elder, Cache, and Weber Counties.	**Unlikely to occur.** The study area is outside the range of this species, and it lacks limestone outcrops.

Species	Habitat Description	Potential for Occurrence in the Study Area
Desert tryonia (*Tryonia porrecta*)	This species is generally found living in springs and spring outflows at nine known localities within Tooele, Utah, and Juab Counties and likely in the Great Basin.	**Unlikely to occur.** The study area is outside the range of this species, and there are no springs within the study area.
Lyrate mountainsnail (*Oreohelix haydeni*)	This species has approximately 21 localities within Utah, and the species is found throughout Tooele County. It is found at springs with limestone talus or calcareous soils.	**Unlikely to occur.** The study area is outside the range of this species.
Utah physa (*Physa gyrina utahensis)*	This species is known to inhabit three pools within Box Elder County.	**Unlikely to occur.** The study area is outside the range of this species.
Western pearlshell (*Margaritifera falcata)*	This species is found in small streams within Utah.	**Unlikely to occur.** Current opinion is that all populations in Utah have been extirpated.
Winged floater (*Anodonta nuttalliana*)	Historically, this species inhabited shallow lakes and freshwater streams near Salt Lake City.	**Unlikely to occur.** This species has not been reported in Utah since 1940.
Amphibians		
Columbia spotted frog (*Rana luteiventris)*	This species lives in aquatic habitat with perennial sources of water. Breeding occurs in small pools or ponds. This species is restricted in to three disjunct areas in the West Desert (Deep Creek Range, Snake Valley, Tule Valley) and to discontinuous portions of the Wasatch Front (Weber County to Sanpete County).	**Low.** The study area is within this species range, but there is little suitable habitat within the study area.
Northern leopard frog (*Lithobates pipiens*)	This species lives in the vicinity of springs, slow streams, marshes, bogs, ponds, canals, floodplains, reservoirs, and lakes; usually they are in or near permanent water with rooted aquatic vegetation. Eggs are generally laid in shallow, permanent water that is usually well exposed to sunlight.	**Low.** The study area is within this species range but there is little suitable habitat within the study area.
Western toad (*Anaxyrus boreas*)	This species is associated with permanent water bodies in a variety of habitats, including riparian, mountain shrub, mixed conifer, and aspen-conifer assemblages.	**Low.** The study area is within this species range but there is little suitable habitat within the study area.

Source: eBird (2022); Oliver and Bosworth (1999); UDWR (2019b).

3.1.2.4 WASATCH WILDLIFE WATCH CAMERA DATA

Within the study area, Sageland Collaborative has created and incorporated the Wasatch Wildlife Watch Project to understand the current condition of wildlife populations, their habitats, and their responses to human presence (Sageland Collaborative 2023). Wasatch Wildlife Watch deploys and monitors trail cameras throughout the study area and analyzes the images to help map wildlife movement and habitat, as well as predict species' responses to human influence (Sageland Collaborative 2023). Sageland Collaborative provided SWCA information from the trail cameras within the study area from data gathered between 2018 and 2020 to assess areas of higher use within the study area (Sageland Collaborative 2023) (Table 7; Appendix A, Figures A-7–23).

Within the study area, canyons and ravines had higher rates of detection than other cameras across all species, although it is important to note that cameras were preferentially placed alongside these features for ease of access and adherence to specific study design. There were no special-status or unique species detected within the study area (Table 7). Three big game species were detected: mule deer, elk, and moose. Mule deer were detected the most times (507 detections) throughout the study area with the highest rates of detection toward the center of the study area (Figure A-16). Elk were detected 8 times and moose were detected 6 times. Both were detected at higher elevations toward the center of the study area (Figure A-18 and A-19).

Mountain lions (*Puma concolor*) were also detected throughout the study area with the highest number of detections in the southern area (Figure A-10). Importantly, although cameras did not detect mountain lion use in the northern section of the study area as frequently, given this species large home range and area requirements, it is likely that they occur throughout the study area. As mountain lion-human conflicts are an important issue, specifically within the Wasatch Front, avoiding areas of known mountain lion use may reduce interactions.

Table 7. Wasatch Wildlife Watch Camera Inventory Detections

Species	Detections
Mule deer (*Odocoileus hemionus*)	507
Northern raccoon (*Procyon lotor*)	90
Rock squirrel (*Otospermophilus variegatus*)	68
Coyote (*Canis latrans*)	50
Striped skunk (*Mephitis mephitis)*	46
Mountain lion (*Puma concolor*)	21
Bobcat (*Lynx rufus*)	11
Mountain cottontail (*Sylvilagus nuttallii*)	12
Eastern fox squirrel (*Sciurus niger*)	11
Elk (*Cervus canadensis*)	8
Moose (*Alces alces*)	6
American badger (*Taxidea taxus*)	6
Uinta ground squirrel (*Urocitellus armatus*)	8
Red fox (*Vulpes vulpes*)	1
North American porcupine (*Erethizon dorsatum*)	3
American red squirrel (*Tamiasciurus hudsonicus*)	1

Source: Sageland Collaborative (2023).

Note: Detections = number of total detections across all cameras throughout the study area. These occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detections by the trail cameras during this survey window does not indicate absence of the species in surrounding areas.

3.1.3 Aquatic Resources

Aquatic resources such as wetlands and streams provide vital habitat resources especially within arid regions. The study area contains several gulches and canyons including City Creek Canyon, Jones Canyon, and Dry Creek. Wildlife thrives where native vegetation and perennial surface water are present (Brand et al. 2011). Nonnative vegetation near surface water also supports wildlife, but there tends to be a lower species diversity and reduced reproduction for vulnerable species. Avian communities are highly dependent on available water sources (Wilsey et al. 2017). Riparian systems of the Arid West are not only threatened by human impacts, but also by continued impacts of climate change. Declines in water supply, increases in temperature and aridity, and disruptions in phenology are projected across the Southwest (Perry et al. 2012; U.S. Bureau of Reclamation 2012). These climate-driven changes are likely to reduce flows and increase vulnerability more than projected development (U.S. Bureau of Reclamation 2012). As water use increases with population growth and water supplies decrease with climate change, riparian ecosystems and the wildlife that depend on them will be under increasing pressure (Merritt and Poff 2010).

SWCA conducted an aquatic resources desktop review within the study area using publicly available data. During this review, SWCA identified 65.33 acres of NWI-mapped palustrine and riverine features. A total of 27.06 linear miles of NHD-mapped flowlines were also identified. Table 8 summarizes the aquatic resources identified within the study area during the desktop review. Figure A-24 in Appendix A depicts the distribution of those aquatic resources within the study area.

Table 87. Summary of Aquatic Resources from Desktop Review Results in the Study Area

Feature Type	Classification	Total Length (miles)	Total Acres
National Hydrography Dataset			
Artificial Path	Not applicable	0.08	–
Stream/River	Ephemeral	17.47	–
Stream/River	Intermittent	6.37	–
Stream/River	Perennial	3.15	–
Total		**27.06**	–
National Wetlands Inventory			
Palustrine, emergent, persistent, seasonally flooded	PEM1C	–	0.11
Palustrine, aquatic bed, semipermanently flooded, excavated	PABFx	–	0.36
Palustrine, forested, temporary flooded	PFOA	–	2.47
Palustrine, scrub-shrub, temporary flooded	PSSA	–	3.29
Riverine, intermittent, streambed, seasonally flooded	R4SBC	–	56.90
Riverine, unknown perennial, unconsolidated bottom, permanently flooded	R5UBH	–	2.21
Total			**65.33**

Source: USFWS (2022a); USGS (2022).

3.2 Soil and Geology

3.2.1 Soils

According to the NRCS (2022), the study area contains 23 soil map units (Figure A-25). Table 9 includes soil map units that comprise more than 1% of the study area. There are no hydric soils within the study area.

Table 9. Soil Map Units in the Study Area

Soil Map Unit Name	Acres	Percentage of Study Area
Dry Creek-Copperton association, moderately steep	1,516.55	21.98%
Emigration very cobbly loam, 40 to 70 percent slopes	1,297.90	18.81%
Stony terrace escarpments	1,062.24	15.40%
Deer Creek loam, 30 to 60 percent slopes	488.15	7.08%
Deer Creek-Picayune association, steep	442.12	6.41%
Harkers-Dry Creek association, moderately steep	410.06	5.94%
Bradshaw-Agassiz association, steep	373.05	5.41%
Harkers-Wallsburg association, steep	301.11	4.36%
Rock land	264.96	3.84%
Brad very rocky loamy sand, 40 to 80 percent slopes	231.05	3.35%

Soil Map Unit Name	Acres	Percentage of Study Area
Picayune association, steep	218.06	3.16%
Harkers soils, 6 to 40 percent slopes	136.33	1.98%
Total	**6,741.59**	**97.72%**

3.2.1.1 SOIL-LIMITING FACTORS

The study area is located on the foothills of the Wasatch Mountain range. The slopes vary between 6 and 70 percent. Soils of the area are dominated by rocky, shallow sandy loam and are generally nutrient poor.

Soil properties in the study area were evaluated to determine the inherent risk of site degradation for restrictive soil features (Table 10). These features consist of the following:

- Water erosion
- Wind erosion
- Droughty soils
- Excess salts (sulfates and chlorides)
- Excess sodium
- Rooting depth

Restrictive soil features are properties that make soils more susceptible to degradation which include water erosion hazard, wind erosion hazard, soil drought susceptibility, excess salt, excess sodium, and rooting depth. Water erodibility indicates soil detachment by runoff and raindrop impact. Wind erodibility indicates the susceptibility of soil to blowing or wind erosion. Soil drought susceptibility is based on the available water capacity of soils. Soils with excess salts limit plant rooting, water, and nutrient uptake, and soils with excess sodium exhibit a general degradation of soil structure. Rooting depth, or depth to bedrock, is the soil depth to fixed rock; shallow soils are often not conducive to vegetation establishment and are prone to erosion (NRCS 2019). See Appendix A for maps of each soil property and the risk of site degradation (Figures A-25 through A-31).

Table 10. Inherent Risk of Site Degradation for Restrictive Soil Features in the Study Area

Restrictive Feature	Inherent Risk of Site Degradation (acres)			No Data
	High	Medium	Low	
Water erosion	930.27	2,846.38	1,710.02	1,411.91
Wind erosion	0.00	241.85	5,243.60	1,413.13
Droughty soils	1,958.13	3,528.54	0.00	1,411.91
Excess salt	0.00	0.00	5,486.67	1,411.91
Excess sodium	0.00	0.00	5,486.67	1,411.91
Rooting depth	0.00	0.00	6,898.59	0.00

Source: NRCS (2022).

Water erosion and droughty soils have the highest risk of site degradation within the study area. The water erosion high risk is largely due to the steep slopes within the study area and the soil erodibility

factors which quantify soil detachment by runoff and raindrop impact. The droughty soil high risk refers to the low capacity for the soils within the study area to store water for use by plants. Trails that are created on soils that have a higher risk of site degradation can increase the loss suitable habitat for native wildlife and vegetation species and can be difficult to reclaim or revegetate. Additionally, trails created in high-risk areas are likely to erode faster which will likely cause users to widen the trail to avoid ruts within the trails or create more informal trails.

3.2.2 Geology

According to the USGS (2023a), there are 30 underlying geological units in the study area. Table 11 includes geological units that comprise more than 5% of the study area (Figure A-32).

Table 11. Geological Units in the Study Area

Geological Unit Name (Symbol)	Acres	Percentage of Study Area
Conglomerate (Tc)	1,677.77	24.32%
Twin Creek Limestone (Jt)	894.64	12.97%
Conglomerate dominant of Wasatch Formation (Twc)	571.71	8.29%
Thanyes Limestone (TRt)	532.05	7.71%
Park City Formation and related rocks (Ppc)	479.99	6.96%
Weber Sandstone (Ipw)	426.96	6.19%
Total	**4,583.13**	**66.44%**

3.3 Cultural Resources

On January 19, 2023, using the Utah Division of State History's (UDSH) Sego GIS-based cultural resources viewer, the UDSH Hub GIS-based viewer, and digital records management databases, SWCA conducted a file search and literature review to identify previously undertaken cultural resource investigations, documented archaeological sites, and historic architecture within a 0.5-mile radius of the study area. The file search indicated that 64 cultural resources investigations have been conducted within a 0.5-mile radius of the study area. Of these 64 investigations, 10 have been conducted within the study area (Table 12). These investigations have resulted in the identification of 32 archaeological sites, 13 of which are within the study area (Table 13).

Because the study area is adjacent to a large urban area, the UDSH HUB search for historic architecture resources was limited to the study area itself and a 200-foot buffer, rather than a 0.5-mile buffer. A total of 116 historic architecture resources are present within a 200-foot buffer of the study area, 15 are present within the study area (Table 14).

Additionally, SWCA reviewed historical maps for features that may be present within the study area (see Table 13). Sources reviewed include the following: Government Land Office (GLO) records through the U.S. Department of the Interior, Bureau of Land Management (BLM) website (BLM 2023); and historical topographic quadrangles using the USGS historical topographic map explorer website (USGS 2023).

As noted above, archaeological survey data maintained by the UDSH indicates that 64 prior cultural resources projects have been completed within 0.5 mile of the study area. Much of the study area has not been previously surveyed. Of the 64 previous investigations conducted within 0.5-mile radius of the study area, only 10 are located within the study area (see Table 12). Previous investigations conducted within

the study area were conducted for the development associated with Red Butte Canyon, the University of Utah, and other small projects and were conducted between 1986 and 2019.

Table 12. Previous Cultural Resources Investigations in the Study Area

Project Number	Project Title*	Organization
U85FS0110	Red Butte Water Tank	USFS
U87CN0615	AT&T Class III Survey-Utah	Centennial Archaeology, Inc.
U88FS0303	Cultural Resources Survey of the University of Utah Parking Lot Expansion	USFS
U01SJ0621	A Cultural Resources Survey of Red Butte Canyon and Reservoir at Fort Douglas, Salt Lake County, Utah	Sagebrush
U03MV0571	Utah Museum of Natural History	Mountain States University
U04ST1104	Historical discovery at This is the Place State Park	SWCA
U09A10245	Apex Expansion Project – Wasatch Loop	Alpine Archaeological Consultants
U17HY0242	Red Butte Gardens Developable Areas	Certus Environmental Solutions, LLC
U19HY0146	An Archaeological Resource Assessment 18 Proposed Bicycle Counter Locations in Salt Lake County, Utah	Certus Environmental Solutions, LLC
U20ST0263	Cultural Resources Inventory for the Salt Lake City Parks Trail Improvement Project, Salt Lake County, Utah	SWCA

* Project titles and organizations are pulled directly from the Sego database, and some have been slightly altered to correct spelling errors.

Thirteen previously recorded archaeological sites are present within the study area (see Table 13). Twelve sites are all historic in age and no information is available for one site. Five sites have unknown, undetermined, or unevaluated National Register of Historic Places (NRHP) recommendations, one was recommended eligible under Criterion D, two have been determined eligible for the NRHP under Criterion A with Utah State Historic Preservation Office concurrence, two have been recommended eligible for the NRHP under Criterion A, one has been recommended eligible but the criterion is unknown, and two sites are not eligible for the NRHP.

Table 13. Archaeological Resources Sites in the Study Area

Site Number	Period	Site Type/Name	NRHP Evaluation
Redacted	Historic	Quarry House stone structure	Unevaluated
Redacted	Historic	Salt Lake & Fort Douglas Railroad	Eligible, Criterion A
Redacted	Historic	This is the Place artifact scatter	Eligible, Criterion D
Redacted	Historic	Civilian Conservation Corps. Stone terraces (Davis County)	Eligible, Criterion A
Redacted	Historic	Civilian Conservation Corps. Stone terraces (Salt Lake County)	Eligible, Criterion A
Redacted	Historic	Red Butte House	Unknown
Redacted	Historic	Quarry Road	Eligible, Criterion A
Redacted	Historic	Artifact scatter	Not eligible
Redacted	Historic	Stone quarry	Not eligible
Redacted	Historic	Limestone kilns	Undetermined
Redacted	Historic	Salt Lake City Cemetery	Eligible

Site Number	Period	Site Type/Name	NRHP Evaluation
Redacted	Historic	Berms and depressions	Unknown/in progress
Redacted	Unknown	Unknown	Unknown

Note: Site data are pulled directly from the Sego database and have not been altered.

Table 14. Architectural Resources in the Study Area

Property Address	Use Type	NRHP Evaluation
672 N. Columbus Street	Single Dwelling	Out of Period
674 N. Columbus Street	Multiple Dwelling	Out of Period
690 N. Columbus Street	Multiple Dwelling	Out of Period
700 N. Columbus Street	Single Dwelling	Ineligible/Non-contributing
272 N. Canyon Road	Single Dwelling	Eligible/Contributing
266 N. Canyon Road	Single Dwelling	Eligible/Contributing
278 N. Canyon Road	Single Dwelling	Eligible/Contributing
282 N. Canyon Road	Single Dwelling	Eligible/Contributing
288 N. Canyon Road	Single Dwelling	Eligible/Contributing
391 N. Virginia Street	Single Dwelling	Out of Period
395 N. Virginia Street	Single Dwelling	Out of Period
403 N. Virginia Street	Single Dwelling	Out of Period
Ensign Peak	N/A	Undetermined
137 E. 10th Avenue	Residential	Out of Period
900 N. B Street	Multiple Dwelling	Out of Period

UDSH records indicate that 16 historic architectural resources are present within the study area; 11 are single dwellings, three are multiple dwellings, one is a general residential property, and one is Ensign Peak. Of these 16 properties, five are eligible/contributing, eight are out of period, one is undetermined, and one is non-contributing/ineligible for the NRHP.

Mapping of public domain lands by the GLO produced 16 plat maps of the study area. The 1874 plat map for Township (T) 1 North (N), Range € 1 East € (BLM 1874) indicates the Camp Douglas Military Reservation and the "Road to Red Butte Canon" in Section 34. The 1869 plat map for T1N, R1E also indicates the "Road to Red Butte Canon" and the Camp Douglas Military Reservation in Section 34, a road traveling up City Creek Canyon and another unnamed road in Sections 30 and 31, and the "Brigham Young Grist Mill" in Section 34 (BLM 1869). The 1884 plat map for T1N, R1E indicates the Fort Douglas Military Reservation in Sections 33 and 34 (BLM 1884).

The study area is also depicted on 11 historical topographic maps. The 1:250,000 scale historical map for Salt Lake from 1885 indicates "Fort Douglass" and unnamed roads leading up City Creek Canyon and Emigration Canyon (USGS 1885). The 1:250,000 scale historical maps of Salt Lake City depict the "Fort Douglas Mil. Res." And the road leading up Emigration Canyon (USGS 1954, 1958, 1960). A 1:24,000 scale map from 1951 for Salt Lake City North depicts a road leading toward Ensign Peak and roads leading to the "State Capitol" in Section 25 of T1N, R1E (USGS 1951a). Finally, the 1:24,000 scale maps for Fort Douglas from 1950, 1951, and 1963 depict an unnamed road within Section 11 of T1N, R1E (USGS 1950, 1951b, 1963). These documents show the mapped locations of historic features that, if located on the ground, would need to be evaluated as potential historic archaeological sites (Table 15). If

field observations find characteristics that meet current definitions of what constitutes an archaeological site, then those features would need to be documented as such.

Table 15. Historic Features on General Land Office and Topographic Maps in the Study Area

Map Type	Year	Author or Map Name	Historic Features in or Adjacent to the Study Area
GLO	1874	Browne	"Road to Red Butte Canon", Camp Douglas Military Reservation
GLO	1869	Bausman	"Road to Red Butte Canon", Camp Douglas Military Reservation, two unnamed roads, "Brigham Young Grist Mill"
GLO	1884	Koeber	"Fort Douglas U.S.M. Reservation"
250k historic topographic	1885	Salt Lake, Utah	"Fort Douglass" two unnamed roads
24k historic topographic	1951	Salt Lake City North, Utah	Unnamed roads
250k historic topographic	1954	Salt Lake City, Utah	"Fort Douglas Mil. Res", unnamed road*
250k historic topographic	1954	Salt Lake City, Utah	"Fort Douglas Mil. Res", unnamed road*
250k historic topographic	1954	Salt Lake City, Utah	"Fort Douglas Mil. Res", unnamed road*
24k historic topographic	1950	Fort Douglas, Utah	Unnamed road
24k historic topographic	1951	Fort Douglas, Utah	Unnamed road
24k historic topographic	1963	Fort Douglas, Utah	Unnamed road

Note: Information in this table is pulled directly from the individual map references and has not been altered.
* Plotted adjacent to the study area.

4 IMPACTS OF TRAIL USE AND DEVELOPMENT

The formal and informal trails in the study area are predominantly used by hikers, dog-walkers, and mountain bikers. Hiking is the most common recreational activity in the area and is likely concentrated along trail corridors. In areas where hiking use is extremely high and where users are likely to create informal trails, such as in the Salt Lake City Foothills, hiking use may potentially exceed the impacts caused by trail construction (Cole 2004).

4.1 Biological Resources

4.1.1 Vegetation

The impacts of trails have been studied, but it is hard to distinguish the impacts of hiking, mountain biking, and trail use from the impacts associated with trail construction and trail maintenance. Impacts of construction include opening vegetation canopies; building a barren, compacted trail that may alter drainage patterns; and the creation of new habitats such as cut slopes and edge habitat (Cole 1981). The most significant physical impacts on vegetation occur during trail construction (Hennings 2017). Once a trail is built, visitor use, trail density, slope, soil type, precipitation, and vegetation type influence the degree of trail disturbance (Hennings 2017).

Land use impacts on vegetation within the study area are largely caused by trailside vegetation trampling and removal when trail users (hikers and bikers) step or move aside to let others pass, move off the formal trail to avoid poor trail conditions, cut corners, or when trails are poorly marked (Hennings 2017).

Trampling causes physical damage to plants resulting in impaired regeneration and altered soil habitats that impair root processes. Additionally, trail users can increase soil erosion from trails by loosening and moving soils, making them more susceptible to erosion by water and wind.

4.1.2 Wildlife

The trails were evaluated for wildlife habitat based on land cover types and known big game habitat. A major concern of trail construction is habitat loss, fragmentation, and edge effects. Habitat fragmentation is the process of dividing large areas of habitat into smaller, disconnected patches. It can cause changes in ecological processes by diminishing the study area's capacity to sustain wildlife populations. Drivers of habitat fragmentation include habitat loss, reduced habitat patch size, increased edge habitat, and loss of connectivity between habitat patches (Hennings 2017). Trails do not cause typical habitat fragmentation because they are limited to a fairly narrow corridor that does not physically separate habitats. However, trails do cause habitat fragmentation in that wildlife are less likely to pass through trails that are frequently used. Trails also alter habitat and create edge effects. The edges of habitat, such as those along trails, are susceptible to changes in light, wind, moisture, invasive seed sources (especially in areas of frequent hiking use), and human disturbance that may reduce habitat quality for some plant and animal species (Hennings 2017).

Wildlife may be directly and indirectly impacted by land use. Although a few wildlife species are attracted to trails, many species avoid trails or change their behavior. This creates an area around trails that alters the distribution and abundance of wildlife, similar to larger changes in plant communities. Heavily used trails and recreational areas may cause wildlife to avoid a much larger area than just the trails themselves. Species richness, the number of species inhabiting an area, and species abundance, the number of individuals per species, have been found to be lower in areas of higher human recreation particularly for avian and mammal species (Larson et al. 2019). Small-bodied birds and ground nesting bird species richness and abundance are more affected than larger birds and tree- and shrub nesting birds (Larson et al. 2019). Larger mammals, especially ungulates such as elk, mule deer, and moose, and carnivores including bears and mountain lions, are more negatively affected by recreational activity than their small mammal counterparts largely due to the need to navigate large swaths of land to access enough resources for survival (Larson et al. 2019; Moll et al. 2018; Salvatori et al. 2023). The lack of larger carnivores in an area may allow smaller species, such as foxes, to move into an area and affect species richness and abundance of smaller herbivores. Additionally, birds and large mammals, particularly ungulates, tend to be particularly sensitive to human recreational activity and have behavioral responses to human activities when relatively far away from the disturbance (Dertien and Reed 2021). Smaller mammals, such as ground squirrels and cottontails, may prefer this altered landscape due to the decreased presence of carnivores and the increase in disturbed habitat (Elbroch et al. 2021).

Wildlife responds to human behavior in ways other than avoidance of the area. Small mammals, in addition to larger mammals, have been shown to adjust their normal behavior in the presence of human activity. One adjustment is the increase in nocturnal behavior. Salvatori et al. (2023) found that a shift in daily activity is one of the most common ways wildlife species adapt to human activity. Nocturnal detections increased over 20% within mammalian communities when human activity increased (Salvatori et al. 2023) regardless of mammal size while spatial avoidance was observed for larger sized species. Wildlife species typically avoid humans on trails at fine scales; however, mountain biking and motorized vehicles elicit stronger avoidance behaviors by wildlife species (Naidoo and Burton 2020). Human presence has been shown to alter other species' behavior which may affect the community ecology. For instance, mountain lions have been found to increase predation of mule deer because they reduced their feeding time by more than half in the presence of humans (Smith et al. 2017). Increased kill rates in carnivores in human disturbed areas are driven by the presence of humans instead of the availability of prey, which may alter the ecological dynamics of the study area.

In addition to human impacts, dogs (especially off-leash dogs) can cause considerable impacts to wildlife. Off-leash dogs are more likely to chase wildlife, forcing them to use important energy reserves. Dog walking is associated with larger disturbance factors than hiking or mountain biking (Miller et al. 2020). Dogs are a domesticated subspecies of wolf and their presence and scent repels many wildlife species, which can incite antipredator response (Miller et al. 2020). This response can occur long after dogs are no longer physically in the area as their scent remains after they are gone. Also, some dogs may kill wildlife, especially in open areas where they cannot escape to a tree or other safe area. Research also shows that wildlife are less likely to habituate to dogs and that people with dogs cause a stronger wildlife response than people without them (Hennings 2017).

4.1.3 Aquatic Resources

Aquatic resources in the study area include streams and wetlands. Aquatic resources are especially important areas in the Arid West. Impacts from trail development and use can be exacerbated in riparian habitat as the soil and vegetation is susceptible to trampling and overuse.

4.2 Soils and Geology

The development and use of trails disturbs environmental systems, especially through vegetation removal. Trails may also be formed by slope cuts, which modify landscape morphology, expose bare soil along trails, and become pathways for runoff, which intensifies erosion processes. Additionally, the number of people using trails influences erosion processes because trail use increases soil compaction, which increases runoff and erosion.

4.3 Cultural Resources

The potential for as-yet undiscovered archaeological resources is moderate to high, as most of the study area has not been inventoried. Furthermore, the presence of known historic-era sites in previously inventoried areas indicates that additional sites dating to this period are likely. Although no sites dating to the prehistoric period have been recorded within or adjacent to the study area, the presence of such sites in areas not previously inventoried cannot be ruled out.

5 REGULATORY CONSIDERATIONS

5.1 Vegetation

SWCA anticipates that impacts to vegetation communities will be low because these communities are common throughout the general region of the site; no permitting and minimal agency coordination is anticipated.

5.1.1 Nonnative species

The State of Utah designates noxious weeds into different classes according to the threat that the specific noxious weeds pose and how they should be dealt with (Utah Administrative Code R68-9). A noxious weed risk assessment and completion of a project-specific weed management plan may be required.

5.1.2 Threatened and Endangered Species

Based on the desktop assessment, Ute ladies'-tresses have a low potential to occur with the study area. However, a habitat assessment of potentially suitable areas may be conducted to confirm the presence of suitable habitat. If suitable habitat is identified, formal presence/absence surveys during the blooming window will need to be conducted to determine occupancy of the study area.

5.1.3 U.S. Forest Service Sensitive Species

There are several USFS species with the potential to occur in the study area. A formal habitat assessment of the study area for these species should be conducted to determine whether suitable habitat is present within USFS land. If there is suitable habitat, presence/absence surveys should be conducted within suitable habitat to determine occupancy. Trails within occupied habitat should be avoided to reduce the impact on USFS sensitive plants.

5.2 Wildlife

5.2.1 General Wildlife and Migratory Birds

Big game habitat is largely protected through seasonal stipulations. These could be carried out via trail closures or leash-on stipulations within crucial habitat during specific times of the year. Mule deer crucial winter habitat has the largest acreage within the study area. However, there are black bear and moose year-long crucial habitats within the higher elevations in the eastern portion of the study area. As human and domestic animal presence affects wildlife use of habitats, avoidance of trail construction within these habitats may limit human disturbance on these species.

Additionally, the regulatory framework for protecting birds includes the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act, and Executive Order 13186 (directing federal agencies to protect migratory birds). All sensitive birds, as well as most other bird species, that are likely to occur in the study area are protected by the MBTA. The MBTA prohibits the take of migratory birds (including any part, nest, or egg) and does not include provisions for allowing unauthorized take. Based on the timing and duration of construction, good-faith preconstruction surveys should be completed to avoid violations of the MBTA, particularly during nesting season, which occurs from approximately April 15 through August 15 in Utah.

5.2.2 Threatened and Endangered Species

The monarch butterfly (*Danaus plexippus*) is the only species with a moderate potential to occur within the study area. The monarch butterfly is not a listed species; it is a candidate species with no ESA protections. However, the study area can be assessed for suitable habitat, including the presence of milkweed, which is essential for monarch butterflies. If milkweed species are identified in the study area, trails can be constructed away from these areas to limit human disturbance.

5.2.3 Species of Greatest Conservation Need

SGCNs have no regulatory protections and species-specific surveys are not required. However, there are certain habitat types, such as cliffs and riparian areas, that may potentially provide nesting habitat that is not common throughout the study area. These areas could be avoided to help limit human disturbance to these species. Additionally, the regulatory framework for protecting birds, including the MBTA, Bald and

Golden Eagle Protection Act, and Executive Order 13186, protect SGCN avian species that are likely to occur in the study area.

5.3 Aquatic Resources

The U.S. Army Corps of Engineers (USACE) regulates waters of the U.S. (WOTUS). These waters include wetland and non-wetland water bodies that meet defined criteria. The USACE determines jurisdiction over WOTUS. Common WOTUS can include wetland and stream habitat types, but WOTUS may also consist of mudflats, playas, and natural ponds. In the Arid West, ephemeral streams may be present, and differentiating between them and erosional features, which are usually not regulated, is an important component of Clean Water Act Section 404 compliance. The USACE typically asserts jurisdiction over perennial and intermittent streams and wetlands abutting or adjacent to these features. Ephemeral streams or washes in the Arid West may also be regulated if they possess indicators of ordinary high-water marks and if they significantly affect the integrity of a downstream jurisdictional water. Erosional features characterized by low volume, infrequent flow, or short duration are not regulated. Many streams in Utah are also considered waters of the state, for which there are separate jurisdictional criteria. If potential WOTUS are identified and cannot be avoided, the USACE will require a field-based delineation and subsequent report from which they can make a jurisdictional determination. If the wetlands or streams are determined to be jurisdictional, the USACE will require additional permitting and possibly mitigation of project impacts.

5.4 Cultural Resources

Federal laws, procedures, and policies affecting the treatment of cultural resources include the Antiquities Act of 1906, Public Law 59-209, Executive Order 11593, Section 106 of the National Historic Preservation Act of 1966 (Public Law 91-190), the Federal Land Policy Management Act (Public Law 94-579), 36 Code of Federal Regulations (CFR) 60, and 36 CFR 800. The American Indian Religious Freedom Act (42 United States Code 1996) has also been established to protect religious practices, ethnic heritage sites, and land uses of federally recognized Native Americans. The Native American Graves Protection and Repatriation Act applies to human remains found on federal lands.

The National Historic Preservation Act is the basis for cultural and historic preservation and defines the responsibility of federal agencies for protection and preservation of cultural and heritage resources. The standards and guidelines established by the USFS take this into consideration and are used to assist with identifying and evaluating cultural and historical resources.

State laws affecting the treatment of cultural resources include Utah Code 9-8-404, R 652-40-500; Utah Code 9-8-306; Utah Code 9-8-305, R 694-1; and Utah Code R 456-1-1-17. The standards and guidelines established by the State of Utah take these regulations into consideration, and they are used to assist with permitting survey and/or excavation, procedures for the discovery of Native American graves on state or non-federal land, and providing procedures for mitigation, if necessary.

All of these regulations require review of potential effects to historic properties (cultural resources sites determined eligible for the NRHP) and require the development of appropriate measures for avoidance or strategies for minimizing or mitigating effects from project development.

6 LITERATURE CITED

Brand, L.A., J.C. Stromberg, D.C. Goodrich, M.D. Dixon, K. Lansey, D. Kang, D.S. Brookshire, and D.J. Cerasale. 2011. Projecting avian response to linked changes in groundwater and riparian floodplain vegetation along a dryland river: a scenario analysis. *Ecohydrology* 4(1):130–142. Available at: https://onlinelibrary.wiley.com/doi/10.1002/eco.143. Accessed February 4, 2023.

Bureau of Land Management (BLM). Bureau of Land Management (BLM). 1869. General Land Office Survey map for Township 1 North, Range 1 East. Available at https://glorecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=UT|cty=|twp_nr=1|twp_dir=N|rng_nr=1|rng_dir=E. Accessed January 17, 2023.

———. 1884. General Land Office Survey map for Township 1 North, Range 1 East. Available at https://glorecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=UT|cty=|twp_nr=1|twp_dir=N|rng_nr=1|rng_dir=E. Accessed January 17, 2023.

———. 2023. General Land Office Records. Available at: https://glorecords.blm.gov/search/default.aspx. Accessed February 3, 2023.

Ciuti, S., J.M. Northrup, T.B. Muhly, S. Simi, M. Musiani, J.A. Pitt, and M.S. Boyce. 2012. Effects of Humans on Behaviour of Wildlife Exceed Those of Natural Predators in a Landscape of Fear. *PLoS ONE* 7(11):e50611. Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0050611. Accessed December 16, 2022.

Cole, D.N. 1981. Vegetational changes associated with recreational use and fire suppression in the Eagle Cap Wilderness, Oregon: some management implications. *Biological Conservation* 20:247–270.

———. 2004. *Impacts of Hiking and Camping on Soils and Vegetation: a Review*. Available at: https://winapps.umt.edu/winapps/media2/leopold/pubs/516.pdf. Accessed February 4, 2023.

Dertien, J.S. and S.E. Reed. 2021. Recreation effects on wildlife: a review of potential quantitative thresholds. *Nature Conservation 44*:51–68. Accessed March 10, 2023.

eBird. 2022. eBird Species Map. Available at: https://ebird.org/map. Accessed December 16, 2022.

Elbroch, L.M., T. Forrester, A.M. Green, J. Haight, N.C. Harris, M. Hebblewhite, F. Isbell, B. Johnston, R. Kays, P.E. Lendrum, J.S. Lewis, A. McInturff, W. McShea, T.W. Murphy, M.S. Palmer, A. Parsons, M.A. Parsons, L. Whipple, J. Whittington, G. Wittemyer, and C.C. Wilmers. 2021. Disturbance type and species life history predict mammal response to humans. G*lobal Change Biology* 27:3718–3731. Accessed March 10, 2023.

Half-Earth Project. 2022. Half-earth Project Map. Available at: https://map.half-earthproject.org/dataGlobe?globe=%7B%22center%22%3A%5B16.951553599999997%2C0.1169589999999909%5D%2C%22zoom%22%3A3.608957830589897%7D. Accessed December 16, 2022.

Hansen, M.J., and A.P. Clevenger. 2005. The influence of disturbance and habitat on the presence of nonnative plant species along transport corridors. *Biological Conservation* 125(2005):249–259. Available at: https://westerntransportationinstitute.org/wp-content/uploads/2017/02/BiolConserv-125-Hansen-Clevenger.pdf. Accessed January 3, 2023.

Hennings, L. 2017. Hiking, mountain biking, and equestrian use in natural areas: A recreation ecology literature review. Portland, Oregon. Portland Metroparks. Available at: https://www.researchgate.net/publication/320084633_Hiking_mountain_biking_and_equestrian_use_in_natural_areas_A_recreation_ecology_literature_review. Accessed January 3, 2023.

iNaturalist. 2022. Noxious Weeds in Salt Lake County, Utah. Available at: https://www.inaturalist.org/projects/noxious-weeds-in-salt-lake-county-utah. Accessed December 16, 2022.

Kuss, F.R. 1986. A review of major factors influencing plant responses to recreation impacts. *Environmental Management* 10:637–650. Available at: https://link.springer.com/article/10.1007/BF01866768. Accessed January 7, 2023.

Larson, C.L., S.E. Reed, A.M. Merenlender, and K.R. Crooks. 2016. Effects of recreation on animals revealed as widespread through global systematic review. *PLoS ONE* 11(12). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0167259. Accessed May 19, 2023.

———. 2019. A meta-analysis of recreation effects on vertebrate species richness and abundance. *Conservation Science and Practice* 1(10): e93. Available at: https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/csp2.93. Accessed March 10, 2023.

Merritt, D.M., and N.L.R. Poff. 2010. Shifting dominance of riparian Populus and Tamarix along gradients of flow alteration in western North American rivers. *Ecological Applications* 20(1):135–152. Available at: https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/08-2251.1. Accessed January 3, 2023.

Miller, A.B., D. King, M. Rowland, J. Chapman, M. Tomosy, C. Liang, E. Abelson, and R. L. Truex. 2020. *Sustaining Wildlife with Recreation on Public Lands: A Synthesis of Research Findings, Management Practices, and Research Needs*. General Technical Report PNW-GTR-993. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Available at: https://www.fs.usda.gov/pnw/pubs/pnw_gtr993.pdf. Accessed February 5, 2023.

Moll, R.J., J.D. Cepek, P.D. Lorch, P.M. Dennis, T. Robison, J.J. Millspaugh, and R.A. Montcomery. 2018. Human and urban development mediate the sympatry of competing carnivores. *Urban Ecosystems* 21:765–778. Accessed March 10, 2023.

Mount, A., and C.M. Pickering. 2009. Testing the capacity of clothing to act as a vector for non-native seed in protected areas. *Journal of Environmental Management* 91(1):168–179. Available at: https://www.sciencedirect.com/science/article/pii/S0301479709002631. Accessed January 7, 2023.

Naidoo, R., and A.C. Burton. 2020. Relative effects of recreational activities on a temperate terrestrial wildlife assemblage. *Conservation Science and Practice* 2:e271. Available at: https://conbio.onlinelibrary.wiley.com/doi/epdf/10.1111/csp2.271. Accessed August 23, 2023.

Natural Resources Conservation Service (NRCS). 2019. National Soil Survey Handbook, Title 430-VI. Available at: https://www.nrcs.usda.gov/resources/guides-and-instructions/national-soil-survey-handbook. Accessed March 10, 2023.

———. 2022. Web Soil Survey. Available at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed December 12, 2022.

The Nature Conservancy. 2022. Resilient Land Mapping Tool. Available at: https://maps.tnc.org/resilientland/. Accessed December 22, 2022.

Oliver, G.V., and W.R. Bosworth III. 1999. Rare, imperiled, and recently extinct or extirpated mollusks of Utah: a literature review. Paper 531. *All U.S. Government Documents (Utah Regional Depository)*. Available at: https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1530&context=govdocs. Accessed January 6, 2023.

Perry, L.G., D.C. Andersen, L.V. Reynolds, S.M. Nelson, and P.B. Shafroth. 2012. Vulnerability of riparian ecosystems to elevated CO2 and climate change in arid and semiarid western North America. *Global Change Biology* 18:821–842.

Potito, A.P., and S.W. Beatty. 2005. Impacts of recreation trails on exotic and ruderal species distribution in grassland areas along the Colorado Front Range. *Environmental Management* 36(2):230–236. Available at: https://pubmed.ncbi.nlm.nih.gov/16025202/. Accessed January 7, 2023.

Sageland Collaborative. 2023. Email from Mary Pendergast, Sageland Collaborative, to Audrey McCulley and Alyson Eddie, SWCA Environmental Consultants, on March 1, 2023.

Salt Lake City Public Lands Department. 2020. *Salt Lake City Foothills Trail System Plan.* Available at: https://www.slc.gov/parks/trails-natural-lands/ftsmp/. Accessed December 14, 2022.

———. 2023. Email from Blake Wellard, Salt Lake City Public Lands Department, to Audrey McCulley, SWCA Environmental Consultants, on January 29, 2023.

Salvatori, M., V. Oberosler, M. Rinaldi, A. Franceschini, S. Trushi, P. Pedrini, and F. Rovero. 2023. Crowded mountains: long-term effects of human outdoor recreation on a community of wild mammals monitored with systemic camera trapping. *AMBIO* (2023): The Royal Swedish Academy of Sciences.

Save Our Foothills. 2022a. Email from Maria Coller, Save Our Foothills, to Audrey McCulley, SWCA Environmental Consultants, on October 20, 2022.

———. 2022b. Email from Eric Edelmen, Save Our Foothills, to Audrey McCulley, SWCA Environmental Consultants, on October 6, 2022.

———. 2023. Email from Maria Coller, Save Out Foothills, to Audrey McCulley, SWCA Environmental Consultants, on March 22, 2023.

Smith J.A., J.P. Suraci, M. Clinchy, A. Crawford, D. Roberts, L.Y. Zanette, and C.C. Wilmers. 2017. Fear of the human 'super predator' reduces feeding time in large carnivores. *Proclamations of the Royal Society Biology* 284:20170433.

SWCA Environmental Consultants. 2016. *Noxious and Invasive Weed Management Plan for Salt Lake City Parks and Public Lands*. Available at: http://www.slcdocs.com/openspace/SLCOS_IPMP_2016_updates_10Aug2016.pdf. Accessed December 20, 2022.

U.S. Bureau of Reclamation. 2012. *Colorado River Basin Water Supply and Demand Study*. Available at: https://www.usbr.gov/lc/region/programs/crbstudy/finalreport/index.html. Accessed January 15, 2023.

U.S. Department of Agriculture (USDA). 2023. Email from Paul Cowley, USDA, to Audrey McCulley, SWCA Environmental Consultants, on February 24, 2023.

U.S. Fish and Wildlife Service (USFWS). 2022a. National Wetlands Inventory (NWI). Available at: https://www.fws.gov/wetlands/data/mapper.html. Accessed December 16, 2022.

———. 2022b. Information for Planning and Consultation (IPaC), Location: Salt Lake County, Utah. Available at: https://ecos.fws.gov/ipac/location/index. Accessed December 16, 2022.

U.S. Geological Survey (USGS). 1885. Topographic Map, 1:250,000 Series for Salt Lake City, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1950. Topographic Map, 1:24,000 Series for Fort Douglas, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1951a. Topographic Map, 1:24,000 Series for Salt Lake City North, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1951b. Topographic Map, 1:24,000 Series for Fort Douglas, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1954. Topographic Map, 1:250,000 Series for Salt Lake City, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1958. Topographic Map, 1:250,000 Series for Salt Lake City, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1960. Topographic Map, 1:250,000 Series for Salt Lake City, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———.1963. Topographic Map, 1:24,000 Series for Fort Douglas, Utah. Available at: https://ngmdb.usgs.gov/topoview/. Accessed January 17, 2023.

———. 2022. National Hydrography Dataset (NHD). Available at: https://hydro.nationalmap.gov/arcgis/rest/services/nhd/MapServer. Accessed December 16, 2022.

———. 2023a. U.S. Geological Survey Geology Web Map Viewer. Bureau of Economic Geology. Available at: https://mrdata.usgs.gov/geology/state/map-us.html#home. Accessed February 2023.

———. 2023b. USGS historical topographic map explorer. Available at: https://ngmdb.usgs.gov/topoview/viewer/#4/40.01/-100.06. Accessed January 17, 2023.

U.S. Geological Survey (USGS) and U.S. Department of Agriculture (USDA). 2016. LANDFIRE 2.0.0 Existing Vegetation Type Layer. Available at: http://landfire.cr.usgs.gov/viewer/. Accessed December 15, 2022.

Utah Division of Wildlife Resources (UDWR). 2019a. *Utah Mule Deer Statewide Management Plan.* Available at: https://wildlife.utah.gov/pdf/bg/mule_deer_plan_2019.pdf. Accessed January 4, 2023.

———. 2019b. Utah species field guide. Available at: https://fieldguide.wildlife.utah.gov/. Accessed January 4, 2023.

———. 2022a. Utah Natural Heritage Program Data Request. Available at: https://dwrapps.utah.gov/HeritageDataRequest/. Accessed December 16, 2022.

———. 2022b. Wildlife GIS Data. Available at: https://utahdnr.maps.arcgis.com/apps/FilterGallery/index.html?appid=f602a8ae57fd4661a8e42bd40d99dc3c. Accessed December 16, 2022.

Van Winkle, J.E. 2014. Informal trails and the spread of invasive species in urban natural areas: spatial analysis of informal trails and their effects on understory plant communities in Forest Park, Portland, Oregon. Paper 1841.Portland State University. *Dissertations and Theses*. Available at: https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=2841&context=open_access_etds. Accessed December 12, 2022.

Wilsey, C.B., N.M. Lotem Taylor, and K. Stockdale. 2017. *Water and Birds in the Arid West: Habitats in Decline*. New York, New York: National Audubon Society. Available at: https://nas-national-prod.s3.amazonaws.com/wbaw_report_5july17_updated.pdf. Accessed February 3, 2023.

Wimpey, J., and J.L. Marion. 2011. A spatial exploration of informal trail networks within Great Falls Park, VA. *Journal of Environmental Management* 92(3):1012–1022. Available at: https://www.researchgate.net/publication/49656625_Wimpey_J_Marion_JL_A_spatial_exploration_of_informal_trail_networks_within_Great_Falls_Park_VA_Journal_of_Environmental_Management. Accessed December 12, 2022.

APPENDIX A

Maps

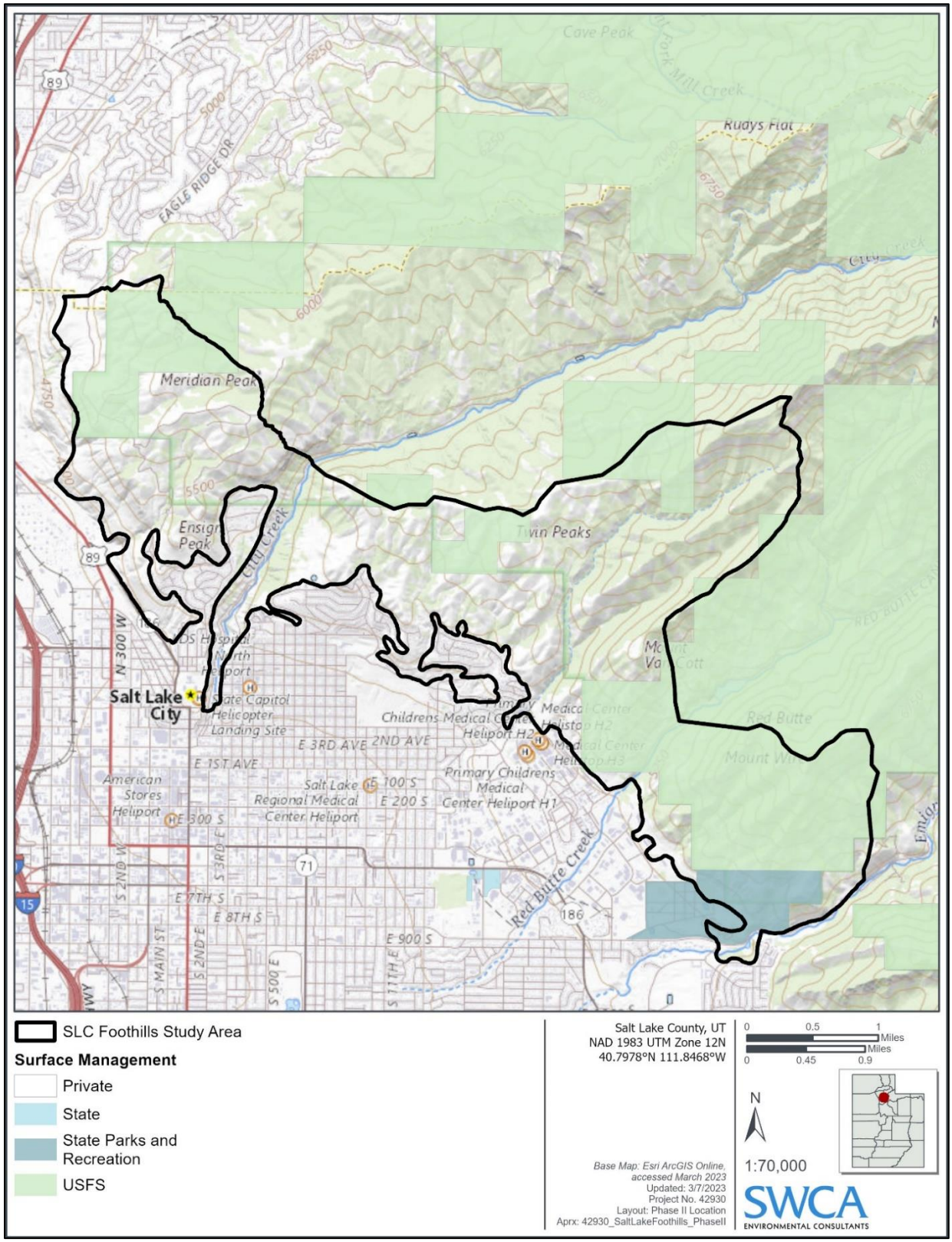

Figure A-1. Location of study area.

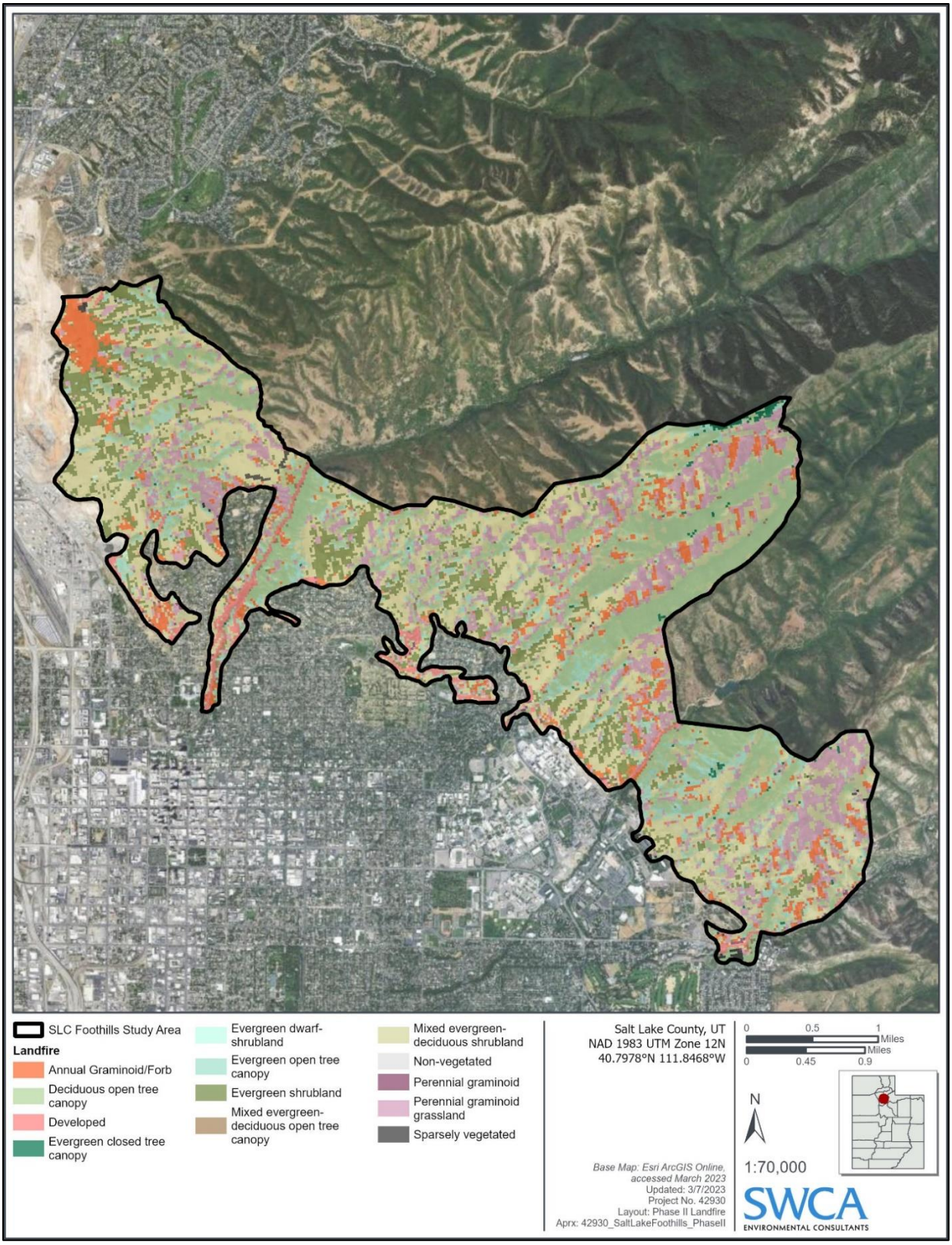

Figure A-2. LANDFIRE vegetation cover types in the study area.

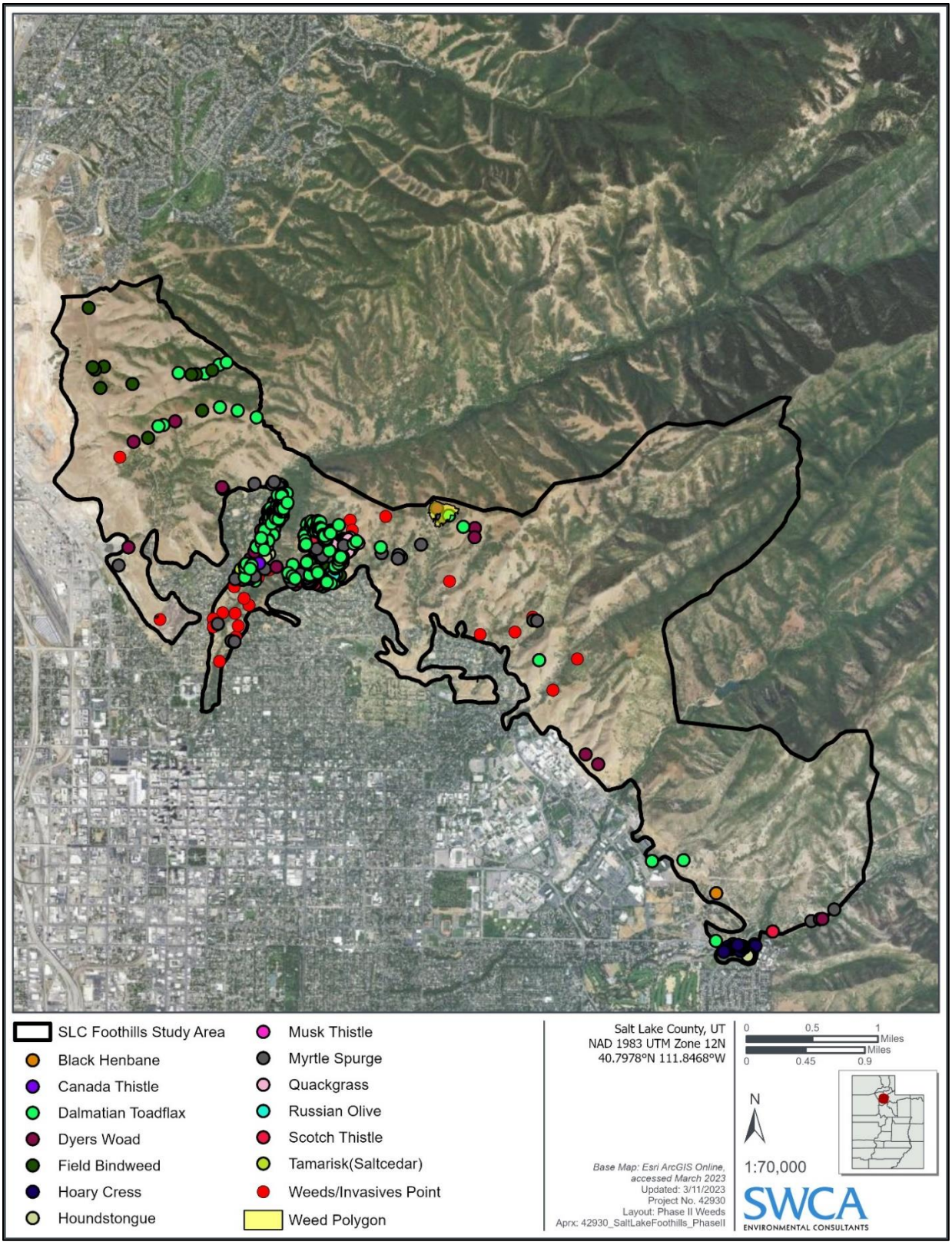

Figure A-3. Weed and invasive vegetation data provided by Salt Lake City.

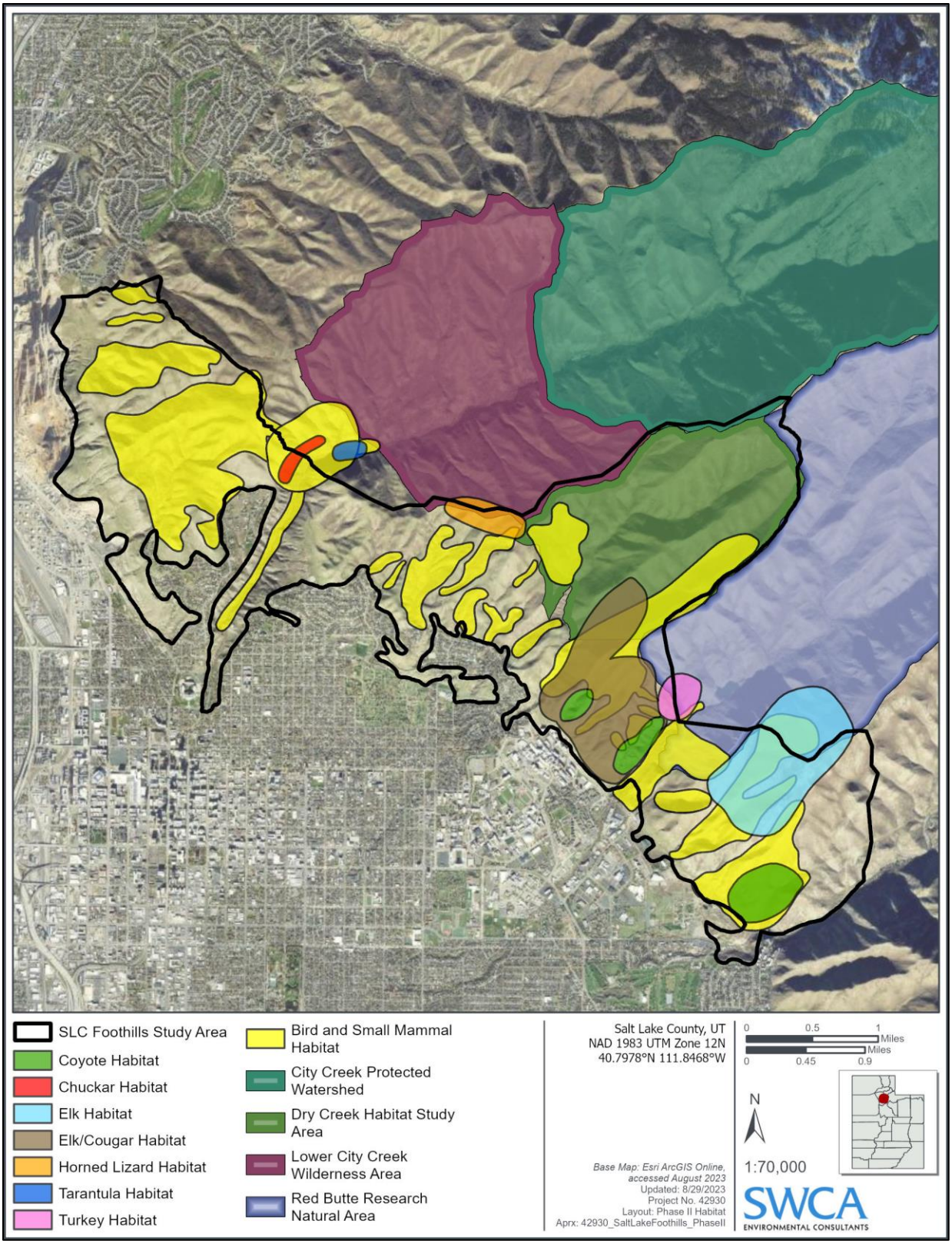

Figure A-4. Wildlife habitat and areas of interest within the study area, provided by Save Our Foothills.

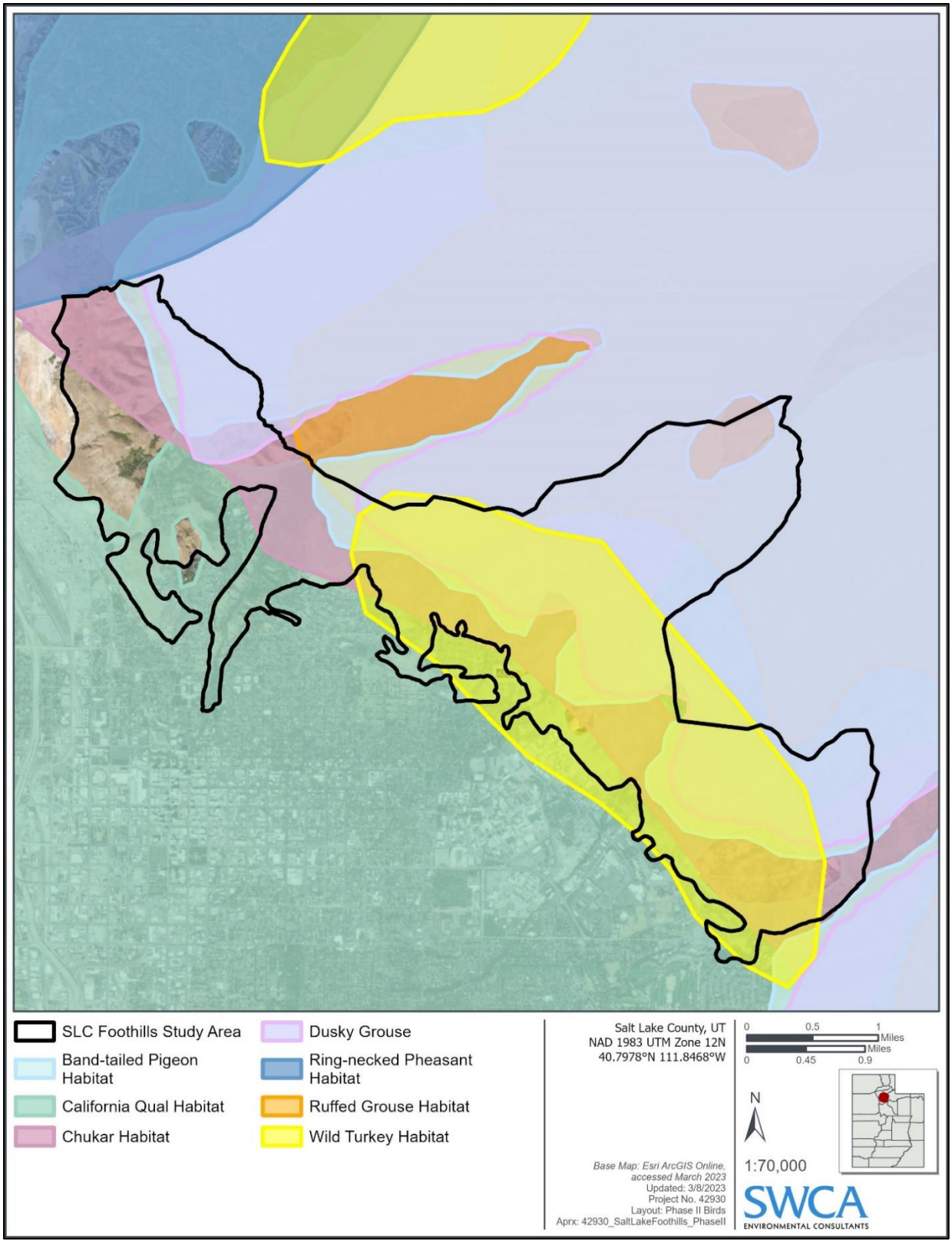

Figure A-5. Game bird habitat mapped by Utah Division of Wildlife Resources.

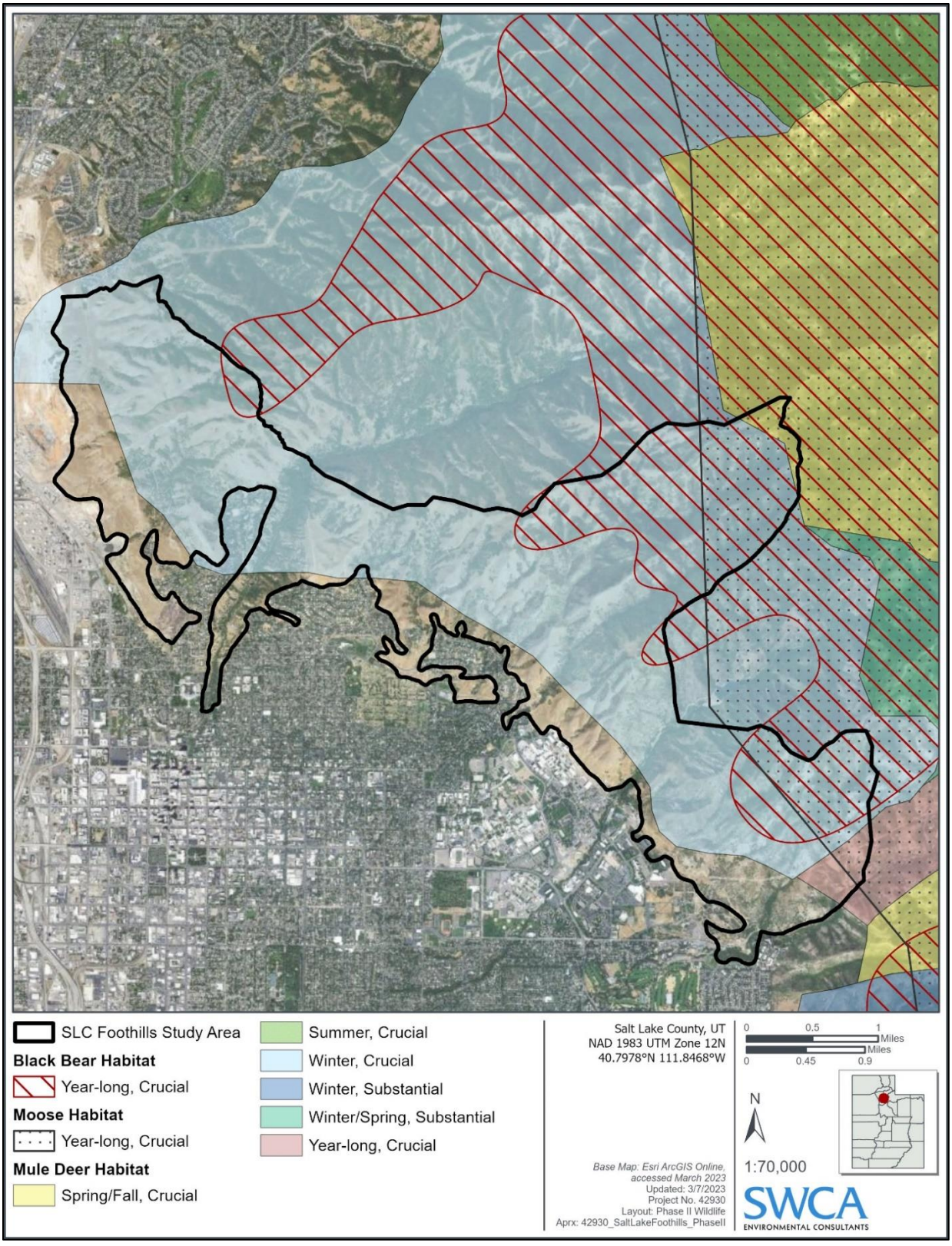

Figure A-6. Big game habitat mapped by Utah Division of Wildlife Resources.

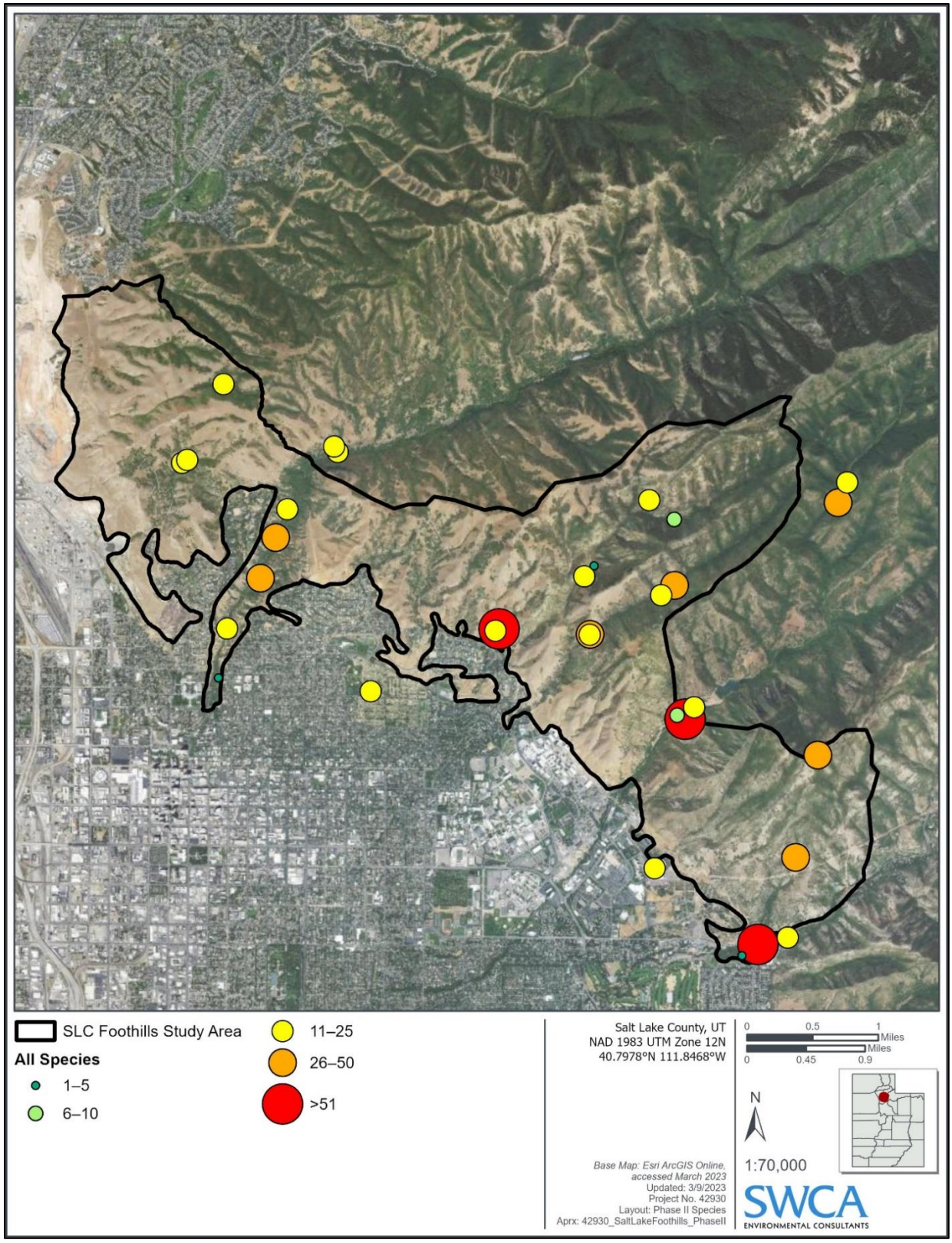

Figure A-7. Wasatch Wildlife Watch detection rates of all species. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

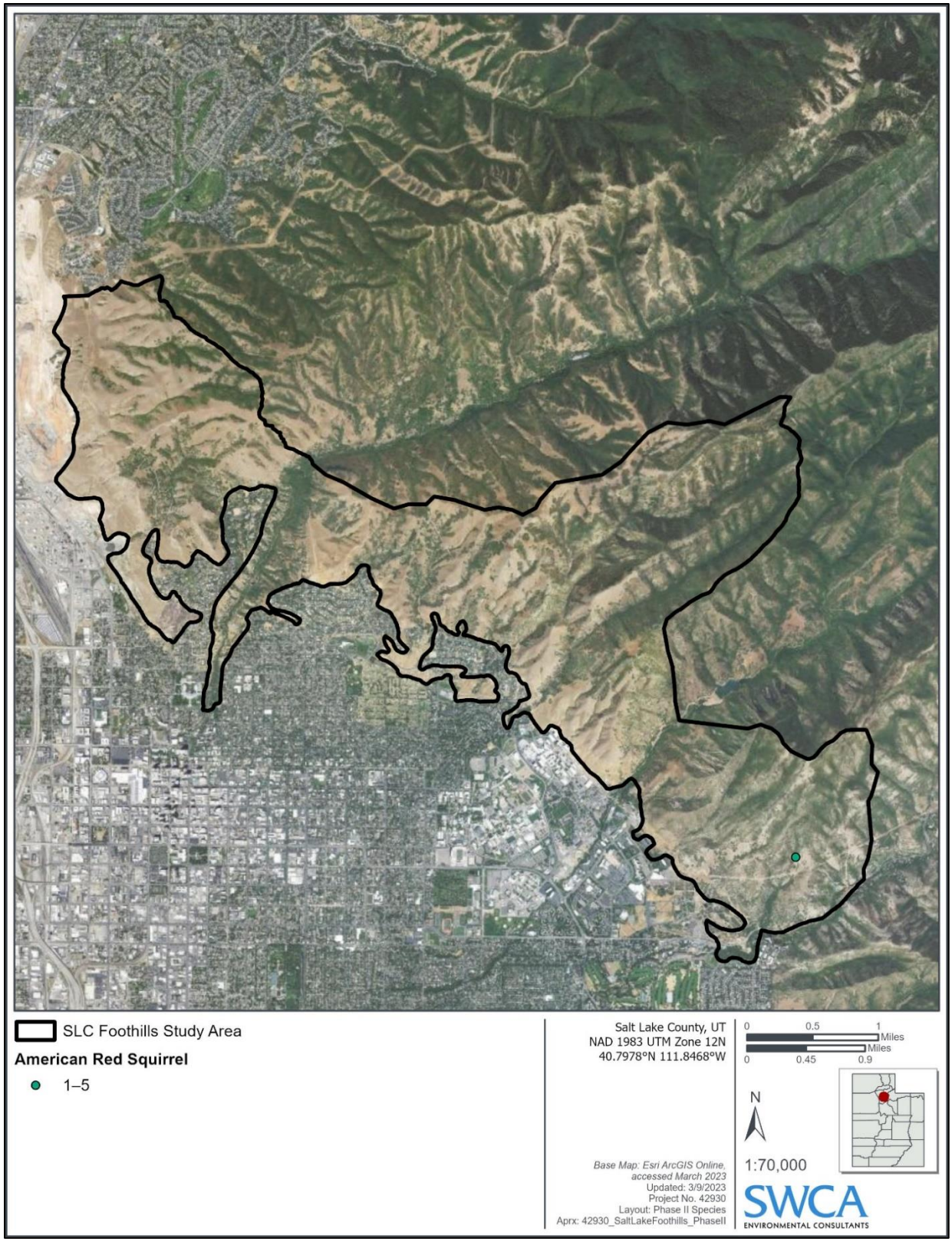

Figure A-8. Wasatch Wildlife Watch detection rates of American red squirrel. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

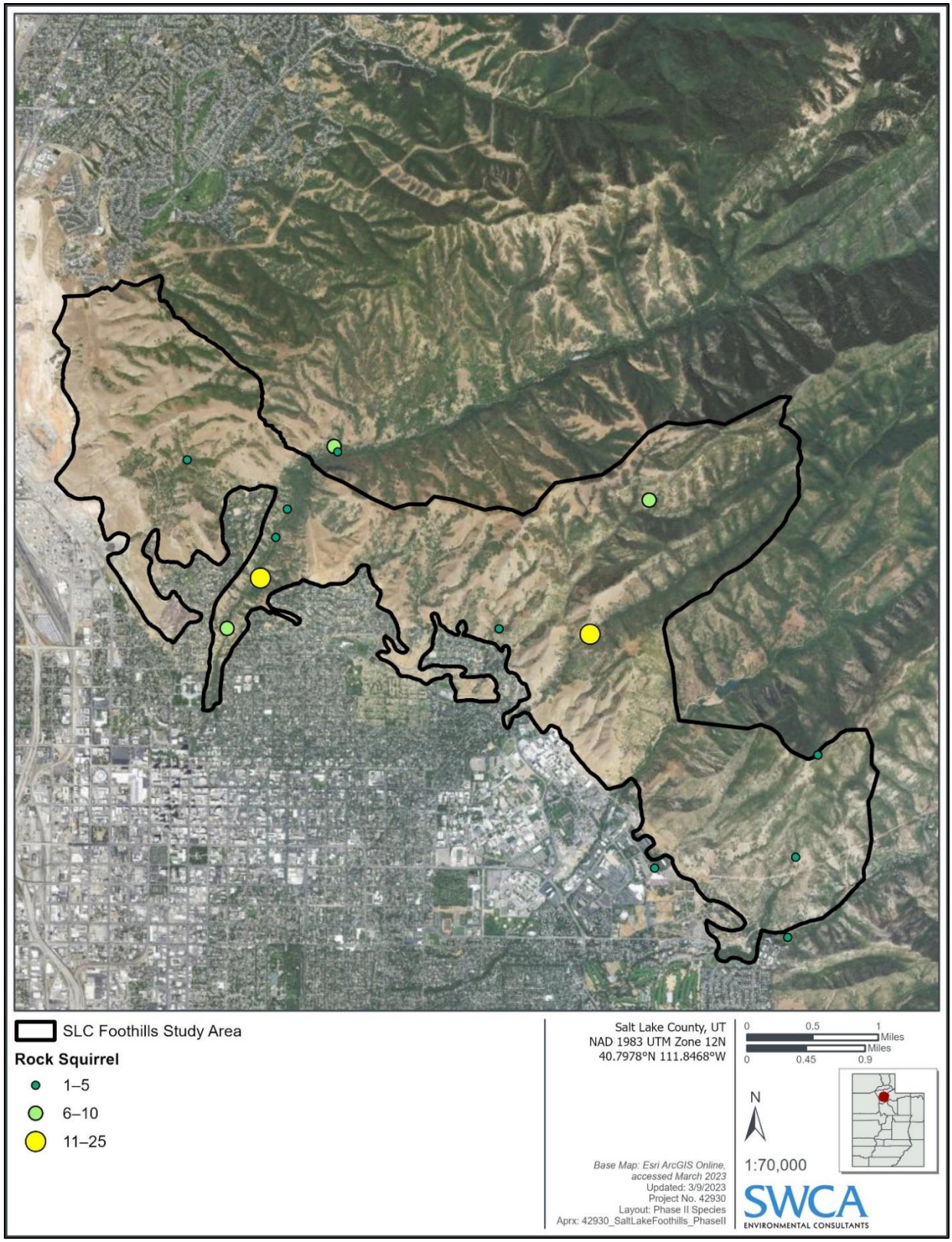

Figure A-9. Wasatch Wildlife Watch detection rates of rock squirrel. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

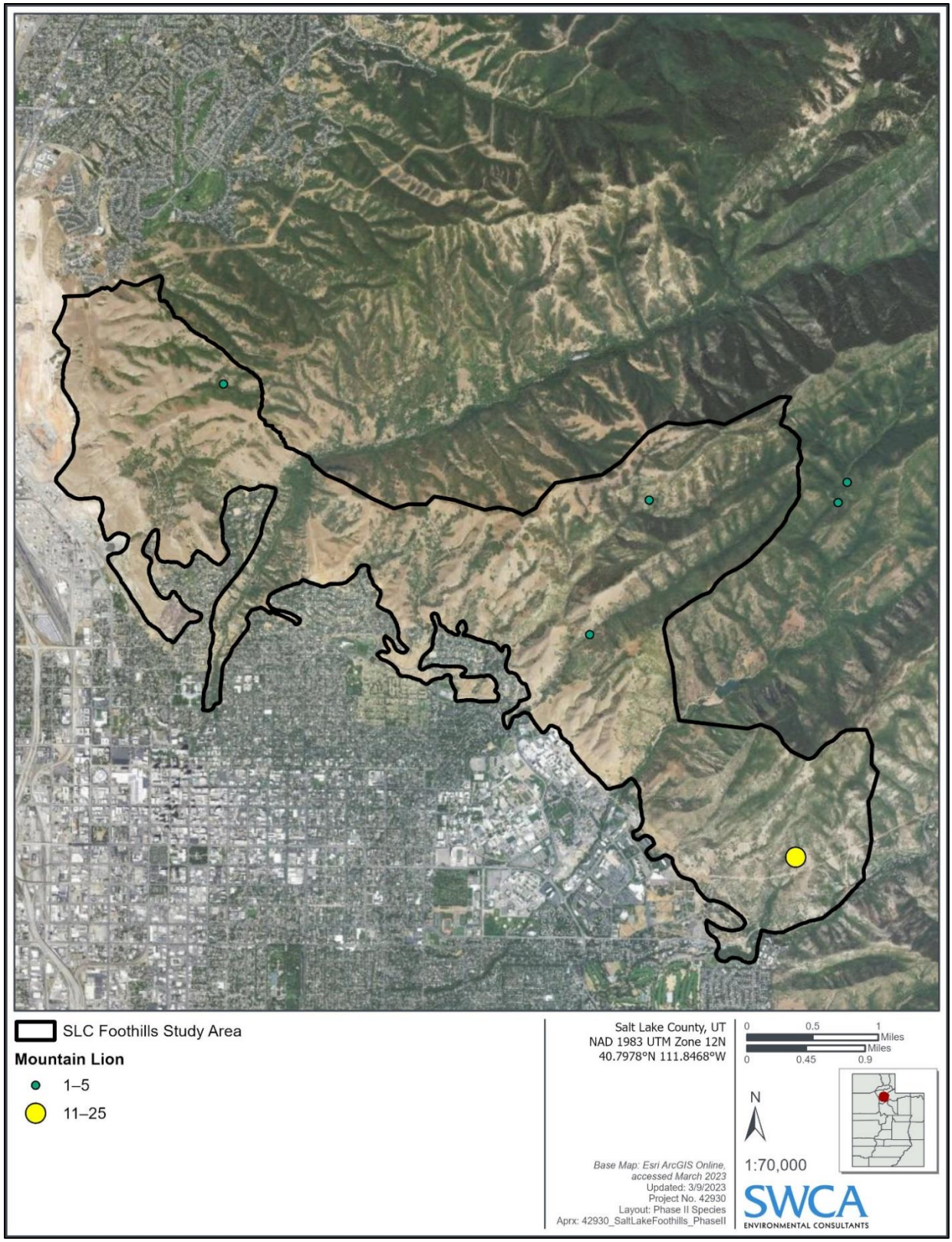

Figure A-10. Wasatch Wildlife Watch detection rates of mountain lion. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

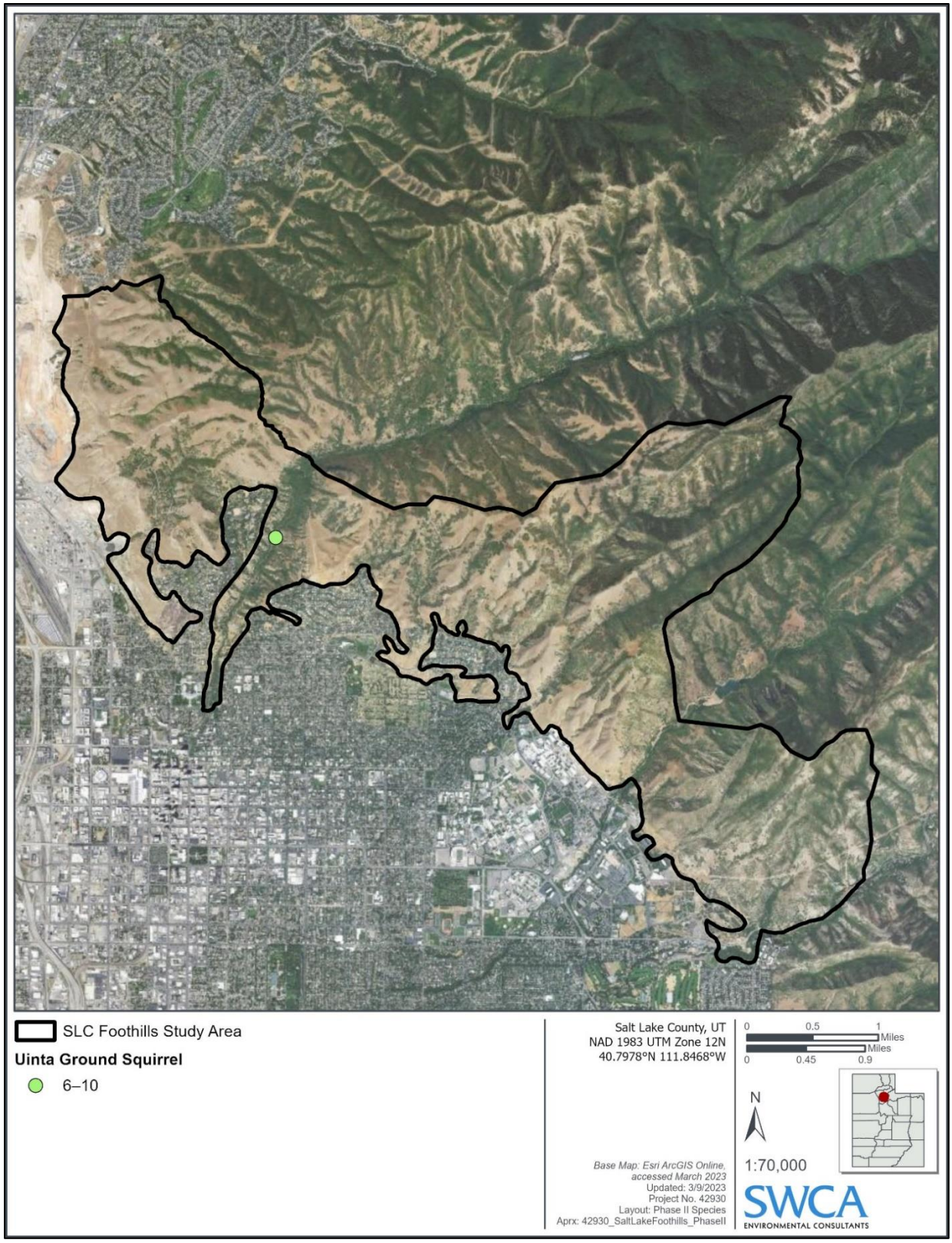

Figure A-11. Wasatch Wildlife Watch detection rates of Unite ground squirrel. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

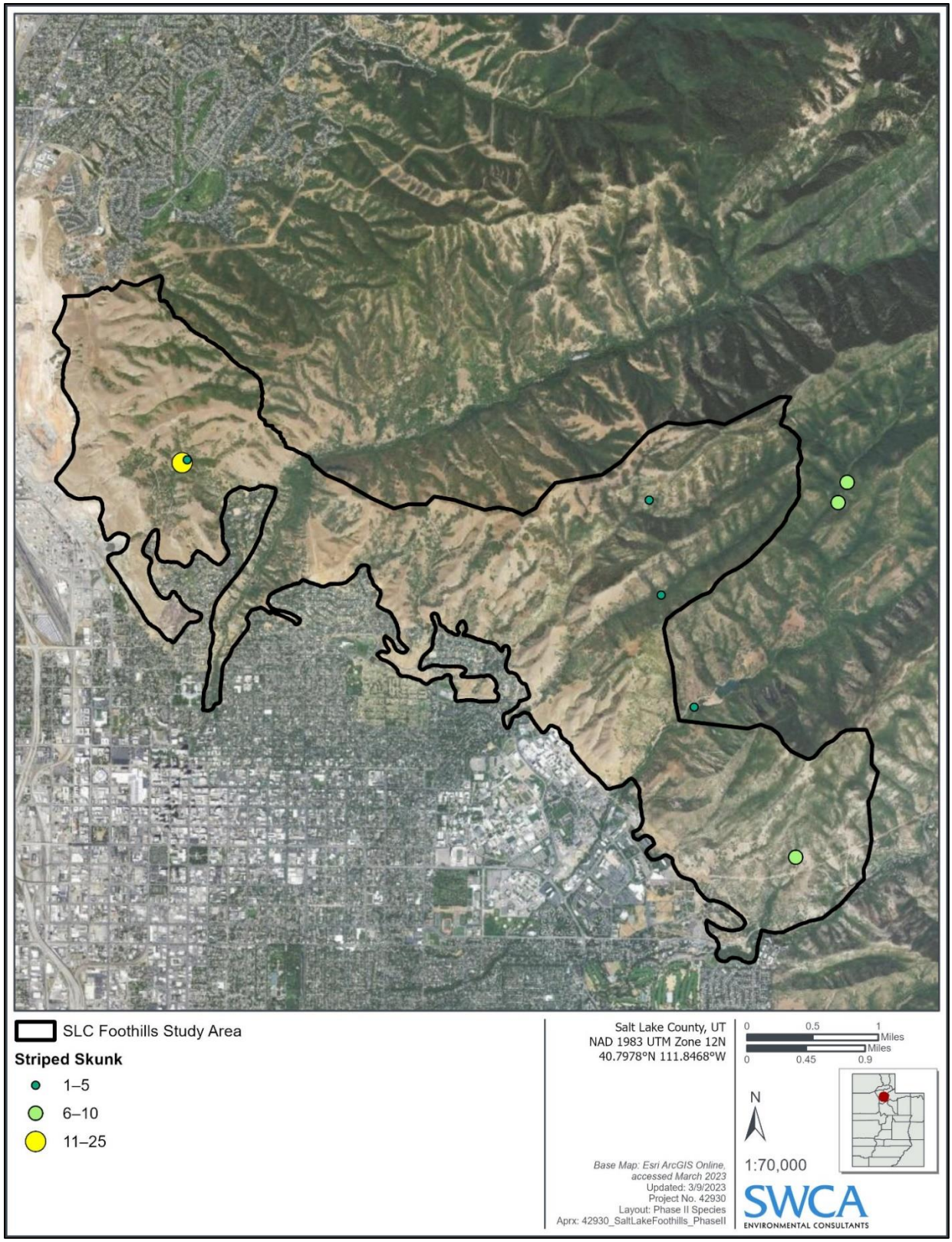

Figure A-12. Wasatch Wildlife Watch detection rates of striped skunk. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

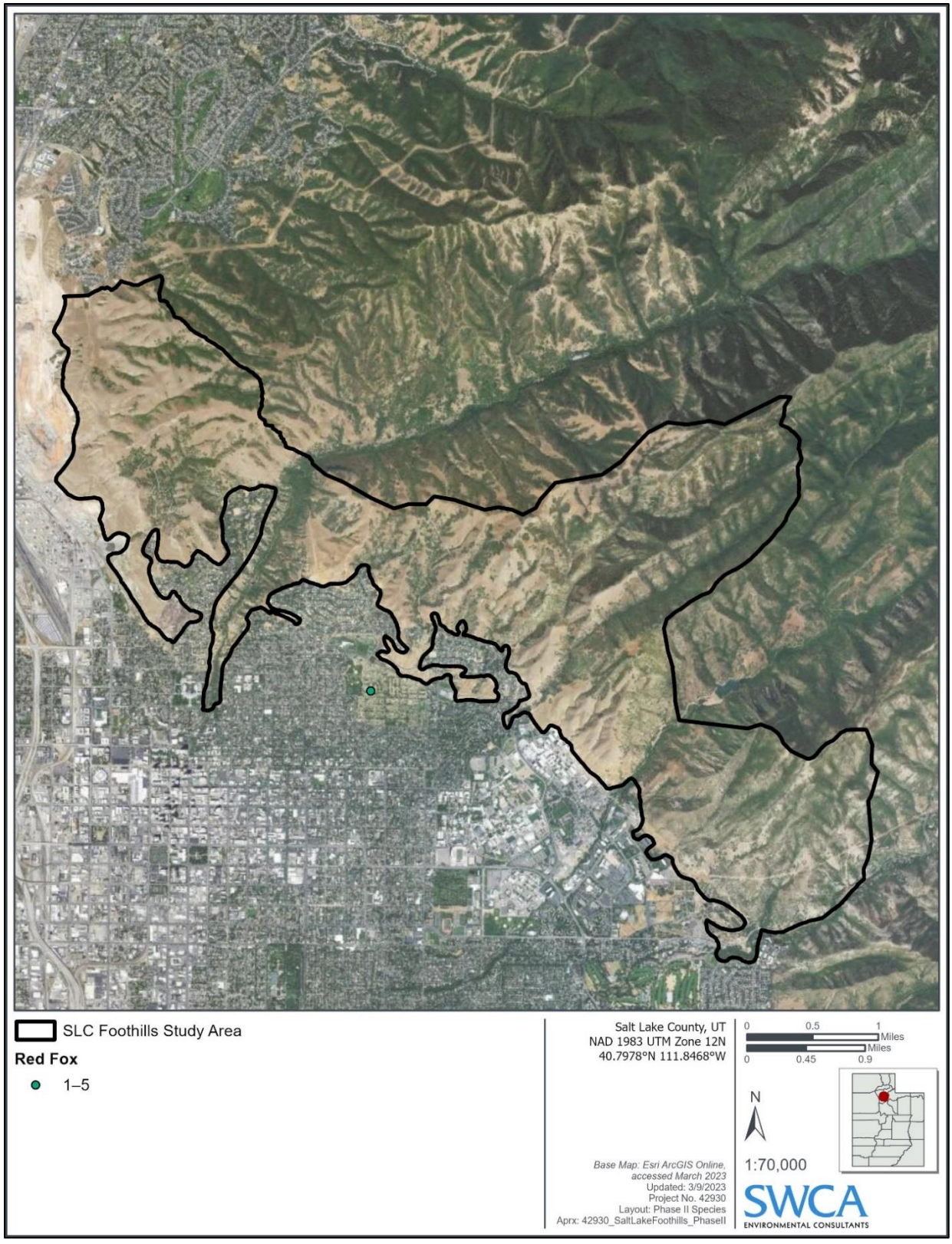

Figure A-13. Wasatch Wildlife Watch detection rates of red fox. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

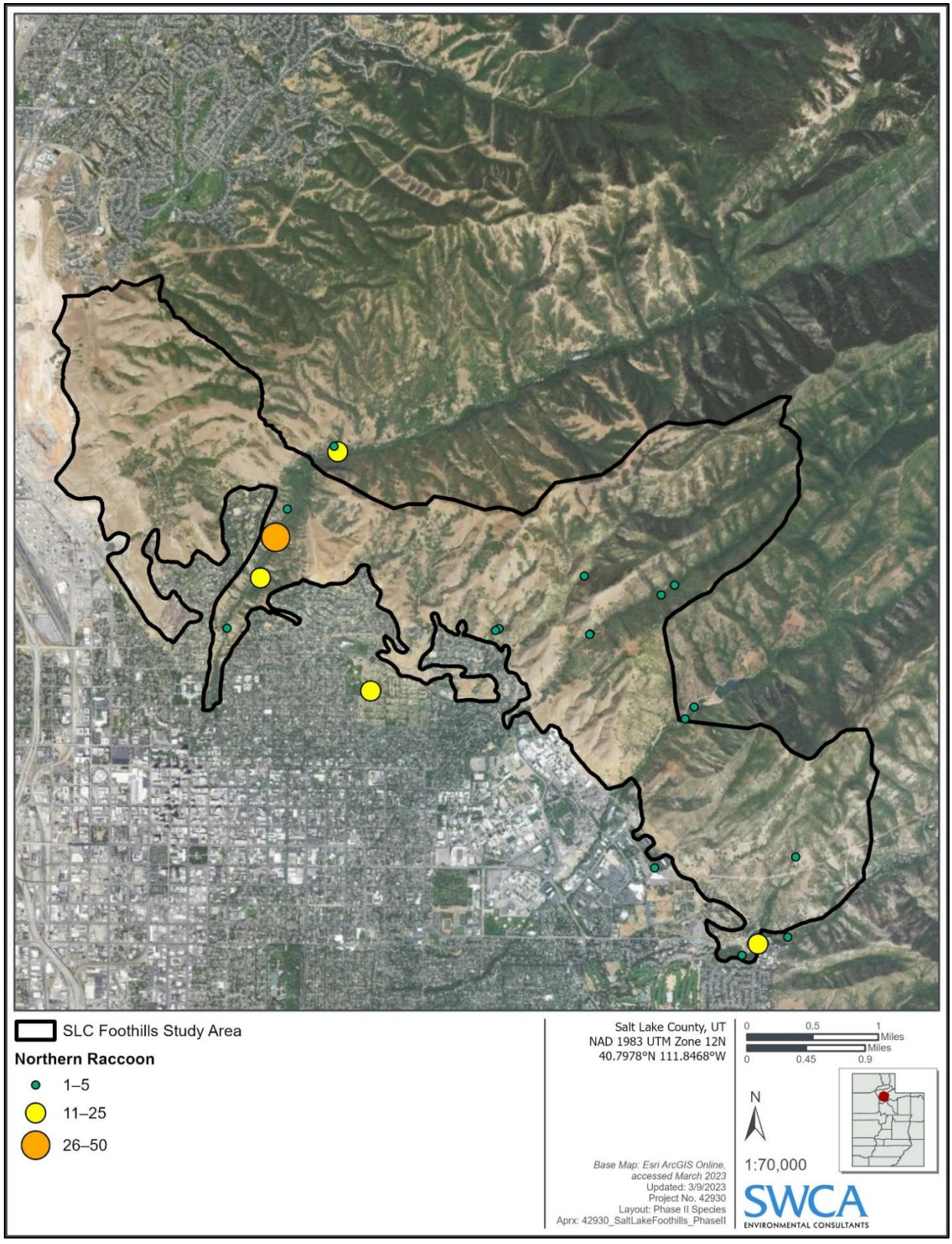

Figure A-14. Wasatch Wildlife Watch detection rates of northern raccon. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

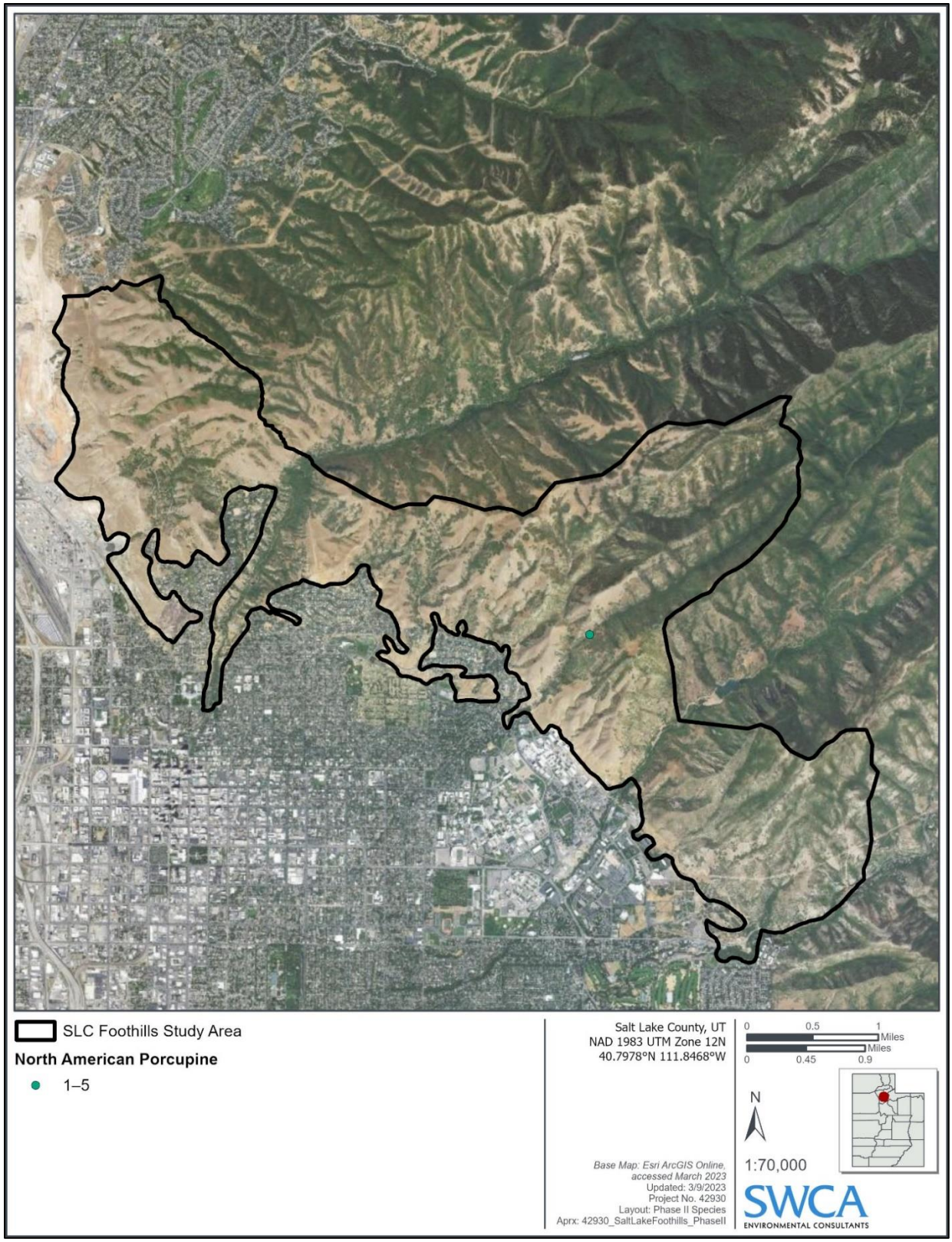

Figure A-15. Wasatch Wildlife Watch detection rates of North American porcupine. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

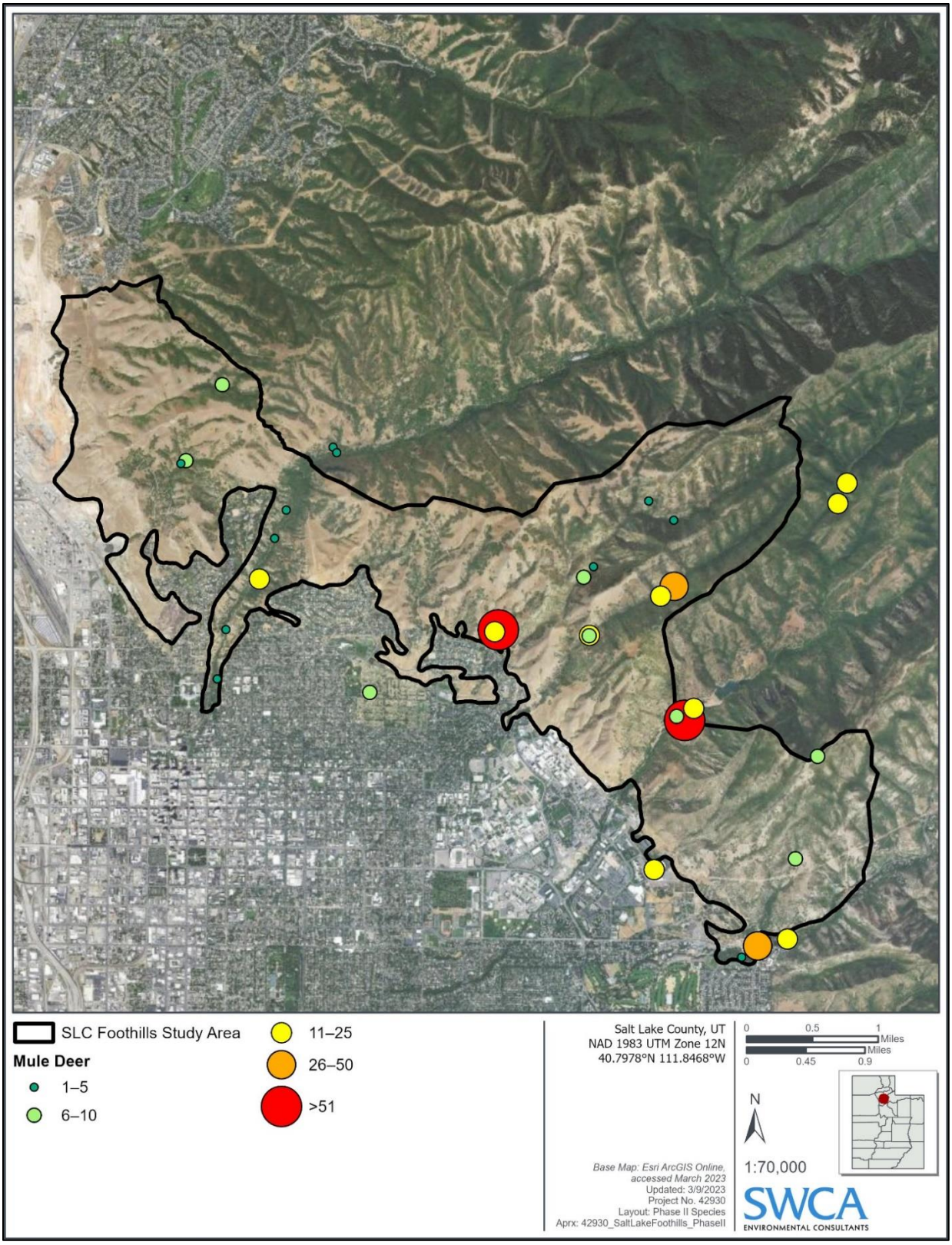

Figure A-16. Wasatch Wildlife Watch detection rates of mule deer. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

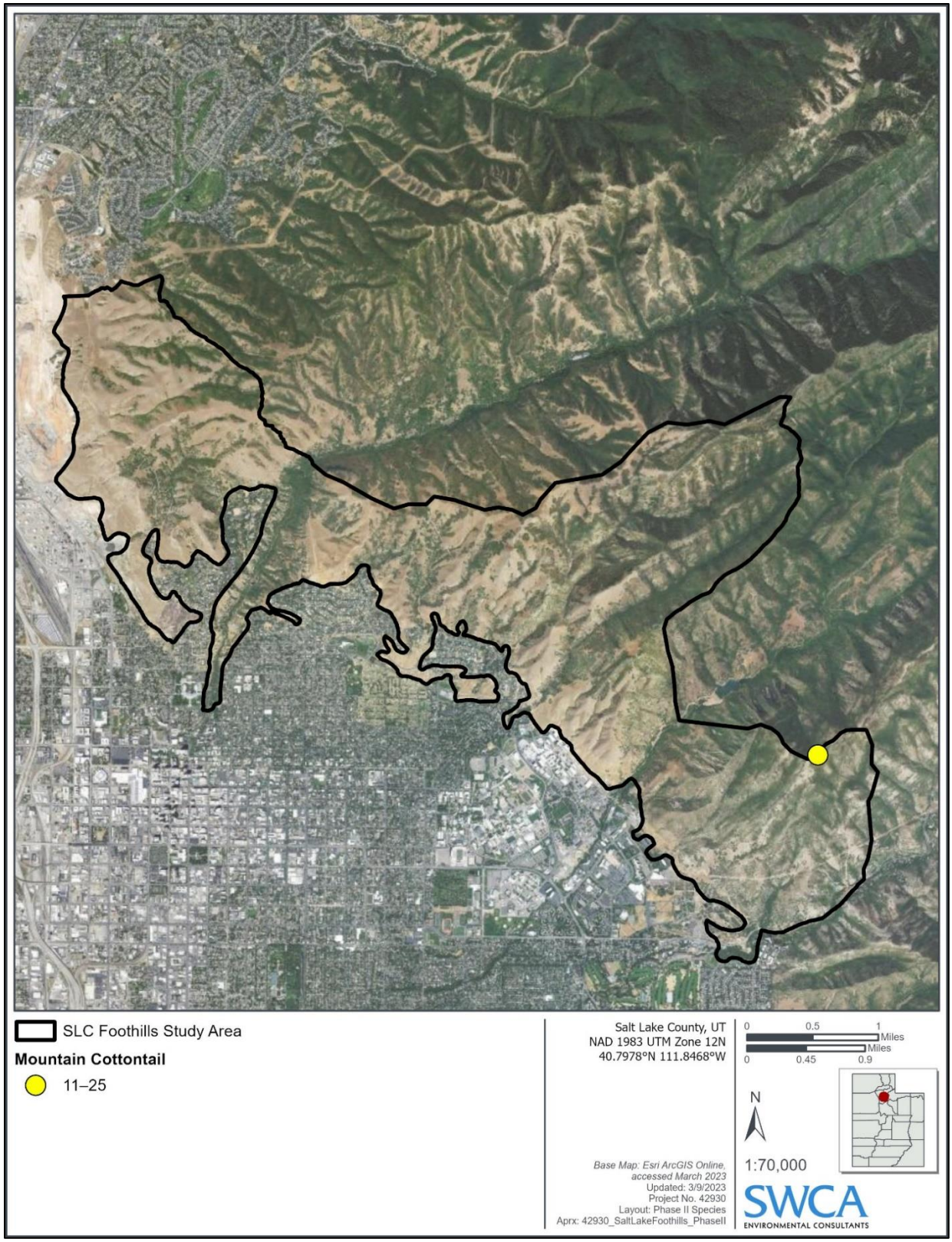

Figure A-17. Wasatch Wildlife Watch detection rates of mountain cottontail. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

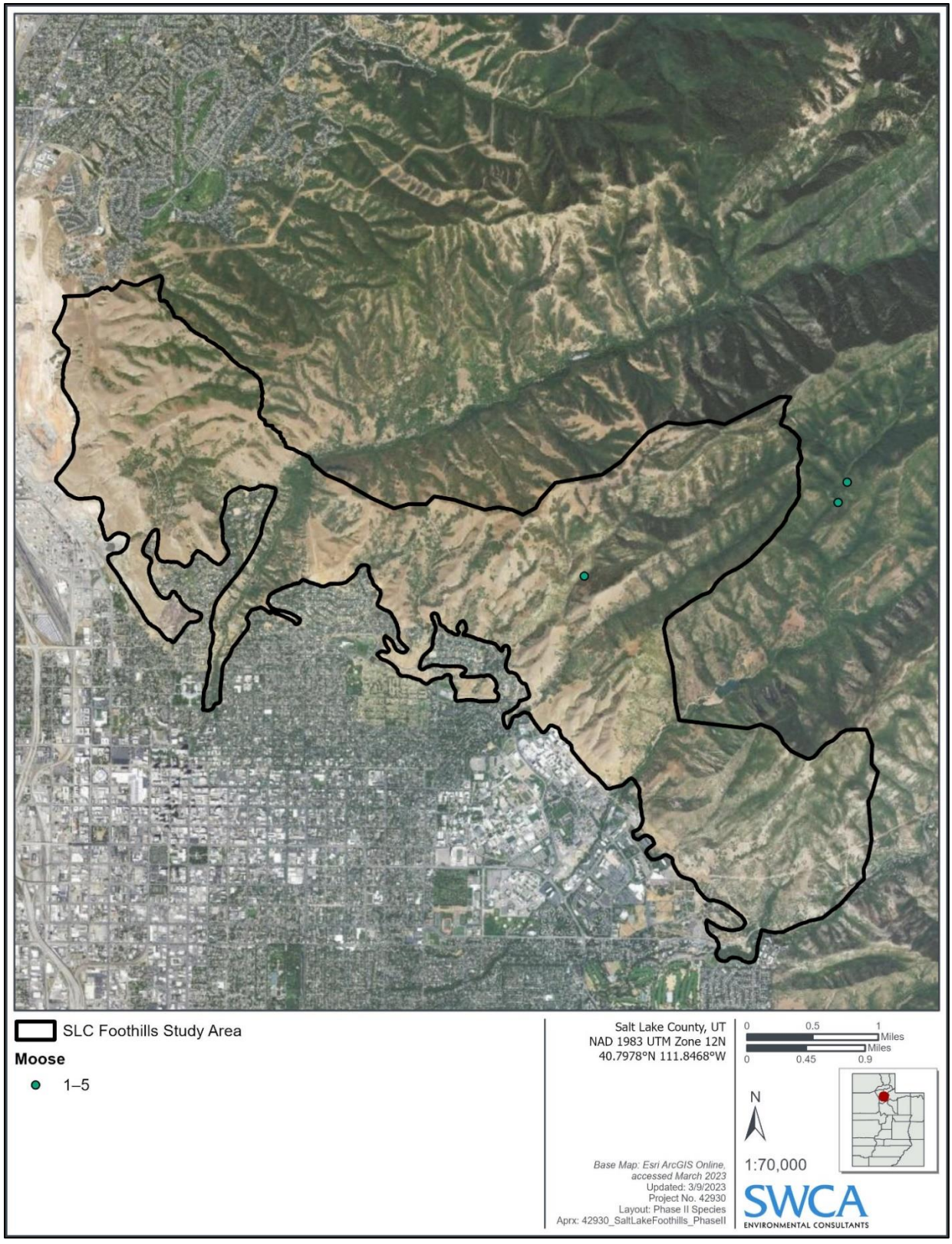

Figure A-18. Wasatch Wildlife Watch detection rates of moose. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

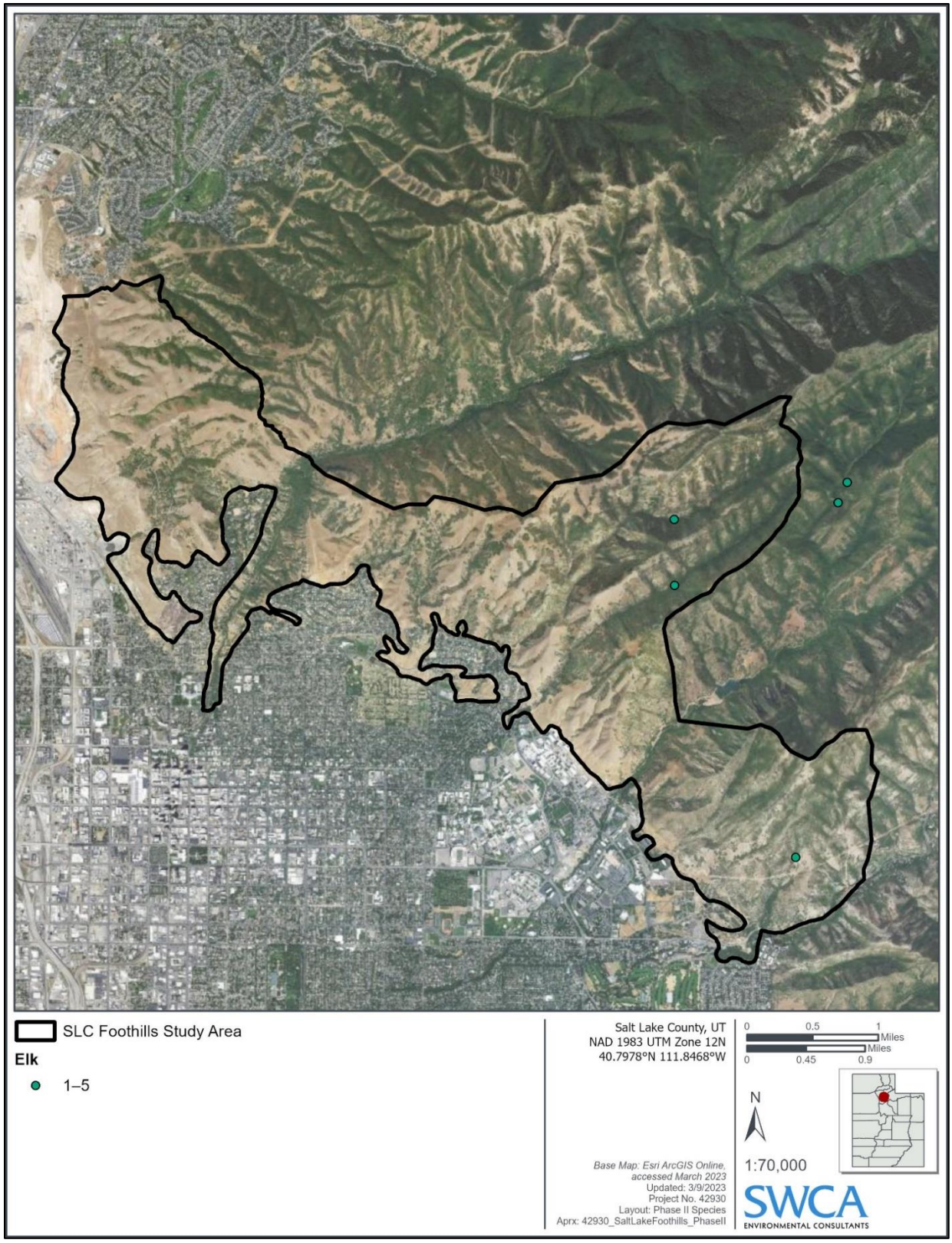

Figure A-19. Wasatch Wildlife Watch detection rates of elk. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

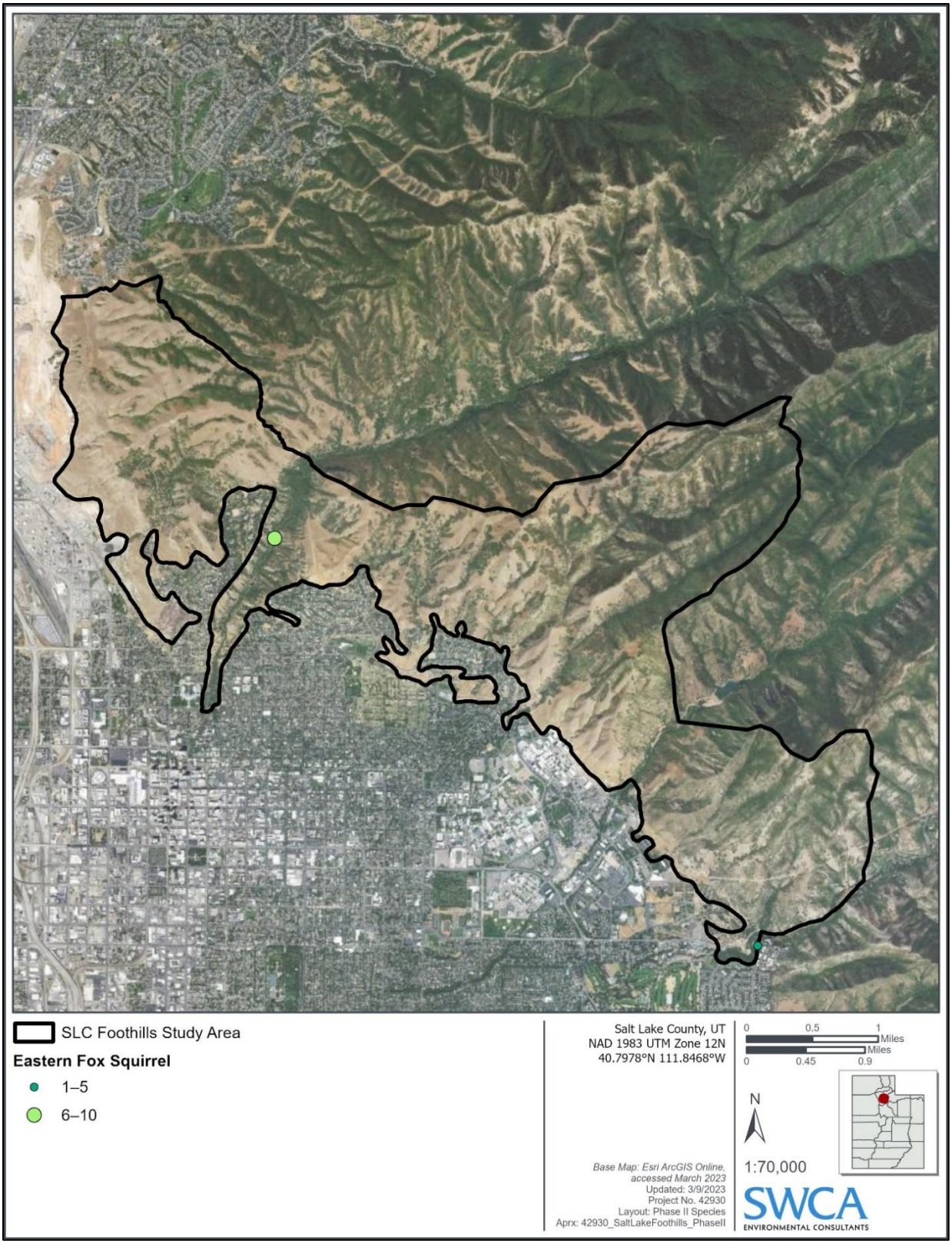

Figure A-20. Wasatch Wildlife Watch detection rates of eastern fox squirrel. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

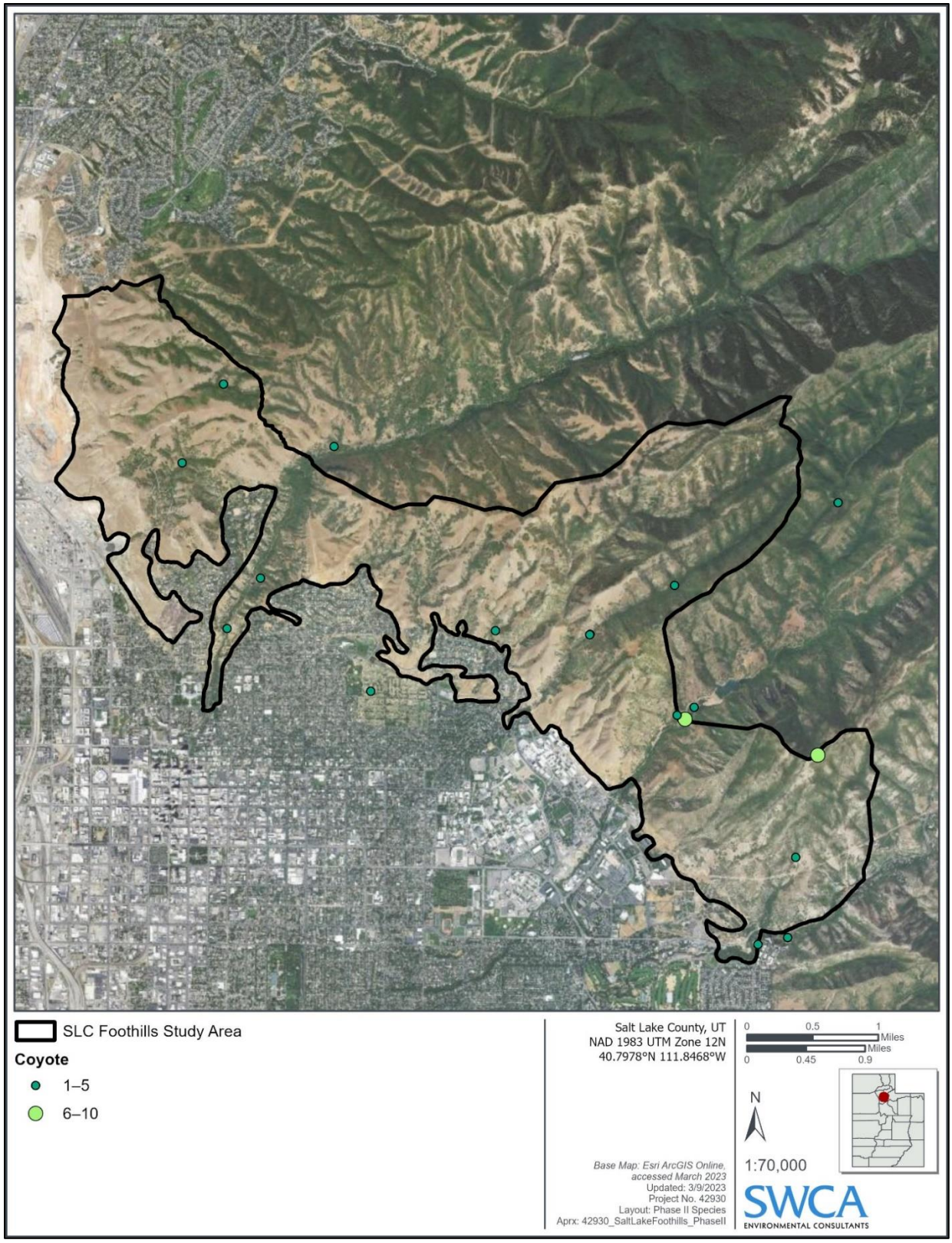

Figure A-21. Wasatch Wildlife Watch detection rates of coyote. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

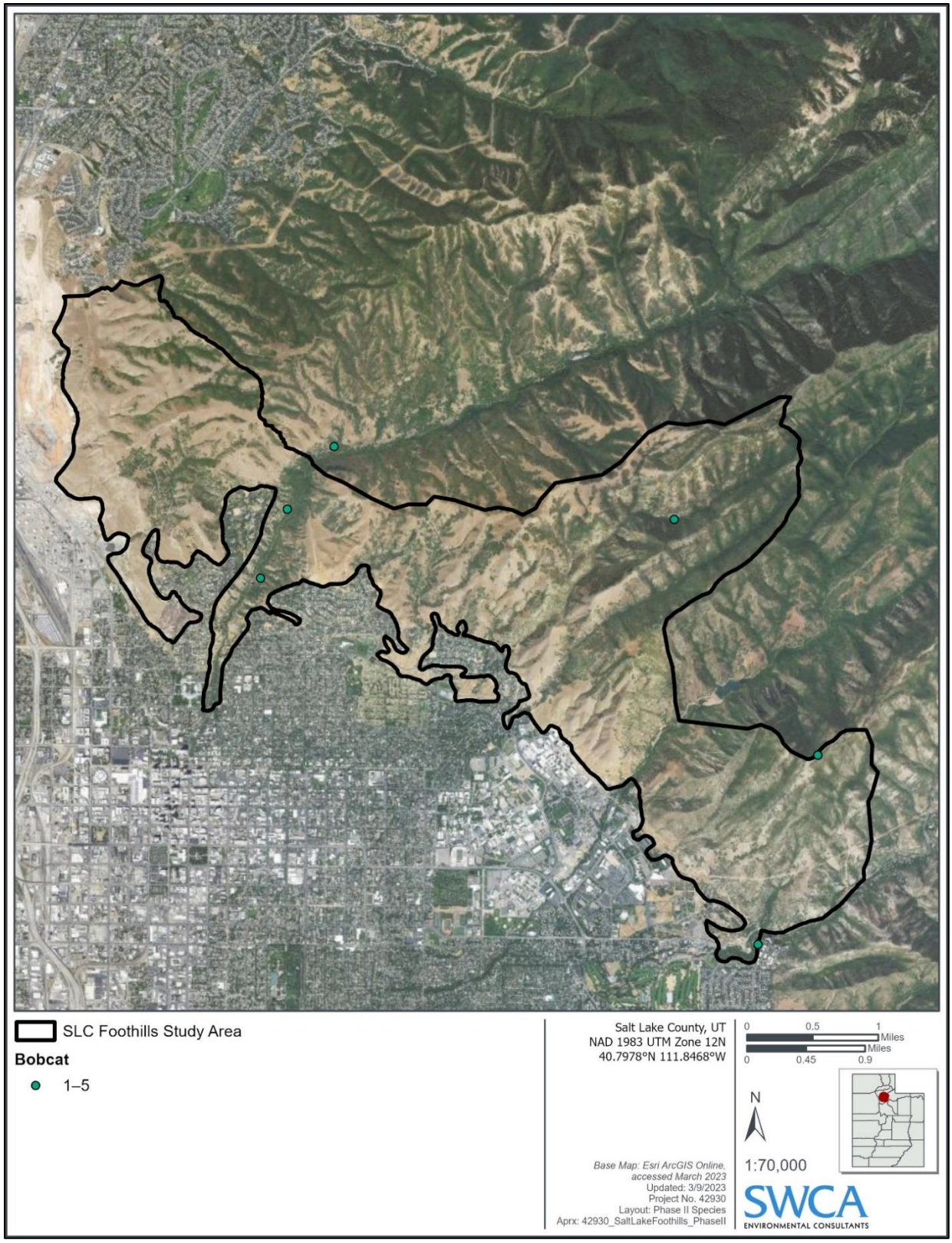

Figure A-22. Wasatch Wildlife Watch detection rates of bobcat. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

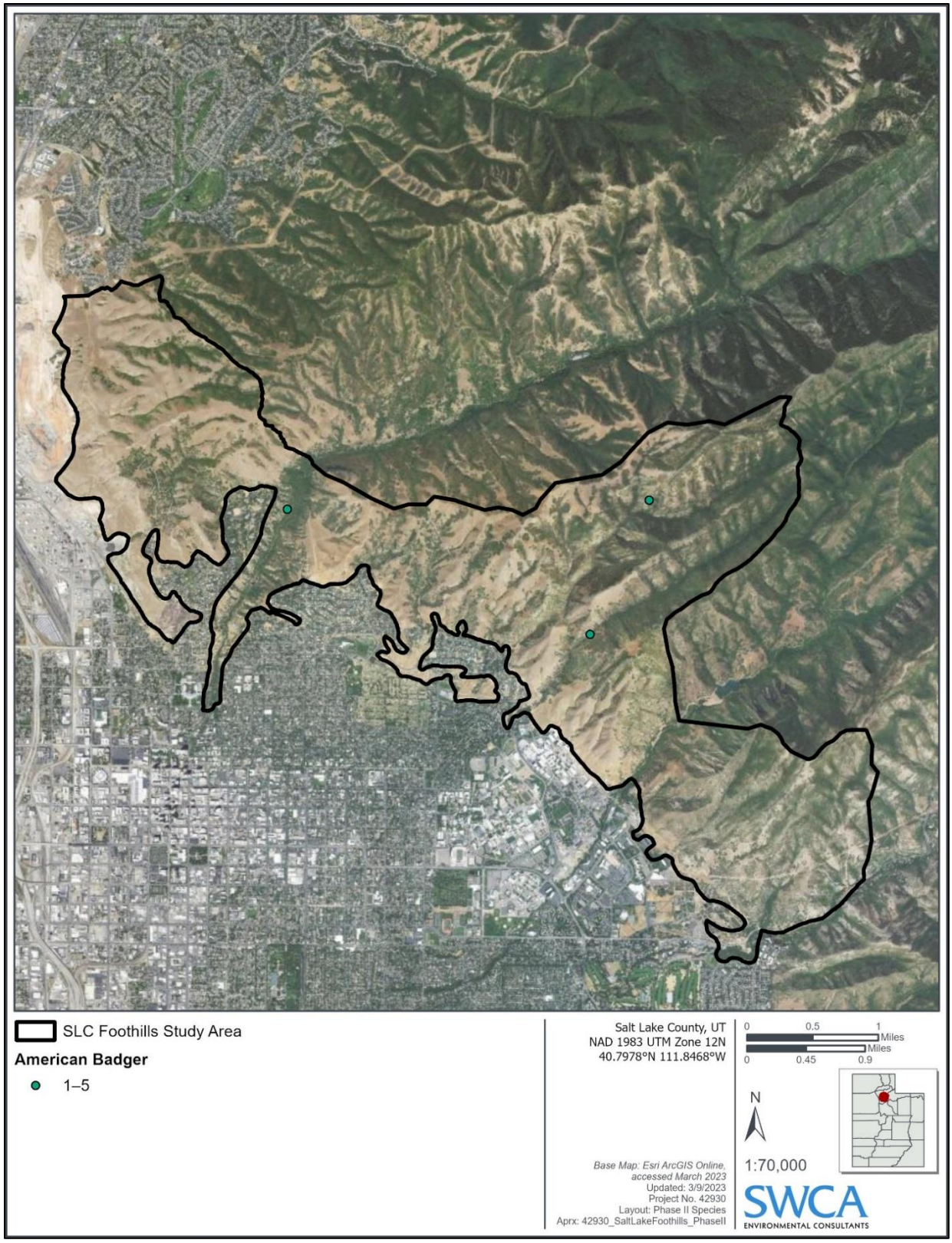

Figure A-23. Wasatch Wildlife Watch detection rates of American badger. ***Note: Occurrence data are based on detection rates during a 28-day survey period with approximately 40 trail cameras across the study area. Absence of detection by the trail cameras in the survey window does not indicate absence of the species in the surrounding areas.***

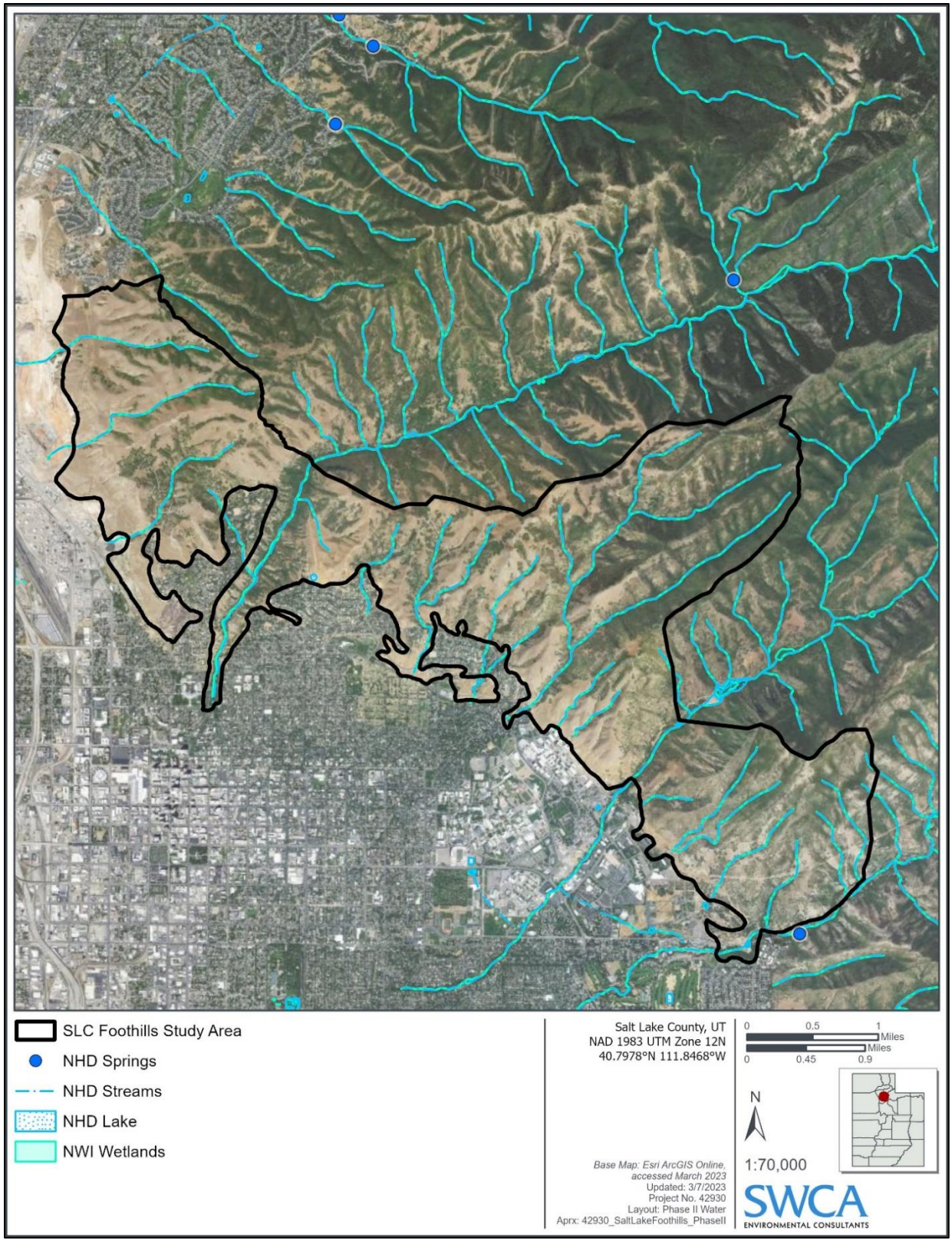

Figure A-24. National Hydrography Dataset and National Wetlands Inventory mapped features.

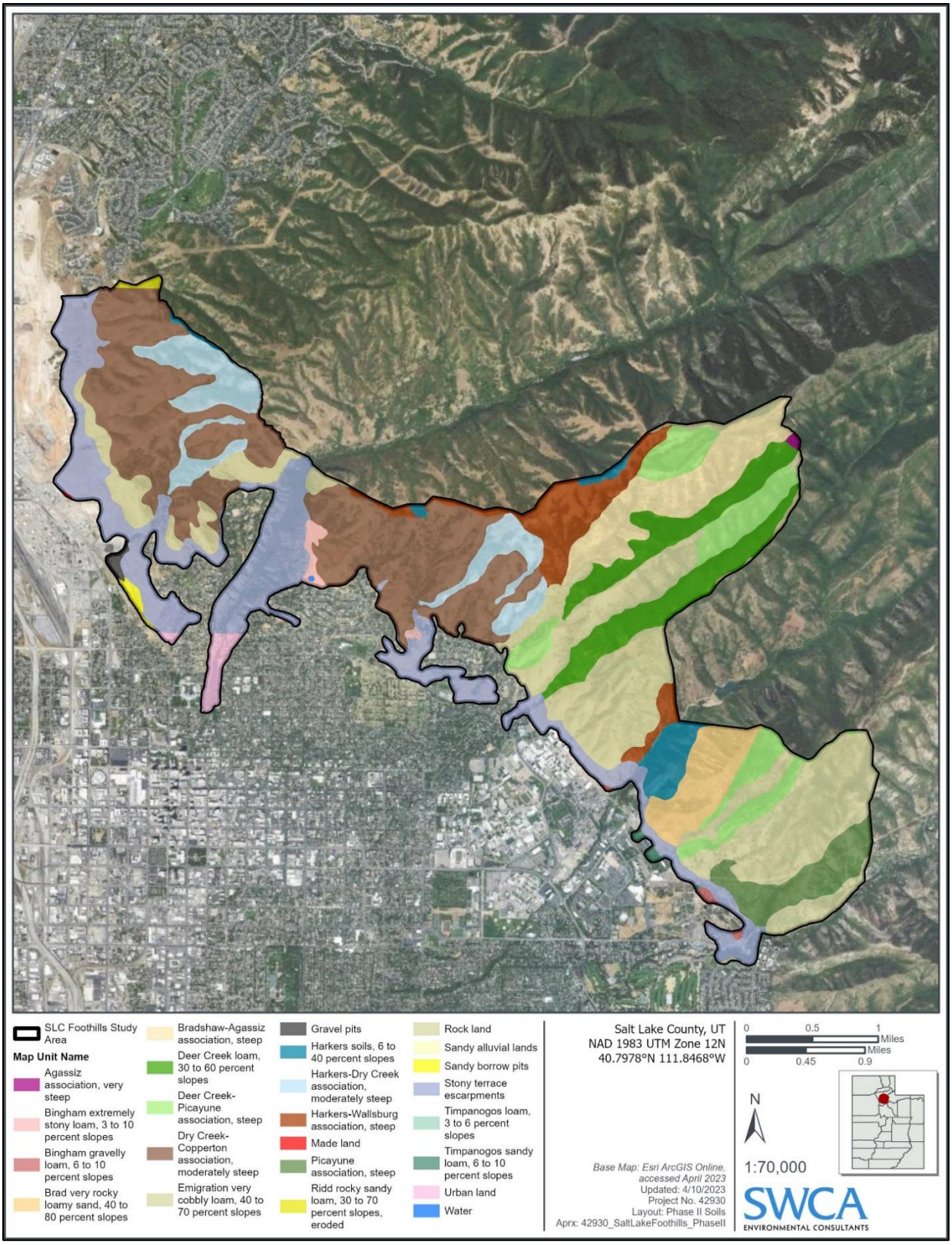

Figure A-25. Soil map units within the study area.

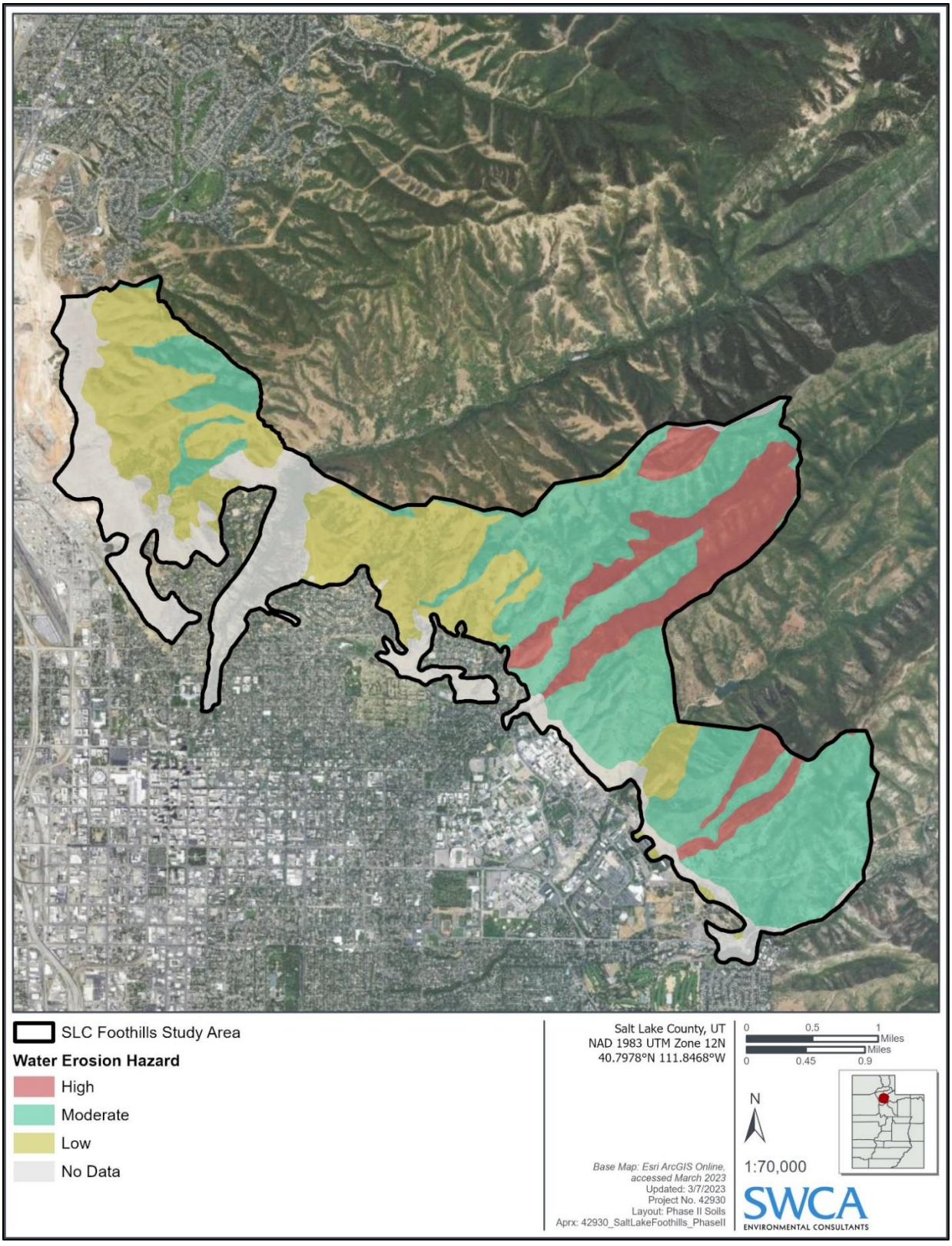

Figure A-26. Inherent risk of site degradation for water erosion in the study area.

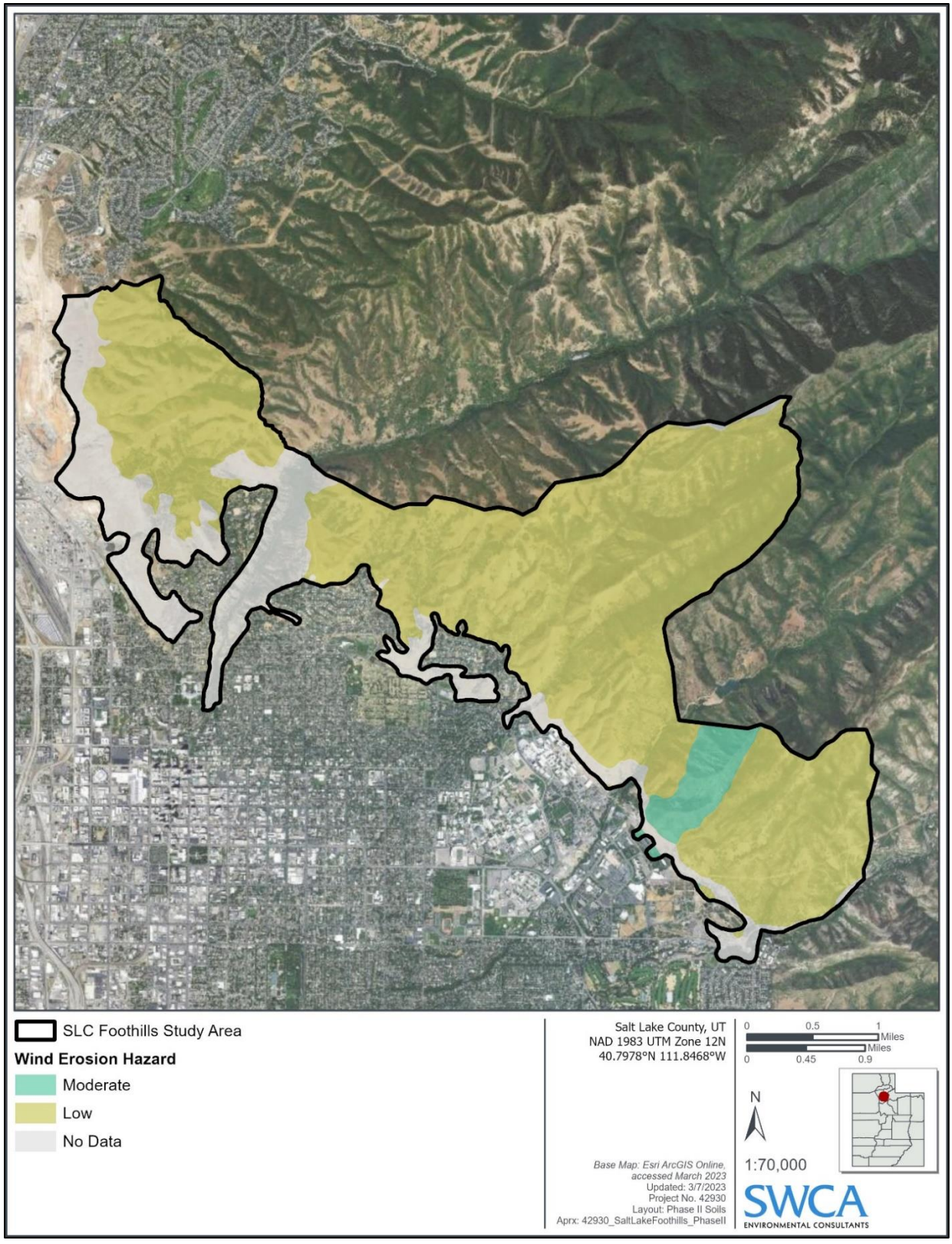

Figure A-27. Inherent risk of site degradation for wind erosion in the study area.

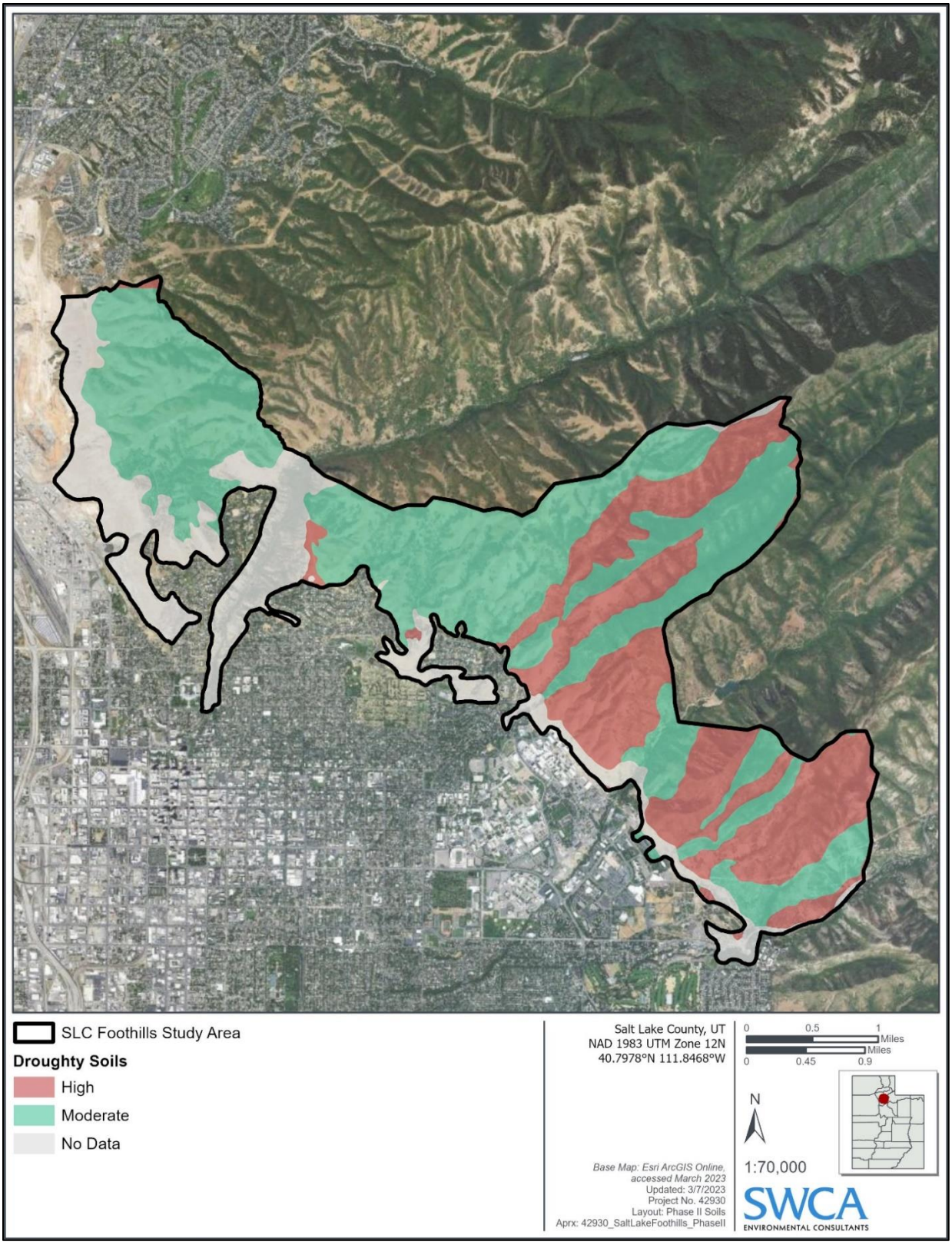

Figure A-28. Inherent risk of site degradation for droughty soils in the study area.

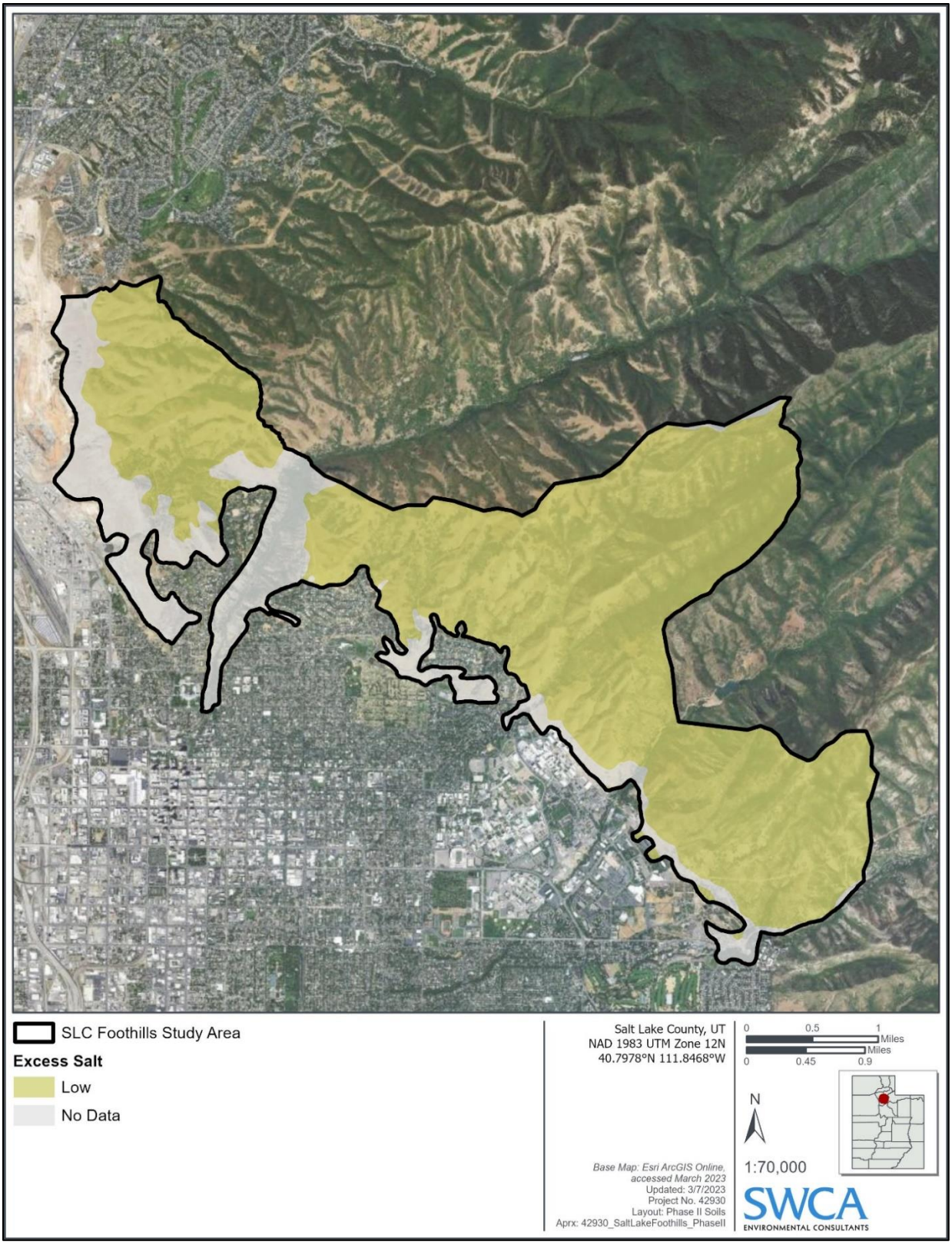

Figure A-29. Inherent risk of site degradation for excess salt in the study area.

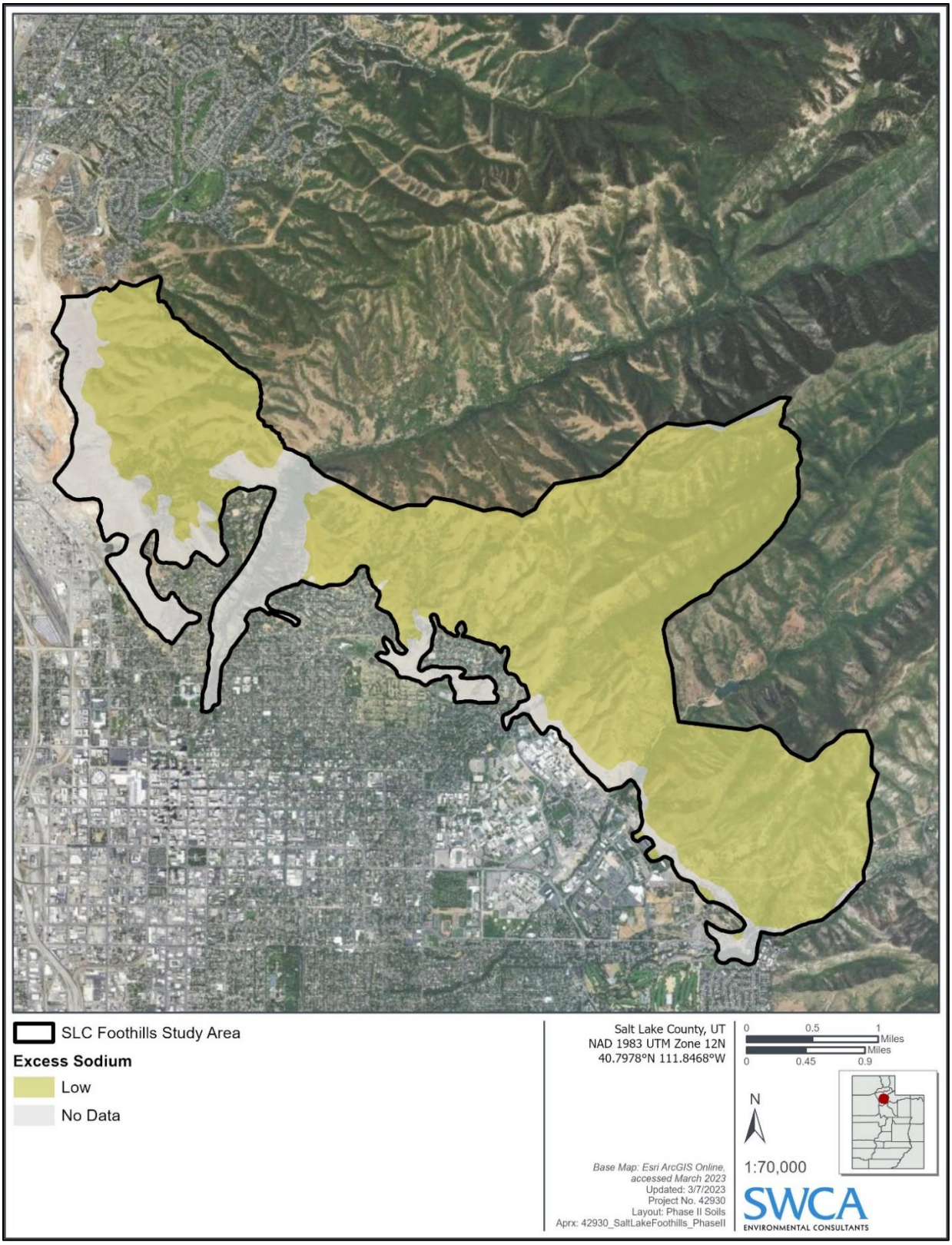

Figure A-30. Inherent risk of site degradation for excess sodium in the study area.

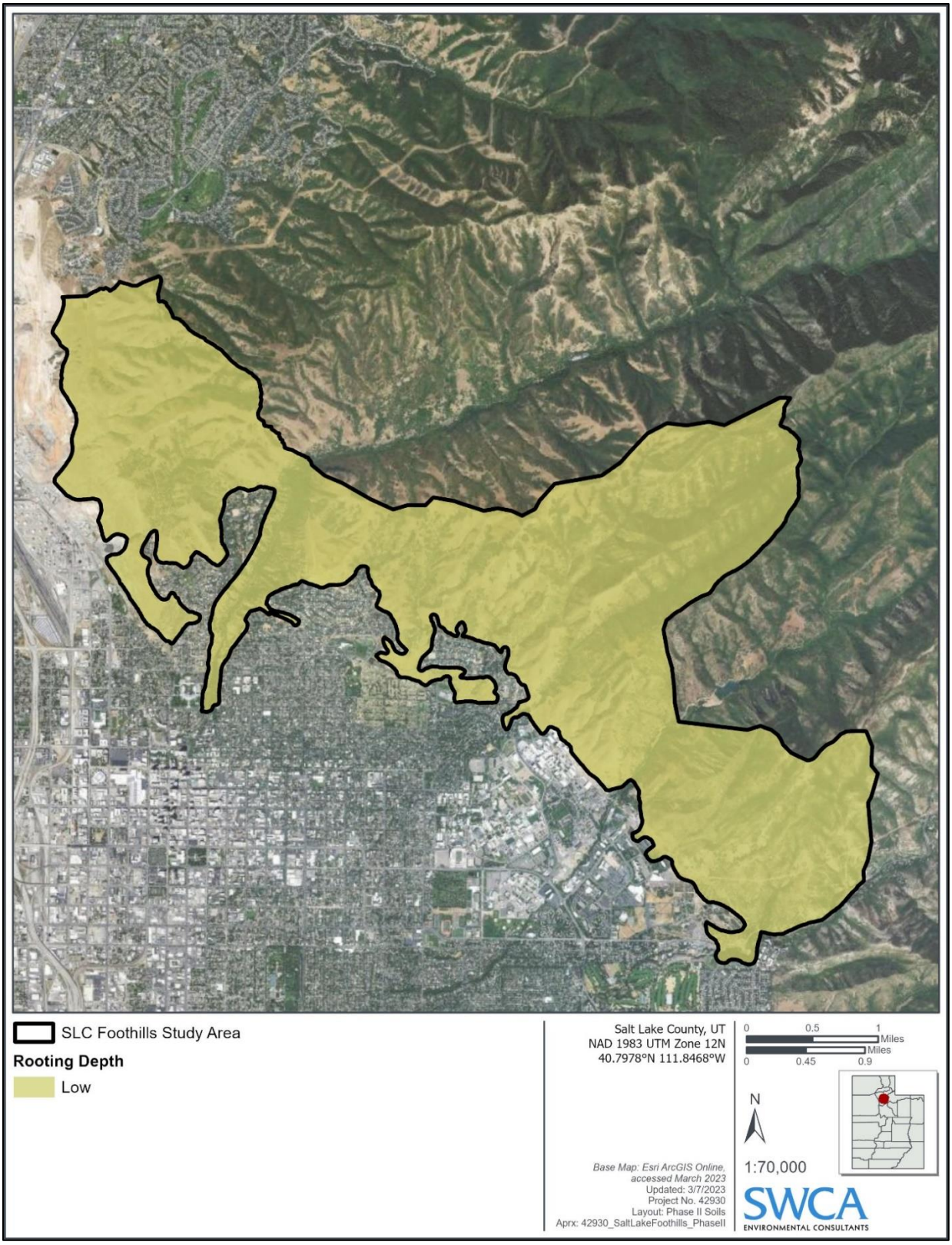

Figure A-31. Inherent risk of site degradation for rooting depth in the study area.

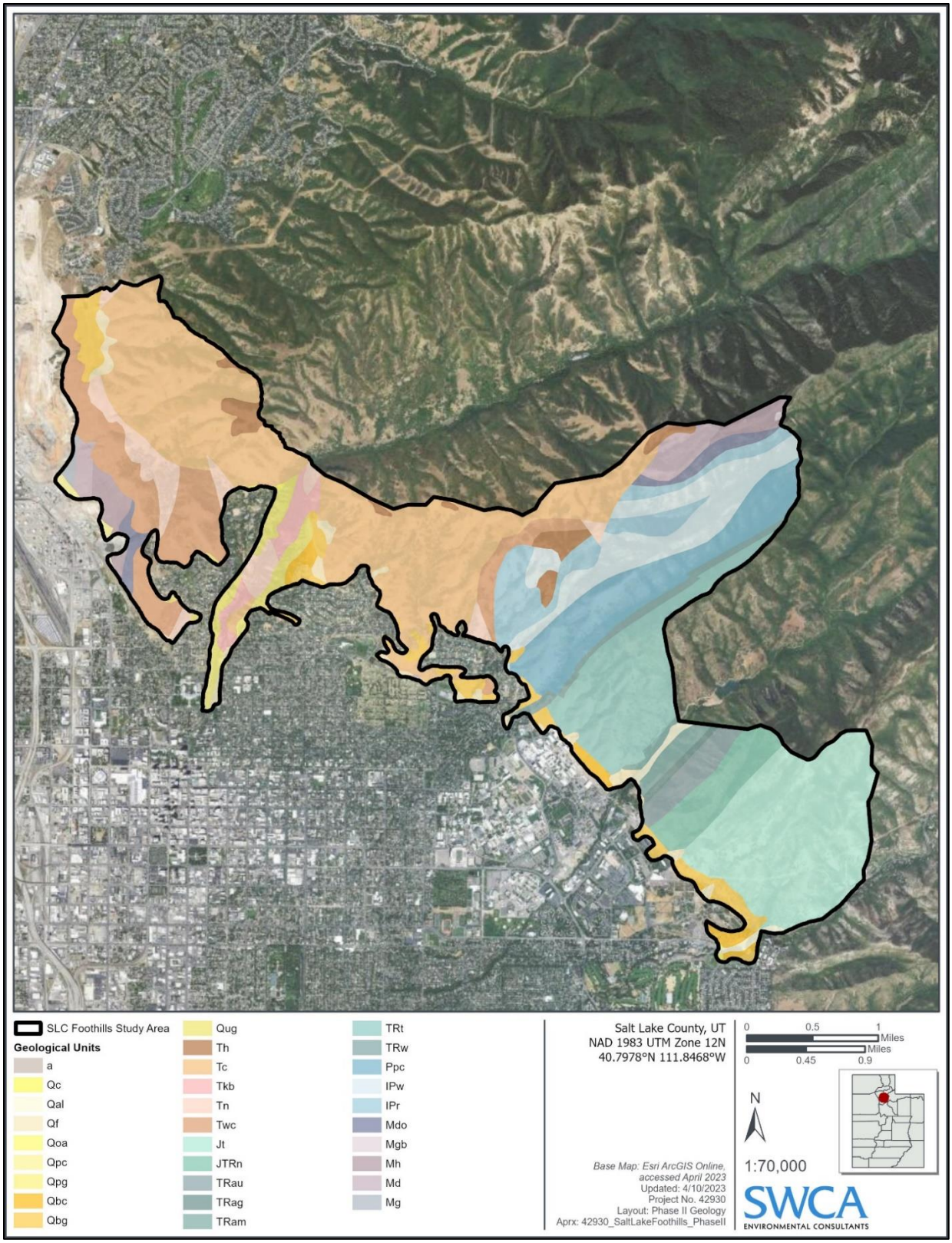

Figure A-32. Geological units in the study area.

APPENDIX B

U.S. Fish and Wildlife Service
Information for Planning and Consultation Resource List

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Davis and Salt Lake counties, Utah

Local office

Utah Ecological Services Field Office

(801) 975-3330
(801) 975-3331

2369 West Orton Circle, Suite 50

West Valley City, UT 84119-7603

https://fws.gov/office/utah-ecological-services

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Canada Lynx Lynx canadensis There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Ute Ladies'-tresses Spiranthes diluvialis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2159	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American White Pelican pelecanus erythrorhynchos This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6886	Breeds Apr 1 to Aug 31

Bald Eagle Haliaeetus leucocephalus — Breeds Dec 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Black Rosy-finch Leucosticte atrata — Breeds Jun 15 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9460

California Gull Larus californicus — Breeds Mar 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Nutcracker Nucifraga columbiana — Breeds Jan 15 to Jul 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Franklin's Gull Leucophaeus pipixcan — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Marbled Godwit Limosa fedoa — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9481

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Rufous Hummingbird selasphorus rufus — Breeds Apr 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Sage Thrasher Oreoscoptes montanus — Breeds Apr 15 to Aug 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9433

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Willet Tringa semipalmata — Breeds Apr 20 to Aug 5

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

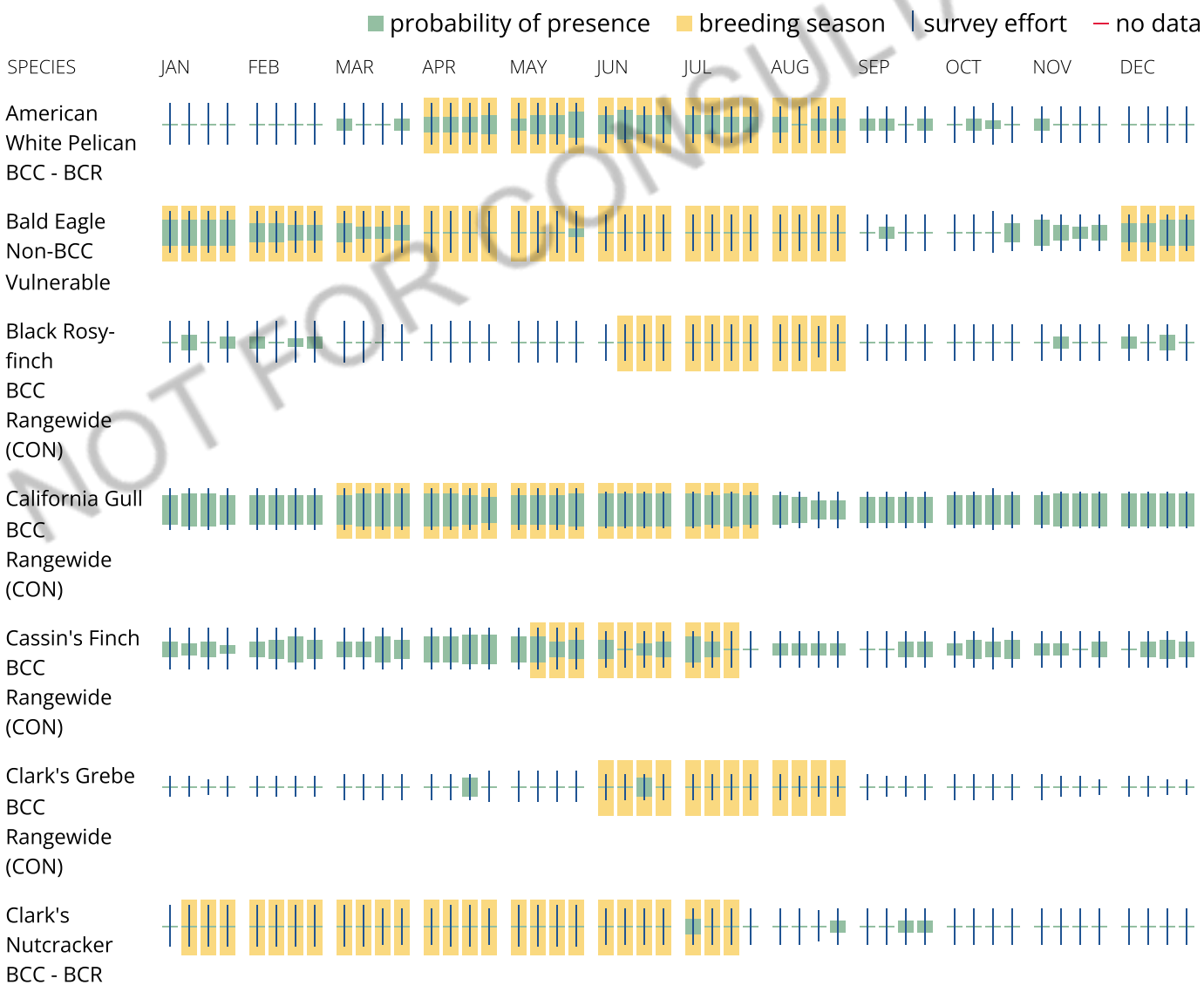
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

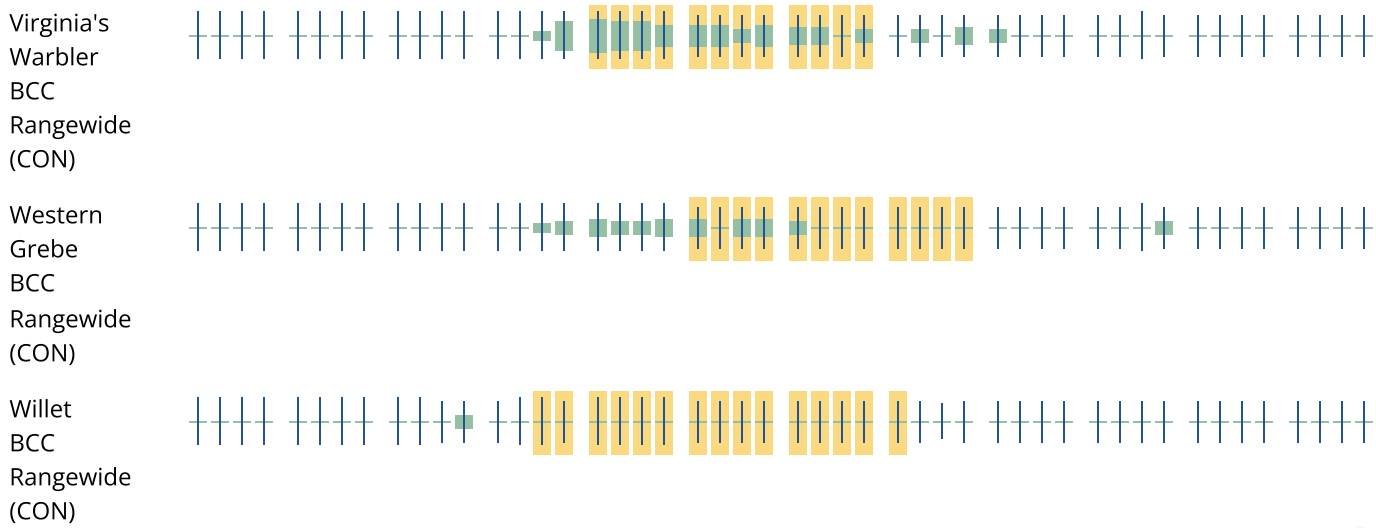
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

(NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas

should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX C

Utah Natural Heritage Program Online Species Search Report

Utah Division of Wildlife Resources
Utah Natural Heritage Program
1594 W. North Temple
PO Box 146301
Salt Lake City, UT 84116

Report Number: 14019
January 3, 2023

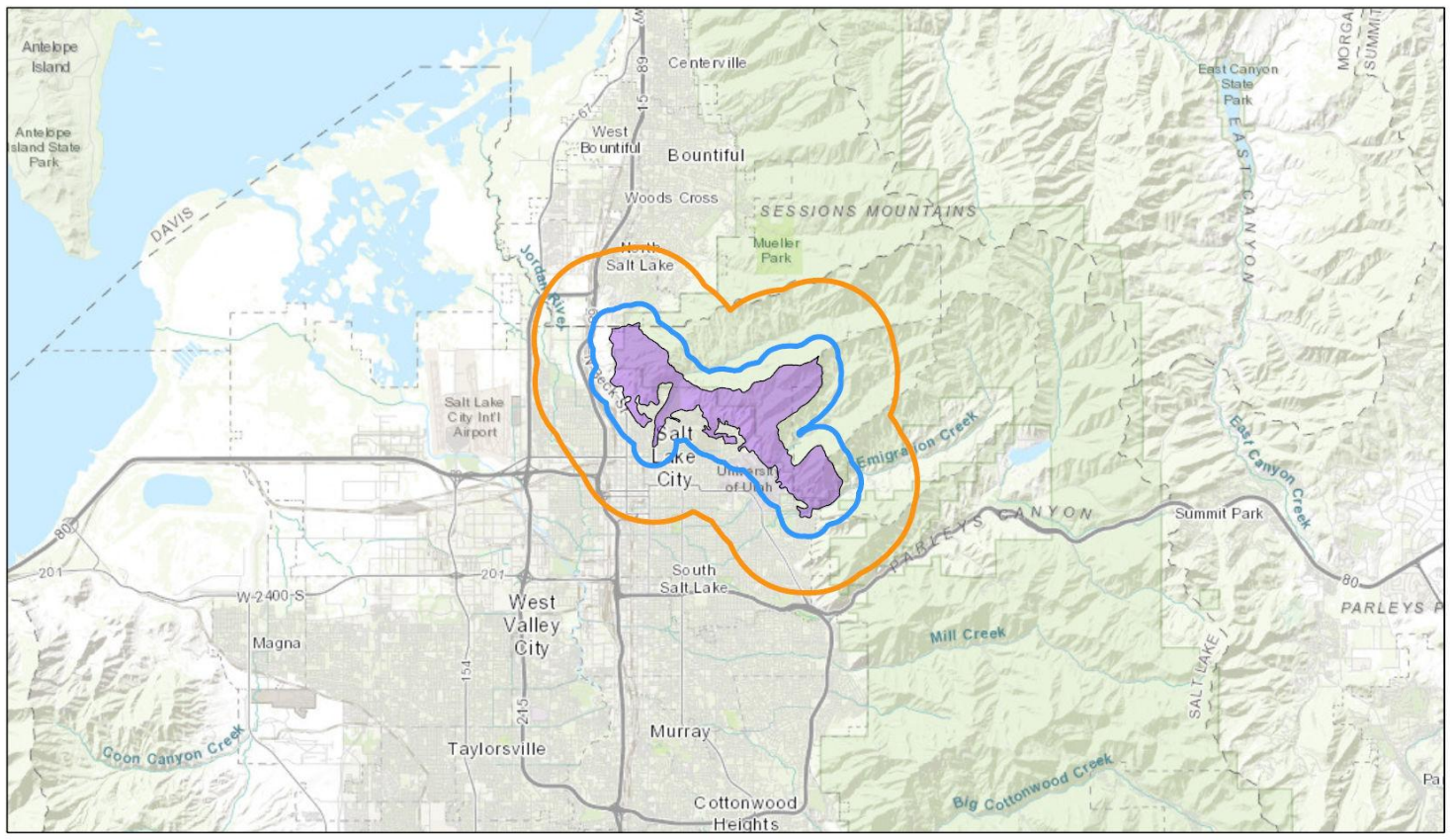
Utah Natural Heritage Program Online Species Search Report

Project Information

Project Name
Salt Lake Foothills Phase II

Project Description
foothills trails project

Location Description
Foothills



January 3, 2023

1:293,561
0 1.75 3.5 7 mi
0 3 6 12 km
Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Animals within a ½ mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
Bald Eagle	Haliaeetus leucocephalus	SGCN		1918
Black Swift	Cypseloides niger	SGCN		1963
Bonneville Cutthroat Trout	Oncorhynchus clarkii utah	SGCN		2007
Coarse Rams-horn	Planorbella binneyi	SGCN		1939
Columbia Spotted Frog	Rana luteiventris	SGCN		1931
Deseret Mountainsnail	Oreohelix peripherica	SGCN		1939
Desert Tryonia	Tryonia porrecta	SGCN		1927
June Sucker	Chasmistes liorus	SGCN	LT	1997
Least Chub	Iotichthys phlegethontis	SGCN		1987
Lewis's Woodpecker	Melanerpes lewis	SGCN		1999
Lyrate Mountainsnail	Oreohelix haydeni	SGCN		1898
Northern Leopard Frog	Lithobates pipiens	SGCN		1979
Peregrine Falcon	Falco peregrinus	SGCN		2017
Snowy Plover	Charadrius nivosus	SGCN		
Utah Physa	Physa gyrina utahensis	SGCN		1939
Western Pearlshell	Margaritifera falcata	SGCN		1884
Western Toad	Anaxyrus boreas	SGCN		1932
Winged Floater	Anodonta nuttalliana	SGCN		1905

Plants within a ½ mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
No Species Found				

Animals within a 2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year
American Bittern	Botaurus lentiginosus	SGCN		1902
Bald Eagle	Haliaeetus leucocephalus	SGCN		1918
Band-tailed Pigeon	Patagioenas fasciata	SGCN		1897
Black Swift	Cypseloides niger	SGCN		1963
Bonneville Cutthroat Trout	Oncorhynchus clarkii utah	SGCN		2007
Coarse Rams-horn	Planorbella binneyi	SGCN		1939
Columbia Spotted Frog	Rana luteiventris	SGCN		1931
Deseret Mountainsnail	Oreohelix peripherica	SGCN		1939
Desert Tryonia	Tryonia porrecta	SGCN		1927
June Sucker	Chasmistes liorus	SGCN	LT	1997
Least Chub	Iotichthys phlegethontis	SGCN		2018
Lewis's Woodpecker	Melanerpes lewis	SGCN		1999
Little Brown Myotis	Myotis lucifugus	SGCN		1964
Long-legged Myotis	Myotis volans	SGCN		1962
Lyrate Mountainsnail	Oreohelix haydeni	SGCN		1898
Mountain Marshsnail	Stagnicola montanensis	SGCN		1994
Northern Leopard Frog	Lithobates pipiens	SGCN		1979
Peregrine Falcon	Falco peregrinus	SGCN		2017
Rustic Ambersnail	Succinea rusticana	SGCN		1942
Snowy Plover	Charadrius nivosus	SGCN		
Utah Physa	Physa gyrina utahensis	SGCN		1939
Western Pearlshell	Margaritifera falcata	SGCN		1884
Western Toad	Anaxyrus boreas	SGCN		1934
Western Yellow-billed Cuckoo	Coccyzus americanus occidentalis	SGCN	LT	1992
Winged Floater	Anodonta nuttalliana	SGCN		1905

Plants within a 2 mile radius

Common Name	Scientific Name	State Status	U.S. ESA Status	Last Observation Year

No Species Found

Definitions

State Status

SGCN	Species of greatest conservation need listed in the Utah Wildlife Action Plan

U.S. Endangered Species Act

LE	A taxon that is listed by the U.S. Fish and Wildlife Service as "endangered" with the probability of worldwide extinction
LT	A taxon that is listed by the U.S. Fish and Wildlife Service as "threatened" with becoming endangered
LE;XN	An "endangered" taxon that is considered by the U.S. Fish and Wildlife Service to be "experimental and nonessential" in its designated use areas in Utah
C	A taxon for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threats to justify it being a "candidate" for listing as endangered or threatened
PT/PE	A taxon "proposed" to be listed as "endangered" or "threatened" by the U.S. Fish and Wildlife Service

Disclaimer

The information provided in this report is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, any given response is only appropriate for its respective request.

The UDWR provides no warranty, nor accepts any liability, occurring from any incorrect, incomplete, or misleading data, or from any incorrect, incomplete, or misleading use of these data.

The results are a query of species tracked by the Utah Natural Heritage Program, which includes all species listed under the U.S. Endangered Species Act and species on the Utah Wildlife Action Plan. Other significant wildlife values might also be present on the designated site. Please contact UDWR's regional habitat manager if you have any questions.

For additional information about species listed under the Endangered Species Act and their Critical Habitats that may be affected by activities in this area or for information about Section 7 consultation under the Endangered Species Act, please visit https://ecos.fws.gov/ipac/ or contact the U.S. Fish and Wildlife Service Utah Ecological Services Field Office at (801) 975-3330 or utahfieldoffice_esa@fws.gov.

Please contact our office at (801) 538-4759 or habitat@utah.gov if you require further assistance.

Your project is located in the following UDWR region(s): Central region , Northern region

Report generated for:
Samantha Mello
SWCA
257 E 200 S #200
Salt Lake City, UT 84106
(508) 245-3223
samanthamello19@gmail.com

APPENDIX D

Information Provided by Stakeholders

Information provided by Save Our Canyons
and Save Our Foothills to SWCA Environmental Consultants

Table D-1. List of Fauna Observed in the Study Area

Common Name	Scientific Name
Birds	
Northern flicker	*Colaptes auratus*
Hairy woodpecker (year-round)	*Leuconotopicus villosus*
Downy woodpecker (year-round)	*Picoides pubescens*
Red-naped sapsucker (migrant)	*Sphyrapicus nuchalis*
Woodhouse's scrub jay (year-round)	*Aphelocoma woodhouseii*
Steller's jay (year-round)	*Cyanocitta stelleri*
Black-billed magpie (year-round)	*Pica hudsonia*
Common raven (year-round)	*Corvus corax*
Clark's nutcracker (Black Mountain only)	*Nucifraga columbiana*
Black-capped chickadee (year-round)	*Poecile atricapillus*
Mountain chickadee (year-round)	*Poecile gambeli*
Juniper titmouse (summer)	*Baeolophus inornatus*
Brown creeper (year-round)	*Certhia americana*
Red-breasted nuthatch (year-round)	*Sitta canadensis*
Ruby-crowned kinglet (year-round)	*Regulus calendula*
Golden-crowned kinglet (winter)	*Regulus satrapa*
Yellow-rumped warbler (year-round)	*Setophaga coronata*
Yellow warbler (summer)	*Setophaga petechia*
Orange-crowned warbler (summer)	*Vermivora celata*
Nashville warbler (migrant)	*Leiothlypis ruficapilla*
MacGillivray's warbler (summer)	*Geothlypis tolmiei*
Townsend's warbler (migrant)	*Setophaga townsendi*
Wilson's warbler (migrant)	*Cardellina pusilla*
Green-tailed towhee (summer)	*Pipilo chlorurus*
Spotted towhee (year-round)	*Pipilo maculatus*
Chipping sparrow (summer)	*Spizella passerina*
Clay-colored sparrow (migrant)	*Spizella pallida*
Brewer's sparrow (migrant)	*Spizella breweri*
Vesper sparrow (summer)	*Pooecetes gramineus*
Lark sparrow (summer)	*Chondestes grammacus*
Fox sparrow (summer)	*Passerella iliaca*
Song sparrow (year-round)	*Melospiza melodia*
Lincoln's sparrow (summer)	*Melospiza lincolnii*
White-crowned sparrow (winter)	*Zonotrichia leucophrys*
Dark-eyed junco (year-round)	*Junco hyemalis*
Lazuli bunting (summer)	*Passerina amoena*
House finch (year-round)	*Haemorhous mexicanus*

Common Name	Scientific Name
Cassin's finch (migrant)	*Haemorhous cassinii*
Gray-crowned rosy-finch (winter)	*Leucosticte tephrocotis*
Pine siskin (year-round)	*Spinus pinus*
American goldfinch (year-round)	*Spinus tristis*
Lesser goldfinch (summer)	*Spinus psaltria*
Western wood-pewee (summer)	*Contopus sordidulus*
Dusky flycatcher (summer)	*Empidonax oberholseri*
Cordilleran flycatcher (summer)	*Empidonax difficilis*
Say's phoebe (summer)	*Sayornis saya*
Western kingbird (summer)	*Tyrannus verticalis*
Loggerhead shrike (winter)	*Lanius ludovicianus*
Northern shrike (winter)	*Lanius excubitor*
Plumbeous vireo (summer)	*Vireo plumbeus*
Warbling vireo (summer)	*Vireo gilvus*
Bullock's oriole (summer)	*Icterus bullockii*
Brown-headed cowbird (summer)	*Molothrus ater*
Western tanager (summer)	*Piranga ludoviciana*
Black-headed grosbeak (summer)	*Pheucticus melanocephalus*
Western meadowlark (summer)	*Sturnella neglecta*
Violet-green swallow (summer)	*Tachycineta thalassina*
Barn swallow (summer)	*Hirundo rustica*
Tree swallow (summer)	*Tachycineta bicolor*
Rock wren (summer)	*Salpinctes obsoletus*
Canyon wren (year-round)	*Catherpes mexicanus*
Pacific wren (winter)	*Troglodytes pacificus*
Blue-gray gnatcatcher (summer)	*Polioptila caerulea*
Townsend's solitaire (summer)	*Myadestes townsendi*
Swainson's thrush (summer)	*Catharus ustulatus*
Hermit thrush (summer)	*Catharus guttatus*
American robin (year-round)	*Turdus migratorius*
American dipper (year-round, creeks only)	*Cinclus mexicanus*
Dusky grouse (year-round)	*Dendragapus obscurus*
Ruffed grouse (year-round)	*Bonasa umbellus*
California quail (year-round)	*Callipepla californica*
Chukar (year-round)	*Alectoris chukar*
Wild turkey (year-round)	*Meleagris gallopavo*
Mourning dove (year-round)	*Zenaida macroura*
Rock pigeon (year-round)	*Columba livia*
Belted kingfisher (year-round, creeks only)	*Megaceryle alcyon*

Common Name	Scientific Name
Mallard (year-round, creeks only)	*Anas platyrhynchos*
Common nighthawk (summer)	*Chordeiles minor*
Common poorwill (summer)	*Phalaenoptilus nuttallii*
White-throated swift (summer)	*Aeronautes saxatalis*
Black-chinned hummingbird (summer)	*Archilochus alexandri*
Broad-tailed hummingbird (summer)	*Selasphorus platycercus*
Turkey vulture (summer)	*Cathartes aura*
Bald eagle (winter)	*Haliaeetus leucocephalus*
Golden eagle (year-round)	*Aquila chrysaetos*
Sharp-shinned hawk (year-round)	*Accipiter striatus*
Cooper's hawk (year-round)	*Accipiter cooperii*
Red-tailed hawk (year-round)	*Buteo jamaicensis*
American kestrel (year-round)	*Falco sparverius*
Peregrine falcon (year-round)	*Falco peregrinus*
Prairie falcon (year-round)	*Falco mexicanus*
Merlin (winter)	*Falco columbarius*
Western screech-owl (year-round)	*Megascops kennicottii*
Great horned owl (year-round)	*Bubo virginianus*
Northern pygmy-owl (year-round)	*Glaucidium californicum*
Mammals	
Rock squirrel	*Otospermophilus variegatus*
Red squirrel	*Sciurus vulgaris*
Fox squirrel	*Sciurus niger*
Northern pocket gopher	*Thomomys talpoides*
Deer mouse	*Peromyscus maniculatus*
American mink	*Neovison vison*
American badger	*Taxidea taxus*
Bobcat	*Lynx rufus*
Mountain lion	*Puma concolor*
Coyote	*Canis latrans*
Red fox	*Vulpes vulpes*
Desert cottontail	*Sylvilagus audubonii*
Elk	*Cervus canadensis*
Mule deer	*Odocoileus hemionus*
Moose	*Alces alces*
Long-tailed weasel	*Mustela frenata*
Short-tailed weasel	*Mustela erminea*
Raccoon	*Procyon lotor*
North American porcupine	*Erethizon dorsatum*

Common Name	Scientific Name
Northern flying squirrel	*Glaucomys sabrinus*
Meadow vole	*Microtus pennsylvanicus*
Striped skunk	*Mephitis mephitis*
Western harvest mouse	*Reithrodontomys megalotis*
Reptiles	
Common garter snake	*Thamnophis sirtalis*
Wandering garter snake	*Thamnophis elegans vagrans*
Western terrestrial garter snake	*Thamnophis elegans*
Valley garter snake	*Thamnophis sirtalis fitchi*
Great Basin gopher snake	*Pituophis catenifer deserticola*
Great basin rattlesnake	*Crotalus oreganus lutosus*
Western yellow-bellied racer	*Coluber constrictor mormon*
Northern rubber boa	*Charina bottae*
Greater short-horned lizard	*Phrynosoma hernandesi*
Western fence lizard	*Sceloporus occidentalis*
Common sagebrush lizard	*Sceloporus graciosus*
Common side-blotched lizard	*Uta stansburiana*
Western whiptail lizard	*Cnemidophorus tigris*
Plateau striped whiptail lizard	*Cnemidophorus septemvittatus*

I'm Maria Goller with Save Our Foothills. I have a PhD in ecology and animal behavior.

The sections I marked on the map are areas of greatest importance for birds and mammals.

Obviously, having large untouched areas would be best for all plants and animals in the Foothills.

However, if trails are a "must", they should at the very least avoid:

Black Mountain to Red Butte protected area

Gulches and gullies, especially Dry Creek

Forested areas (scrub oak, maple)

The least important areas for birds are the bare grassland areas. However, keep in mind that the grasses are very important to insects and birds eat insects.

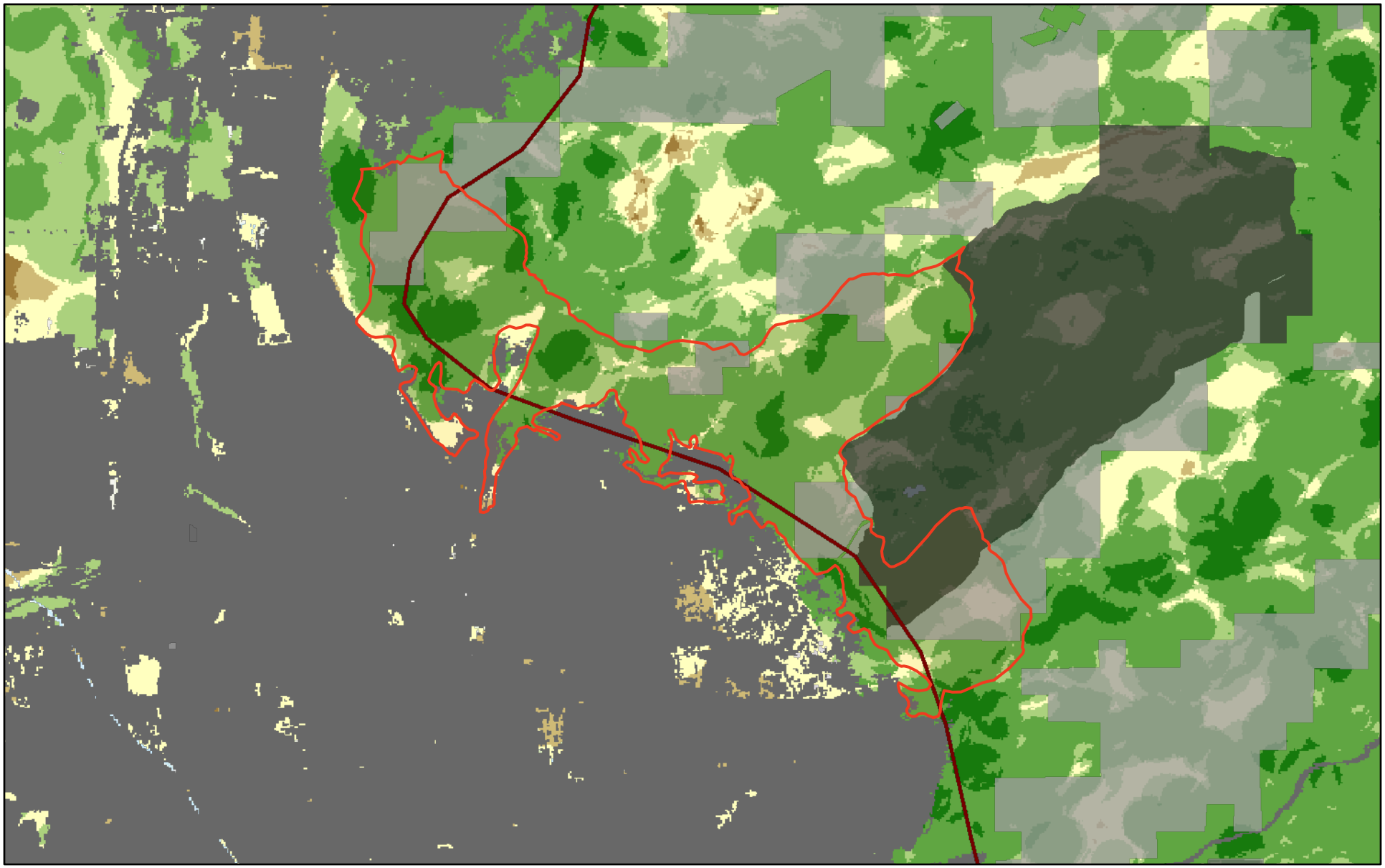
Exposed rocky areas (little grass, rocks on ground) are important habitat for horned lizards.

If you have any questions, I will email you the same note and you can reply to the email. Or call me at 801 678 3349.

Thanks,

Maria

SLC Foothills Landscape Diversity - Landscape Diversity



May 25, 2022

1:105,808

SLC_Foothills_StudyArea

Ecoregion Boundaries

Conserved Lands (by Gap Status)

1

2

3

Landscape Diversity

Most landscape diversity

More landscape diversity

Slightly more landscape diversity

0 0.5 1 2 mi

0 1 2 4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Notes from Maria Goller (Save our Foothills):

MAMMALS OBSERVED personally:
Rock squirrel
Red squirrel
Fox squirrel
Northern pocket gopher
Deer mouse
American mink
American badger
Bobcat
Mountain lion
Coyote
Red fox
Desert cottontail
Elk
Mule deer
Moose
Long-tailed weasel
Short-tailed weasel
Raccoon
North American porcupine

MAMMALS EXPECTED or observed by others:
Northern flying squirrel
Meadow vole
Striped skunk
Western harvest mouse
Western jumping mouse?
Northern grasshopper mouse?
Long-tailed vole?
Sagebrush vole?
Meadow vole?
Vagrant shrew?
Masked shrew?
Definitely several other species I'm missing!

COMMON REPTILES:
Common garter snake
Wandering garter snake
Western terrestrial garter snake
Valley garter snake
Great Basin gopher snake
Great basin rattlesnake

Western yellow-bellied racer
Northern rubber boa
Greater short-horned lizard
Western fence lizard
Common sagebrush lizard
Common side-blotched lizard
Western whiptail lizard
Plateau striped whiptail lizard

PASSERINE SPECIES

Northern flicker (year-round)
Hairy woodpecker (year-round)
Downy woodpecker (year-round)
Red-naped sapsucker (migrant)
Woodhouse's scrub jay (year-round)
Steller's jay (year-round)
Black-billed magpie (year-round)
Common raven (year-round)
Clark's nutcracker (Black Mountain only)
Black-capped chickadee (year-round)
Mountain chickadee (year-round)
Juniper titmouse (summer)
Brown creeper (year-round)
Red-breasted nuthatch (year-round)
Ruby-crowned kinglet (year-round)
Golden-crowned kinglet (winter)
Yellow-rumped warbler (year-round)
Yellow warbler (summer)
Orange-crowned warbler (summer)
Nashville warbler (migrant)
MacGillivray's warbler (summer)
Townsend's warbler (migrant)
Wilson's warbler (migrant)
Green-tailed towhee (summer)
Spotted towhee (year-round)
Chipping sparrow (summer)
Clay-colored sparrow (migrant)
Brewer's sparrow (migrant)
Vesper sparrow (summer)
Lark sparrow (summer)
Fox sparrow (summer)
Song sparrow (year-round)
Lincoln's sparrow (summer)

White-crowned sparrow (winter)
Dark-eyed junco (year-round)
Lazuli bunting (summer)
Painted bunting (unusual, summer)
House finch (year-round)
Cassin's finch (migrant)
Gray-crowned rosy-finch (winter)
Common redpoll (unusual, winter)
Pine siskin (year-round)
American goldfinch (year-round)
Lesser goldfinch (summer)
Western wood-pewee (summer)
Dusky flycatcher (summer)
Cordilleran flycatcher (summer)
Hammond's flycatcher (migrant)
Say's phoebe (summer)
Western kingbird (summer)
Eastern kingbird (migrant)
Loggerhead shrike (winter)
Northern shrike (winter)
Plumbeous vireo (summer)
Warbling vireo (summer)
Bullock's oriole (summer)
Brown-headed cowbird (summer)
Western tanager (summer)
Black-headed grosbeak (summer)
Horned lark (migrant)
Western meadowlark (summer)
Violet-green swallow (summer)
Barn swallow (summer)
Tree swallow (summer)
Northern rough-winged swallow (migrant)
Cliff swallow (migrant)
Rock wren (summer)
Canyon wren (year-round)
Pacific wren (winter)
Blue-gray gnatcatcher (summer)
Western bluebird (migrant)
Mountain bluebird (migrant)
Townsend's solitaire (summer)
Swainson's thrush (summer)
Hermit thrush (summer)
American robin (year-round)
Cedar waxwing (migrant)

American pipit (migrant)
American dipper (year-round, creeks only)

NON-PASSERINE SPECIES
Dusky grouse (year-round)
Ruffed grouse (year-round)
California quail (year-round)
Chukar (year-round)
Wild turkey (year-round)
Mourning dove (year-round)
Rock pigeon (year-round)
Belted kingfisher (year-round, creeks only)
Mallard (year-round, creeks only)
Common nighthawk (summer)
Common poorwill (summer)
White-throated swift (summer)
Black-chinned hummingbird (summer)
Anna's hummingbird (migrant)
Broad-tailed hummingbird (summer)
Rufous hummingbird (migrant)
Turkey vulture (summer)
Bald eagle (winter)
Golden eagle (year-round)
Northern harrier (migrant)
Sharp-shinned hawk (year-round)
Cooper's hawk (year-round)
Broad-winged hawk (migrant)
Red-tailed hawk (year-round)
Swainson's hawk (migrant)
American kestrel (year-round)
Peregrine falcon (year-round)
Prairie falcon (year-round)
Merlin (winter)
Western screech-owl (year-round)
Great horned owl (year-round)
Northern pygmy-owl (year-round)
Northern saw-whet owl (migrant)