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Results of Surveys for Special Status Reptiles at the Site 300 Facilities of Lawrence Livermore National Laboratory

J. J. Woollett

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Results of Surveys for Special Status Reptiles at the Site 300 Facilities of Lawrence Livermore National Laboratory

Prepared for

University of California
Lawrence Livermore National Laboratory
Attention Jim Woollett, L-627
P.O. Box 808
7000 East Avenue
Livermore, CA 94551

Prepared by

Swaim Biological Consulting
4435 First Street, PMB 312
Livermore CA, 94551
(925) 455-8770

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INTRODUCTION

The purpose of this report is to present the results of a live-trapping and visual surveys for special status reptiles at the Site 300 Facilities of Lawrence Livermore National Laboratory (LLNL). The survey was conducted under the authority of the Federal recovery permit of Swaim Biological Consulting (PRT-815537) and a Memorandum of Understanding issued from the California Department of Fish and Game.

Site 300 is located between Livermore and Tracy just north of Tesla Road (Alameda County) and Corral Hollow Road (San Joaquin County) and straddles the Alameda and San Joaquin County line (Figures 1 and 2). It encompasses portions of the USGS 7.5 minute Midway and Tracy quadrangles (Figure 2).

Focused surveys were conducted for four special status reptiles including the Alameda whipsnake (*Masticophis lateralis euryxanthus*), the San Joaquin Whipsnake (*Masticophis flagellum ruddocki*), the silvery legless lizard (*Anniella pulchra pulchra*), and the California horned lizard (*Phrynosoma coronatum frontale*).

SPECIES ACCOUNTS

Alameda Whipsnake

The Alameda whipsnake is one of two subspecies of the California whipsnake. The second subspecies, the chaparral whipsnake (*M. l. lateralis*) has no State or Federal protective status. Site 300 is geographically located in an area where the protected Alameda whipsnake and the chaparral whipsnake intergrade (Jennings 1983). Identification of museum specimens form the Corral Hollow area (all on Tesla Road-Alameda County) indicates presence of a single intergrade specimen and the four specimens of the non-protected subspecies (Jennings 1983, 1994). Jennings (1994) did not provide information regarding which subspecies the intergrade more closely resembled. Swaim (1998) found an intergrade population on the site and concluded that one of 14 individuals captured may more closely resemble the listed subspecies and recommended further analysis. The species range map in Stebbins (1985) indicates a peninsula of chaparral whipsnake in the extreme eastern edge of Alameda County and extreme western San Joaquin County. However, the classification in that area of the range was based on only a few museum specimens (Stebbins, pers. comm.). Base on Swaim (1998) the U.S. Fish and Wildlife Service in Sacramento has included the study area within the range of the

The Alameda whipsnake is a slender, fast moving, diurnal snake with a narrow neck and relatively broad head. The Alameda whipsnake reaches up to five feet in length. It is found primarily in chaparral, Diablan sage scrub, northern coyote brush scrub, and riparian scrub. Recent studies of Alameda whipsnakes equipped with radio transmitters have shown that they also utilize grassland and oak woodland/savanna adjacent to chaparral and scrub communities (Swaim 1994). The home ranges of six radio-equipped whipsnakes were centered on scrub communities. They ranged into the surrounding grassland for distances of greater than 500 feet

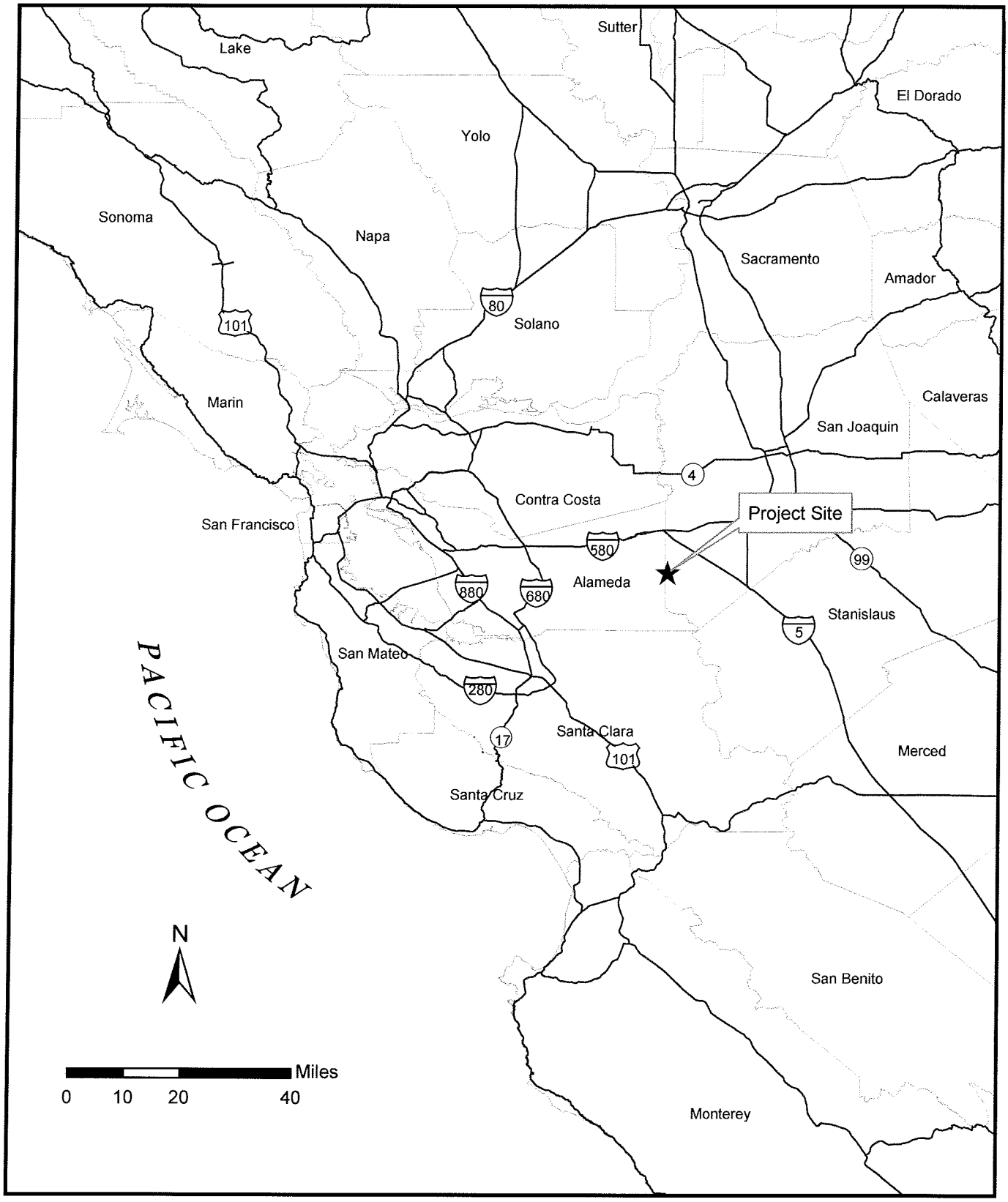

Figure 1. Regional location map.

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(Swaim 1994). Whipsnakes remained in the grassland for periods ranging from a few hours to several weeks at a time (Swaim 1994). Grassland habitats were used by male whipsnakes most extensively during the mating season in spring (Swaim 1994).

San Joaquin Whipsnake

The San Joaquin coachwhip is a large-sized (90-155 cm SVL), smooth- scaled, large-eyed, slender snake with a buffy citrine, tan-yellow, or olive brown dorsal color. The San Joaquin whipsnake ranges from Colusa County in the Sacramento Valley southward to the Grapevine in the Kern County portion of the San Joaquin Valley and westward into the inner South Coast Ranges An isolated population occurs in the Sutter Buttes.The San Joaquin whipsnake occurs in open, dry, vegetation e associations. In the western San Joaquin Valley, it occurs in valley grassland and saltbush scrub associations. The San Joaquin whipsnake probably requires one or more mammal associates because it uses burrows for refuge and probably for oviposition sites, and may sometimes be dependent on mammals for food. Although this snake probably has a high degree of dependence on mammals, the species it may be dependant upon and the nature of such relationships are vague.

Silvery Legless Lizard

The California legless lizard, *Anniella pulchra*, is a small (43/8-7 in.) limbless burrowing lizard. It has small eyes and a shovel shaped inset lower jaw. Although they appear snakelike they can be differentiated by the presence of a moveable eyelid. *Anniella pulchra*, are covered with small cycloid scales which appear polished, enabling movement through soil to be easy. Dorsal coloration is highly variable; along a continuum that displays beige, metallic silver, dark brown, ad black. Ventral coloration is also variable ranging from a pale white yellow to bright yellow. A dark to black middorsal line runs the length of the body. Lateral stripes are present on the sides of the body where the dorsal and ventral coloration meet. However, these stripes may decrease in number with age. Young are cream or silver dorsally and gray or pale yellow ventrally.

Anniella pulchra, is nearly endemic to California. It can be found in suitable habitats from Antioch South into Coast Ranges, Transverse Mountains, and Peninsular ranges into NW Baja, CA. There are spotty occurrences within the San Joaquin Valley, southern Sierra, Walker Basin, and in the Piute, Scodie and Techachapi mountains. This species has accidentally been introduced in the southern Sierra foothills through nursery and tree planting operations.

Habitat requirements of this fossorial animal include loose soil for burrowing, moisture, warmth and plant cover. Legless lizards construct burrows in loose soil with a high sand fraction. Often they can be located in the sparse vegetation of chaparral, beaches, pine-oak woodlands, and the streamside growth of cottonwoods, sycamores, and oaks. *Anniella pulchra*, depend on moist soil. Soil moisture is key to energy conservation on hot days.

Anniella pulchra, are insectivorous feeding primarily on larval insects, termites, beetles and spiders. They feed within leaf litter in the overhang of trees and shrubs. They can also be found under logs, rocks, boards, and even the twig base of woodrat nests.

Anniella pulchra, breed between early spring and July. They are viviparous. Litter size ranges from 1-4, however, 2 is the standard. Young are born between September and November. It is believed sexual maturity is not reached until age three and that females may not be capable of reproducing yearly.

California Horned Lizard

The California horned lizard (*Phrynosoma coronatum frontale*), California Species of Special Concern and formerly a federal Species of Concern, occupies a variety of open habitats including coastal scrub, oak savanna and grasslands. Historically, the species ranged throughout the Central Valley and Coast Range from Sonoma County south to Santa Barbara, Kern and Los Angeles Counties where it likely intergrades with the San Diego horned lizard (*P. c. blainvillei*). Despite a wide-ranging distribution, the species appears to be restricted to localized populations because of its close association with loose soils that have a high sand content (Jennings and Hayes 1994). However, local abundance and geographic distribution are poorly understood for this region. Horned lizards require open areas to forage and feed primarily on native harvester ants (*Pogonomyrmex barbatus*) species. The spread of introduced Argentine ants (*Linepithema humile*), which are toxic to horned lizards and eliminate native ants, has probably contributed significantly to localized extirpations in urban and semi-rural areas (Jennings, pers. comm. 2000). The species cannot exist in areas that have been converted to agriculture, so its current distribution throughout the Central Valley is highly restricted.

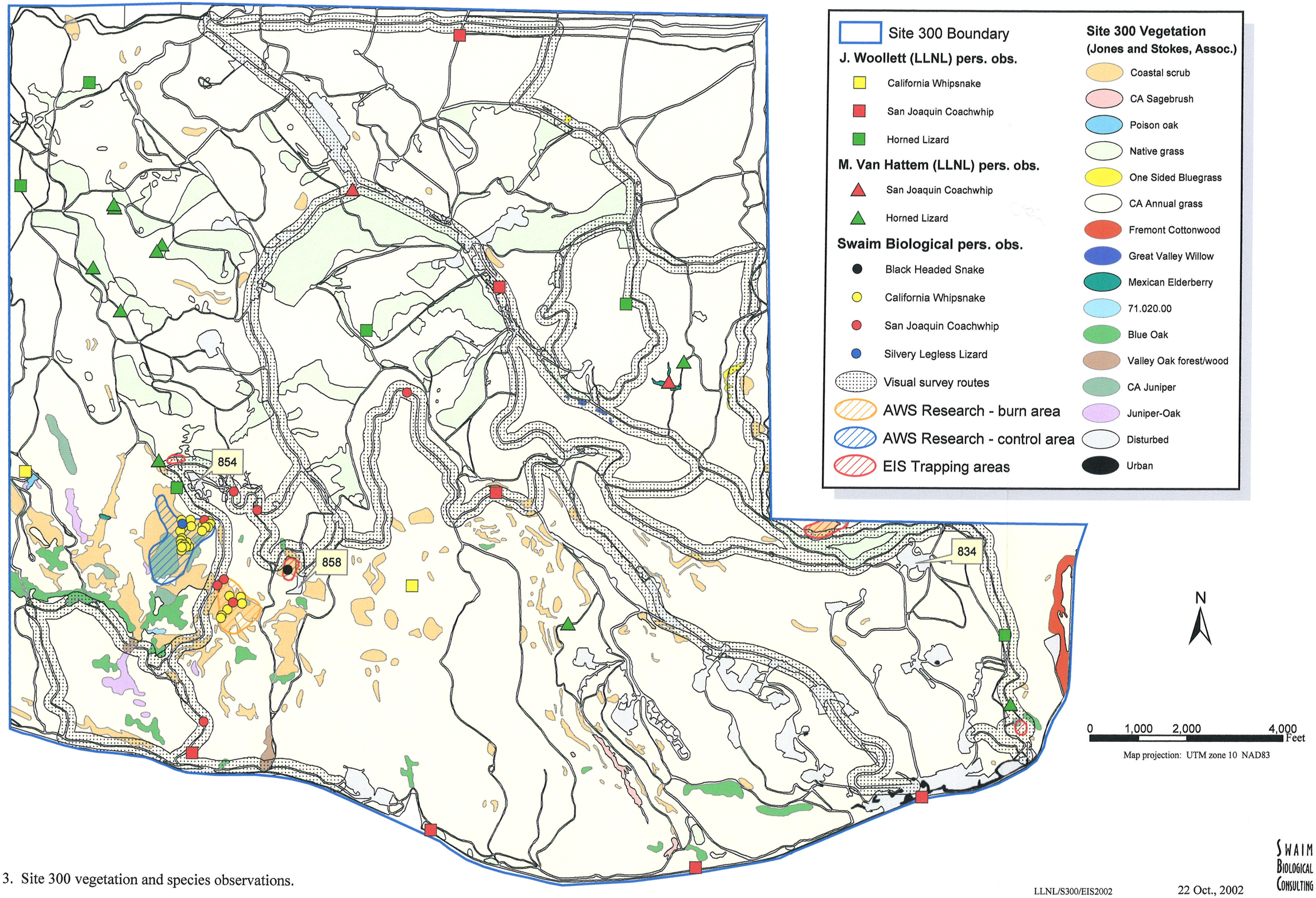

Figure 3. Site 300 vegetation and species observations.

MATERIALS AND METHODS

Trapping and visual surveys were conducted during spring and fall in two areas in the southwest quadrant of S300 (Figure 3). Fall trapping and visual surveys were conducted in additional areas of the site (Figure 3). Spring surveys were conducted for a total of 63 days between April 16 and July 1, 2002. Fall surveys were conducted for 30 days between August 14 and October 15, 2002. Visual surveys were conducted on all days the traps were checked and on August 14 and August 19. Visual transect routes corresponded the pathways between traplines and several road routes on the site (Figure 3).

Habitats sampled on the site included those expected to be the primary habitats to support the special status target species including grassland and scrub. Trapping areas included two large scrub patches in the southwest quadrant, grassland in the vicinity of Building 854, scrub northwest of Building 834 (just south of Primex), scrub in the vicinity of the drop tower, and scrub in the vicinity of Building 875. Visual surveys were also conducted in grassland (native and non-native) adjacent to roads on the site (Figure 3).

Two types of traps were used during the surveys. Funnel traps are constructed of a wooden frame with large panels of 1/8th inch wire mesh on surfaces of the trap. Two wire mesh funnels were inserted into the same end of each trap. A single length of mylar flap was positioned inside the trap such that a small space (approximately 1/4 inch) remained between the small funnel openings and the mylar flap material. Wire was used to fasten each end of the flap to the small funnel opening. A strong material, such as wire, is needed to prevent mice from chewing and breaking the fastening material. Each trap was fitted with a 8" x 12" piece of dense foam board (insulation) which rested on the bottom of the wooden trap frame to cover and create a thermal retreat for captives. One or two pieces of plywood measuring approximately 16" x 20" were placed on top of each trap to provide additional shade.

The second type of trapping method used was drift fenced in association with a bucket or "pit fall" trap. This type of trapping was used at the drop tower site and the area near Building 875. Two arrays were constructed at each of these areas. An array consisted of three 50 foot lengths of drift fence radiated in three directions from a central point. There was a 2-gallon bucket at the end of each arm of the array and in the center. This type of trapping was only possible in areas with sandy or loose soils. The bucket size and method was used to target the legless lizard and horned lizard. This method was expected to be more effective means of capture for legless lizards and horned lizards.

Traps were monitored daily, when active. All vertebrate species captured were identified to species, with the exception of several individual mice which were identified to genus (*Peromyscus*) and shrews identified to genus (*Sorex*) spp. All snakes were marked for future recognition by clipping a specific ventral scute. Rattlesnakes were safely handled and processed through use of a series of clear plastic tubes of various diameters between 1/4 and 2 inches in diameter.

RESULTS

Three of the four special status target species were documented on the site (Figure 3 and Table 1). Figure 3 shows the location of all special status reptiles observed during the 2002 site wide study. In addition, all recorded observations of special status reptiles by LLNL wildlife biologists, Jim Woollett and Michael Van Hattem, and observations from the 1991 EIS work and Swaim (1998) were mapped (Figure 3).

Three of the species, the Alameda whipsnake, Coast horned lizard and the San Joaquin whipsnake had been previously documented on the site. During the 2002 surveys, the fourth target species, the silvery legless lizard was documented in the southwest quadrant of the site (Figure 3). A second rare reptile species with no special status was also documented on the site during the 2002 fall surveys. One California black-headed snake was captured in a bucket trap near the Drop Tower during the fall 2002 survey (Figure 3).

Table 1. Special status reptiles captured or observed during 2002 Swaim Biological Consulting Surveys.

Species	Total # of Captures	Location
California whipsnake	19	Southwest Quadrant
San Joaquin whipsnake	6	Southwest Quadrant
Silvery legless lizard	1	Southwest Quadrant

DISCUSSION

Alameda Whipsnake

The California whipsnake is abundant in the southwest quadrant of the site. This species (and intergrades) is likely to be resident in several other areas of the site based on suitable habitat. These include the areas mapped as coastal scrub by Jones and Stokes (Figure 3). Although the California whipsnake would concentrate activity in the scrub they use the adjacent grassland and may be expected in non-scrub habitats on the site, at least on occasion. The abundant and wide-spread distribution of rock outcrops on the site (not mapped) increase the potential for California whipsnakes to move away from scrub habitats.

San Joaquin Whipsnake

Based on our observations and those of LLNL biologists, the San Joaquin Whipsnake can be expected use all but the most disturbed developed areas of the site.

California Horned Lizard

Although no California horned lizards were observed during the 2002 surveys, they have been previously documented in a wide distribution on the site by LLNL biologists (Figure 3) The distribution of the California horned lizard on the site is expected to coincide with the distribution of sandy soils in all of the site habitats except those that are highly disturbed or developed.

Silvery Legless Lizard

Surveys for the legless lizard on the site confirmed their presence in the southwest quadrant. Given the presence of the legless lizard in that area, they would be expected to be present in suitable habitat throughout the site. Surveys outside the southwest quadrant were not conducted at the optimal time period to detect this species.

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