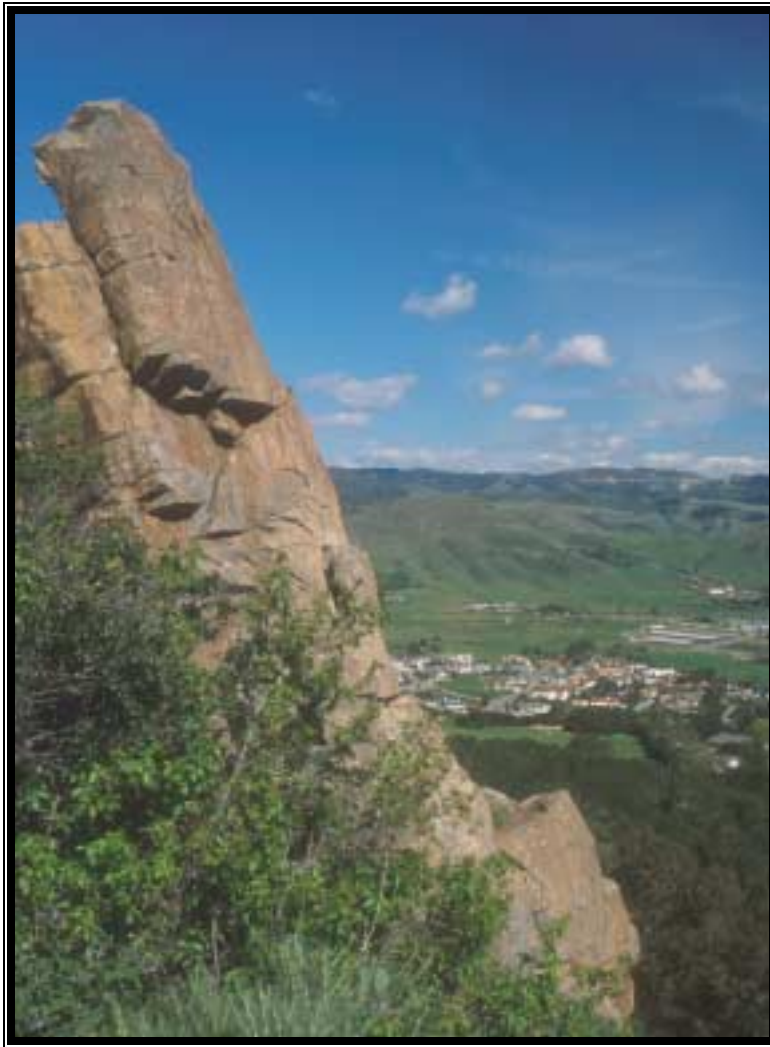


Wildlife Resources of the Bishop Peak Natural Reserve



Prepared for:

**The City of San Luis Obispo
Administration Department
990 Palm Street
San Luis Obispo, CA 93401**

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225 Prado Road, Suite D
San Luis Obispo, CA 93401
(805) 541-0310 FAX (805) 541-0421

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Introduction

The special character of the City of San Luis Obispo is derived, to a great extent, from its small town atmosphere and unique, visually pleasing surroundings. These attributes have contributed to community growth and resulted in pressure to develop available lands for additional housing and commercial infrastructure. While such development is unavoidable and even economically beneficial, it can result in the degradation of the pastoral scenery that is considered so appealing to area residents and visitors. Effective planning is necessary to accommodate community growth while ensuring that scenic views and natural resources are preserved. The City General Plan includes a provision that briefly describes a program to create an open space greenbelt around the city. The creation of this greenbelt is intended to assist in shaping the urban limits of the city, protecting sensitive natural resources, preserving contiguous wildlife corridors through and around urban areas, and providing outdoor recreational opportunities for local residents and visitors. To this end, municipal planners for the city have committed to a variety of land conservation efforts, including the acquisition of land on Bishop Peak.

Bishop Peak is the highest in the chain of volcanic peaks, or *morros*, that extend from Islay Hill northwest to Morro Rock, forming a ridge that divides the Los Osos and Chorro Creek valleys. Bishop Peak is the third in the chain of nine named peaks and is situated between Cerro San Luis and Chumash Peak. The pinnacle is a prominent feature of the scenic backdrop surrounding San Luis Obispo and a popular area landmark that is frequented by hikers, joggers, rock climbers, and other recreational users (Figure 1).

Despite its private ownership, city residents have long revered Bishop Peak as a special place within their city and have actively sought to preserve its scenic character and sensitive natural resources for the enjoyment of future generations. The creation of the Bishop Peak Natural Reserve (BPNR) is the culmination of a successful, cooperative effort between landowners, the City of San Luis Obispo, and various county and state agencies. The effort was



Figure 1. View of the eastern exposure of Bishop Peak from Highway 1.

initiated in 1977 when the Gnesa family deeded 104.31 acres at the summit of Bishop Peak to the California State Park Foundation. In 1995 the city completed negotiations with the Ferrini family to secure the dedication of 140 acres of land surrounding the peak

as open space. The final addition to the Reserve (BPNR) occurred in 1998 with a purchase by the city of 108 acres of land from Ray Bunnel.

Administration of the BPNR requires the development of a plan for the ongoing management of the property. The identification of sensitive natural resources within the boundaries of the Reserve is an important component of this process. While Bishop Peak has been a popular recreation site for years, relatively few biological studies of the area have been conducted. Consequently, little site-specific information is available regarding the assemblage of wildlife species inhabiting the Reserve. This report presents the results of a wildlife survey of the BPNR conducted by TENERA biologists. The survey results are intended to assist city resource managers with the development of a management plan for the area by providing an inventory of wildlife resources and sensitive habitats within, and in the immediate vicinity of, the Bishop Peak Natural Reserve.

Site Location / Description

The Bishop Peak Natural Reserve is situated immediately to the northwest of the City of San Luis Obispo, California (Figure 2). The reserve encompasses approximately 352 acres of wildlife habitat and is bordered to the north, south, and west by sizable areas of largely rural land. The city spreads out to the east of Bishop Peak and residential neighborhoods have gradually grown part way up its eastern slopes. The fertile Los Osos Valley lies to the west and southwest. The Reserve is irregular in shape and an arm of the property extends to the east, terminating at State Highway 1 (Figure 3). Rancho Caballo, a gated development consisting of 14 one-acre home parcels, is planned for 110 acres of land immediately to the north of the BPNR.

Elevations within the BPNR range from around 350 feet at the boundary adjacent to Highway 1 to 1,559 feet at the Bishop Peak summit. The topography of the property is generally steep, with the exception of the small patch of alluvial soils near Highway 1. Soils within the BPNR are variable, ranging from nearly level, silty clay loam to steep rocky outcrops. Eight soil series are listed on U.S. Department of Agriculture (USDA) soils survey maps as being present within BPNR boundaries. Soils on the upper slopes are shallow and well drained with very low available water capacity. Soils on the median slopes are deeper and have moderate or very high available water capacity. Surface runoff is rapid in both areas and the hazard of water erosion is high. Bishop Peak is located within the 84 square mile San Luis Obispo Creek watershed and is situated immediately to the southwest of the Stenner Creek watershed, a sub-watershed of San Luis Obispo Creek.

Recreational activities currently constitute the predominant land use within the BPNR. Recreational users access the four miles of authorized trails within the Reserve from two trailheads, one originating at the end of Highland Drive and the other in the 800 block of Patricia Drive. Cattle grazing is also permitted in areas of the Reserve and is one of the primary historical uses of the terrain surrounding the peak. Historical use of Bishop Peak

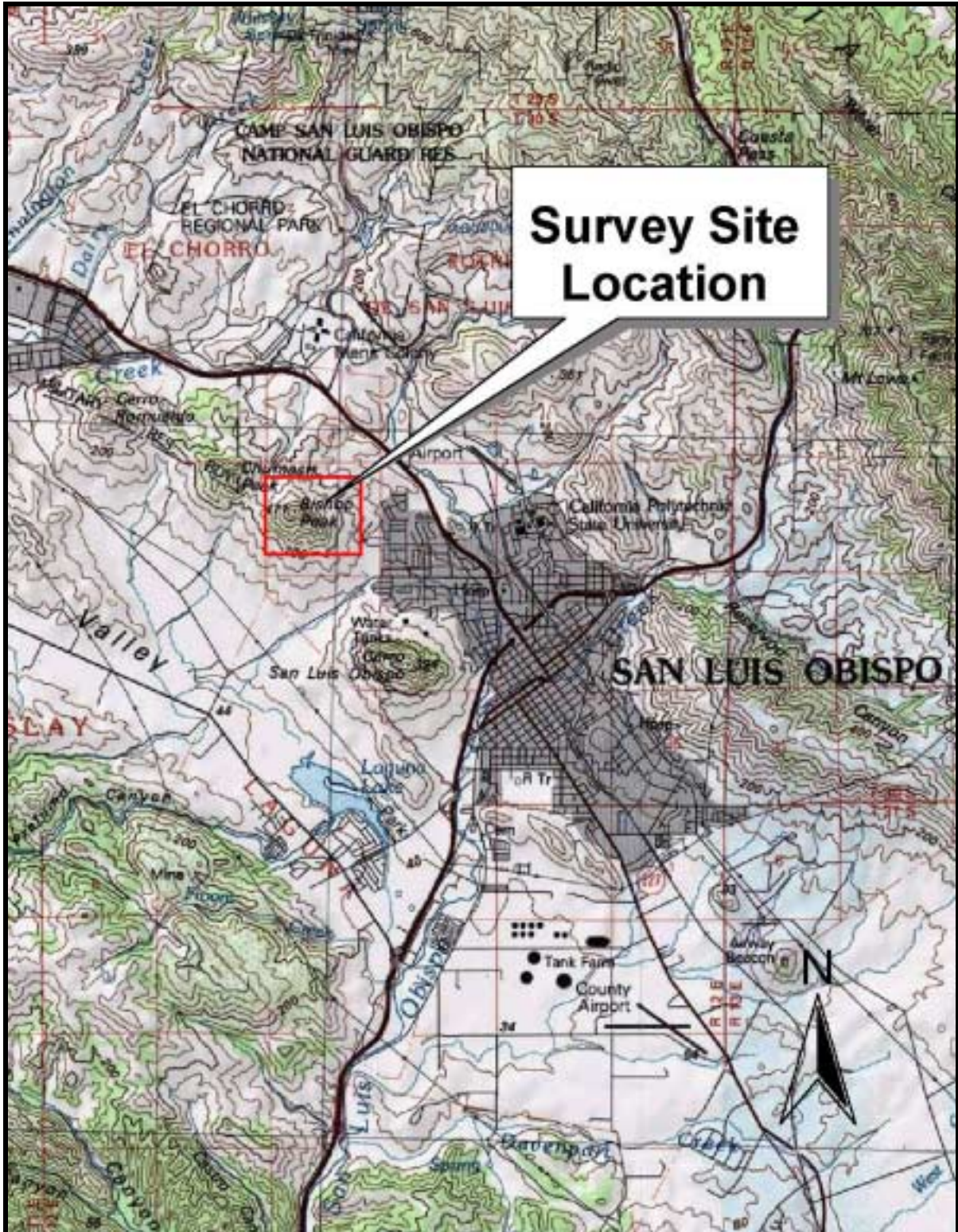


Figure 2. Regional view of the City of San Luis Obispo showing the location of the Bishop Peak Natural Reserve.

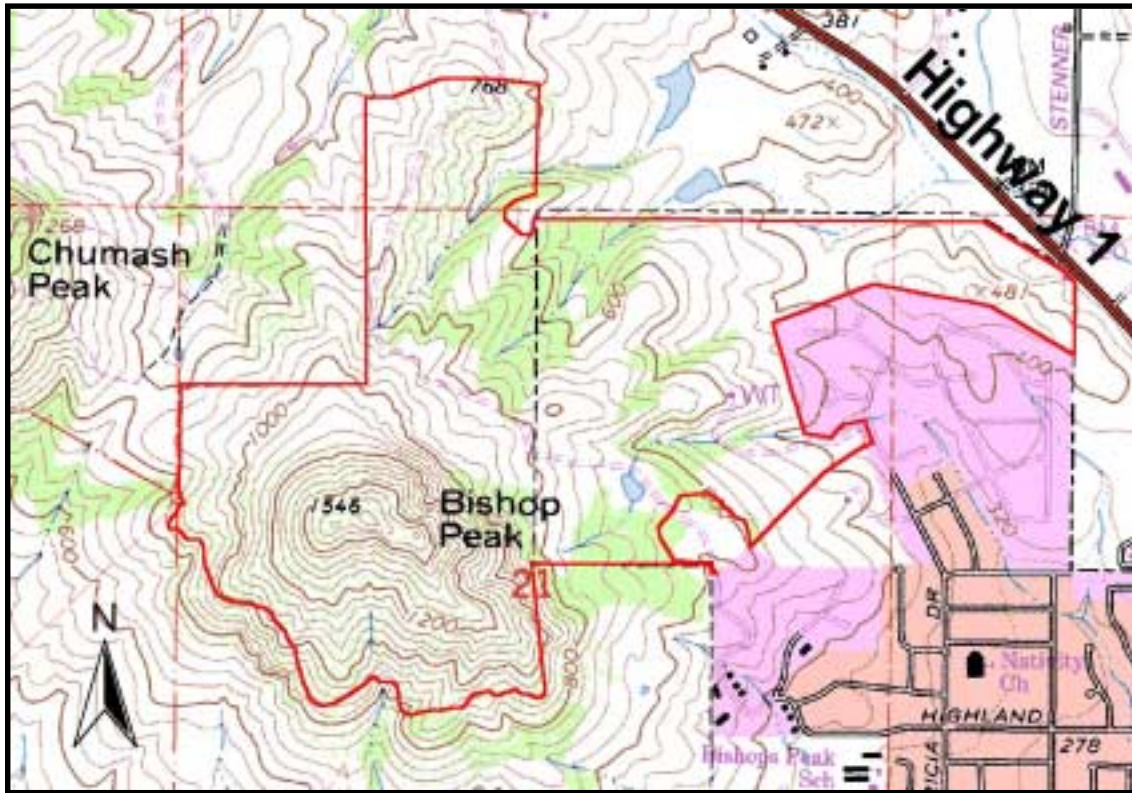


Figure 3. Topographic map showing the boundaries of the BPNR (outlined in red).

also includes stone quarries that operated on the peak during the late 1800s and early 1900s. A number of structures in San Luis Obispo are built from stone mined from these quarries.

Methodology

The wildlife survey of the Bishop Peak Natural Reserve (BPNR) consisted of a general reconnaissance of the property followed by focused field surveys. The primary objective of the wildlife survey was to determine if listed or special status animal species were present on the property, however, all bird, reptile, amphibian, and mammal species observed or detected during the surveys were documented. Invertebrate genera and rare or unusual plants identified during the surveys are also noted in this report.

An initial reconnaissance of the BPNR was conducted to ascertain the extent and composition of dominant vegetative communities within its boundaries and to determine the best locations for subsequent survey efforts. Focused field surveys within each of the identified vegetative communities were then conducted to detect wildlife species. Focused surveys included canvassing the area by foot and conducting point surveys, nighttime spotlight surveys, and small mammal trapping surveys. Sampling was conducted in scrub/chaparral, oak woodland, and grassland habitats.

Each of the dominant vegetative communities was canvassed thoroughly by foot during both day and nighttime surveys. Binoculars were used to aid in the detection and

identification of wildlife species. Flashlights (four “D” cell batteries) were used in conjunction with binoculars during nighttime surveys. Wildlife species were identified through direct observation, calls, or sign such as tracks, scat, pellets, hair, nests, or dens. Sampling was also conducted from various vantage points within each of the major habitat types by stationary observers. Points were sampled in the morning and/or evening during daylight hours for a duration of between 15 to 30 minutes. A limited number of points were also sampled between sunset and midnight. During point surveys the observer remained stationary and still, watching and listening for movement or calls.

Small mammal trapping was conducted in three grassland, three oak woodland, and three scrub/chaparral habitat areas. Five Tomahawk live traps (trap size: 25.4 cm x 7.6 cm x 7.6 cm) were set in each of the three habitat types during each night of the trapping effort. Traps were baited with peanut butter on tortillas and placed near rock outcrops, woodrat nests, within dense scrub vegetation, and in other locations that might be utilized by small mammals. The trapping effort was conducted during three consecutive nights and the traps were checked each morning. All live captured animals were released.

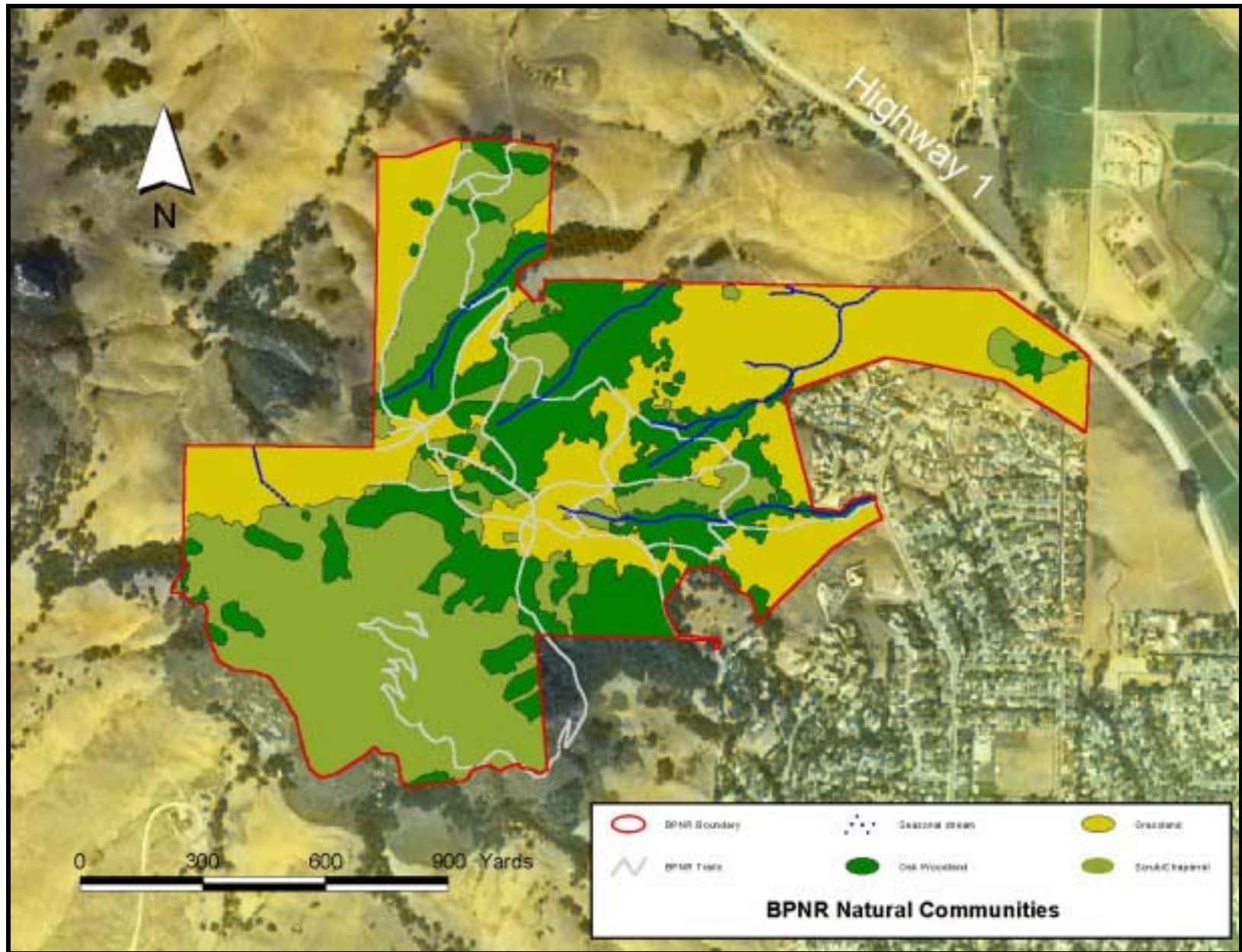
Survey Results

The BPNR encompasses a mosaic of woodland, grassland, and scrub habitats that encircle Bishop Peak and extend upward to merge with its rocky façade. These natural communities support a diverse assemblage of plants and animals. Wildlife surveys of the BPNR were conducted between November 2002 and June 2003. Representative areas of scrub, live oak woodland, and grassland habitats were sampled using survey methods described above. Riparian habitat was sampled during surveys of oak woodland areas, but was not sampled as a separate habitat type. Additionally, rock outcrops were present in each of the three habitat types surveyed and appeared to be an important natural feature in the BPNR, but were not selectively sampled.

A variety of bird, mammal, reptile, amphibian, and invertebrate species were observed or detected during the surveys. Some areas within the Reserve were inaccessible due to dense stands of poison oak (*Toxicodendron diversilobum*) and/or thick scrub vegetation. Wildlife observations in these areas were made, when possible, from footpaths and game trails. Appendix A presents a list of wildlife species identified during this survey and those described in Ostrowski (1979) as occurring within or directly adjacent to the BPNR.

Dominant Vegetative Communities

Three broadly defined native vegetative communities were identified as dominant habitat types during the reconnaissance of the BPNR. These included live oak woodland, mixed scrub-chaparral, and grassland habitats. The locations and coverage of each of these communities is shown in Figure 4. Mixed scrub/chaparral habitat and grassland habitat



occupied roughly equal areas of the BPNR (37 and 36 percent, respectively). Approximately 27 percent of the area within the BPNR was occupied by oak woodland habitat. The composition and abundance of dominant species within each community was variable.

Mixed Scrub-Chaparral Habitat

Scrub vegetation occupies nearly 129 acres of the area within the BPNR boundaries (Figure 5). This community was variable with observed differences most likely resulting from differences in soil type, location/exposure, topography, and degree of disturbance (including fire). Scrub habitat recovering from a relatively recent brush fire was encountered along a ridge in the northeastern region of the BPNR. Although the species composition, abundance, and density/height of the community varied, the dominant vegetative components within scrub-chaparral habitats generally included:



Figure 5. View of mixed scrub-chaparral habitat on the southern exposure of the BPNR.

- California sagebrush (*Artemisia californica*)
- Black sage (*Salvia mellifera*)
- Coyote brush (*Baccharis pilularis*)
- Chamise (*Adenostoma fasciculatum*)
- Toyon (*Heteromeles arbutifolia*)
- Coast live oak (*Quercus agrifolia*)
- Deerweed (*Lotus junceus*)
- Poison oak (*Toxicodendron diversilobum*)
- Monkeyflower (*Mimulus* spp.)
- Wedgeleaf ceanothus/buck brush (*Ceanothus cuneatus* var. *cuneatus*)
- Wild buckwheat (*Eriogonum* sp.)



Figure 6. Purple nightshade in a chaparral area on Bishop Peak.

A variety of flowering plants and shrubs were also noted in the scrub-chaparral habitat. These included fuchsia-flowered gooseberry (*Ribes speciosum*), Indian paintbrush (*Castilleja* sp.), morning glory (*Calystegia* sp.), purple nightshade (*Solanum xanti*), blue dicks (*Dichelostemma pulchella*), goldenrod (*Solidago occidentalis*), and coast tassel bush (*Garrya elliptica*) (Figure 6).

Coast Live Oak Woodland Habitat

Areas identified as coast live oak woodland occupy approximately 97 acres of the BPNR and are present on many of the north and east facing hillsides and swales within the Reserve (Figure 7).

Oak woodland habitat also extends up into the Reserve along a few of the drainage swales located on the scrub-chaparral dominated southern exposure of Bishop Peak. As with scrub-chaparral habitats, the species composition, density, and height of the coast live oak

community was variable. Generally, a mixed coast live oak-California bay-laurel community dominated coast live oak woodland along the eastern and northern exposures of the peak. A mixed coast live oak-toyon community vegetated southern exposures and the drier (upper) areas within drainage swales. The dominant species identified within coast live oak woodland included:

- Coast live oak (*Quercus agrifolia*)
- California bay-laurel (*Umbellularia californica*)
- Toyon (*Heteromeles arbutifolia*)
- Poison oak (*Toxicodendron diversilobum*)
- Coffeeberry (*Rhamnus californica*)
- Sycamore (*Platanus racemosa*)
- Monkeyflower (*Mimulus* spp.)
- Blackberry (*Rubus ursinus*)
- Wood fern (*Dryopteris arguta*)
- Blue elderberry (*Sambucus mexicana*)

Understory vegetation was generally sparse beneath the canopy of oaks, California bay-laurel, and toyon but included poison oak, blackberry, monkeyflower, ferns, and grasses. Fuchsia-flowered gooseberry, hummingbird sage (*Salvia spathacea*), and shooting stars (*Dodecatheon* spp.) were among the flowering plants encountered in oak woodland habitats (Figure 8).



Figure 7. View showing coast live oak woodland habitat along the Bishop Peak trail.



Figure 8. Shooting stars found in oak woodland area.

Grassland Habitat

Grassland habitat occupies a combined area of approximately 126 acres within the BPNR (Figure 9).

Areas identified as grassland habitat consist of a variable mixture of native and non-native grass species, wildflowers, and forbs.

Identification of the dominant grass species was not conducted in any grassland area. Generally, however, grasslands along the lower slopes appeared to be dominated by annual grasses. The dominant species identified within grassland habitat included:

- Foxtail barley (*Hordeum marinum*)
- Ryegrass (*Lolium multiflorum*)
- Common wild oats (*Avena fatua*)
- Ripgut brome (*Bromus diandrus*)
- Hummingbird sage (*Salvia spathacea*)
- Mustard (*Hirschfeldia incana*)
- Wild rose (*Rosa californica*)

A variety of native wildflowers were observed blooming in grassland areas during surveys. These included buttercup (*Ranunculus californicus*), goldenstar (*Bloomeria crocea*), soap plant (*Chlorogalum pomeridanum*), mariposa lily (*Calochortus* spp.), California poppy (*Eschscholzia californica*), chocolate lilies (*Fritillaria biflora*), and blue dicks (*Dichelostemma capitatum*) (Figure 10).

Sensitive Habitats

A number of areas were encountered during wildlife surveys that supported special status animal species and may warrant special considerations for management (Appendix B). A significant proportion of the BPNR is not used regularly as rangeland and supports relatively intact native plant communities. Grassland habitat along the northwestern exposure of Bishop Peak, facing Chumash Peak, is a good example of such an area. Scrub and oak woodland habitat extending upward to the peak from this grassland area and around (counterclockwise) to the Bishop Peak trail also appear to have remained relatively undisturbed. A large portion of the BPNR is currently not accessible to visitors. These areas support a diversity of endemic plant species and offer wildlife a



Figure 9. View showing grassland habitat along the northeastern slopes of the BPNR.



Figure 10. Chocolate lilies blooming on Bishop Peak in early spring.

refuge from disturbances associated with the regular use of trails in other areas of the BPNR. Seep areas and stream channels should also be considered sensitive areas that can be adversely impacted by hikers and grazing cattle.

Wildlife Survey

The three broad habitat types identified within the BPNR support a diversity of wildlife species. Most of the species observed or detected during wildlife surveys were relatively common inhabitants of scrub-chaparral, oak woodland, and grassland habitats; however, five special status wildlife species were encountered during the surveys. These included the Cooper's hawk (*Accipiter cooperii*), white-tailed kite (*Elanus leucurus*), loggerhead shrike (*Lanius ludovicianus*), San Diego desert woodrat (*Neotoma lepida intermedia*), and the Morro shoulderband snail (*Helminthoglypta walkeriana* var. *morroensis*). Additionally, several species of local concern were encountered during surveys. These included the ringneck snake (*Diadophis punctataus*), western skink (*Eumeces skiltonianus*), yellow-rumped warbler (*Dendroica coronata*), olive-sided flycatcher (*Contopus borealis*), greater roadrunner (*Geococcyx californianus*), rufous-crowned sparrow (*Aimophila ruficeps*), and monarch butterfly (*Dananus plexippus*). A summary of the wildlife species identified within the BPNR during this survey is presented in the following section. General information relative to their observed distribution is included in the summary.

Birds

The varied habitats within the BPNR offer food, shelter, and roosting/nesting sites for a wide variety of bird species. A total of 56 bird species was identified during surveys, including three special status species (Figure 11). Table 1 presents a list of the birds identified during the survey. Undoubtedly, many more resident and migratory bird species could be detected with a more extensive seasonal sampling effort.



Figure 11. A variety of bird species were encountered in the BPNR including the dark-eyed junco (left), western bluebird (center), and yellow-rumped warbler (right).

A Cooper's hawk was observed on two occasions during the surveys, once in oak woodland habitat near the Highland Drive access trail and once in an oak woodland area

near the northern extent of the Reserve. On both occasions the hawk appeared to be hunting. A white-tailed kite was observed in both grassland (perching and foraging) and oak woodland (perching) habitats in the northeastern region of the BPNR on several occasions. Nesting white-tailed kites and Cooper's hawks are listed in the California Natural Diversity Database (CNDDDB) as fully protected and as "migratory non-game birds of management concern" by the United States Fish and Wildlife Service (USFWS). Another federal and state special concern species, the loggerhead shrike, has been observed in the BPNR in recent years. A single loggerhead shrike was sighted in a sycamore tree near Highway 1 (across from Stenner Creek Road) in 2000. Additionally, the BPNR supports a variety of warblers, wrens, vireos, flycatchers, and native sparrows that are considered local species of concern.

Table 1. List of birds identified during wildlife surveys of the BPNR showing habitats in which the species were observed.

Scientific Name	Common Name	Scrub-Chaparral	Live Oak Woodland	Grassland
<i>Accipiter cooperii</i>	Cooper's hawk		√	
<i>Aeronautes saxatalis</i>	White-throated swift	√	√	
<i>Aimophila ruficeps</i>	Rufous-crowned sparrow	√		
<i>Anas platyrhynchos</i>	Mallard		in stock pond	
<i>Aphelocoma californica</i>	Western scrub-jay	√	√	
<i>Buteo lineatus</i>	Red-shouldered hawk		√	
<i>Buteo jamaicensis</i>	Red-tailed hawk	√	√	√
<i>Callipepla californica</i>	California quail	√	√	
<i>Catherpes mexicanus</i>	Canyon wren	√		
<i>Calypte anna</i>	Anna's hummingbird	√		
<i>Carduelis tristis</i>	American goldfinch	√		
<i>Carpodacus mexicanus</i>	House finch	√		√
<i>Cathartes aura</i>	Turkey vulture	√		
<i>Catharus ustulatus</i>	Swainson's thrush	√	√	
<i>Chamaea fasciata</i>	Wrentit	√		
<i>Chondestes grammacus</i>	Lark sparrow	√		
<i>Colaptes auratus</i>	Northern flicker		√	
<i>Columba livia</i>	Rock dove (pigeon)		√	
<i>Contopus borealis</i>	Olive-sided flycatcher	√		
<i>Corvus brachyrhynchos</i>	American crow		√	√
<i>Dendroica coronata</i>	Yellow-rumped warbler		√	
<i>Dendroica townsendi</i>	Townsend's warbler		√	
<i>Elanus leucurus</i>	White-tailed kite	√	√	√
<i>Euphagus cyanocephalus</i>	Brewer's blackbird			√
<i>Falco sparverius</i>	American kestrel			√
<i>Geococcyx californianus</i>	Greater roadrunner	√		
<i>Hirundo pyrrhonta</i>	Cliff swallow			√
<i>Junco hyemalis</i>	Dark-eyed junco	√	√	

<i>Lanius ludovicianus</i>	Loggerhead shrike			√
<i>Meleagris gallopavo</i>	Wild turkey			√
<i>Mimus polyglottis</i>	Northern mockingbird	√	√	
<i>Parus inornatus</i>	Plain (oak) titmouse	√		
<i>Parus rufescens</i>	Chestnut-backed chickadee		√	
<i>Phalaenoptilus nuttallii</i>	Common poorwill			√
<i>Picoides villosus</i>	Hairy woodpecker		√	
<i>Pipilo crissalis</i>	California towhee	√	√	
<i>Pipilo erythrophthalmus</i>	Spotted towhee	√	√	
<i>Poliophtila caerulea</i>	Blue-gray gnatcatcher	√		
<i>Psaltriparus minimus</i>	Bushtit	√	√	
<i>Regulus calendula</i>	Ruby-crowned kinglet		√	
<i>Sialia mexicana</i>	Western bluebird		√	√
<i>Sayornis nigricans</i>	Black phoebe	√	√	
<i>Sayornis saya</i>	Say's phoebe			√
<i>Selasphorus sasin</i>	Allen's hummingbird	√		
<i>Spizella passerina</i>	Chipping sparrow	√		√
* <i>Sterna</i> sp.	*U.I. tern			
<i>Sturnella neglecta</i>	Western meadowlark			√
<i>Thryomanes bewickii</i>	Bewick's wren		√	
<i>Toxostoma redivivum</i>	California thrasher	√		
<i>Turdus migratorius</i>	American robin			√
<i>Tyto alba</i>	Barn owl		√	
<i>Vireo huttoni</i>	Hutton's vireo		√	
<i>Vermivora celata</i>	Orange-crowned warbler	√	√	
<i>Zenaida macroura</i>	Mourning dove	√		√
<i>Zonotrichia atricapilla</i>	Golden-crowned sparrow	√	√	√
<i>Zonotrichia leucophrys</i>	White-crowned sparrow	√		√

* Observed in stock pond outside of northern BPNR boundary.

Mammals

A total of seventeen mammal species was observed or detected during the wildlife surveys (Table 2). Scrub-chaparral habitats appeared to support the greatest diversity of mammal species. Mule deer (*Odocoileus herionus*) were encountered in each of the habitat types sampled. Six rodent species were identified during small mammal trapping efforts, including the California meadow mouse (*Microtus californicus*) (Figure 12). Woodrat nests were common in chaparral and oak woodland areas and two species of woodrat, the dusky-footed woodrat (*Neotoma fuscipes macrotis*) and the San Diego desert woodrat, were identified in the BPNR during small



Figure 12. The California meadow mouse was found in grassland and scrub habitat within the BPNR.

mammal trapping. The San Diego desert woodrat is a federal and state species of special concern. Positive identification of the sub-species of dusky-footed woodrat encountered on Bishop Peak was not determined, however, it was not believed to be a special concern species as Bishop Peak is situated several miles to the south and east of the described range of the Monterey dusky-footed woodrat, a special concern species. Bats (Order Chiroptera) were detected by sound in a rock crevice near the top of Bishop Peak, however, their taxa could not be determined. Numerous rock crevices suitable for roosting bats are present in the BPNR and the area supports an abundant prey base for special status species such as the pallid bat (*Antrozous pallidus*).

Table 2. List of mammals identified during wildlife surveys of the BPNR showing habitats in which the species were observed or detected.

Scientific Name	Common Name	Scrub - Chaparral	Live Oak Woodland	Grassland
<i>Canis latrans</i>	Coyote	√		√
Order Chiroptera	Bat	√		
<i>Didelphis marsupialis</i>	Opossum		√	
<i>Peromyscus boylei</i>	Brush mouse	√	√	
<i>Peromyscus californicus</i>	California mouse	√		
<i>Peromyscus maniculatus</i>	Deer mouse	√	√	
<i>Procyon lotor</i>	Raccoon		√	
<i>Mephitis mephitis</i>	Striped skunk	√		
<i>Microtus californicus</i>	California meadow mouse	√		√
<i>Neotoma fuscipes macrotis</i>	Dusky-footed woodrat	√	√	
<i>Neotoma lepida intermedia</i>	San Diego desert woodrat	√	√	
<i>Odocoileus herionus</i>	Mule deer	√	√	√
<i>Sciurus griseus</i>	Western gray squirrel		√	
<i>Spermophilus beecheyi</i>	California ground squirrel			√
<i>Sylvilagus bachmani</i>	Brush rabbit	√		
<i>Thomomys bottae</i>	Botta's pocket gopher	√		√
<i>Urocyon cinereoargenteus</i>	Gray fox	√	√	

Reptiles

Five reptile species were encountered during the BPNR wildlife survey including two species of local concern, the ringneck snake and the western skink. The reptile species identified during the survey are listed in Table 3. The western fence lizard (*Sceloporus occidentalis*) was the most commonly encountered reptile species and was present in all of the surveyed habitat types (Figure 13). Western skink appeared to be relatively abundant in grassland areas on the eastern and northern exposures of the peak.



Figure 13. Several reptile species were identified during surveys of the BPNR including the western fence swift (left), ringneck snake (center), and western skink (right).

Table 3. List of reptiles identified during wildlife surveys of the BPNR showing habitats in which the species were observed.

Scientific Name	Common Name	Scrub-Chaparral	Live Oak Woodland	Grassland
<i>Diadophis punctataus</i>	Ringneck snake		√	√
<i>Elgaria multicarinatus</i>	Southern alligator lizard			√
<i>Eumeces skiltonianus</i>	Western skink			√
<i>Pituophis melanoleucus</i>	Gopher snake			√
<i>Sceloporus occidentalis</i>	Western fence lizard	√	√	√

Amphibians

Two amphibian species, the Pacific tree frog (*Hyla regilla*) and the black-bellied slender salamander (*Batrachoseps nigriventris*) were encountered during this survey (Figure 14). Both species were encountered in greatest abundance in grassland areas, although they were also observed in oak woodland habitat. Pacific tree frog larvae and froglets were present in the stock pond near the Highland Drive access point and in ephemeral pools associated with two of the larger watercourses that drain the northern areas of the peak.



Figure 14. Pacific tree frogs and slender salamanders are common beneath rocks and logs in the BPNR.

Invertebrates

A variety of invertebrates were identified during surveys of the BPNR including one special status terrestrial snail species, the federally endangered Morro shoulderband snail (*Helminthoglypta walkeriana*) (Figure 15). A total of five live Morro shoulderband snails (MSS) and 12 empty shells was found during surveys of the BPNR. All of the shells and two live snails were found within grassland habitat in the eastern region of the Reserve. Live specimens were also encountered beneath rocks in grassland habitat



Figure 15. The BPNR supports a diverse invertebrate fauna that includes the mourning-cloak butterfly, Big Sur shoulderband snail, and centipede.

located between the stock pond (near Highland Drive) and the Patricia Drive access gate. A table showing live MSS and MSS shell locations is presented in Appendix B. A related but more widely distributed terrestrial snail species, the Big Sur shoulderband snail (*Helminthoglypta umbilicata*), was also encountered in the BPNR. Monarch butterflies were also observed within the Reserve, however, no over-wintering sites were identified during surveys. A number of live Big Sur shoulderband snails, as well as empty shells, were found during the surveys. The invertebrate species noted during the survey are listed in Table 4. Other invertebrates noted during the surveys included various butterflies, bees, wasps, beetles, flies, centipedes, millipedes, spiders, crickets, and several ant species.

Table 4. List of invertebrate species noted during wildlife surveys of the BPNR showing habitats in which the species were observed.

Scientific Name	Common Name	Scrub-Chaparral	Live Oak Woodland	Grassland
<i>Danusus plexippus</i>	Monarch butterfly	√		
<i>Eleodes</i> sp.	Stink beetle	√		√
<i>Gryllus pennsylvanicus</i>	Field cricket	√		√
<i>Helix aspersa</i>	European garden snail			√
<i>Helminthoglypta walkeriana</i> var. <i>morroensis</i>	Morro shoulderband snail			√
<i>Helminthoglypta umbilicata</i>	Big Sur shoulderband snail			√
<i>Latrodectus mactans</i>	Black widow spider			√
<i>Lygaeus kalmii</i>	Common milkweed bug	√		√
<i>Nymphalis antiopa</i>	Mourning-cloak butterfly	√		
Order Scorpionida	Scorpion	√		√
<i>Stenoplematus fuscus</i>	Jerusalem cricket			√
<i>Vespula</i> sp.	Yellow jacket			√

Discussion

The BPNR sustains a relatively high level of recreational use by hikers, joggers, rock climbers, and to a lesser extent, equestrians. Cattle are also permitted to graze in areas of the Reserve. Each of these land uses has the potential to result in habitat degradation if not managed effectively.

Erosion problems are evident along some trails in the BPNR and, because of the soil and slope characteristics of much of the Reserve, the potential for such problems remains high. The primary management challenge for the BPNR will likely be the avoidance and minimization of erosion from both authorized and unauthorized trails. Measures have already been implemented by the city to minimize erosion within the BPNR and restore areas where erosion has occurred. Incorporating and maintaining appropriate erosion control measures (e.g., water bars) into existing authorized trails should help minimize problems. Trails that traverse steep grades or cross drainage channels should be avoided when possible, however, when such trails are necessary they should be well planned and constructed. Efforts should be made to encourage fidelity to authorized trails and limit the proliferation of unauthorized trails and shortcuts. Such efforts might include installing fencing across existing unauthorized trails and shortcuts (which has been done in some areas) and adding placards to existing trail markers reminding visitors to stay on authorized trails. Periodic enforcement efforts targeting visitors who stray from authorized trails may help reduce the frequency of unauthorized trail use. The closure of some trails or trail sections following significant storm events may be necessary to help minimize damage from trail use under wet or muddy conditions.

The sustained use of terrain within the BPNR as rangeland for cattle has resulted in the localized degradation of some areas of wildlife habitat. This effect is most obvious along the stream channel and alluvial area in the northeastern region of the Reserve. The banks and wide channel in this low gradient section of the stream offer a good opportunity for the restoration of riparian habitat. Fencing cattle out of this area and planting willows and other native riparian trees and shrubs is recommended. Once established, the riparian vegetation would greatly increase the value of wildlife habitat in the area.

The results of this survey provide a foundation of information regarding the wildlife resources of the BPNR that may be built upon by subsequent surveys. Although five special status species were identified during this survey, along with several species of local concern, most of the animals encountered were relatively common inhabitants of the habitat types sampled. Undoubtedly, additional species would be detected with a more sustained survey effort. This is especially true of migratory birds and other wildlife species whose presence and/or activity may be seasonally influenced or difficult to detect.

Focused field surveys may be required to generate a more complete inventory of migratory birds, invertebrates, and small mammals (including bats). Invertebrate

observations were largely incidental and, with the exception of the Morro shoulderband snail, the species listed in this report were the most conspicuous ones encountered. Based on observations during this survey effort, a focused entomological survey of the BPNR would likely produce a considerable inventory of invertebrates. Local resources that may be enlisted to assist with insect and bird surveys include Cal Poly researchers and non-profit groups such as the local chapter of the National Audubon Society.

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Appendix A

Biological Inventory

The following species have been identified as occurring on, or directly adjacent to, the Bishop Peak Natural Reserve. The references in the last column are the reference that cites the relevant information. Entries in bold indicate species have been positively identified by City staff, or a staff appointed biologist, as occurring on Bishop Peak Natural Reserve.

Birds				
Scientific Name	Common Name	Comments	Status	Source
<i>Accipiter cooperi</i>	Coopers hawk	Native	CSC*	1
<i>Accipiter striatus</i>	Sharp-shinned hawk	Native	CSC*	2
<i>Aeronautes saxatalis</i>	White-throated swift	Native		1,2
<i>Agelaius phoeniceus</i>	Red-winged blackbird	Native		2
<i>Aimophila ruficeps</i>	Rufous-crowned sparrow	Native		1
<i>Anas ajanopiera</i>	Cinnamon teal	Native		2
<i>Anas platyrhynchos</i>	Mallard duck	Native		1
<i>Aphelocoma californica</i>	Western scrub-jay	Native		1,2
<i>Aquila chrysaetos</i>	Golden eagle	Native	CSC***, DFG, CDF, BLM	2
<i>Bombycilla cedrorum</i>	Cedar waxwing	Native		2
<i>Bubo virginianus</i>	Great horned owl	Native		2
<i>Buteo lineatus</i>	Red-shouldered hawk	Native		1
<i>Buteo jamaicensis</i>	Red-tailed hawk	Native		1,2
<i>Callipepla californica</i>	California quail	Native		1,2
<i>Calypte anna</i>	Anna's hummingbird	Native		1,2
<i>Carduelis psaltria</i>	Lesser goldfinch	Native		2
<i>Carduelis tristis</i>	American goldfinch	Native		1,2
<i>Carpodacus mexicanus</i>	House finch	Native		1,2
<i>Carpodacus purpureus</i>	Purple finch	Native		2
<i>Cathartes aura</i>	Turkey vulture	Native		1,2
<i>Catherpes mexicanus</i>	Canyon wren	Native		1
<i>Catharus ustulatus</i>	Swainson's thrush	Native		1
<i>Charadrius vociferous</i>	Killdeer	Native		2
<i>Chamaea fasciata</i>	Wrentit	Native		1,2
<i>Chondestes grammacus</i>	Lark sparrow	Native		1,2
<i>Colaptes auratus</i>	Northern flicker	Native		1,2
<i>Columba livia</i>	Rock dove (pigeon)	Introduced		1,2
<i>Contopus borealis</i>	Olive-sided flycatcher	Native	MNBMC*, Cal WL	1
<i>Corvus brachyrhynchos</i>	American crow	Native		1,2
<i>Dendroica coronata</i>	Yellow-rumped warbler	Native		1,2
<i>Dendroica townsendii</i>	Townsend's warbler	Native		1
<i>Elanus leucurus</i>	White-tailed kite	Native	MNBMC* DFG	1

<i>Euphagus cyanocephalus</i>	Brewer's blackbird	Native		1
<i>Falco columbarius</i>	Merlin	Native	CSC**	2
<i>Falco sparverius</i>	American kestrel	Native		1,2
<i>Geococcyx californianus</i>	Greater roadrunner	Native		1,2
<i>Hirundo pyrrhonta</i>	Cliff swallow	Native		1
<i>Catharus guttatus</i>	Hermit thrush			2
<i>Ixoreus naevius</i>	Varied thrush			2
<i>Junco hyemalis</i>	Dark-eyed junco	Native		1,2
<i>Lanius ludovicianus</i>	Loggerhead shrike	Native	FSC, CSC, Cal WL, MNBMC	1
<i>Meleagris gallopavo</i>	Wild turkey	Introduced		1
<i>Melanerpes formicivorus</i>	Acorn woodpecker	Native		2
<i>Melospiza lincolnii</i>	Lincoln's sparrow	Native		2
<i>Melospiza melodia</i>	Song sparrow	Native		2
<i>Mimus polyglottis</i>	Northern mockingbird	Native		1,2
<i>Parus inornatus</i>	Plain titmouse	Native		1,2
<i>Parus rufescens</i>	Chestnut-backed chickadee	Native		1
<i>Passer domesticus</i>	House sparrow	Introduced		2
<i>Passerculus sandwichensis</i>	Savanna sparrow	Native		2
<i>Phalaenoptilus nuttalli</i>	Common poorwill	Native		1
<i>Pheucticus melanocephalus</i>	Black-headed grosbeak	Native		2
<i>Picoides nuttallii</i>	Nuttall's woodpecker	Native		2
<i>Picoides pubescens</i>	Downey woodpecker	Native		2
<i>Picoides villosus</i>	Hairy woodpecker	Native		1
<i>Pipilo crissalis</i>	California towhee	Native		1
<i>Pipilo erythrophthalmus</i>	Spotted towhee	Native		1,2
<i>Pipilo fuscus</i>	Canyon towhee			2
<i>Piranga ludoviciana</i>	Western tanager	Native		2
<i>Polioptila caerulea</i>	Blue-gray gnatcatcher	Native		1
<i>Psaltriparus minimus</i>	Bushtit	Native		1,2
<i>Oporornis tolmiei</i>	MacGillivray's warbler	Native		2
<i>Regulus calendula</i>	Ruby-crowned kinglet	Native		1
<i>Sialia mexicana</i>	Western bluebird	Native		1,2
<i>Sayornis nigricans</i>	Black phoebe	Native		1,2
<i>Sayornis saya</i>	Say's phoebe	Native		1,2
<i>Selasphorus sasin</i>	Allen's hummingbird	Native		1
<i>Spizella passerina</i>	Chipping sparrow	Native		1
<i>Sterna sp.</i>	U.I. tern*	Native		1
<i>Sturnella neglecta</i>	Western meadowlark	Native		1,2

<i>Sturnus vulgaris</i>	European starling	Introduced		2
<i>Tachycineta thalassina</i>	Violet-green swallow	Native		2
<i>Thryomanes bewickii</i>	Bewick's wren	Native		1,2
<i>Toxostoma redivivum</i>	California thrasher	Native		1,2
<i>Troglodytes aedon</i>	House wren	Native		2
<i>Turdus migratorius</i>	American robin	Native		1,2
<i>Tyto alba</i>	Common barn-owl	Native		1
<i>Vermivora celata</i>	Orange-crowned warbler	Native		1
<i>Vireo huttoni</i>	Hutton's vireo	Native		1,2
<i>Zenaida macroura</i>	Mourning dove	Native		1,2
<i>Zonotrichia atricapilla</i>	Golden-crowned sparrow	Native		1,2
<i>Zonotrichia leucophrys</i>	White-crowned sparrow	Native		1,2

Mammals

Scientific Name	Common Name	Comments	Status	Source
<i>Canis latrans</i>	Coyote	Native		1,2
Order Chiroptera	Bat	Native		1
<i>Didelphis virginiana</i>	Virginia opossum	Introduced		1,2
<i>Felis concolor</i>	Mountain lion	Native		2
<i>Peromyscus boylei</i>	Brush mouse	Native		1
<i>Peromyscus californicus</i>	California mouse	Native		1,2
<i>Peromyscus maniculatus</i>	Deer mouse	Native		1,2
<i>Procyon lotor</i>	Raccoon	Native		1,2
<i>Lepus californicus</i>	Blacktail jackrabbit	Native		2
<i>Lynx rufus</i>	Bobcat	Native		2
<i>Mephitis mephitis</i>	Striped skunk	Native		1,2
<i>Microtus californicus</i>	California meadow mouse	Native		1
<i>Neotoma fuscipes macrotis</i>	Dusky-footed woodrat	Native		1,2
<i>Neotoma lepida intermedia</i>	San Diego desert woodrat	Native	FSC, CSC	1
<i>Odocoileus herionus</i>	Mule deer	Native		1,2
<i>Sciurus griseus</i>	Western gray squirrel	Native		1,2
<i>Spermophilus beecheyi</i>	California ground squirrel	Native		1,2
<i>Sylvilagus bachmani</i>	Brush rabbit	Native		1,2
<i>Thomomys bottae</i>	Botta's pocket gopher	Native		1,2
<i>Urocyon cinereoargenteus</i>	Gray fox	Native		1

Amphibians

Scientific Name	Common Name	Comments	Status	Source
<i>Batrachoseps nigriventris</i>	Black-bellied slender salamander	Native		1,2

<i>Hyla regilla</i>	Pacific treefrog	Native		1,2
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Reptiles

Scientific Name	Common Name	Comments	Status	Source
<i>Diadophis punctataus</i>	Ringneck snake	Native		1
<i>Elgaria multicarinatus</i>	Southern alligator lizard	Native		1
<i>Eumeces skiltonianus</i>	Western skink	Native		1
<i>Lampropeltis getulus</i>	Common kingsnake	Native		2
<i>Masticophis lateralis</i>	Striped racer	Native		2
<i>Pituophis melanoleucus</i>	Gopher snake	Native		1,2
<i>Sceloporus occidentalis</i>	Western fence lizard	Native		1,2

Invertebrates

Scientific Name	Common Name	Comments	Status	Source
<i>Dananus plexippus</i>	Monarch butterfly	Native		1
<i>Eleodes sp.</i>	Stink beetle	Native		1
<i>Gryllus pennsylvanicus</i>	Field cricket	Native		1
<i>Helix aspersa</i>	European garden snail	Introduced		1
<i>Helminthoglypta walkeriana</i>	Morro shoulderband snail	Native		1
<i>Helminthoglypta umbilicata</i>	Big Sur shoulderband snail	Native		1
<i>Latrodectus mactans</i>	Black widow spider	Native		1
<i>Lygaeus kalmii</i>	Common milkweed bug	Native		1
<i>Nymphalis antiopa</i>	Mourning-cloak butterfly	Native		1
Order Scorpionida	Scorpion	Native		1
<i>Stenoplematus fuscus</i>	Jerusalem cricket	Native		1
<i>Vespula sp.</i>	Yellow jacket	Native		1

References

- 1 – Field observation by City Staff or biological consultant.
 2 – Reported in Ostrowski - (1979)

Status Codes

FSC- Federal Special Concern Species (Endangered Species Act listing code)

CSC- Department of Fish and Game: California Special Concern Species

MNBMC- Fish and Wildlife Service Migratory Nongame Birds of Management Concern

Cal WL- Audubon's state WatchList for California

DFG- Department of Fish and Game: Fully Protected species

CDF- California Department of Forestry: Sensitive Species

BLM- Bureau of Land Management: Sensitive Species

* Nesting

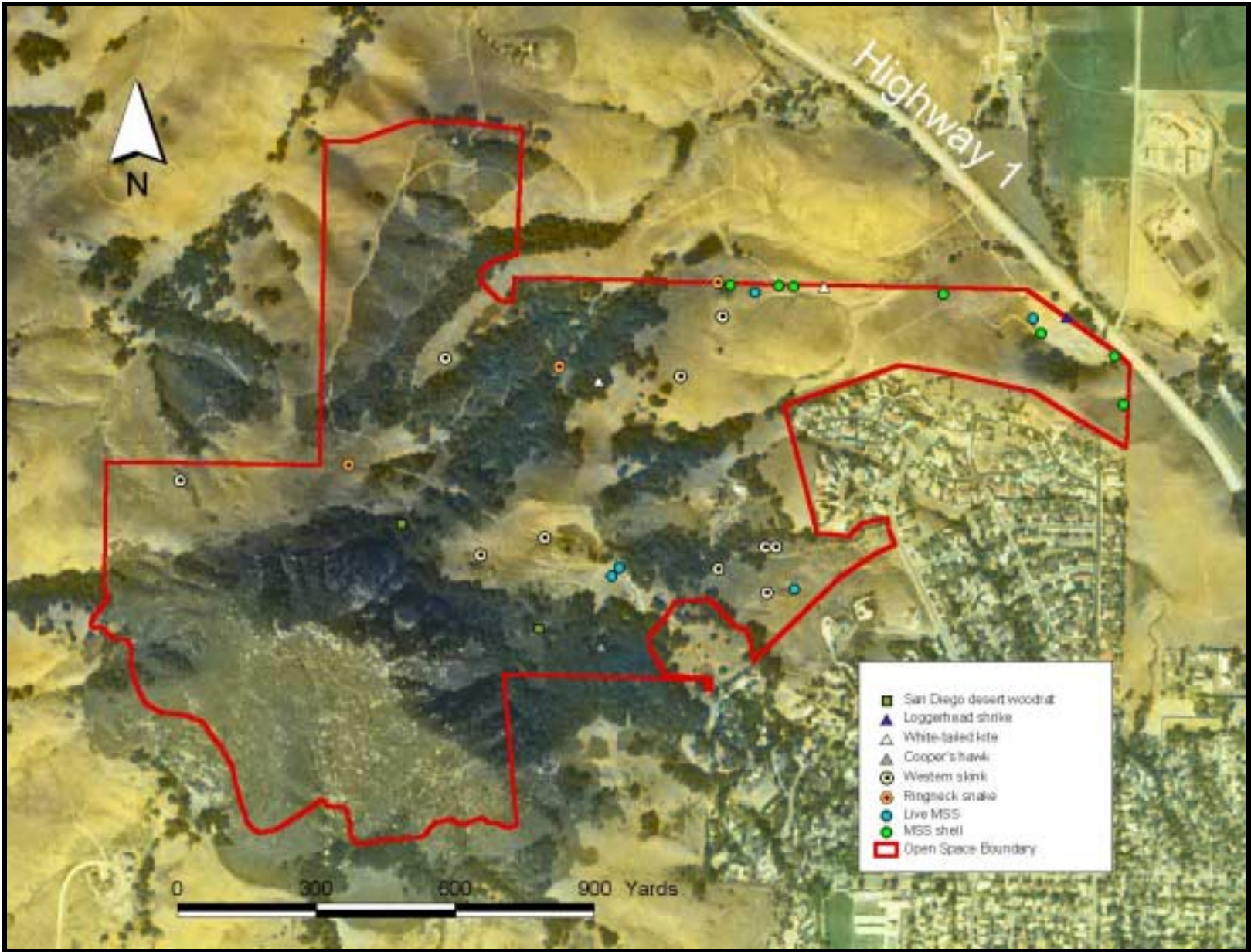
** Wintering

*** Nesting and Wintering



Appendix B

Special Status Species Locations



Locations of special status plant and wildlife species encountered in the BPNR.

Common Name (status) Scientific Name	Latitude	Longitude	Location/ Area Type
Morro shoulderband snail (Endangered) <i>Helminthoglypta walkeriana (shell)</i>	35° 18' 26.4" N	120° 40' 49.8" W	Grassland
1 shell	35° 18' 23.8" N	120° 40' 49.4" W	Grassland
1 shell	35° 18' 29.5" N	120° 40' 57.0" W	Grassland
1 shell	35° 18' 29.9" N	120° 40' 57.4" W	Grassland
1 shell	35° 18' 29.8" N	120° 41' 00.4" W	Grassland
4 shells +shell fragments	35° 18' 30.1" N	120° 41' 05.4" W	Grassland
1 shell	35° 18' 31.1" N	120° 41' 21.4" W	Grassland
2 shells + shell fragments	35° 18' 31.2" N	120° 41' 16.1" W	Grassland
2 live snails	35° 18' 30.0" N	120° 41' 16.4" W	Grassland
1 shell	35° 18' 30.2" N	120° 41' 16.4" W	Grassland
1 live snail	35° 18' 11.7" N	120° 41' 14.5" W	Grassland
1 live snail	35° 18' 12.2" N	120° 41' 26.2" W	Grassland/woodland
1 live snail	35° 18' 12.1" N	120° 41' 29.0" W	Grassland/woodland
San Diego Desert Woodrat (FSC/CSC) <i>Neotoma lepida intermedia</i>	35° 18' 09.2" N	120° 41' 29.4 W	Oak woodland
	35° 18' 11.5" N	120° 41' 42.0 W	Scrub/chaparral
Cooper's Hawk (CSC) <i>Accipiter cooperii</i>	35° 18' 07.7" N	120° 41' 26.1 W	Oak woodland
	35° 18' 40.3" N	120° 41' 41.8 W	Oak woodland
White-tailed Kite (FWS:MNBMC) <i>Elanus leucurus</i>	35° 18' 30.9" N	120° 41' 12.8" W	Grassland
	35° 18' 25.5" N	120° 41' 30.7" W	Oak woodland
Loggerhead Shrike (FSC/CSC) <i>Lanius ludovicianus</i>	35° 18' 27.8" N	120° 41' 51.5" W	Sycamore near Highway 1