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BEAR CREEK REDWOODS
OPEN SPACE PRESERVE
SPECIAL-STATUS WILDLIFE REVIEW

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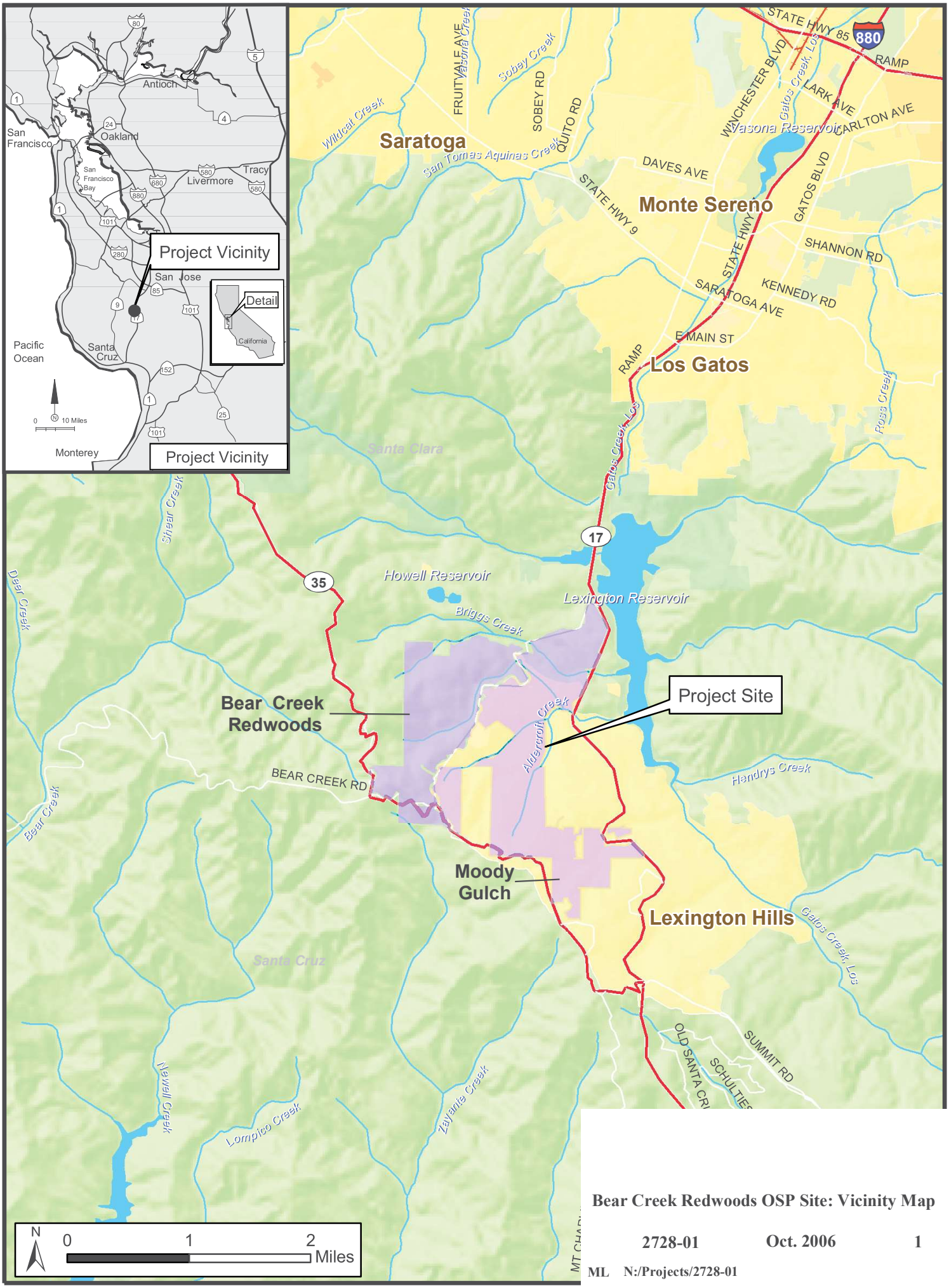
INTRODUCTION

STUDY PURPOSE

This report provides an assessment of wildlife use of the Bear Creek Redwoods Open Space Preserve (BCROSP) and the adjacent Moody Gulch parcel, with a particular focus on special-status wildlife species. In addition, we provide an analysis of potential opportunities and constraints related to future management of the site.

PROJECT AREA DESCRIPTION

The project area includes the 1,343-acre BCROSP and a 183-acre parcel at Moody Gulch, adjacent to the BCROSP. Both parcels are located west of Lexington Reservoir, in the Santa Cruz Mountains (Figure 1). Throughout this report, "BCROSP" and "preserve" refer to both the existing preserve and the 183-acre Moody Gulch parcel, unless explicitly stated otherwise. The project area is located primarily in Santa Clara County, although a small portion of the preserve south of Bear Creek Road and Summit Road is located in Santa Cruz County. The preserve rises from an elevation of approximately 800 feet near State Route 17 to approximately 2,400 feet in the southwest corner of the preserve. The majority of the site is in the Los Gatos Creek watershed, with most creeks on the preserve flowing into Lexington Reservoir. A small portion along the southern edge of the preserve is in the San Lorenzo River watershed, via Zayante Creek. The preserve is currently primarily undeveloped, with the exception of an equestrian facility and an abandoned college (Alma College) in the northeast portion of the preserve.



Bear Creek Redwoods OSP Site: Vicinity Map

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METHODS

Reconnaissance-level field surveys of the project site were conducted by H. T. Harvey & Associates wildlife ecologist Laird Henkel, M.S., on September 15 and October 3, 2006. The purpose of these surveys was:

- To classify and describe existing wildlife habitat on the preserve and assess its value for supporting common and special-status species;
- To identify and describe rare, threatened, or endangered wildlife species potentially occurring on the preserve; and
- To identify Open Space Preserve management opportunities and constraints associated with these wildlife resources.

The preserve was surveyed by vehicle and on foot. Protocol-level surveys for special-status species were not conducted as part of this study, and the season in which this survey was conducted (the non-breeding season for most special-status species on the preserve) was not conducive for determining whether incidentally observed individuals breed on the preserve. Nevertheless, special-status species detected during the survey were noted.

Prior to the site survey, information concerning threatened, endangered, or other special-status species that may occur in the area was collected from several sources and reviewed. The sources consulted included the California Department of Fish and Game's (CDFG) Natural Diversity Data Base (CNDDB 2006), and miscellaneous information available through the U.S. Fish and Wildlife Service (USFWS), CDFG, and technical publications. In addition, materials provided by the MROSD were reviewed, including an aerial photo, a vegetation map, a conceptual Draft Master Plan alternatives map, past timber harvest plans, the *Biological Resource Assessment for the Los Gatos Country Club EIR* (Environmental Collaborative 1995), the *Addendum to the 2000 Bat Inventory Survey for Midpeninsula Regional Open Space District* (Heady and Frick 2002), and *A Survey of Biodiversity in Bear Creek Redwoods Open Space Preserve* (Conrad et al. 2003).

Vegetation at the BCROSP was previously mapped by MROSD staff, based on *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995), and the resulting vegetation map was supplied to H.T. Harvey & Associates. At the request of the MROSD, we reclassified habitats on the BCROSP per the California Wildlife Habitat Relationships (CWHR) System (Mayer and Laudenslayer 1988). We used the most recent habitats listed on the CWHR website (http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html). A portion of Moody Gulch was not previously mapped, thus we mapped CWHR habitats for this parcel. In addition, a small pond northwest of Bear Creek Road and several streams in the northern portion of the preserve were not mapped by MROSD; these features were added to the habitat map.

SURVEY RESULTS

WILDLIFE HABITATS

Wildlife use of CWHR habitats found on the preserve is described below. MROSD-mapped plant associations that are included within each CWHR habitat type are shown in parentheses. Because MROSD staff mapped plant associations at a finer scale than the broader CWHR habitat types, multiple plant associations were subsumed within each CWHR habitat type. Habitats are shown in Figure 2. More detailed wildlife species lists for the BCROSP are available in Conrad et al. (2003).

Redwood (Redwood Series, Douglas-fir Coast Redwood Association)

Redwood-dominated habitats occur throughout much of the aptly named BCROSP. Redwood forests on the BCROSP occur within canyons and on slopes that receive high winter rainfall. This habitat is dominated by coast redwood (*Sequoia sempervirens*), and can be relatively homogenous with little understory vegetation. Most redwoods on the preserve are second-growth trees and occur in areas that have been previously logged. On portions of the preserve, Douglas fir (*Pseudostuga menziesii*), tanoak (*Lithocarpus densiflorus*), and California bay (*Umbellularia californica*) are important components on drier slopes and ridges. The habitat mapped by MPROSD as the douglas-fir coast redwood association was placed in this CWHR habitat due to the relatively high proportion of redwood observed in this habitat. Understory plants and abundant invertebrates in redwood forests provide foraging opportunities for a number of wildlife species. Small mammals occurring in redwood habitat at the BCROSP include the Trowbridge shrew (*Sorex trowbridgei*) and California myotis (*Myotis californicus*). Several species of amphibian thrive in the moist environment of the redwood forest floor and small creeks, including the Pacific giant salamander (*Dicamptodon ensatus*) and California newt (*Taricha torosa*). Common birds in found in this habitat on the preserve include the Western Screech-Owl (*Otus kennicottii*), Steller's Jay (*Cyanocitta stelleri*), Common Raven (*Corvus corax*), Chestnut-backed Chickadee (*Poecile rufescens*), Brown Creeper (*Certhia americana*), Winter Wren (*Troglodytes troglodytes*), and Pacific-slope Flycatcher (*Empidonax difficilis*). Sharp-shinned Hawks (*Accipiter striatus*) could nest here as well. Redwood forests on the BCROSP also provide habitat for banana slugs (*Ariolimax columbianus*), and many species of arachnids and other invertebrates.

Special-status wildlife species that may occur in this habitat on the BCROSP include the California red-legged frog (*Rana aurora draytonii*), Osprey (*Pandion haliaetus*), and Sharp-shinned Hawk.

Douglas-fir (Douglas-fir Series, Douglas-fir Association, Douglas-fir California Bay Association)

Douglas-fir habitat is present in several areas within the BCROSP, particularly in the northwestern portion of the preserve. This habitat is typically more complex than redwood habitat, with substantial components of tanoak and California bay, and occasional Pacific madrone (*Arbutus menziesii*). Wildlife species found in this habitat are generally similar to those

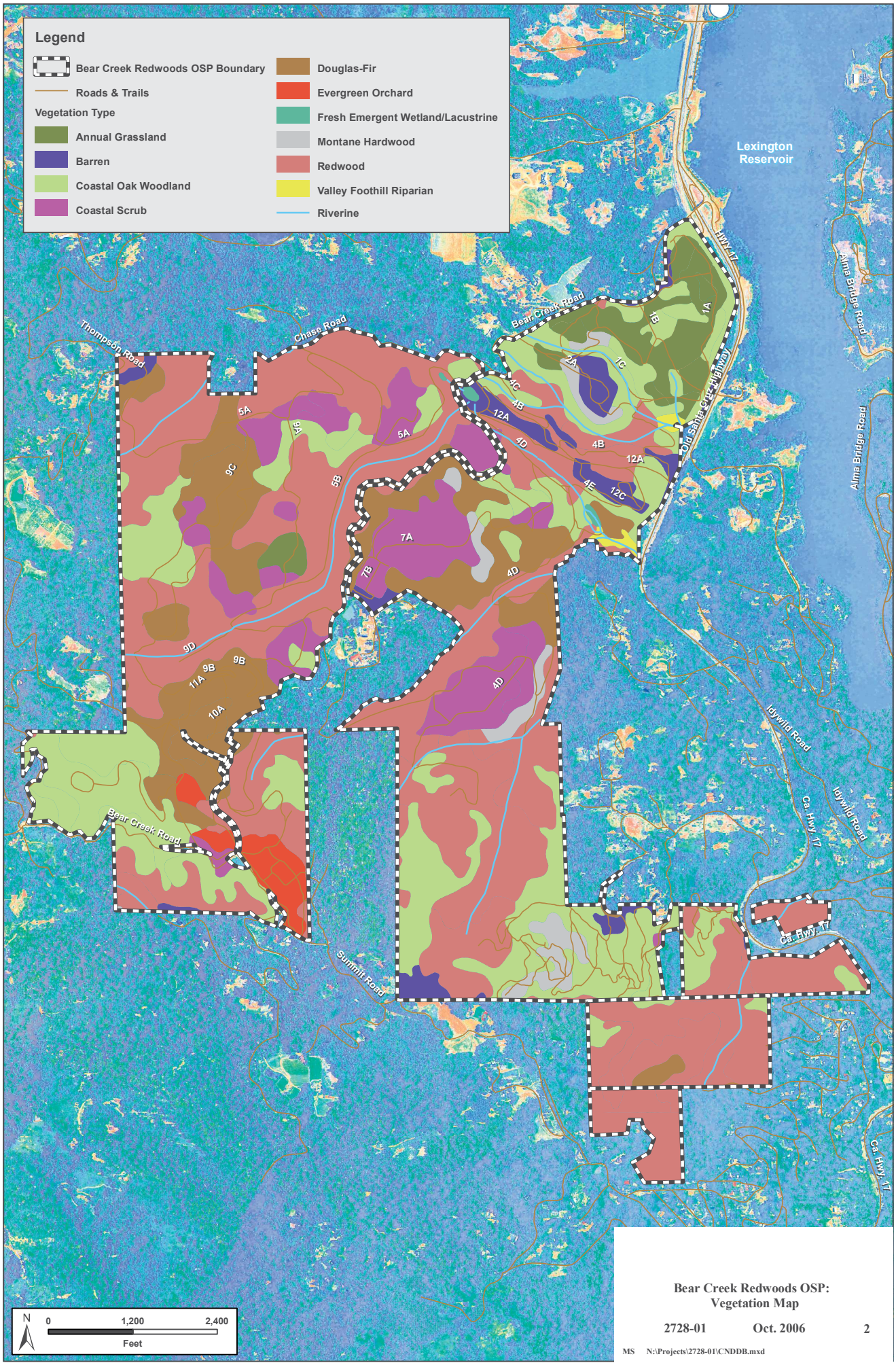
found in redwood forests, although the more diverse habitat results in a more diverse assemblage of wildlife species. Some avian species, including Pygmy Nuthatch (*Sitta pygmaea*), Hermit Warbler (*Dendroica occidentalis*), Black-throated Gray Warbler (*Dendroica nigrescens*), Olive-sided flycatcher (*Contopus cooperi*), and Purple Finch (*Carpodacus purpureus*), occur in redwood forest, but are more likely to be found in this drier habitat. The drier substrate here is also more suitable for certain reptile species, such as sharp-tailed snake (*Contia tenuis*) and rubber boa (*Charina bottae*), and mammals such as the Yuma myotis (*Myotis yumanensis*) and Merriam's chipmunk (*Tamias merriami*). As in redwood habitat, taller trees could potentially provide nesting habitat for raptors such Ospreys, which forage at Lexington Reservoir, and Sharp-shinned Hawks.

Special-status wildlife species that may occur in this habitat include the Osprey and Sharp-shinned Hawk.

Coastal Oak Woodland (California Bay Series, California Bay Association, California Bay Coast Live Oak Multiple Series Mapping Unit, California Bay Tanoak Multiple Series Mapping Unit, Mixed Oak Mapping Unit, Coast Live Oak Series)

Coastal oak woodlands scattered throughout much of the BCROSP are dense, closed-canopy broadleaved evergreen forests dominated by coast live oak (*Quercus agrifolia*). California bay and tanoak are also common in this habitat; habitats dominated by the evergreen California bay fall into this CWHR habitat more appropriately than in the montane hardwood category (described below), which is dominated by deciduous trees. The shrub understory here includes blackberry (*Rubus* spp.), poison oak (*Toxicodendron diversilobum*), common snowberry (*Symphoricarpos alba*), and toyon (*Heteromeles arbutifolia*). Coastal oak woodlands on the BCROSP provide high-quality habitat for an array of wildlife species. This habitat is quite complex and diverse, and provides good cover, nesting opportunities, and a diversity of foraging opportunities.

Mammals occurring in the coastal oak woodland on the BCROSP include western gray squirrels (*Sciurus griseus*) and San Francisco dusky-footed woodrats (*Neotoma fuscipes annectens*), as well as other small rodents. The dense understory vegetation provides potential cover for mountain lions (*Felis concolor*). Acorns provide food for several species of wildlife, and a number of bird species utilize tree cavities for nesting. Acorn Woodpeckers (*Melanerpes formicivorous*), Western Scrub-Jays (*Aphelocoma californica*), California Quail (*Callipepla californica*), Wild Turkeys (*Meleagris gallopavo*), and wild boar (*Sus scrofa*) are among the species that feed heavily on acorns. Chestnut-backed Chickadees, Oak Titmice (*Baeolophus inornatus*), White-breasted Nuthatches (*Sitta carolinensis*), and Nuttall's Woodpeckers (*Picoides nuttallii*) are some of the birds that take advantage of numerous nesting cavities in mature oak trees. Hutton's Vireos (*Vireo huttoni*) and Dark-eyed Juncos (*Junco hyemalis*) are also common nesting species in this habitat, and Cooper's Hawks (*Accipiter cooperii*) and White-tailed Kites (*Elanus leucurus*) may nest here as well. Several species of amphibians, such as the California slender salamander (*Batrachoseps attenuatus*), can be found in oak woodlands, especially where moisture is retained under fallen wood and in crevices in oaks. Conrad et al. (2003) found a Santa Cruz black salamander (*Aneides flavipuctatus niger*), an uncommon species with an



Bear Creek Redwoods OSP: Vegetation Map

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extremely restricted range, at the BCROSP. Reptiles occurring in this habitat include the ringneck snake (*Diadophis punctatus*) and western skink (*Eumeces skiltonianus*).

Special-status wildlife species that could occur in coastal oak woodland on the BCROSP include the San Francisco dusky-footed woodrat, Long-eared Owl (*Asio otus*), Cooper's Hawk, and White-tailed Kite.

Montane Hardwood (Black Oak Forest, Blue Oak Mapping Unit, Valley Oak Series, Lower Elevation Mixed Broadleaf Hardwoods Mapping Unit)

Montane hardwood habitat is present on the BCROSP only in limited areas in the eastern portion of the preserve. In contrast to the coastal oak woodland, most trees in this habitat are deciduous. Dominant tree species here include black oak (*Quercus kelloggii*), blue oak (*Quercus douglassii*), valley oak (*Quercus lobata*), and California buckeye (*Aesculus californica*). Mesic conditions on the BCROSP result in a fairly dense canopy in this habitat, in contrast to Valley Oak Woodlands (which do not occur on the BCROSP). Where this habitat occurs on the BCROSP, it typically occurs adjacent to occurrences of coastal oak woodland dominated by California bay.

The high diversity of habitats and nesting and foraging opportunities here correspond to a relatively high diversity of wildlife species. In general, wildlife use of this habitat is very similar to that in coastal oak woodland habitat. As with coastal oak woodlands, acorns provide forage for wildlife, and oaks provide optimal nesting habitat for many bird species, including cavity-nesting birds. Because the dominant tree species in the montane hardwoods on the BCROSP are deciduous, winter use of these trees by birds is lower than in the coastal oak woodland habitat, both due to the reduced cover and reduced foraging substrate present in the leafless deciduous oaks during the winter season. However, the seasonally open canopy has led to thicker understory vegetation, providing additional cover for mammals and some bird species.

Special-status wildlife species that could occur in montane hardwood habitats on the BCROSP include the San Francisco dusky-footed woodrat, Long-eared Owl, Cooper's Hawk, and White-tailed Kite.

Valley Foothill Riparian (White Alder Series, Big-leaf Maple Series)

Because the riparian habitat on the BCROSP is primarily embedded within forested upland habitats, it is generally narrow, with little understory, and is poorly defined, intergrading quickly with adjacent redwood and oak woodland habitats. In addition to the habitats mapped by the MROSD as the white alder and big-leaf maple series (in two small areas in the northeastern part of the preserve), narrow bands of riparian habitat that were too narrow to map occur along all riverine habitat on the preserve. Where this habitat is distinct at the BCROSP, it is dominated by box elder (*Acer negundo*), big leaf maple (*Acer macrophyllum*), and alder (*Alnus* sp.).

Riparian habitats in the Santa Cruz Mountains are typically of very high value to wildlife. The presence of water and abundant invertebrate fauna provide foraging opportunities for a number of wildlife species. Downed logs, boulders, and fluvial debris provide cover and refugia for small mammals, reptiles, and amphibians. In more open, less shaded areas, the diverse structure

of riparian habitat provides abundant cover and nesting opportunities, resulting in high bird diversity. However, throughout most of the BCROSP, the riparian habitat is poorly defined, as the upland habitat occurs right up to the edges of the streams (or nearly so), and shading from evergreen species such as redwoods, Douglas-firs, California bays, and coast live oaks limits the development of understory vegetation. In such cases, wildlife species are mostly similar to those described for the upland habitat type.

Valley foothill riparian habitat on the BCROSP supports a moderate diversity of wintering and migrating birds, including insectivores, such as warblers, and seed-eaters, such as sparrows. Riparian habitats also provide breeding habitat for Neotropical migrants such as Pacific-slope Flycatchers, Warbling Vireos (*Vireo gilvus*), Wilson's Warblers (*Wilsonia pusilla*), California Yellow Warblers (*Dendroica petechia brewsteri*), and Black-headed Grosbeaks (*Pheucticus melanocephalus*). The mixed understory and presence of water in riparian habitats usually supports a variety of mammals, reptiles, and amphibians, including raccoons (*Procyon lotor*), San Francisco dusky-footed woodrats, deer mice (*Peromyscus maniculatus*), garter snakes (*Thamnophis* spp.), and Pacific treefrogs (*Hyla regilla*).

Special-status wildlife species that could occur in riparian habitats on the BCROSP include the California red-legged frog, Long-eared Owl, White-tailed Kite, Cooper's Hawk, California Yellow Warbler, San Francisco dusky-footed woodrat, and ringtail (*Bassariscus astutus*).

Coastal Scrub (Broom Series, Coyote Brush Series, Agriculture)

Coastal scrub habitat on the BCROSP includes areas, mostly in the northern and north-central parts of the site, dominated by coyote brush (*Baccharis pilularis*), as well as areas dominated by non-native French broom (*Genista monspessulana*) and Scotch broom (*Cytisus scoparius*). The area mapped by the MROSD as "agriculture" is an abandoned vineyard that has been colonized by non-native annual grasses and coyote brush scrub, and is thus mapped as coastal scrub. This habitat contrasts with the similar CWHR habitat "chamise-redshank chaparral" (not found on the preserve), in that it is dominated by coyote brush rather than chamise (*Adenostoma fasciculatum*) and redshank (*Adenostoma sparsifolium*). On the BCROSP, the coastal scrub habitat includes both open areas, where coyote brush is dispersed within non-native annual grassland, and dense stands of broom intergrading with coyote brush.

Coastal scrub supports wildlife adapted to fairly dry, shorter (*i.e.*, less vertically complex), often denser/brushier habitats. Wildlife use of this habitat is affected to a large degree by its juxtaposition with adjacent grassland and woodland habitats. In open areas of coyote brush scrub, wildlife use is likely to be similar to that in grassland habitat on the preserve, although the coyote brush shrubs provide cover for sparrows, finches, towhees, rabbits, and lizards, and provides nesting sites for several bird species, including Loggerhead Shrikes (*Lanius ludovicianus*) that forage in the adjacent grassland. Adjacent oak woodland habitat in some locations provides nesting opportunities for bird species that may forage in scrub habitat, such as Western Scrub-Jays and Dark-eyed Juncos. Bird species such as the California Thrasher (*Toxostoma redivivum*), California Towhee (*Pipilo crissalis*), Spotted Towhee (*Pipilo maculatus*), Wrentit (*Chamaea fasciata*), Bewick's Wren (*Thryomanes bewickii*), and Anna's Hummingbird (*Calypte anna*) are common in this habitat type, regardless of its relation to other habitat types. Mammal species common in scrub habitat on the BCROSP include the coyote

(*Canis latrans*), California mouse (*Peromyscus californicus*), black-tailed jackrabbit (*Lepus californicus*), brush rabbit (*Sylvilagus bachmani*), and dusky-footed woodrat. Reptiles in this habitat include the gopher snake (*Pituophis melanoleucus*), western rattlesnake (*Crotalus viridis*), northern alligator lizard (*Elgaria coerulea*), and western fence lizard (*Sceloporus occidentalis*).

Special-status wildlife species that may occur in this habitat include Loggerhead Shrike and San Francisco dusky-footed woodrat.

Annual Grassland (Sedge *Juncus* Meadow Mapping Unit, California Annual Grasslands Series, Yellow Star Thistle Series)

Annual grasslands at the BCROSP are dominated by non-native grasses such as wild oat (*Avena fatua*) and soft chess brome (*Bromus hordeaceus*). These grasslands on the BCROSP provide lower cover, structural diversity, and foraging opportunities for wildlife than habitats supporting woody vegetation, and thus wildlife diversity is lower here than in most other habitat types. Furthermore, the limited extent of grassland habitat on the BCROSP (where it occurs primarily in the northeastern part of the preserve) reduces habitat quality for some species that occur more typically in broad expanses of grassland. However, a number of grassland-specialist species occur in the grasslands in the northern portion of the BCROSP, and several other wildlife species that use woody vegetation for cover or nesting forage in these grasslands. Small mammals such as deer mice (*Peromyscus maniculatus*), California ground squirrels (*Spermophilus beecheyi*), and Botta's pocket gophers (*Thomomys bottae*) are common residents in annual grasslands on the BCROSP. Black-tailed deer are common browsers throughout the preserve, and other large mammals, including coyotes and bobcats (*Lynx rufus*), also forage in grasslands on the preserve. A variety of birds use annual grasslands as foraging habitat, including Savannah Sparrows (*Passerculus sandwichensis*), Horned Larks (*Eremophila alpestris*), American Pipits (*Anthus rubescens*), Western Meadowlarks (*Sturnella neglecta*), Lesser Goldfinches (*Carduelis psaltria*), and Barn Swallows (*Hirundo rustica*). Western Meadowlarks and Mourning Doves (*Zenaida macroura*) may nest in grasslands on the BCROSP. Raptors such as Red-tailed Hawks (*Buteo jamaicensis*), Red-shouldered Hawks (*Buteo lineatus*), and White-tailed Kites forage for small mammals and reptiles within grasslands on the preserve. Western fence lizards, northern alligator lizards, and gopher snakes are among the reptiles that occur in grasslands on the preserve.

Foraging Loggerhead Shrikes and White-tailed Kites are the only special-status wildlife species that occur in grassland habitats on the project site.

Fresh Emergent Wetland/Lacustrine (Small Ephemeral Farm Ponds)

The three ponds in the northeastern part of the BCROSP provide substantial aquatic habitat, but relatively little emergent wetland vegetation. These former farm ponds were termed "ephemeral" in MROSD's mapping, but they hold surface water year-round. Emergent plants such as cattails (*Typha latifolia*) around the middle pond, at Alma College, support nesting Song Sparrows (*Melospiza melodia*) and Red-winged Blackbirds (*Agelaius phoeniceus*). Several species of birds forage in aquatic habitats, including Green Herons (*Butorides virescens*) and other waders, Belted Kingfishers (*Ceryle alcyon*), and many species of waterfowl. Waterbirds

such as Pied-billed Grebes (*Podilymbus podiceps*) and American Coots (*Fulica americana*) may occur as occasional visitors to these ponds, but are unlikely to breed in the limited emergent vegetation. Mallards (*Anas platyrhynchos*), however, may nest near the middle pond. Herpetological surveys conducted at these ponds in 2006 did not detect western pond turtles (*Emys marmorata*) or California red-legged frogs (L. Infante, pers. comm.), although habitat is suitable for these species. Non-native bullfrogs (*Rana catesbeiana*) were detected at all three ponds during those surveys, and Pacific treefrogs (*Hyla regilla*), recorded only at the middle pond, likely occur at all three ponds. In addition, California newts were detected at the upper and lower ponds, and non-native fishes (sunfish and bass) were detected at the lower and middle ponds. Small mammals, such raccoons and striped skunks (*Mephitis mephitis*), are likely to be found near wetlands, as well as several reptile species, especially garter snakes.

The only special-status species that may occur in wetlands on the BCROSP is the California red-legged frog, although this species was not detected during recent surveys (L. Infante, pers. comm.).

Riverine (Not Previously Mapped by MROSD)

Creeks present throughout the BCROSP are shallow first-order and second-order streams (as determined a 1:24,000 topographic map) that include ephemeral, intermittent, and perennial streams. The ephemeral and intermittent streams provide little in the way of aquatic habitat for wildlife. Although these streams provide drinking and bathing water for wildlife, the surface water in most such streams is too short-lived to provide breeding habitat for amphibians. Even the perennial streams provide very little habitat for aquatic wildlife species due to a paucity of deep pools, shallow flow, and a lack of emergent vegetation. No fish were observed in these streams, although amphibians such as California red-legged frogs and Pacific giant salamanders may occasionally occur here. Pacific giant salamanders and California newts likely breed in streams on the preserve, and it is possible that California yellow-legged frogs (*Rana boylii*) breed here as well (though the species has not been recorded here). California red-legged frogs are expected to occur in riverine habitat on the preserve as occasional, though likely very infrequent, dispersants.

Special-status wildlife species that may occur in this habitat include the California red-legged frog and foothill yellow-legged frog.

Barren (Built Up/Urban Disturbance)

Developed habitats, classified as "barren" according to the CWHR, occur in disturbed areas at a few locations scattered throughout the preserve. Barren habitats include paved areas, buildings, highly disturbed areas associated with developed areas, and some ornamental vegetation. These habitats support certain wildlife species adapted to the unique nesting and foraging opportunities found there, but wildlife abundance and diversity is generally low in this habitat. Striped skunks, raccoons, and Virginia opossums (*Didelphis virginiana*) may occur around the horse stable buildings. Birds adapted to the developed landscapes include House Finches (*Carpodacus mexicanus*), Northern Mockingbirds (*Mimus polyglottos*), Mourning Doves, and non-native European Starlings (*Sturna vulgaris*), House Sparrows (*Passer domesticus*), and Rock Pigeons (*Columba livia*). These birds are likely to nest on buildings or in ornamental vegetation in

developed areas on the site. The horse stables likely support nesting Barn Swallows and Black Phoebes (*Sayornis nigricans*), and the buildings at Alma College are used as roosting habitat by several species of bat. During a survey in spring 2002, a large colony of Mexican free-tailed bats (*Tadarida brasiliensis*) was found roosting in the main chapel building, and individual of Townsend's big-eared bat (*Corynorhinus townsendii*) and long-eared myotis (*Myotis evotis*) were also observed roosting in buildings (Heady and Frick 2002).

The only special-status species that is likely to occur in developed portions of the BCROSP is the Townsend's big-eared bat.

Evergreen Orchard (Christmas Tree Farm, Mixture of Planted Pines and Young Douglas-fir)

Christmas tree farms in the southwestern part of the site consist of rows of young conifers interspersed with ruderal vegetation, including non-native broom. Due to the habitat homogeneity of Christmas tree farms, few wildlife species are expected to occur in this habitat. A few bird species that occur in adjacent habitats may occasionally venture into this habitat, and small reptiles and rodents may occasionally occur here. Birds such as the Mourning Dove, House Finch, and Northern Mockingbird may nest in these trees in small numbers.

No special-status species are likely to occur in this habitat.

SPECIAL-STATUS WILDLIFE

Federal and state endangered species legislation gives species protected under these laws special status. In addition, state resource agencies and professional organizations, whose lists are recognized by agencies when reviewing environmental documents, have identified other species as sensitive. Such species are referred to collectively as "species of special status" and include: animals listed, proposed for listing, or candidates for listing as threatened or endangered under the Federal Endangered Species Act (FESA) or the California Endangered Species Act (CESA), animals listed as "fully protected" under the California Fish and Game Code, and animals designated as "Species of Special Concern" by CDFG.

Special-status animal species that occur in the vicinity of BCROSP in habitats similar to those found on the site are described below. The legal status and likelihood of occurrence of these species on site are presented in Table 1. Expanded descriptions are included only for those species for which potentially suitable breeding habitat occurs on the project site, or for which the resource agencies have expressed particular concern. The occurrence of special-status species reported to the CNDDB (2006) is shown in Figure 3.

The project is outside the known distribution range for several special-status species that occur elsewhere in Santa Clara County or adjacent counties. The bay checkerspot butterfly (*Euphydryas editha bayensis*) is known to occur on serpentine grasslands in Santa Clara County south of the preserve (from south San Jose to the south), and until recently it was known from

Table 1. Special-status Animal Species, Their Status, and Potential Occurrence on Bear Creek Redwoods Open Space Preserve.

NAME	*STATUS	HABITAT	POTENTIAL FOR OCCURRENCE ON SITE
Federal or State Endangered or Threatened Species			
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	FT	Serpentine grasslands in the San Francisco Bay area where host plant (*Plantago erecta*) is present.	Out of range; the closest known populations are in south San Jose. Considered absent.
Zayante band-winged grasshopper (*Timerotropis infantillis*)	FE	Sand parkland habitat in the Santa Cruz Mountains.	Out of range; currently occurs only in Santa Cruz County. No habitat present on preserve. Considered absent.
Steelhead-south/central coast ESU (*Oncorhynchus mykiss*)	FT, CSSC	Cool unobstructed coastal streams.	Most streams on BCROSP flow into Lexington Reservoir; Lenihan Dam is a barrier to upstream migration. Any trout found in these streams would be non-anadromous. Headwaters of Zayante Creek in the extreme southwest corner of the preserve too shallow/ephemeral to support steelhead. Steelhead considered absent.
California red-legged frog (*Rana aurora draytonii*)	FT, CSSC	Freshwater ponds and still pools in streams.	Suitable habitat present, and recorded in the northern part of the preserve in 1999. However, surveys conducted in 2006 failed to detect species in the ponds in the northeastern part of the preserve. Currently appears to be absent as a breeder, but dispersing individuals could occasionally occur in streams and ponds.
California tiger salamander (*Ambystoma californiense*)	FT, CSSC	Temporary or permanent pools or ponds in grasslands in California.	No local records, and no high-quality habitat on-site. Considered absent.
San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)	FE, SE	Wetlands in San Mateo and northern Santa Clara County.	BRCOSP is outside the range of this species. Considered absent.
American Peregrine Falcon (*Falco peregrinus anatum*)	SE, SP	Nests on cliffs, and occasionally on buildings or bridges; forages for birds over many habitats.	No nesting habitat present. Likely to occur as an uncommon forager, primarily during migration and winter.
Least Bell's Vireo (*Vireo bellii pusillus*)	FE, SE	Willow dominated riparian habitat in flat, arid valleys.	No suitable habitat for nesting, and no local records. Considered absent.
California Species of Special Concern and State Protected Species			
Western pond turtle (*Emys marmota*)	CSSC	Creeks, ponds and other aquatic habitat. Needs upland heavy soils to breed.	Suitable habitat is present in ponds, but none have been detected during repeated surveys of these ponds. Considered absent.
Foothill yellow-legged frog (*Rana boylii*)	CSSC	Streams, usually with relatively little riparian vegetation and a cobble substrate.	Suitable habitat present in creeks on the preserve. Not detected during surveys, but could potentially occur.
Golden Eagle (*Aquila chrysaetos*)	CSSC	Nests on cliffs or in large trees, forages over grasslands and oak woodlands.	No nesting habitat present, and no local nesting records. Considered absent as a breeder, but could occur as a rare forager in grasslands.
Cooper's Hawk (*Accipiter cooperii*)	CSSC	Nests in oak woodlands, forages in many habitats.	Suitable nesting and foraging habitat present throughout the preserve. Expected to nest in oak woodlands or other woodlands on the preserve.
Sharp-shinned Hawk (*Accipiter striatus*)	CSSC	Nests in a variety of dense woodlands, forages in many habitats.	Suitable habitat present. May nest in redwood forests or other woodlands on the preserve.

Table 1. Special-status Animal Species, Their Status, and Potential Occurrence on Bear Creek Redwoods Open Space Preserve.

NAME	*STATUS	HABITAT	POTENTIAL FOR OCCURRENCE ON SITE
Osprey (*Pandion haliaetus*)	CSSC	Nests in large trees near lakes or large rivers. Forages on fish.	Not found nesting on the preserve, but nests nearby. Suitable habitat present, and could potentially nest on the preserve.
White-tailed Kite *(Elanus leucurus*)	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats.	Open grasslands provide suitable foraging habitat, and numerous trees provide suitable nesting habitat. Expected to breed in suitable habitat on the preserve.
Merlin (*Falco columbarius*)	CSSC	Does not nest in California; uses many habitats in winter and during migration.	Does not breed locally; occurs as an uncommon forager during migration or during winter.
Long-eared Owl (*Asio otus*)	CSSC	Occurs in dense riparian woodlands and other woodlands, and forages over grasslands and other open habitats.	Potential habitat occurs on the BCROSP. Could breed in forested areas and forage on the preserve.
Burrowing Owl (*Athene cunicularia*)	CSSC	Grasslands and ruderal habitats where ground squirrel burrows or other burrows are present.	Habitat on the preserve is marginal, and there are no local breeding records. Considered absent.
Vaux's Swift (*Chaetura vauxi*)	CSSC	Nests in chimneys and in hollow snags in redwood forests.	No suitable nesting habitat in anthropogenic structures, and no large snags suitable for nesting. Unlikely to breed on the preserve, occurring only as an occasional forager and migrant.
California Horned Lark (*Eremophila alpestris actia*)	CSSC	Short-grass prairies, annual grasslands, coastal plains, and open fields.	No suitable short-grass habitat present for breeding. Could occur in grasslands as an occasional forager.
Loggerhead Shrike (*Lanius ludovicianus*)	CSSC	Nests in tall shrubs and dense trees, forages in grasslands, marshes, and ruderal habitats.	Shrubs and trees in open habitats provide marginal breeding habitat. Could breed near grasslands on the preserve.
California Yellow Warbler (*Dendroica petechia brewsteri*)	CSSC	Nests in dense stands of willow and other riparian habitat	Riparian habitat in the northeastern part of the site is marginally suitable for breeding, but this species occurs on the preserve primarily as a migrant.
Tricolored Blackbird (*Agelaius tricolor*)	CSSC	Nests colonially in cattails or other emergent vegetation around freshwater ponds.	Emergent vegetation around ponds not extensive enough to be suitable for breeding. Could occur in grasslands or disturbed areas (*e.g.*, near the stables) as an occasional forager.
Pallid Bat (*Antrozous pallidus*)	CSSC	Forages on the ground in open habitats; roosts in buildings, large oaks or redwoods, rocky outcrops and rocky crevices in mines and caves.	Grasslands likely not extensive enough to provide suitable foraging habitat; this species was not detected during two bat surveys (2002 and 2003). Considered absent.
Townsend's big-eared bat (*Corynorhinus townsendii*)	CSSC	Forages aerially in a variety of habitats. Typically roosts in caves, but can also roost in anthropogenic structures.	Likely no maternity roosts present, but an individual was found roosting at Alma College. Roosting and foraging individuals expected to occur occasionally.
San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*)	CSSC	Builds large stick nests in a variety of habitats, including riparian areas, oak woodlands, and scrub.	Coastal scrub, oak woodlands, and riparian habitats provide suitable habitat. Observed on site.
American badger (*Taxidea taxus*)	CSSC	Burrows in grasslands.	Grasslands likely not extensive enough to provide suitable habitat, and site too isolated from more extensive grassland to support a population. Considered absent.

Table 1. Special-status Animal Species, Their Status, and Potential Occurrence on Bear Creek Redwoods Open Space Preserve.			
NAME	***STATUS**	**HABITAT**	**POTENTIAL FOR OCCURRENCE ON SITE**
Ringtail (*Bassariscus astutus*)	SP	Prefers riparian and heavily wooded habitats near water.	Potential habitat present, and this species may occur on site in coastal scrub, oak woodlands, and riparian habitats.

SPECIAL STATUS SPECIES CODE DESIGNATIONS

FE = Federally listed Endangered
FT = Federally listed Threatened
SE = State listed Endangered
CSSC = California Species of Special Concern
SP = State Protected Species

locations in southern San Mateo County, but it has never been recorded in the vicinity of the BCROSP. Surveys for potential habitat were conducted in 1994 and 1995 for the Los Gatos Country Club EIR (Environmental Collaborative 1995), and only a very small patch of the butterfly's primary host plant, *Plantago erecta*, was found. It was determined that this habitat patch was not large enough to support a population of bay checkerspots. Based on the lack of local records and the lack of suitable habitat on the preserve, this species is not expected to occur on the preserve. Similarly, the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) is not known to occur in Santa Clara County south of the extreme north (near the San Mateo County border), and it is also considered absent from the preserve. The California tiger salamander (*Ambystoma californiense*), western pond turtle, and Burrowing Owl (*Athene cunicularia*) are also considered absent from the preserve; these species are discussed in detail below.

The BCROSP lacks suitable habitat for several other special-status species that occur nearby. Because streams on the preserve enter into Lexington Reservoir, steelhead (*Oncorhynchus mykiss*) are prevented from reaching the preserve by Lenihan Dam. The Zayante band-winged grasshopper (*Trimerotropis infantillis*) occurs in open sandy pine habitats in the Santa Cruz Mountains, but is currently known to occur only in Santa Cruz County. There is a historic (1928) CNDDB record from the town of Alma (now under Lexington Reservoir), but there is no suitable habitat for this species on the BCROSP. Similarly, the Santa Cruz kangaroo rat (*Dipodomys venustus venustus*) occurs in sand hills habitats in the Santa Cruz Mountains, and no suitable habitat is present for this species on the preserve. The Least Bell's Vireo (*Vireo bellii pusillus*) is extremely rare north of Santa Barbara County, and is considered absent on the BCROSP. Although this species has been recorded in Santa Clara County, suitable habitat for the species (*i.e.*, willow riparian habitat), is not present on the preserve. Pallid bats (*Antrozous pallidus*) are also presumed absent from the BCROSP, due to lack of extensive grassland foraging habitat. The limited extent of grassland and isolation of the site from areas of more extensive grassland also preclude the maintenance of a population of American badgers (*Taxidea taxus*), and thus this species is also considered absent from the site. Finally, although it is not listed as a California Species of Special Concern, the CNDDB shows a historic record for an unnamed isopod, *Calesellus californicus*, at the "springs of Black Creek", just north of the preserve (Figure 3). It is presumed that there is no suitable habitat for this cave-dwelling isopod on the preserve.

Other special-status species may occur on the preserve only as uncommon to rare visitors, migrants, or transients, or may forage on the site in low numbers while breeding in adjacent areas. However, these species are not expected to breed on the site, and any management actions on the preserve would be unlikely to affect them. These species include the American Peregrine Falcon (*Falco peregrinus anatum*), Merlin (*Falco columbarius*), Golden Eagle (*Aquila chrysaetos*), Vaux's Swift (*Chaetura vauxi*), California Horned Lark (*Eremophila alpestris actia*), and Tricolored Blackbird (*Agelaius tricolor*).

Federal or State Threatened or Endangered Species

California Red-legged Frog (*Rana aurora draytonii*). Federal Listing Status: Threatened; State Listing Status: None. The California red-legged frog is California's largest native frog. The species is generally restricted to riparian and lacustrine habitats in California and northern

Baja California. Red-legged frogs prefer deep, calm pools (usually more than 2 feet deep) in creeks, rivers, or lakes below 5000 feet in elevation (Jennings and Hayes 1994). Breeding habitat requirements include fresh water emergent or dense riparian vegetation, especially willows adjacent to shorelines. Red-legged frogs can survive in seasonal bodies of water that are dry for short periods if a permanent water body or dense vegetation stands are nearby.

Adult red-legged frogs are normally active at night and breed in still water during the late winter or early spring after waters recede. Females attach eggs in a single cluster to a vegetation brace just under the surface of the water. The eggs hatch in just over a week and the resulting larvae feed on plant and animal material on the bottom of the pond. It takes at least four months for the larvae to metamorphose into juvenile frogs. On rare occasions, larvae over-winter. Red-legged frogs can move considerable distances overland. Dispersal usually occurs within creek drainages, but movements of more than two miles over upland habitats have been reported during winter (wet) months (USFWS 2006). Red-legged frogs are often found in summer months in summer foraging habitat that would not be suitable for breeding; these individuals presumably move seasonally between summer foraging habitat and winter breeding habitat.

The U.S. Fish and Wildlife Service (USFWS) listed southern populations of the California red-legged frog as threatened in 1996, due to continued habitat degradation throughout the species' range, and population declines. Critical Habitat was designated for the California red-legged frog in 2001, but was rescinded in 2002; Critical Habitat was then re-designated in April 2006 (USFWS 2006). No portion of the BCROSP is within the designated Critical Habitat.

Red-legged frogs have not been reported on the BCROSP. The closest CNDDB record is approximately 2 miles southeast of the preserve, in Los Gatos Creek (Figure 3). Surveys were conducted by consultant Rich Seymour for special-status herpetofauna on the preserve in 2006, and no red-legged frogs were detected in the three ponds on the preserve (L. Infante, pers. comm.). These surveys consisted of two surveys (February and June) at the lower pond, and three surveys (February, May, and June) at the upper and middle ponds. All surveys were conduct during daylight hours except the February surveys at the middle and upper ponds, which were conducted at night. These surveys do not quite meet the requirements of USFWS protocol-level surveys for red-legged frogs, but the negative results of these surveys do strongly suggest that the species is likely absent as a breeder from these ponds. Similarly, no red-legged frogs were detected during surveys in 1994 and 1995 (Environmental Collaborative 1995) or in 2003 (Conrad et al. 2003). However, as reported in the amendment to Timber Harvest Plan 1-00-137 SCL, Eric Remington, a consulting biologist for the MROSD, found an adult red-legged frog in the northern portion of the BCROSP in 1999. Details on the exact location of this sighting are not available. Based on the lack of detections during focused surveys, it is unlikely that red-legged frogs breed in any of the ponds on the preserve. However, red-legged frogs can disperse considerable distances overland, and several potential breeding ponds are present less than 1 mile from the preserve, including the pond at the Presentation Center, adjacent to the BCROSP. Frogs from breeding populations off-site could potentially disperse into streams on the preserve, and there is some potential for this species to occur (albeit irregularly and in low numbers) in any aquatic or riverine habitat on the preserve, and therefore potentially in any terrestrial habitat adjoining the aquatic or riverine habitats on the preserve.

California Tiger Salamander (*Ambystoma californiense*). Federal Listing Status: Threatened; State Listing Status: Species of Special Concern. The California tiger salamander's preferred breeding habitat is temporary ponded environments (*e.g.*, vernal pools or human-made ponds providing water for at least three months) surrounded by uplands that support small mammal burrows. This species will utilize permanent ponds provided that aquatic vertebrate predators are not present. Such ponds provide breeding and larval habitat, while small mammal burrows (*e.g.*, those of ground squirrels and pocket gophers) in adjacent upland habitats provide aestivation sites for juvenile and adult salamanders during the dry season.

The range of the California tiger salamander is restricted to the Central Valley and the South Coast Range of California from Butte County south to Santa Barbara County. Tiger salamanders have disappeared from a significant portion of their range due to habitat loss from agriculture and urbanization and the introduction of non-native aquatic predators. The California tiger salamander was listed as threatened by the USFWS in July 2004. The USFWS designated Critical Habitat for the California tiger salamander in August 2005 (USFWS 2005). No portion of the BCROSP is within Critical Habitat for this species.

There are no CNDDB (2006) records of tiger salamanders within 5 miles of the BCROSP (the closest records are just over 5 miles to the northeast [Figure 3]), and habitat on the project site is not consistent with typical tiger salamander habitat. Two of the ponds on the preserve occur in redwood forest habitat, which is not known to be used by tiger salamanders, and all three ponds apparently contain predatory, non-native bullfrogs. Amphibian surveys conducted during summer 2006 failed to detect any tiger salamander larvae in the three ponds on the project site. Given the lack of local records and the absence of high-quality habitat on the preserve, this species is considered absent.

California Species of Special Concern and State Protected Species

Western Pond Turtle (*Emys marmorata*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The western pond turtle occurs in ponds, streams, and other wetland habitats in the Pacific Slope drainages of California and northern Baja, Mexico. Two subspecies have been described, the northwestern pond turtle (*E. m. marmorata*) and the southwestern pond turtles (*E. m. pallida*), but central California appears to be an intergrade zone. Adult western pond turtles occur in a variety of aquatic habitats, including streams and ponds. Ponds or slack-water pools with suitable basking sites (such as logs) are an important habitat component, and western pond turtles do not occur commonly along high-gradient streams. Breeding occurs in late spring or early summer (typically May-June). Females lay eggs in upland habitats, in clay or silty soils in unshaded (often south-facing) areas within a few hundred meters of aquatic habitat. Juveniles feed and grow in shallow aquatic habitats (often creeks) with emergent vegetation and ample invertebrate prey. Pond turtles reach sexual maturity between 7-11 years of age, and adults may live 40 years or more. Breeding habitat is typically found within 600 feet of aquatic habitat, but if no suitable breeding habitat can be found close by, adults may travel overland considerable distances to breed. Adults may also spend several months during winter up to 1500 feet or more from aquatic habitats, typically in areas with heavy leaf litter or duff.

A resident population of pond turtles occurs at Vasona Lake, approximately 3 miles north of the BCROSP, in the Los Gatos Creek drainage, but no pond turtles have been reported on the preserve (CNDDB 2006). If pond turtles were present on the preserve, they likely would have been detected during herpetological surveys conducted in summer 2006. Although habitat in the three ponds on the preserve appears suitable for this species, it is considered absent from the preserve based on the lack of sightings.

Foothill Yellow-legged Frog (*Rana boylii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The foothill yellow-legged frog occurs primarily in streams in Pacific drainages in Oregon and California. Foothill yellow-legged frogs prefer shallow flowing water with at least some cobble-sized substrate, in which they lay their eggs (Jennings and Hayes 1994). Like other frogs, they feed on insects and aquatic invertebrates. There are no CNDDB (2006) records of this species with 5 miles of the BCROSP, although a foothill yellow-legged frog was seen in Hendry's Creek, east of Lexington Reservoir near the BCROSP, approximately 35 years ago (H.T. Harvey & Associates 1999). Although potentially suitable habitat for foothill yellow-legged frogs occurs in the creeks on the preserve, no yellow-legged frogs were detected during focused surveys for the species in 1995 (Environmental Collaborative 1995). Although it is unlikely that this species occurs on the preserve, not all potential habitat has been surveyed, and there is a small potential that this species occurs in riverine habitat on the BCROSP.

Cooper's Hawk (*Accipiter cooperii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Cooper's Hawk is a medium-sized hawk that preys upon smaller birds (*e.g.*, jays, doves, and quail) and occasionally takes small mammals and reptiles. The Cooper's Hawk prefers landscapes where wooded areas occur in patches and groves which facilitates the ambush hunting tactics employed by this species. Breeding pairs in California are often found in stands of oak woodland or riparian areas, although this species has adapted well to suburban habitats, and many pairs tolerate human activity. Though the oak woodland, montane hardwood, and valley foothill riparian habitats on the BCROSP provide the most suitable nesting habitat for this species, Cooper's Hawks could potentially nest in any medium to large tree on the preserve, and foraging could occur virtually throughout the site.

Sharp-shinned Hawk (*Accipiter striatus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Sharp-shinned Hawk is very similar to the Cooper's Hawk, but is smaller and typically nests locally in coniferous forests and areas more remote from human activity. Sharp-shinned Hawks typically pursue small birds in semi-open country, at the edges of open woodlands, in clearings, along hedgerows, shorelines, or along passerine migration corridors. Nest sites are usually within 90 meters of a water source and located in dense stands of even-aged trees on north facing slopes. Sharp-shinned Hawks are much less abundant than Cooper's Hawks as breeders in the Los Gatos area, usually nesting only in remote, extensive forest stands. On the BCROSP, this species forages throughout the site, and it could potentially nest in small numbers in the redwood and Douglas-fir forest habitats.

Osprey (*Pandion haliaetus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Osprey is a fish-eating raptor that nests in tall trees or on human-made platforms near large rivers or lakes. Ospreys breed in coastal California only as far south as

Santa Cruz County, and are relatively rare in the Santa Cruz Mountains. However, in recent years, three nests have been found in the Los Gatos Creek watershed between Lexington Reservoir and the Lake Elsman area, southeast of the preserve (Figure 3). Lexington Reservoir provides suitable foraging habitat, and Ospreys could potentially nest in larger redwood or Douglas-fir trees on the preserve.

White-tailed Kite (*Elanus leucurus*). Federal Listing Status: None; State Listing Status: Fully Protected. White-tailed Kites are raptors that forage for small rodents and other prey, primarily in open grassy or scrubby areas. They nest in large shrubs or trees adjacent to this habitat. Breeding typically occurs between February and September, with a peak from May through August. White-tailed Kites occur throughout much of California, and they are fairly common in portions of the San Francisco Bay area where suitable nesting trees are interspersed with grassland foraging habitat. Larger oaks on the preserve provide potential nesting habitat, and there is a possibility that this species could nest on the BCROSP. White-tailed Kites are listed as "Fully Protected" by the CDFG.

Long-eared Owl (*Asio otus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. Long-eared Owls typically nest in densely vegetated woodlands in a variety of habitats, including riparian, oak woodland, and coniferous forest habitats. In these habitats, they often use abandoned nests of other raptors. They forage in open areas primarily on small mammals, especially California voles. Long-eared Owls are uncommon in Santa Clara County, but oak woodland, montane hardwood, and valley foothill riparian habitats on the preserve provide potentially suitable nesting habitat for this species, which could occur on the preserve.

Burrowing Owl (*Athene cunicularia*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Burrowing Owl is a small, terrestrial owl that resides in flat or gently sloping open grassland or sparse shrubland ecosystems. Preferred habitats are annual and perennial grasslands, typically with sparse, or nonexistent, tree or shrub canopies. In California, Burrowing Owls are found in close association with California ground squirrels. Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by Burrowing Owls. In the absence of ground squirrel populations, habitats soon become unsuitable for occupancy by owls. Burrowing Owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding Burrowing Owls. The nesting season, as recognized by the California Department of Fish and Game (CDFG), runs from February 1 through August 31. Breeding pairs typically have four to five young each year. Burrowing Owls often disperse after breeding, but they spend time in burrows year-round, and occupied burrows are protected year-round.

The limited grassland habitat on the BCROSP is marginal for Burrowing Owls. Burrowing Owls typically prefer extensive grazed grasslands with abundant ground squirrel burrows, in contrast to the relatively small area of grasslands on the preserve, which are not currently grazed. There are no records of Burrowing Owls within 5 miles of the project site (CNDDB 2006), and no Burrowing Owls were detected during focused surveys in 1994 (Environmental Collaborative 1995). Based on the lack of local records, and the poor habitat quality, Burrowing Owls are considered absent from the project site.

Loggerhead Shrike (*Lanius ludovicianus*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Loggerhead Shrike is a predatory songbird that prefers open habitats interspersed with shrubs, trees, poles, fences, or other perches from which it can hunt. Nation-wide, Loggerhead Shrike populations have declined significantly over the last 20 years. Even with this trend, Loggerhead Shrikes are still considered a fairly common species in California. Nests are built in densely foliated shrubs or trees, often containing thorns, which offer protection from predators and upon which prey items are impaled. Shrikes breed between February and July, with the peak of breeding between mid March and late June. This species could potentially nest in trees or shrubs adjacent to annual grassland on the preserve.

California Yellow Warbler (*Dendroica petechia brewsteri*). Federal Listing Status: None; State Listing Status: Species of Special Concern. Yellow Warblers breed in deciduous riparian habitats consisting of alders, cottonwoods, willows and other trees and shrubs. Most Yellow Warblers migrate to Mexico and South America in the fall and return to California to breed in April. This species is common in California during migration, but the subspecies that nests in central California, including the BCROSP, is less common and has declined due to riparian habitat loss. The valley foothill riparian habitat in the northeastern part of the preserve provides potential nesting habitat for this species, although few pairs are expected to nest on the preserve due to the limited extent and marginal quality (for this species) of this habitat.

Townsend's big-eared bat (*Corynorhinus townsendii*). Federal Listing Status: None; State Listing Status: Species of Special Concern. The Townsend's big-eared bat is a colonial species, with females aggregating in the spring at nursery sites known as maternity colonies. Although the Townsend's big-eared bat is usually a cave dwelling species, many colonies are found in anthropogenic structures such as the attics of buildings or old abandoned mines. Radiotracking studies suggest that movement from a colonial roost during the maternity season is confined to within 15 km of the nursery. Townsend's big-eared bats forage primarily on small moths in a variety of mesic habitats. The preserve provides potential roosting and foraging habitat, and a single Townsend's big-eared bat was found roosting in an abandoned building at Alma College in 2002 (Heady and Frick 2002). Based on surveys conducted in 2002, it is unlikely that a large maternity colony is present on the preserve, but individuals likely forage and occasionally roost on the site (in buildings within the "barren" habitat type) in small numbers.

San Francisco Dusky-footed Woodrat (*Neotoma fuscipes annectens*). Federal Listing Status: None; State Listing Status: Species of Special Concern. This species prefers hardwood forests, riparian habitats, and brushlands and often forages above ground. Food includes berries, fungi, leaves, flowers, and nuts. Woodrats construct large conspicuous nests of sticks. They are often semi-colonial, nesting in concentrations that are patchily distributed on the landscape. Several woodrat nests were found in September 2006 in broom/coyote brush scrub in the northern portion of the preserve (near the intersection of roads 5A and 5B). This species is likely widespread on the preserve, occurring in riparian, montane hardwood, oak woodland, and coastal scrub habitats.

Ringtail (*Bassariscus astutus*). Federal Listing Status: None; State Listing Status: Fully Protected. The ringtail is a small member of the raccoon family, occurring in California in or

near riparian habitats with some forest or brush cover. Ringtails are nocturnal animals, and den in hollow trees, logs, snags, rock recesses, and abandoned burrows or woodrat nests. They are omnivorous, feeding on items such as seeds, berries, and small rodents. Relatively little is known regarding the distribution of this species, since they are nocturnal and rarely seen. The BCROSP is within the species' known range, and ostensibly suitable habitat at the preserve is present in all the wooded and scrub habitats. Although this species could occur at the preserve, there are no local records, and there is thus a low likelihood that this species occurs on the BCROSP.

POTENTIAL WILDLIFE-RELATED CONSTRAINTS

Following is a discussion of the constraints that special-status and sensitive wildlife species on the BCROSP may pose to management, maintenance, and other activities of the MROSD. Relevant regulations are summarized first, followed by a discussion of the constraints posed by individual wildlife species and groups.

REGULATIONS OVERVIEW

Federal and California Endangered Species Acts

Federal Endangered Species Act provisions protect federally listed threatened and endangered species and their habitats from unlawful take. "Take" under FESA includes activities such as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct." The USFWS, which oversees federally-listed species, defines harm to mean "an act which actually kills or injures wildlife." Such an act "may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 CFR § 17.3). Activities that may result in "take" of individuals are regulated by the USFWS. Candidate species are not afforded any legal protection under FESA; however, candidate species typically receive special attention from federal and state agencies during the environmental review process.

Provisions of the California Endangered Species Act protect state-listed threatened and endangered species. CDFG regulates activities that may result in "take" of individuals (*i.e.*, "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code. The CDFG, however, has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification . . . "

Thus, the presence of state or federally listed species on the BCROSP could constrain activities that have the potential to "take" the species. The only federally or state-listed wildlife species that would potentially occur on the BCROSP is the California red-legged frog.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) and the CEQA Guidelines provide guidance in evaluating project impacts and determining which impacts will be significant. CEQA defines "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." Under CEQA Guidelines section 15065, a project's effects on biotic resources are deemed significant where the project would:

- "substantially reduce the habitat of a fish or wildlife species"
- "cause a fish or wildlife population to drop below self-sustaining levels"

- "threaten to eliminate a plant or animal community"
- "reduce the number or restrict the range of a rare or endangered plant or animal"

In addition to the section 15065 criteria that trigger mandatory findings of significance, Appendix G of the CEQA Guidelines provides a checklist of other potential impacts to consider when analyzing the significance of project effects. The impacts listed in Appendix G may or may not be significant, depending on the level of the impact. For biological resources, these impacts include whether the project would:

- "have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"
- "have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service"
- "have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means"
- "interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites"
- "conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance"
- "conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan."

Potentially significant impacts would need to be addressed during the approval process for any project subject to CEQA review. Whether or not impacts to special-status and sensitive wildlife species are considered significant under CEQA would depend on the magnitude of the impact (*i.e.*, the amount of occupied habitat or the number of individuals impacted), the type of impact (*e.g.*, temporary vs. permanent, breeding habitat vs. foraging or dispersal habitat), and the rarity of the species in question. Of the special-status and sensitive species that potentially occur on the BCROSP, impacts to most would be unlikely to be considered significant under CEQA, in our opinion, primarily due to the limited, low-impact activities (*e.g.*, routine trail and facilities construction and maintenance and routine habitat management activities) that are likely to be undertaken by the MROSD and the low number of individuals or pairs of these species (relative to regional populations) that would be potentially affected by these activities.

Due to the rarity of the California red-legged frog in the project vicinity, impacts to this species could potentially be significant under CEQA if individual frogs or occupied habitat were lost. In addition, impacts to San Francisco dusky-footed woodrats and roosting bats could potentially be

significant if large numbers of individuals were impacted by MROSD activities, and due to their relative rarity in the region, impacts to active nests of Ospreys and Long-eared Owls could be significant.

Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA; 16 U.S.C., §703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. The trustee agency that addresses issues related to the MBTA is the USFWS. Migratory birds protected under this law include almost all native birds that could occur on the BCROSP, with the exception of the Wrentit (*Chamaea fasciata*), which is the sole member of its family in the new world, and certain game birds (*e.g.*, turkeys and pheasants; *Federal Register* 70(2):372-377). This act encompasses whole birds, parts of birds, and bird nests and eggs. Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment, a violation of the MBTA. The MBTA protects active nests from destruction and all nests of species protected by the MBTA, whether active or not, cannot be possessed. An active nest under the MBTA as described by the Department of the Interior in their Migratory Bird Permit Memorandum dated 15 April 2003 is one having eggs or young. Nest starts, prior to egg laying, are not protected from destruction.

California State Fish and Game Code

Migratory birds are also protected in and by the state of California. The State Fish and Game Code §3513 specifically emulates the MBTA and other sections and subsections of §3500-3516 provide additional protections for birds. Specifically, § 3503 protects birds' nests and eggs from all forms of needless take. All native birds are protected (including the Wrentit), although game birds may be taken with a hunting license. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFG. In addition, §3511 lists species that are "fully protected" and cannot be taken or possssed at any time.

In addition, raptors (eagles, hawks, and owls) and their nests are specifically protected in California under Fish and Game Code Section 3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." For all of these regulations, resource agencies typically consider "nests" to be active nests (nests with eggs or chicks). Destruction of inactive nests is generally not considered "take."

Non-game mammals are also protected in California. The State Fish and Game Code §4150 states that all non-game mammals or parts thereof may not be taken or possessed except as provided otherwise in the code or in accordance with regulations adopted by the commission. Activities resulting in mortality of non-game mammals (*e.g.*, destruction of an occupied non-breeding bat roost, resulting in the death of bats, or destruction of a woodrat nest), or disturbance that causes the abandonment of mammal dens, nests, or colonies resulting in the death of young, may be considered "take" by the CDFG.

SPECIAL-STATUS AND SENSITIVE WILDLIFE-RELATED CONSTRAINTS

California Red-legged Frog

Given the numerous negative findings of surveys conducted for this species on the preserve, it is highly unlikely that red-legged frogs currently breed on the preserve. However, California red-legged frogs may disperse as much as 2 miles between aquatic habitats (Bulger et al. 2003, USFWS 2006). Based on a review of aerial photographs and USGS topographic maps, there appear to be several small ponds within 2 miles of the BCROSP. The sighting of a red-legged frog on the preserve in 1999 indicates that red-legged frogs are present in the general area, and that frogs breeding elsewhere occasionally (although likely very rarely) disperse onto the preserve.

Most likely, any management actions (*e.g.*, trail maintenance or construction) that might be undertaken by the MROSD on the preserve would not affect red-legged frogs. However, if red-legged frogs are present in or near work areas, impacts to individual frogs or occupied habitat could result in a significant impact under CEQA, and approval from the USFWS and CDFG may be required for purposes of FESA compliance. The MROSD may wish to consult with the USFWS and the CDFG prior to any work that would occur in or immediately adjacent to aquatic habitat (*e.g.*, culvert repair) to obtain these agencies' concurrence that the activity will not adversely affect the red-legged frog. Presumably, if aquatic habitat regulated by the U.S. Army Corps of Engineers would be affected by any MROSD activity, Clean Water Act Section 404 permitting would be required, and the Corps would then determine whether to consult with the USFWS under Section 7 of the FESA. If there is no federal nexus (*i.e.*, no Corps permit), and consultation with the USFWS is necessary, consultation would occur under Section 10 of the FESA, requiring the preparation of a Habitat Conservation Plan (HCP).

If these agencies are of the opinion that the species may occur on the site, or if the MROSD wants to be conservative in terms of avoiding potential take of a federally-listed species, the following measures should be adequate to avoid any impacts to red-legged frogs.

Measure 1. Avoidance of Suitable Habitat. Ground disturbance and impacts to vegetation within close proximity to (*i.e.*, within 200 feet of) aquatic habitats where red-legged frogs are known or presumed to occur should be avoided to the extent practicable.

Measure 2. Seasonal Avoidance (Work Window). To the extent practicable, ground-disturbing activities within 200 feet of aquatic habitat (ponds or streams) should not occur during the wet season, from 15 October through 15 April, when California red-legged frogs are most likely to be found in upland habitats away from aquatic habitat. The preferred work window would be 16 April to 14 October.

Measure 3. On-site Work Crew Education Program. Before the commencement of any work activities that may affect the red-legged frog, a qualified biologist should explain to construction workers how best to avoid the accidental take of California red-legged frogs. The biologist should conduct a training session that would be scheduled as a mandatory informational field meeting for contractors and all work personnel. The field meeting should include topics on

species identification, life history, descriptions, and habitat requirements during various life stages. Emphasis should be placed on the importance of the habitat and life stage requirements within the context of project avoidance and minimization measures. Handouts, illustrations, photographs, and project maps showing areas where minimization and avoidance measures are being implemented should be included as part of this education program. The program would increase the awareness of the contractors and workers about existing federal and state laws regarding endangered species as well as increase their compliance with conditions and requirements of resource agencies.

Prior to the start of work each day, dedicated personnel should inspect trenches and pits that were left open overnight for frogs. If a ranid frog of any kind is encountered during project construction, the following protocol should be implemented:

- All work that could result in direct injury, disturbance, or harassment of the individual animal must immediately cease;
- The foreman will be immediately notified;
- The foreman will immediately notify a qualified biologist, who in turn will immediately notify USFWS and CDFG if the frog is a red-legged frog; and
- If approved by the USFWS and CDFG, the qualified biologist will remove the individual to a safe location nearby.

Measure 3. Pre-disturbance Surveys. Prior to any work within 200 feet of aquatic habitat, a pre-disturbance survey should be conducted by a qualified biologist. If any red-legged frogs are found within the work area, the USFWS and the CDFG should be contacted, and if approved by the USFWS and CDFG, the qualified biologist would remove the individual to a safe location nearby.

Measure 4. Exclusion Barrier. If ground disturbance will occur within 200 feet of aquatic habitat in which red-legged frogs are known or assumed to be present, a temporary barrier should be constructed prior to commencement of work along the limits of impact (including temporary grading, equipment staging, and other impacts) between the work area and the aquatic habitat. This barrier should be designed to prevent California red-legged frogs from entering the work site and should remain in place until all work activities have been completed. This barrier should be inspected daily and maintained and repaired as necessary to ensure that it is functional and is not a hazard to red-legged frogs on the outer side of the fence.

San Francisco Dusky-footed Woodrat

Impacts to entire colonies (multiple nests) of San Francisco dusky-footed woodrats could potentially be considered significant under CEQA, and individuals of this species are also protected by the State Fish and Game Code. These mammals may occur in broom-dominated areas, which could be impacted during restoration activities (see *Potential Opportunities and Management Recommendations* below), and they may also occur in other scrub or wooded habitats on the preserve. Implementation of the following measures would be adequate to avoid and minimize impacts to dusky-footed woodrats.

Measure 1. Pre-construction Surveys/Avoidance. Prior to any action that would result in clearing of riparian, oak woodland, montane hardwood, or coastal scrub habitat, a qualified biologist should conduct a survey for San Francisco dusky-footed woodrat nests in the vicinity of the work area. If multiple nests are found, these nests (and a minimum 10-foot buffer around the nests) should be avoided if feasible. If avoidance is not feasible, the following measure should be implemented.

Measure 2. Relocation. If active woodrat nests are present and they cannot be avoided, all understory vegetation should be cleared within the project site or in the area immediately surrounding the nests, but the nests themselves should not be removed at this stage. Then, each active nest should be disturbed (preferably by a qualified wildlife biologist) to the degree that all woodrats leave the nest and seek refuge outside the work area. The nest sticks should then be removed from the site and piled at the base of a nearby hardwood tree (preferably an oak or California bay with refuge sites among the tree roots). The spacing distance between the newly placed piles of sticks should not be less than 100 feet, unless a qualified wildlife biologist has determined that a specific habitat can support higher densities of nests.

Roosting Bats

Although only one special-status bat, a single Townsend's big-eared bat, has been found on the preserve, the buildings of Alma College provide roosting habitat for a number of bat species, and support a maternity colony of Mexican free-tailed bats. The razing of buildings occupied by roosting bats could result in the direct loss of individuals. Although Mexican free-tailed bats have no special regulatory status, loss of a large maternity colony could potentially be considered a significant impact under CEQA, and individuals of all bat species are protected by the State Fish and Game Code. Implementation of the following measures would minimize impacts to bat roosts.

Measure 1. Pre-disturbance Surveys. A pre-disturbance survey for bat roosts should be conducted prior to disturbance, including renovation or demolition, of any buildings. The survey should be conducted by a qualified bat biologist (*i.e.*, a biologist holding a CDFG collection permit and a Memorandum of Understanding with CDFG allowing the biologist to handle and collect bats). No activities that would result in disturbance of active roosts should proceed prior to the completed surveys. If no active roosts are found, then no further action would be required. If a maternity roost is present, Measure 2 should be implemented. If a non-maternity roost is present, or after young in a maternity colony are volant (flying) and independent (typically after 31 August), Measure 3 should be implemented before the roost location is disturbed.

Measure 2. Buffer Zones and Seasonal Avoidance. If a maternity roost is detected, a qualified bat biologist would determine the extent of a construction-free buffer zone that should be maintained around the roost, since bats are known to abandon young when disturbed. Construction activities within this zone should not occur during the period 1 March through 31 August to avoid potential construction disturbance to the maternity roost.

Measure 3. Eviction. If a non-maternity roost is present within a structure to be disturbed, or if a maternity roost is to be disturbed after 31 August, roosting individuals should be safely evicted

under the direction of a qualified bat biologist (as determined by a Memorandum of Understanding with CDFG), by either opening the roosting area to allow air flow through the cavity or using a one-way door to exclude the bats. Construction should then follow no sooner than the following day. This action should allow bats to leave during dark hours, thus increasing their chance of finding new roosts while minimizing the risk of predation, which would be higher during daylight hours.

Nesting Birds

The vast majority of birds found on the BCROSP are protected under the MBTA and State Fish and Game Code. In addition, impacts to nesting Ospreys or Long-eared Owls (neither of which has been recorded breeding on the preserve, though there is some potential for breeding to occur in the future) could be considered significant under CEQA due to the regional rarity of these species. MROSD activities, including routine maintenance and management activities, have the potential to take nests, eggs, young, or individuals of protected bird species. Disturbance during the breeding season could result in the incidental loss of fertile bird eggs or nestlings, both on natural substrates (*e.g.*, in trees or on the ground) and on artificial substrates such as buildings. Implementation of the following measures would minimize the potential for impacts to migratory birds.

Measure 1. Avoid Disturbance during the Nesting Season. Activities that could result in the disturbance of bird nests should be scheduled to avoid the nesting season to the extent practicable. The nesting season for most birds in Santa Clara County extends from February through August.

Measure 2. Pre-disturbance Surveys. If activities that could result in the disturbance of bird nests are to occur during the breeding season, pre-disturbance surveys should be conducted by a qualified ornithologist no more than 7 days prior to the initiation of construction in any given area. Pre-construction surveys should be conducted to ensure that no nests of species protected by the MBTA or State Code will be disturbed during project implementation.

Measure 3. Inhibiting Nesting. If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting substrate (*e.g.*, bushes, trees, grass, buildings, burrows) that will be removed by the project should be removed during the period September-January, before the nesting season, to help preclude nesting.

Measure 4. Buffer Zones. If an active nest is found, a qualified ornithologist, in consultation with CDFG, will determine the extent of a disturbance-free buffer zone to be established around the nest. For raptors, which may be particularly sensitive to disturbance, this buffer is typically 250 feet; for other birds, buffers may be considerably smaller (*e.g.*, 50-100 feet).

POTENTIAL OPPORTUNITIES AND MANAGEMENT RECOMMENDATIONS

MANAGEMENT OPPORTUNITIES FOR SPECIAL-STATUS WILDLIFE

The BCROSP currently provides high-quality habitat for a wide variety of wildlife species. The vast majority of the preserve consists of wildlands, and little management is needed to enhance this habitat for wildlife. Below, we provide two potential opportunities to enhance the value of wildlife habitat on the BCROSP. Implementation of these management actions could potentially be used for mitigation, if needed, for potential impacts to special-status wildlife either as a result of on-site management actions (*e.g.*, development of park facilities), or off-site actions on other MROSD lands.

Eradication of Non-native Vegetation

Non-native vegetation, such as the broom and Christmas tree farms on the preserve, generally provides low-quality habitat for native wildlife. Native wildlife species are generally well adapted to exist in native landscapes, and non-native vegetation can result in homogenous habitat with few foraging or breeding opportunities for native wildlife. Removal of broom and Christmas tree farms on the preserve, and restoration of native plant associations in these areas, would benefit most native wildlife species found on the site.

It should be noted that San Francisco dusky-footed woodrat nests were observed in broom habitat on the preserve, and prior to habitat restoration in areas of broom, surveys should be conducted for this species, and measures (described above) should be taken to minimize impacts to woodrats.

Eradication of Non-native Aquatic Species

Non-native fish and bullfrogs in the ponds on the BCROSP may prey on native species such as California red-legged frogs and western pond turtles, and particularly on the young of these native species. The presence of these non-natives may be one of the reasons why red-legged frogs and western pond turtles were not detected at the ponds on the preserve during recent surveys. Removal of non-native fish and bullfrogs would thus improve the potential for the establishment of breeding populations of red-legged frogs or pond turtles, either by allowing occasional dispersants to breed successfully or providing suitable habitat to which red-legged frogs or western pond turtles may be introduced. The most effective means of eliminating non-native fish from these ponds would be to completely drain the ponds. Dewatering would also allow for removal of bullfrog larvae (tadpoles), and some adult bullfrogs. To completely eliminate adult bullfrogs, follow-up management (*e.g.*, spotlighting and removal) would likely be necessary. Because there is a remote possibility of red-legged frogs occurring in these ponds, dewatering should occur in fall to avoid impacting red-legged frog larvae, and a qualified biologist should be on-site to relocate red-legged frogs if they are found at the dewatered pond. Relocation of a red-legged frog would require consultation with the USFWS.

MANAGEMENT RECOMMENDATIONS

The MROSD provided a draft map of conceptual alternatives for the Sierra Azul and Bear Creek Master Plan. At BCROSP, this map shows eight new/improved staging (*i.e.*, parking) areas, primarily at existing trail heads, a vista point at the peak in the southwest corner of the preserve, a new satellite field office at the Alma College site, and a new campground in the northwest portion of the preserve, near Chase Road. The map also shows several new interior preserve trails, and new regional trail connections.

These conceptual improvements are not likely to have a substantial adverse effect on wildlife use of the preserve. The majority of improvements involve relatively minor alterations (*e.g.*, creation of official parking areas) of areas that are already disturbed. The use of existing trailheads, and existing buildings for office space, minimizes potential impacts to wildlife. The most substantial change in land use on the preserve would be the creation of a campground in the northwestern portion of the preserve. The habitat in this area is Douglas-fir and redwood forest. Conversion of a portion of this habitat may result in disturbance of low numbers of special-status species such as Sharp-shinned Hawks, but such effects are not likely to constrain the development of a campground in this area.

Any large-scale management actions, or any activities that impact aquatic habitats, should be carefully reviewed by a qualified biologist once detailed plans are available. However, implementation of the measures described above should minimize impacts to special-status and sensitive wildlife species.

RECOMMENDATIONS FOR ADDITIONAL STUDIES

The MROSD has proactively coordinated general wildlife surveys, herpetological surveys, and bat surveys on the BCROSP, and for most of the special-status and sensitive wildlife species considered in this report, previous surveys have been adequate to allow an assessment of the potential constraints posed by these species. Because of the rarity of the California red-legged frog in the site vicinity, its status as federally threatened, and the 1999 report of this species on the preserve, this species has the potential to constrain MROSD activities on the preserve if it is present. While the herpetological surveys performed to date on the preserve strongly suggest that it is absent as a breeder, more extensive surveys for red-legged frogs (and, simultaneously, for yellow-legged frogs) would shed more light on the extent to which these species use the preserve, and thus the extent to which their presence may constrain MROSD activities. Because the surveys performed in 2006 do not quite meet the requirements for protocol-level red-legged frog surveys according to the USFWS's *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (dated August 2005), we recommend that additional surveys be conducted in accordance with the USFWS protocol until that protocol has been satisfied.

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