RESOURCE INVENTORY

ANIMAL LIFE
BIG BASIN REDWOODS STATE PARK
DECEMBER 1998

by
Gary Waldron
Associate State Park Resource Ecologist

Edited and Updated by Cyndy Shafer, Assistant Resource Ecologist – 9/18/01

TABLE OF CONTENTS

TABLES:

INTRODUCTION

The objective of this inventory is to provide an overview of the status, distribution, and abundance of terrestrial vertebrate populations occurring in Big Basin Redwoods State Park. Realization of this objective resulted from a literature search as well as communication with wildlife biologists knowledgeable of the western Santa Cruz County environments. To a lesser extent, original field work was conducted to augment the literature.

Field investigations were conducted by the author during 1995 and 1996. Sampling methodologies employed were simple and in no way quantified faunal population parameters. Vertebrate species presence or absence was determined by visual search, auditory search, road-kill and sign examination. Owls were inventoried by use of playback from pre-recorded calls. Each distinct wildlife habitat type was visited at least two times during the spring and at least once during other seasons. Existing trails were used as survey routes.

Potential bat roosting and foraging habitat were determined by interviewing park staff and other researchers familiar with the park, and by conducting field reconnaissance. Buildings, hollows of large trees (especially "goose pens" in redwood trees), rocky cliffs, and caves and mines were considered potential roosting sites, while riparian corridors, water bodies, and meadows were considered potential foraging habitat. Areas with accessible surface waters were sought for potential mist netting sites at which to capture bats as they came to drink or forage for insects.

Daytime visits were made to buildings, storage areas, water tanks and redwood hollows near public use areas to look for indications of bat use (guano or bats present). Bats located were captured with a hand net, identified and measured, and returned to the point of capture. During the evening hours visits were made to the most promising sites at which to detect bats. During these visits, a combination of detection techniques were used: 1) Visual observations for the presence of bats; 2) Acoustic surveys utilizing both human high frequency hearing (typically up to 20 kHz) and bat detectors to detect higher frequencies, and 3) Mist-netting at surface water or travel corridors, which consisted of stretching an 18 to 40 foot long by 7 to 14 foot high, 50-denier nylon mist nets between poles over open surface water or across a forest clearing.

Individual bats caught in the mist net were removed and the following information collected: forearm length (Tajima 150 vernier calipers), weight (Avinet 50 gram spring scale), sex, relative age and sexual condition. Species identification was determined using two different keys to North American bats, as well as past experience by Resource Ecologist Karen Minor, who led bat surveys.

California red-legged frogs (*Rana aurora draytonii*), federally listed as a Threatened species, were surveyed at Sempervirens Reservoir by row boat during nocturnal hours. Habitat along the edge of the lake was surveyed using flashlights to detect frog eye-shine. Detected frogs were captured by hand,

identified, measured (snout to vent length), and released at the site of capture. Naturalists Michael Westfall and Rich Seymour led frog surveys.

Nomenclature for species of terrestrial vertebrates cited in this inventory follows Stebbins (1985), American Ornithologists' Union (1998, 2000), and Jones, et al. (1986). Standardized English names currently in usage were applied in the text.

Special species are discussed separately in the text (see Sensitive Animals). Species appearing on the Federal Endangered or Threatened species list are taken from the Code of Federal Regulations (50 CFR 17.11); species listed by the State of California are from the California Administrative Code (Title 14, Section 670.5). Species listed as California Fully Protected are from Fish and Game Code of California, Section 5050; finally, the California Department of Fish and Game maintains a species of special concern list (California Department of Fish and Game 2001).

TERRESTRIAL FAUNA

Regional Setting

Big Basin Redwoods State Park is within the California Mixed Evergreen section of the Pacific Forest Province (Baily 1980). Because this province fronts on the Pacific Ocean, its climate is characteristically mild throughout the year, with heavy winter rainfall; fog partially compensates for summer drought.

Redwood is the characteristic tree of the Pacific Forest Province. Douglas-fir and some other conifers associate with it to form dense conifer forests. Common large animals include Columbian black-tailed deer and bobcat. The California grizzly bear, a former resident of the region, is now extinct. Small mammals include mice, squirrels, and dusky-footed woodrats.

Wildlife Habitat Relationship System

The Wildlife Habitat Relationships System (WHR) was developed primarily by State and Federal biologists to standardize a system of wildlife habitat classifications in California and to provide a framework for evaluating wildlife habitat components. The WHR system was used to describe wildlife habitats at Big Basin Redwoods State Park.

Wildlife habitats are described in terms of vegetation and vegetative structure. Many of the plant communities described in this inventory can be combined into a single wildlife community. Table AL-1 provides a crosswalk between plant communities of Big Basin Redwoods State Park and the corresponding wildlife habitat types. Each wildlife habitat type is discussed below.

Wildlife Habitats

Big Basin Redwoods State Park contains a very rich assemblage of vertebrate species, as attributed to its various habitat types and seral stages.

There are fifteen distinct wildlife habitats at the park unit, including marine, estuarine, freshwater emergent wetland, lacustrine, riverine, montane riparian, annual/perennial grassland, coastal scrub, mixed-chaparral, montane hardwood-conifer, montane hardwood, closed-cone pine-cypress, redwood and urban. Each habitat type will be discussed separately; typical vertebrates and all sensitive species associated with each habitat will be mentioned. Unitwide Habitat types were not mapped for this project, but are currently being mapped. See Appendix AL-1 for a comprehensive listing of recorded and predicted vertebrate species.

Marine

A discussion of the marine habitat is included in the Marine Life Section of this report.

Estuarine

Estuarine habitats occur on periodically and permanently flooded substrates and open water portions of semi-enclosed coastal waters where tidal seawater is diluted by flowing fresh water (Ellison *in* Mayer and Laudenslayer 1980).

Estuarine habitat at Big Basin Redwoods State Park occurs near the mouth of Waddell Creek, in the Theodore J. Hoover Natural Preserve. The habitat is situated on a flat area, with a slope of less than 9 percent (California Department of Parks and Recreation 1984). Typically, a sand bar is formed at the mouth of Waddell Creek by low energy wave action during spring and summer months (Smith 1987). This sand bar effectively blocks creek flows, ponding water into a lagoon. After bar formation the heavier salt-water layer in the lagoon is lost to seepage through the bar and dilution from stream inflow, and the lagoon is converted to a freshwater system (Smith 1987). During the winter, high energy, steep waves erode beach sand and remove the sandbar allowing seawater intrusion into the creek and create brackish conditions (Hecht and Rusmore (eds.) 1973).

The various physiological stresses exerted in the estuarine environment, especially those related to changing salinity levels, result in aquatic natural

Table AL-1. Crosswalk between Wildlife Habitat Relationship (WHR) System and Terrestrial Plant Communities (Holland 1986) for Big Basin Redwoods State Park.

WHR Habitat	Terrestrial Plant Community

Marine	No Analogue
Estuarine	No Analogue
Freshwater Emergent Wetland	Coastal and Valley Freshwater Marsh
	Coastal Brackish Marsh
Lacustrine	No Analogue
Riverine	No Analogue
Montane Riparian	Red Alder Riparian Forest
Coastal Scrub	Northern Coastal Scrub
	Northern Foredunes
Mixed Chaparral	Northern Mixed Chaparral
Annual/Perennial Grassland	Bald Hills Prairie
	Non-native Grasslands
Closed-cone Pine-Cypress	Knobcone Pine Forest
	Monterey Pine Forest
	Northern Interior Cypress Forest
Montane Hardwood-Conifer	Mixed Evergreen Forest
Montane Hardwood	Interior Live Oak Woodland
Redwood	Alluvial Redwood Forest
	Upland Redwood Forest
Urban	No Analogue

communities that are low in numbers of species (i.e., species richness), but high in population densities of those species present (Mayer and Laudenslayer (eds.) 1988). The largest number of estuarine organisms are benthic and include hydrozoans, anthozoans, and annelid worms. Mollusks, including bivalves and gastropods also occur in this zone (Mayer and Laudenslayer (Eds.) 1988).

The emergent wetlands resulting from the fluctuating brackish/freshwater environment include vegetation such as bulrushes (*Scirpus* spp.), sedges (*Carex* spp.), rushes (*Juncus* spp.), and cattails (*Typha latifolia*).

The most common reptiles found in this habitat are the terrestrial, western aquatic and common garter snakes, gopher snake and southwestern pond turtle, a special species. The San Francisco garter snake, a state and federal listed Endangered species, has been found in the small freshwater emergent wetland of Turtle Pond (see below). Individuals have also been observed near the Rancho del Oso Ranger Station and in the nearby horse pasture. While there is some suspicion that the San Francisco garter snake was artificially introduced into the Waddell, it is entirely possible that the species emigrated there from the Ano Nuevo area (Paul Keel pers. comm.). Regardless, the species appears to be successfully breeding in the Waddell (Smith et al. 1997). See the Sensitive Animals Section (below), for more information on the status of the southwestern pond turtle and San Francisco garter snake at Big Basin Redwoods State Park and statewide.

This habitat provides for reproduction, feeding, resting and cover for many species of mammals and birds. It provides shelter for large numbers of water birds, especially during heavy winter storms when ocean waters are rough. It also provides critical nursery habitat for steelhead to adapt to saltwater before entering the ocean (see Aquatic Life Section).

Some of the mammals visiting estuarine habitat include Columbian black-tailed deer, brush rabbit, bobcat, spotted skunk and coyote. An occasional northern elephant seal may enter the Waddell estuary, as occurred in the winter of 1996.

Typical avifauna found in this habitat varies throughout the year. During the winter, it provides a resting place and wintering habitat for many migrating waterfowl and shorebirds. Small flocks of wintering green-winged teal mix with year-round residents such as great-blue herons, mallards, American coots, and common mergansers. During the spring, migrant shorebirds like greater yellowlegs and northern phalaropes make use of the shrinking marsh. Various species of swallows replace the black phoebe as a primary insectivore and red-winged blackbirds arrive to complete their reproductive cycle. While not known to nest in the park, bank swallows, a state listed Threatened species, use the habitat for foraging on flying insects. The common yellowthroat, a special species that is subject to nest parasitism by brown-headed cowbirds, breeds in this habitat. The peregrine falcon, a state listed Endangered species, utilizes the habitat for foraging upon waterfowl and shorebirds. Northern harriers, a special species, also use the brackish marsh for foraging habitat. See the Sensitive Animals Section for more information on the status of bank swallows, common yellowthroats, peregrine falcons, and northern harriers in the state park and statewide.

Pacific treefrogs are common, especially during periods when seawater is abated. Red-legged frogs are found in the freshwater marsh (Westfall pers. comm.)

Freshwater Emergent Wetland

Freshwater emergent wetlands are characterized by erect rooted herbaceous hydrophytes. Dominant vegetation is generally perennial monocots to 2 meters in height (Mayer and Laudenslayer (eds.) 1988). Emergent wetlands are flooded frequently, enough so that the roots of the vegetation prosper in an anaerobic environment (Gosselink and Turner 1978 *in* Mayer and Laudenslayer (eds.) 1988).

This habitat type occurs in a small area known as "Turtle Pond" located just west of the Rancho del Oso Nature Center (the former McLean residence), and as part of the estuarine/freshwater marsh complex of Waddell Creek. Water for Turtle Pond is provided by a natural spring. The marsh vegetation of the pond is dominated by bulrush (*Scirpus acutus*) and California bulrush (*S. californicus*). Mature arroyo willows (*Salix lasiolepis*) grow around the margins of the marsh/pond. This marsh is inhabited by the southwestern pond turtle, a sensitive species, red-legged frog and San Francisco garter snake (Smith pers. comm., Smith et al 1997). Rancho del Oso used to be called "Frogtown" for the abundance of red-legged frogs that occurred there (West-Bourke pers. comm.). For further information on the status of these species, see the Sensitive Animal Section of this document. Virginia rails and soras are also present in Turtle Pond. Smith et al. (1997) reported the presence of black rails (a sensitive species) here during their studies.

The larger "Waddell Marsh" is discussed as a seasonal freshwater wetland component of the estuarine habitat (see above), although during the winter seawater intrusion turns it into a brackish marsh.

Lacustrine

Lacustrine habitats are inland depressions or dammed riverine channels containing standing water (Mayer and Laudenslayer (eds.) 1988). Sempervirens Reservoir, located between the Maintenance Yard and the Park Headquarters, forms the only lacustrine habitat in the state park.

Suspended organisms such as phytoplankton, including diatoms, desmids and filamentous green algae carry on photosynthesis in open water and are the base upon which the rest of the limnetic life depends. Zooplankton such as rotifers, copepods and caldocerans graze upon the phytoplankton, and in turn provide a food source for predaceous organisms (Smith 1974 *in* Mayer and Laudenslayer (eds.) 1988).

Red-legged frogs and bullfrogs were introduced into Sempervirens Reservoir in the early 1960's (Seymor pers. comm.). Both species continue to coexist at the reservoir, although bullfrogs are known to predate upon and compete with red-

legged frogs and are implicated as a factor in red-legged frog extirpation from various sites in the Central Valley (Jennings and Hayes, 1994).

Riverine

Intermittent or continually running water distinguishes riverine habitat. There are several perennial and intermittent creeks in the park. Terrestrial vertebrates that utilize riverine habitat within Big Basin Redwoods State Park are discussed here; aquatic species are discussed in the Aquatic Life Section of the resource inventory.

Waddell Creek possesses significant wildlife resources. Waterfowl species such as mallards, common mergansers, and pied-billed grebes are common in the open water. Great-blue herons commonly forage in the near shore zone. A heron rookery next to Waddell Creek outside of park boundaries blew down in the early 1990's, however it is suspected that a new rookery may have been built nearby (West-Bourke pers. comm.). Special species such as red-legged frogs and southwestern pond turtles have been documented from Waddell Creek. At night, Yuma myotis and other bat species forage for insects above the creek, while during the day several species of swallows feed in the same manner. Belted kingfishers hunt for fish in the creek. American dippers glean insect larvae occurring beneath and between rocks on the creek's gravel substrate.

Black swift, a special interest species, nests behind the falling water of Berry Creek Falls (California Department of Parks and Recreation 1984).

Montane Riparian

The vegetation of montane riparian zones is variable and often structurally diverse (Marcot 1979 *in* Mayer and Laudenslayer (eds.) 1988). Montane riparian vegetation usually occurs as a narrow, often dense grove of broad-leaved, winter deciduous trees up to 30 meters (98 feet). Often, the transition from this habitat type to adjacent types is abrupt.

The largest, most structurally complex riparian area in Big Basin Redwoods State Park is found in the lower Waddell Creek area. Here the riparian habitat is dominated by bigleaf maple (*Acer macrophyllum*), box elder (*A. negundo*), cottonwood (*Populus trichocarpa*), red alder (*Alnus rubra*) and willow (*Salix laevigata*). Along the upper Waddell and other Big Basin creeks, there is a decrease of deciduous trees and an increase of such shrubs as western azalea (*Rhododendron occidentale*) and western staff tree (*Euonmus occidentalis*). In these upper streams, riparian habitat, where present, occurs as thin ribbons of vegetation.

Riparian vegetation is invaluable as wildlife habitat, regardless of seral stage. Riparian habitat with a mature overstory and well-developed understory vegetation provides thermal cover, migration corridors and diverse nesting and feeding opportunities.

Most of the mammals inhabiting the Santa Cruz Mountains visit the streambank community for water but do not remain there full-time. However, mammals like the Trowbridge shrew, shrew-mole, and western harvest mouse spend the majority of their time in and around the riparian vegetation.

Bat species confirmed to occur in riparian areas during 1995 surveys include Yuma myotis, a special species, and big brown bat . Others bat species that probably visit riparian areas of the park unit include the little brown myotis, long-legged myotis, California myotis, western pipistrelle, red bat, hoary bat, Townsend's big-eared bat (a special species), pallid bat (a special species), and Brazilian free-tailed bat (Minor pers. comm.). See the Special Animal Section for information regarding the status of Yuma myotis, Townsend's big-eared bat, and pallid bat in the park and statewide.

The population status of the ringtail, a fully protected species, at Big Basin Redwood State Park is unclear. There are a few reports of this species occurring in the park unit. Studies elsewhere in California suggest high ringtail populations in riparian corridors (Belluomini and Trapp 1981).

Because of the cover afforded by riparian vegetation, these zones provide travel corridors for mammals such as striped skunks, long-tailed weasels, mountain lions and others. Mountain lions (a fully protected species), have been observed in the park, albeit very infrequently.

Riparian areas provide excellent habitat for amphibians, as there is abundant moisture for respiration and reproduction. Pacific giant salamander, western toad, and Pacific treefrog are common in riparian areas. Part of the California red-legged frog's life cycle may be spent in riparian zones. Areas of the park unit known to harbor this species include lower Waddell Creek and Sempervirens Reservoir. All stream corridors in the park should be considered potential habitat for this species. See the Sensitive Animals section for information regarding the current statewide and local status of red-legged frogs.

Studies suggest that riparian corridors are critical to maintenance of herpetofaunal populations. Species diversity and abundance of amphibians and reptiles may be dramatically high in riparian systems. In biomass, salamanders are often the dominant type of vertebrate.

Reptiles occurring within riparian habitat include western skink, southern alligator lizard, common garter snake and southwestern pond turtle. The southwestern pond turtle, a Species of Special Concern, occurs in Waddell Creek and Turtle Pond (Smith pers. comm., Smith et al 1997). See the Sensitive Animals section for further information regarding the status of this species. Western terrestrial and western aquatic garter snakes are predicted by the WHR model to also occur in riparian situations.

Deciduous plants found in the riparian areas support a great variety of insects which attract such insectivorous birds as the black phoebe, Townsend's warbler, Wilson's warbler, downy woodpecker and several others. Common yellowthroats, a special species, may also be observed in this habitat type.

Facultative riparian nesting species include black-headed grosbeak, house wren, and warbling vireo.

Coastal Scrub

Coastal Scrub habitat is typified by low growing vegetative cover usually less than 1.8 meter (6 feet) high, found from sea level to about 152 meters (500 feet) elevation, where it grades into Monterey Pine forest (closed-cone pine - cypress habitat). For purposes of this report, the Northern Foredunes plant community is included in the Coastal Scrub habitat type.

While productivity of this habitat is lower than that of mixed chaparral, coastal scrub appears to support vertebrate species richness roughly equivalent to those in surrounding habitats (Gray 1982 *in* Mayer and Laudenslayer (eds.) 1988).

Within the park, the coastal scrub is found on bluffs in portions of the Rancho del Oso subunit, on dunes at Waddell Beach, and on the windswept summit and hills of the Chalks Lookout. Growth on these sites varies from grassland to sites that are thick with vegetation and difficult to penetrate. Coastal fog, wind and salt spray act upon this habitat type continually.

Reptile populations are high in coastal scrub habitats with a well-developed duff and debris layer. Where the duff layer and debris are nonexistent, rocky outcrops, rodent burrows, and the density of the shrub layer itself are used as microhabitats. The kingsnake is secretive and rarely seen. The gopher snake is found in clearings and under brush. Other reptiles include the coast horned lizard, a sensitive species, and the southern alligator lizard.

Some typical mammal species found in the coastal scrub habitat include Columbian black-tailed deer, gray fox, raccoon, long-tailed weasel, and dusky-footed woodrats.

Bird species like wrentit, white-crowned sparrow, and Bewick's wren are common in this habitat.

Mixed Chaparral

This wildlife habitat is dominated by chamise (*Adenostoma fasciculatum*), knobcone pine (*Pinus attenuata*), oak (*Quercus* spp.), manzanita (*Arctostaphylos* spp.), and chaparral pea (*Pickeringia montana*). The mixed chaparral type is found frequently on southern aspects and at 0 - 122 meters (0 - 400 feet) elevation. The vegetation is dense and at times impenetrable; in such areas herbaceous growth underneath the shrubs is minimal or lacking. Chaparral

species occupy soils where moisture stress is extreme and are normally excluded from moist habitats (Langenheim et al. 1983).

The mixed chaparral association is adapted to recurrent fire. Many of the slopes exhibiting this habitat type occur above the region of most fog and therefore are subject to hot, dry summer weather. Several shrub species present have basal burls, which sprout after a fire. The resin-filled cones of the occasional knobcone pine will only disperse seeds after it has been subjected to heat from fires or very hot weather (Hecht and Rusmore (eds). 1973).

Avifauna typical of mixed chaparral habitat include scrub jay, California quail, California thrasher, rufous-sided towhee, wrentit, and others.

Because of the arid nature of this habitat type, amphibians are very poorly represented. Conversely, reptiles flourish here. Commonly seen reptiles include western fence lizard, Alameda striped racer, Pacific gopher snake, and western rattlesnake.

Examples of mammals occurring in mixed-chaparral include desert cottontail, brush rabbit, California ground squirrel, gray fox, coyote, bobcat, Columbia black-tailed deer, and mountain lion.

Annual/Perennial Grassland

The largest grassland in the state park is found on the coastal plain of Waddell Creek. This type of habitat occupies a small portion of the landscape compared to other vegetation associations in the park. These areas may have originally contained bunchgrasses and herbaceous plants. In the recent past, the grasslands have been grazed, cultivated, and burned, resulting in a vegetation cover of old world annual grasses, including *Hordeum* spp., *Avena* spp., *Festuca* spp., and *Danthonia* spp., as well as a number of native grasses and herbs (Langenheim et al. 1983). Because of this mix, these habitats have been termed “annual/perennial grassland,” a combination of two WHR habitat types (Mayer and Laudenslayer (eds.) 1988).

In addition to the grassland in the Waddell Valley, smaller grassland sites occur at Sky Meadow, Elk Paddock, and East Ridge.

Amphibians that may be found in the grassland environment include California newt, western toad, Pacific tree frog and red-legged frogs (California Department of Parks and Recreation 1984). Reptiles like the western fence lizard, western skink, Pacific ring-necked snake, Pacific gopher snake, common kingsnake, common garter snake, and western rattlesnake are common residents of grasslands.

Some common mammals found in the park’s grasslands include ornate shrew, Trowbridge’s shrew, broad-footed mole, desert cottontail, Botta’s pocket gopher, California vole, coyote, raccoon, bobcat, and black-tailed deer. Rudd (1954)

reported American badgers from open areas of Waddell Valley; the current status of this species in the park is unknown.

Closed-cone Pine-Cypress

This habitat is typically dominated by a single species of one of the closed-cone pines or cypress. Monterey pine (*Pinus radiata*), knobcone pine and the rare Santa Cruz cypress (*Cupressus adamsiana*) habitat occur in the state park. Several shrub species are found in the understory. Knobcone pine and Santa Cruz cypress stands occur near each other in the Eagle Rock area.

The Monterey pine version of this habitat is found on the sides of ridges flanking both sides of the mouth of Waddell Creek.

Knobcone pine habitat is demonstrated by stands that occur on Pine Mountain. This species frequently grows in small dense patches with chamise, ceanothus, leather oak and manzanita occurring between patches or in openings in the pine stands (Colwell 1980 *in* Mayer and Laudenslayer (eds.) 1988).

Within the state park, Santa Cruz cypress habitat only occurs in the vicinity of Eagle Rock.

Several species make use of this type for feeding and cover, while few use it for breeding. Animal species composition is similar to that of the mixed chaparral habitat type.

Montane Hardwood - Conifer

Montane hardwood-conifer habitat is a mixture of both hardwoods and conifers (Anderson et al. 1976, *in* Mayer and Laudenslayer (eds.) 1988). In this habitat, at least one third of the trees are conifers and one third are broadleaf; often the habitat occurs in a mosaic-like pattern with small pure stands of conifers interspersed with small stands of hardwoods (Sawyer 1980 *in* Mayer and Laudenslayer (eds.) 1988).

At Big Basin Redwoods State Park, this plant association is usually found bordering coniferous tracts of forest and on drier slopes (California Department of Parks and Recreation 1984). Douglas-fir dominates this habitat on steeper, more sheltered sites.

Common vegetative associates within this habitat type at the state park include tanoak (*Lithocarpus densiflorus*), Pacific madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), broad-leaf maple, canyon live oak (*Quercus chrysolepis*), interior live oak (*Q. wislizenii*), coast live oak (*Q. agrifolia*), Douglas-fir (*Pseudotsuga menziesii*), and numerous shrubs and herbs which grow in the semi-shade afforded by these trees.

Vegetation of this habitat type harbors a rich insect fauna and subsequently is able to support a wide variety of birds. One of these, the pileated woodpecker, is the largest extant woodpecker in the United States.

Mature forests are valuable to cavity nesting birds and mammals. Moreover, mast crops are an important food source for many species. Canopy cover and understory vegetation are variable which makes the habitat suitable for numerous species. In mesic areas, many amphibians are found in the detrital layer.

Many of the vertebrate species that utilize other habitat types at the park unit are also found in the montane hardwood-conifer type. Sharp-shinned hawks were observed nesting in the park in 1995 (Burkett pers. comm.). Cooper's hawks are strongly suspected of having bred there as well. Both are recognized by the California Department of Fish and Game as Species of Special Concern on their nesting grounds.

Examples of other typical avifauna occurring in this habitat type include northern flicker, downy woodpecker, hairy woodpecker, bushtit, and Hutton's vireo.

Montane Hardwood

A typical Montane Hardwood habitat is composed of a pronounced hardwood tree layer, with an infrequent and poorly developed shrub stratum, and a sparse herbaceous layer (Mayer and Laundenslayer (eds.) 1988). At Big Basin Redwoods State Park, this habitat is composed of mixed stands dominated by Interior live oak and canyon live oak. Other canopy species are coast live oak, knobcone pine, Douglas-fir and California bay. The understory includes chamise, monkey flower, brittle-leaved manzanita, mountain iris, and various ferns. This habitat type is primarily ecotonal with adjacent Mixed Evergreen Forest, Upland Redwood Forest, Northern Mixed Chaparral, and Knobcone Pine Forest in the park. This is a relatively rare habitat type at Big Basin Redwoods State Park, occurring near China Grade and near the water tanks at the lower residence area (Skyview Meadow vicinity).

Birds and mammal species characteristic of this habitat include acorn disseminators like Steller's jay, acorn woodpecker, and western gray squirrel. They also include those species that utilize acorns as a major food source such as band-tailed pigeon, California ground squirrel, dusky-footed woodrat, and mule deer (Mayer and Laudenslayer (eds.) 1988). Deer also feed on foliage of several hardwood species to a moderate extent.

Most amphibians and reptiles are found on the forest floor. Examples include ensatina, western fence lizard, rubber boa, western rattlesnake, and California mountain kingsnake.

Redwood

The redwood (*Sequoia sempervirens*) habitat is a composite name for a variety or mix of conifer species that grow within the coastal influence zone less than 50 kilometers (31 miles) from the coast. Aside from mature redwood stands, it is mixed with other conifers and hardwoods such as Douglas-fir, Pacific madrone,

California bay, bayberry (*Myrica californica)*, and rhododendron (*Rhododendron californicum*). At drier inland sites Douglas-fir becomes dominant, with tanoak and Pacific madrone as major associates (Becking 1968, Zinke 1977 *in* Mayer and Laudenslayer (eds.) 1988). The redwood forest dominates Big Basin, covering 10,804 acres or approximately 58 percent of the park (California Department of Parks and Recreation 1984).

The redwood habitat type occurs under both dry and moist conditions; rainfall varies from 87-122 centimeters (34-48 inches) per year. Because of the dense forest canopy, the forest floor is relatively shaded. As a result, the vertebrate community displays relatively low diversity (Hecht and Rusmore (eds.) 1973).

The most common diurnal animals within this habitat type include the western gray squirrel, chipmunk, and Columbian black-tailed deer. Other mammals found in this habitat type include hoary bat, western pipistrelle, coyote, raccoon, striped skunk, and bobcat.

The most common resident bird species in this habitat type are dark-eyed juncos, Steller's jays, and winter wrens. Documented increases in jay and common raven populations in camping areas are attributed to supplemental food supplied by park visitors (Burkett pers. comm.). Population increases have had a negative effect on small bird populations in the area, as both corvid species are known to predate upon other species' eggs and nestlings (Hecht and Rusmore (eds.) 1973) (Larsen 1991) (see Sensitive Animals Section).

The marbled murrelet, a California Endangered and federal Threatened species, nests on high, large diameter branches of old-growth coastal redwood and Douglas-fir trees within this habitat type (Hamer and Nelson 1995). Large diameter old-growth coastal conifer forest (i.e., redwood and Douglas-fir) in Big Basin Redwoods State Park was mapped by Singer and Fiedler (1995). This forest type has been designated as Critical Habitat for marbled murrelets by the U.S. Fish and Wildlife Service (GPO 1996). Old growth forest occurs on approximately 4,400 acres of the park (Singer and Fiedler 1995). A discussion regarding the status of this species in Big Basin Redwoods State Park and statewide appears in the Sensitive Animals Section of this report.

A number of insectivorous birds live and forage in the Redwood forest. Intensive competition for food is not a problem as each species is specialized with respect to foraging. Each bird species has a unique pattern of searching for food in the forest layer it inhabits. For example, the hermit warbler, golden-crowned kinglet and Wilson's warbler all prey upon caterpillars and other crawling insects. Yet the hermit warbler tends to forage in the tops of trees, the kinglet in the understory while the Wilson's warbler favors the herbaceous ground cover. Other species also have different feeding methods. The brown creeper, pileated woodpecker and hairy woodpecker all forage for insects on the trunks of trees. The pileated woodpecker has a stout, chisel-like bill, which enables it to seek out insects deep in the heartwood of a tree. The hairy woodpecker, with a much

smaller bill, searches for insects, which do not bore as deeply into the wood. Finally, the brown creeper has a slightly recurved bill excellently adapted for prying off small pieces of bark, exposing any hidden insects.

Reptiles are an uncommon component of moist redwood forests. Two species that may be seen are the mountain kingsnake and the common garter snake. Amphibians are common in moist duff layer. Ensatinas and slender salamanders are frequently encountered through the spring under logs, duff and loose bark of downed trees. Pacific giant salamanders are found close to water sources, although they also climb trees (Bakker 1971).

Urban

There are several areas of human development in the park unit, including lawns, roads, parking lots, housing, shop area and corporation yard, waste-water treatment plant, and historic structures. In some instances, artificial habitats may be beneficial to native species. Lawns are favored by American robins for foraging, while Townsend's big-eared bats use some structures for roosting.

Human alterations also severely impact the natural environment, and disrupt wildlife and their habitats. Steller's jays and common ravens raid campsites and picnic areas for garbage. Park visitors deliberately provide food for these species, as well. Alternate food sources such as these contribute to unnaturally high corvid populations that exert strong predatory pressure upon other bird species' eggs and nestlings, possibly depressing their victim's populations. Alternative food contributes to the presence and spread of brown-headed cowbirds, a brood parasite. The horse camp at Rancho del Oso is favored by brown-headed cowbirds that forage on undigested grain in horse dung, as well as insects that are drawn to it.

Introduced species such as the European starling are favored by disturbance and compete with native species for habitat resources.

INVERTEBRATES

While no effort was made to field inventory invertebrates occurring at the park, a query was made of the Center for Conservation Biology, Stanford University database and the California Natural Diversity Database for species of special concern. Results of these queries indicate the following:

- the unsilvered silverspot butterfly (*Speyeria adiaste adiaste*), a species of local importance that occupies meadows and seeps in evergreen forests, oak forests and grasslands with *Viola* species, has been observed along China Grade Road and at Eagle Rock;

- Strohbeen's parnassian (*Parnassius clodius strohbeeeni*), a butterfly of conifer forests and meadows with *Dicentra formosa,* is extinct from Big Basin (last seen in 1958);

- Santa Cruz rain beetle (*Pleocoma conjugens conjugens*), a proposed endangered beetle of the Coast Range ponderosa pine savanna, has been observed in the Waddell Creek drainage.

Steve Singer (pers. comm.), in consultation with Randy Morgan, reports that the sandy beach tiger beetle (*Cincindela hirticollis gravida*) and California brackish water snail (*Tryonia imitator*), both species of local importance, may also occur in the Rancho del Oso subunit. Diane West-Bourke (pers. comm.) reports that a previously unknown and presently unnamed close relative of the San Bruno elfin (*Incisalia mossii banensis*) [Federal-listed endangered] has been observed in the Rancho del Oso subunit associated with rock outcrops and *Sedum* sp.

The soils of old-growth conifer forests (including redwood forests), from early seral stages through climax, have been reported to contain up to 6,000 different arthropod species (Lattin 1993). One 6,400 ha old growth Douglas-fir site in Oregon was discovered to have 3,400 different species. This fauna plays an important role in nutrient cycling of forest litter. There is a very distinct fauna of flightless species of low vagility that are certain to be impacted by forest fragmentation (Lattin 1993). Studies involving species diversity of arthropods in the ancient forests of the park should be encouraged in order to enhance our knowledge of this fauna and to determine conservation strategies that will benefit them.

HISTORICAL INFLUENCES

A thorough investigation of the faunal composition of the Big Basin Redwoods State Park area prior to the arrival of European humans is beyond the scope of this project. Historical land use has included introduction of a variety of disturbance factors: tanoak bark harvesting, logging, grazing, poaching, hunting, trapping, development of highways, residences and other structures, and the introduction of exotic plants and animals have undoubtedly affected native animal populations.

In 1970, the brackish marsh located in what is now the Theodore J. Hoover Natural Preserve was dammed by the Silver King Oceanic Farms for use as a fish hatchery (Hecht and Rusmore (eds) 1973). The exclusion of seawater, coupled with the year-round impoundment of the area, encouraged several new bird species into the former estuarine environment. However, the hydrologic regime was disrupted and entrained sediments were forced to settle-out in the marsh, accelerating the deposition rate. Since that time, the dam has been removed and the natural estuarine processes resumed.

Faunal Changes - Mammals

One of the many distinct populations of grizzly bear known to occur in California was the California (coast) grizzly bear, *Ursus arctos californicus*. It ranged from San Francisco Bay south to San Luis Obispo County. The first record of this

species comes from Vizcaino's expedition to Monterey Bay in 1602; several bears were observed feeding on a whale carcass washed up on a beach (Gordon 1974). The species' local population responded favorably to an inexhaustible supply of food in the form of cattle brought to the region by Spanish settlers. In the end, however, unremitting persecution led to the species' local extinction by the late 1800's.

The Mexican jaguar, *Felix onca arizonensis*, was reported in Monterey and vicinity (Grinnell 1913). The species is now only rarely found along the Mexican border region of the United States. Habitat loss and persecution by humans resulted in the extirpation of the California population.

The black-tailed jackrabbit, *Lepus californicus,* a lagomorph inhabiting grassland and open chaparral, has possibly been extirpated from Santa Cruz County (Singer pers. comm.). This species was not observed in the park unit during surveys in 1995 and 1996.

Other species have responded favorably to European human invasion. The California ground squirrel, *Spermophilus beecheyi*, no doubt abundant prior to Spanish settlement, has expanded in range and numbers to phenomenal levels in neighboring Monterey County. After introduction of cattle and concomitant habitat changes, ground squirrels swarmed over grazed land (Gordon 1974).

Faunal Changes - Birds

Several species of birds are much more common following European human arrival. The brown-headed cowbird was introduced into the state near the turn of the twentieth century. Their numbers have increased phenomenally as a result of conversion of natural habitats to agricultural and ranch lands (Grinnell and Miller 1944). Favorite forage grounds include stock yards, pastures and grazed land. A supplemental food source for cowbirds is horse feces, which provides grain and/or insects to the bird.

The cowbird is a nest parasite. It does not build its own nest, but deposits a single egg in the nests of other native species. Upon hatching, cowbird nestlings aggressively expel all other nestlings, thereby eliminating competition for food and space. With the current abundance of cowbirds and the decline of many native host species, this behavior has had a tremendous negative impact on the host species populations. Cowbirds are known to have been successfully raised by 101 species of North American birds.

The common raven was not common in Santa Cruz County until the mid 1970's. It is an edge preferring species that has expanded in numbers in response to habitat fragmentation resulting from human developments and land use changes. Common ravens have been linked with the nest abandonment and predation of

marbled murrelets, a California listed Endangered and federal listed Threatened species (Esther Burkett pers. comm.).

Singer (1977) lists several bird species that were formerly more common in Santa Cruz County that are now either extirpated from, rare, or uncommon, in the county. These include: California condor (extirpated from the county); bald eagle (formerly a regular visitor, now very rare in the county), peregrine falcon (very rare in county); golden eagle (habitat is being lost); osprey (former resident, now a rare visitor); red-shouldered hawk (uncommon and declining; habitat being lost); burrowing owl (once common resident, now uncommon visitor); yellow-breasted chat (formerly a resident of extensive riparian woodlands, now rare visitor); blue grosbeak (formerly resident in riparian areas along San Lorenzo River, now extirpated from county); American dipper (uncommon and declining); western kingbird (common summer resident prior to 1900, now very rare in the county); horned lark (formerly common resident, now an uncommon visitor to county); purple martin (common in mountains prior to 1960, now rare); western bluebird (locally rare resident, formerly much more numerous); common crow (formerly more common when oak savanna habitat was more extensive); roadrunner (rare; only one report since 1955 in county); mountain quail (rare locally, formerly more common); wood duck (uncommon and declining; dependent on riparian woodland habitat. Not known to breed in coastal range).

Information on reptile and amphibian population changes from pre-European invasion to present is unavailable.

EXOTICS

Several species of exotic animals have been introduced into Santa Cruz County, frequently with deleterious effects. Of particular concern to biologists are the spread of the wild pig (*Sus scrofa*), bullfrog (*Rana catesbeiana*), red fox (*Vulpes fulva*), eastern gray squirrel (*Sciurus carolinensis*), European starling (*Sturnus vulgarus*), and brown-headed cowbird (see above). These species are extremely prolific and impact natural ecosystems and native species where they occur.

Feral Pigs:

The term feral pig is used in this report to include both wild pigs and feral pigs. Feral pigs were introduced throughout California by the Spanish missionaries in the 1700's (Barrett and Pine 1980). The earliest reported date of feral pig presence in Santa Cruz County was 1944 (Hoehne n.d.). These pigs were observed in the eastern portions of Forest of the Nisene Marks State Park. It was common practice to run domestic pigs on the open range in Santa Cruz County.

Beginning in the early 1970's, feral pig populations began to grow in the Santa Cruz County area. Feral pigs came to the county by way of three general means: natural immigration, unintentional, and intentional introduction by humans. Pigs immigrated into the southern part of the county from burgeoning populations in Santa Clara County. Domestic pigs escaped from farmers into the

wild. Also, private residents captured wild pigs in order to rear them as pets. However, attaining adulthood, these wild pigs became unmanageable and escaped (Hoehne n.d.). The most significant method of introduction was intentional release. Pigs were captured in San Benito and Monterey Counties and released throughout Santa Cruz County. The majority of these releases were on private lands to enhance the local hunting possibilities.

Feral pigs damage native vegetation by their rooting activities; they can eliminate populations of rare plants, cause erosion problems, and stimulate exotic plant proliferation. They compete with native animal species for mast and feed on herptofauna, bird eggs and nestlings. They also may harbor diseases, which pose a health threat to other mammals in their range, including humans.

Preferred wild pig habitat includes coast live oak woodlands and riparian areas. However, they will also forage in redwood forests. Areas receiving more than 20 inches of annual precipitation produce the most favorable habitat. Pig territoriality is influenced by availability of food and water. During the dry season, they are usually found in damp creek bottoms, while in spring and winter they move along ridge tops, rooting in oak woodlands.

Areas of the park unit that have shown evidence of feral pig activity include the park headquarters area, Waddell drainage and the Theodore Hoover Natural Preserve; they have become established in the Natural Preserve as recently as 1995.

Bullfrog:
Bullfrogs are an introduced exotic that are present in Sempervirens Reservoir, where they predate upon and compete with threatened California red-legged frogs. They also interfere with red-legged frog reproduction (researchers have observed red-legged frogs in amplexus with bullfrogs).

Red Fox:
Red foxes were first discovered in Big Basin Redwoods State Park in 1995 (Burkett personal communication). This species is not native to Santa Cruz County. Red foxes have the ability to swim and have caused nesting mortality among the endangered clapper rail that nests on floating vegetation in San Francisco Bay. They also predate on ground nesting birds, causing significant damage to prey populations. They pose a potentially serious threat to the threatened Western Snowy Plover, which ground nests in the Rancho del Oso subunit.

Eastern Gray Squirrel:
The eastern gray squirrel is a native of the eastern half of the United States. It was introduced to San Francisco and other cities since 1925. It competes with native wildlife for mast and other forage resources.

European Starling:

The European starling was introduced from Europe to New York in 1890. Rapidly spreading west, the species was first noted in California in 1952, reaching Santa Cruz County soon thereafter. Behaviorally aggressive, the starling frequently out-competes native bird species for nesting cavities, effectively depressing native bird populations. Methods of controlling starlings include trapping or shooting; neither method is completely satisfactory.

HUNTING

The California Department of Parks and Recreation does not permit hunting on Big Basin Redwoods State Park lands.

SENSITIVE ANIMALS

Big Basin Redwoods State Park is within the range of numerous sensitive species of animals, including some that are currently listed by both the State and Federal government as threatened or endangered. Undoubtedly, the relatively undeveloped character of northern Santa Cruz County has resulted in retention of habitat that is elsewhere unavailable for declining species.

The California Department of Parks and Recreation is responsible under law for the protection and conservation of threatened, endangered, and candidate species and their habitats in all units, regardless of unit classification (see Sections 670.2 Regulations, Sections 17.11 or 17.12 pursuant to the Federal Endangered Species Act). A species not included on the State and/or Federal lists is considered “special” and therefore subject to the provisions of the California Environmental Quality Act if it meets the criteria for listing. All species included in this discussion may meet said criteria and must be taken into account when departmental land management activities occur.

The following annotated species list provides current information on the status of sensitive animals of Big Basin Redwoods State Park. The list was generated from a variety of sources: State and Federal Threatened and Endangered Species lists including candidates, California Department of Fish and Game Species of Special Concern List, Natural Diversity Data Base Special Animal List (2001). Table AL-2 provides information on listing criteria and explains status code notation. Table AL-3 summarizes the names and status of all sensitive animal species appearing in this section

Table AL-2. Sensitive Animal Status Code Notation.
(Source: California Department of Fish and Game
Natural Diversity Data Base, December 1992

"Sensitive Animals' is a broad term used to refer to all the vertebrate and invertebrate taxa of concern regardless of their legal or protection status. Sensitive Animals listed with a code fall into one or more of the following categories:

Officially listed or proposed for listing under the State and/or Federal Endangered Species Acts;

A State or federal candidate species of possible listing;

A California Department of Fish and Game Species of Special Concern.

Taxa listed without a code fall into one or more of the following categories;

Taxa that are considered endangered or rare under Section 15380 (d) of CEQA Guidelines;

Taxa that are biologically rare, very restricted in distribution or declining throughout their range but not currently threatened with extirpation;

Population(s) in California that may be peripheral to the major portion of a taxon's range, but which are threatened with extirpation in California;

Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g., wetlands, riparian, old growth forests, desert aquatic systems, and native grasslands).

STATUS CODES

CE Listed as Endangered in the State of California

CT Listed as Threatened in the State of California

CCE California Candidate for listing as Endangered

CCT California Candidate for listing as Threatened

CSC California Department of Fish and Game Species of Special Concern

CFP A California Department of Fish and Game "fully protected" species, as described in the Fish and Game Code, Section 4700 of Chapter 8,

Section 5050 of Chapter 2, Division 6, Chapter 1, Section 5515 (Note: There are other fully protected species not included on the Special Animal List).

FE Listed as Endangered by the Federal Government

FT Listed as Threatened by the Federal Government

FPE Proposed as Endangered by the Federal Government

FPT Proposed as Threatened by the federal Government

FSS Federal (BLM or USFS) sensitive species.

FC Candidate for Federal listing (Taxa for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened).

0 Other - Species of special management concern for the Department of Parks and Recreation at Big Basin Redwoods State Park.

Table AL-3. Sensitive Animals Potentially Occurring at Big Basin Redwoods State Park.

Name	Status Code
*Townsend's Big-eared Bat, *Plecotis townsendii townsendii*	CSC, FSS
*Pallid Bat, *Antrozous pallidus*	CSC, FSS
*Western Mastiff Bat, *Eumops perotis*	CSC, FSS
*Ringtail, *Bassariscus astutus*	0
*Mountain Lion, *Felis concolor*	0
Ashy Storm Petrel, *Oceanodroma homochroa*	CSC
*California Brown Pelican, *Pelecanus occidentalis californicus*	FE, CE, CFP
*California Gull, *Larus californicus*	CSC
*Western Snowy Plover, *Charadrius alexandrinus nivosus*	FT,CSC
*Double-crested Cormorant, *Phalacrocorax aruitus*	CSC
*California Black Rail, *Laterallus jamaicensis coturniculus*	CT
*Harlequin Duck, *Histrionicus histrionicus*	CSC
*White-tailed Kite, *Elanus caeruleus*	CFP
Bald Eagle, *Haliaeetus leucocephalus*	FT, FPD, CE, CFP
*Northern Harrier, *Circus cyaneus*	CSC
*Sharp-shinned Hawk, *Accipiter striatus*	CSC
*Cooper's Hawk, *Accipiter cooperi*	CSC
*Golden Eagle, *Aquilla chrysaetos*	CSC, CFP
*Merlin, *Falco columbarius*	CSC
*American Peregrine Falcon, *Falco peregrinus anatum*	CE, CFP
*Marbled Murrelet, *Brachyramphus marmoratus*	CE, FT, CFP
*Elegant Tern, *Sterna elegans*	CSC
California Spotted Owl, *Strix occidentalis occidentalis*	CSC
*Long-eared Owl, *Asio otus*	CSC
*Black Swift, *Cypseloides niger*	CSC
*Vaux's swift, *Chaetura vauxi*	CSC
*Loggerhead Shrike,	CSC
*Willow Flycatcher, *Empidonax traillii*	CE, FSS
*Purple Martin, *Progne subis*	CSC
*Yellow Warbler, *Dendroica petechia brewster*	CSC
*Saltmarsh Common Yellowthroat, *Geothlypis trichas sinuosa*	CSC
*Southwestern Pond Turtle, *Clemmys marmorata*	CSC, FSS
*California Horned Lizard, *Phrynosoma coronatum frontale*	CSC, FSS
*San Francisco Garter Snake, *Thamnopsis sirtalis tetrataenia*	FE, CE, CFP
*California Red-legged Frog, *Rana aurora draytonii*	FT, CSC
Foothill Yellow-legged frog, *Rana boylii*	CSC

* Species confirmed or strongly suspected to occur at Big Basin Redwoods State Park.

Name & Status: **Townsend's Big-eared Bat** (*Plecotus townsendii townsendii*) CSC, FSS. Note: Other subspecies have declined nationwide, leading to increasing legal protection.

Habitat: Mesic sites in a variety of plant communities. Site tenacity at roosts noted.

Range in California: Statewide but of sparse distribution. *P.t. pallescens* occur throughout the west while *P.t. townsendii* is limited to the coastal zone. Only seven maternity roosts with a total of 325 adult females are known (Pierson 1988).

Range in Big Basin Redwoods S.P.: Total range unknown; probably unit-wide in appropriate habitat. Known to roost in the historic CCC blacksmith shop.

Threats: This species is very sensitive to human disturbance at roosts, maternity colonies and hibernacula.

Management Recommendations: Encourage the Department of Fish and Game to conduct surveys in Department of Parks and Recreation units. Protect sites from human disturbance. Care should be taken even during survey period to eliminate all disturbance factors. Participate in a statewide effort to develop a model bat education program following recommendations made by Pierson (1988).

Species Name & Status: **Pallid Bat** (*Antrozous pallidus*); CSC, FSS

Habitat: Found in a variety of habitats from desert to brushy terrain to coniferous forest, non-coniferous woodlands. Particularly associated with oak, ponderosa pine, redwood and giant sequoia habitats of central and northern California (Brown and Pierson 1996).

Range in California: Found throughout California, primarily in the low to middle elevations, although found at over 10,000 ft. in the Sierra Nevada. Year-round resident.

Range in Big Basin Redwoods S.P: Was occasionally observed in the Waddell Valley by Hecht and Rusmore (1973); strongly suspected to occur throughout the park in appropriate habitats.

Threats: Habitat loss.

Management Recommendations: Retain appropriate habitats. Interpret benefits of bat species to public.

Species Name & Status: **Western Mastiff Bat** (*Eumops perotis*); CSC, FSS

Habitat: Found in a variety of habitats, from desert scrub to chaparral to montane coniferous forest. Day roosts primarily in crevices of cliff faces and cracks in boulders. Distribution is tied to the availability of roosting habitat (Brown and Pierson 1996).

Range in California: Until recently was known in California primarily in the southern portion of the state, from the Los Angeles basin south through San Diego County and the southeastern desert. Recent surveys have extended the range northward almost to the Oregon border. Western mastiff bats occur along the west side of the Sierra Nevada at primarily low to mid-elevation, and in the Coastal Range to San Francisco Bay. They are unconfirmed in the park.

Range in Big Basin Redwoods S.P: Unknown; potentially occurring in appropriate habitats, especially areas with significant rock features such as the East Waddell Canyon.

Threats: Recreational climbing, water impoundments, pest control exclusion, highway projects, loss of foraging habitat to urban/suburban development, agricultural spraying.

Management Recommendations: Survey for roosting habitats in the park. Protect habitat.

Name & Status: **Ringtail** (*Bassariscus astutus*); 0

Habitat: Riparian communities preferred; also, chaparral, pine/oak woodland with den sites and water nearby.

Range in California: Statewide except deserts and northeast, from below sea level to at least 8,000 feet.

Range in Big Basin Redwoods State Park: Unknown; have been observed near park headquarters.

Threats: Loss of riparian habitat; development.

Management Recommendations: The habits and population status of this extremely secretive, nocturnal animal are little known. Develop reliable methods to census this species; conduct census in the park unit.

Species Name & Status: **Mountain Lion** (*Felis concolor*); O

Habitat: Variable; widespread, following deer herds.

Range in California: Statewide except for Central Valley.

Range in Big Basin Redwoods S.P.: The coast range from San Francisco to Monterey maintains a low density of mountain lions (Sitton *in* Jones and Stokes 1981). As deer herds are non-migratory in Santa Cruz County, a constant food source is available. The exact status of the species in the park is unknown.

Threats: Habitat loss and fragmentation; human disturbance.

Management Recommendations: Study mountain lion population dynamics in the Santa Cruz Mountains. Work with adjacent landowners to ensure that wildlife migration and movement corridors are retained.

Name & Status: **American Peregrine Falcon** (*Falco peregrinus anatum*); CE, CFP

Habitats: Rocky shore, estuary, woodland, grassland.

Range in California: During winter and in migration, statewide. Nests in central and north Coast Range plus Cascades. Captive breeding program has helped to reestablish the species as a nester, statewide.

Range in Big Basin Redwoods State Park: Peregrine falcons have been observed in various areas of the park unit and are known to breed there. In 1996 several sightings were made of this species in the headquarters meadow area of Big Basin.

Threats: Illegal take and other human disturbances threaten nesting individuals. Pesticide poisoning continues to pose a serious threat to the health of the Central California birds. All pairs along the Big Sur coast were unable to hatch their own eggs "due to heavy pesticide poisoning". Throughout the State, the pattern of failure is vague with females showing extreme shell-thinning nesting only miles from successful birds" (The Peregrine Fund Newsletter, Fall 1988). The Salinas River-Elkhorn Slough-Moss Landing region, after extensive monitoring by the Toxic Substance Monitoring Program and State Mussel Watch, show DDT-DDE and toxaphene contamination levels in mussels and fish well above national Academy of Science Guidelines for protection of predator species (Agee et al. 1985 *in:* Detrich and Garcelon 1986).

Management Recommendations: Nest locations must be regarded as secret. **District must not release nest site location information to the public.** Consultation with California Department of Fish and Game (formally or informally) is required for all land management actions and land use changes at Big Basin Redwoods State Park.

Name & Status: **California Brown Pelican** (*Pelecanus occidentalis californicus*); CE, FE, CFP

Habitat: Rocky coast, inshore waters for feeding.

Range in California: Nests in Southern California and Baja California; post-breeding individuals migrate north as far as Del Norte County.

Range in Big Basin Redwoods State Park: Does not nest along the Santa Cruz coast. However, individuals of this species may be observed at any time during the year.

Threats: Human harassment; residual contamination of body tissue by pesticides and therefore continued reproductive failure.

Management Recommendations: There are some indications that the species may be recovering in California. Document and report any nesting activity, if noted.

Name & Status: **California Gull** (*Larus californicus*); CSC

Comments: This species is included as a California Species of Special Concern (Remsen 1978) because of threats to nesting habitat at Mono Lake. California gulls are present year-round in Santa Cruz County but numbers increase in the winter. Birds present in spring/summer are non-breeding individuals. The mouth of Waddell Creek is a congregation area during the winter.

Name & Status: **White-tailed Kite** (*Elanus caeruleus*); CFP

Habitat: Grassland, riparian zones, and oak woodland

Range in California: Length of state, west of Sierra Nevada and the desert region.

Range in Big Basin Redwoods State Park: One individual was recorded in flight over the Pine Mountain area (unit files 1973). Further documentation is lacking.

Threats: Habitat loss; human disturbance.

Management Recommendations: Investigate winter raptor use at the park unit. Survey for nesting white-tailed kites, and, if found, protect nests from human disturbance.

Species Name & Status: **Bald Eagle** (*Haliaeetus leucocdphalus*); FT, FPD, CE, CFP.

Habitat: For nesting, prefers ponderosa pine forest adjacent to rivers, or reservoirs. Tall trees favored for nest substrate. Winter range centers around waterfowl concentration areas. Large, stoutly limbed trees, snags, or broken-topped trees used as roosts (Zeiner et al. 1990).

Range in California: The current breeding range includes the northern third of the state plus Santa Catalina Island in southern California. The species winters statewide, west of the deserts.

Range in Big Basin Redwoods S.P.: Unknown.

Threats : Habitat loss; human disturbance; DDE poisoning

Management Recommendations: Report sightings to the California Natural Diversity Database. Maintain habitat integrity.

Name & Status: **Cooper's Hawk** (*Accipiter cooperi*); CSC

Habitat: Riparian woodland, mixed hardwoods, oak woodland

Range in California: Statewide

Range in Big Basin Redwoods State Park: Unit-wide in appropriate habitats.

Threats: Pesticides have caused egg-shell thinning.

Management Recommendations: Conduct nesting surveys. Maintain habitat.

Name & Status: **Northern Harrier** (*Circus cyaneus*); CSC

Habitat: Marsh, meadow, and grassland

Range in California: Statewide. Fairly common winter visitor, rare and local as a breeder. See Remsen (1978) for specific breeding areas.

Range in Big Basin Redwoods State Park: Sightings of this species have been made at Waddell Creek (Theodore J. Hoover Natural Preserve), Chalks Road, Sky Meadow and the upper residence areas. Its range within the park unit may be more extensive in appropriate habitats.

Threats: Grazing almost certainly has had a negative impact on populations nesting in grasslands (Remsen 1978).

Management Recommendations: Conduct nesting surveys for the species at the park unit. Maintain integrity of meadows and wetlands within the park unit.

Name & Status: **Merlin** (*Falco columbarius*); CSC

Comments: The merlin is a rare winter visitor and migrant along the coast, statewide. There are no breeding records for California. The species feeds along estuaries, river mouths, and other habitats supporting flocks of shorebirds, favorite prey items. Maintaining these habitats (such as lower Waddell Creek) is of critical importance for this and several other sensitive species.

Name & Status: **Long-eared Owl** (*Asio otus*); CSC

Habitat: Riparian woodland; redwood-riparian woodland.

Range in California: Statewide but common only in the northeast. Severe declines in the Sacramento Valley, where it is probably extirpated, the San Joaquin Valley and the San Diego area. Was a common breeder in Santa Cruz County at the turn of the Twentieth Century. Five nests were located in 1947, but today it no longer breeds there (the last known nesting in Santa Cruz Co. was in 1972) (Remsen 1978).

Range in Big Basin Redwoods State Park: Unknown.

Threats: Destruction of lowland riparian woodland; roadkill as the birds are very prone to collide with vehicles (Remson 1978).

Management Recommendations: Protect lowland riparian habitat; conduct surveys to determine species presence in park.

Name & Status: **Sharp-shinned Hawk** (*Accipiter striatus*); CSC

Habitat: Montane Hardwood and Montane Hardwood-conifer.

Range in California: Winters statewide; breeds in Northern California, formerly in Southern California.

Range in Big Basin Redwoods State Park: Unit-wide in appropriate habitat.

Threats: Pesticides have caused egg-shell thinning, resulting in decline in population recruitment.

Management Recommendations: Conduct nesting surveys. Maintain habitat.

Name & Status: **Golden Eagle** (*Aquila chrysaetos*); CSC, CFP

Habitat: Grassland, coastal sage scrub, and other low-growing vegetation communities.

Range in California: Statewide.

Range in Big Basin Redwoods State Park: The last resident pair was reportedly shot in the 1950's in the Rancho del Oso subunit (Hecht and Rushmore 1973). An individual was sighted in 1987 soaring past Pine Mountain towards the sea.

Threats: Increased agricultural and residential development in the central coast region certainly pose a threat to the species through loss of habitat. Human disturbance.

Management Recommendations: Maintain integrity of habitats.

Name & Status: **Marbled Murrelet** (*Brachyramphus marmoratus*); CE, FT, CFP

Habitat: Nests coastally in the tops of old-growth Douglas-fir (*Pseudotsuga menziesii*) and coast redwood (*Sequoia sempervirens*) on large diameter branches; forages and winters at sea. Central Coast population depends heavily on Ano Nuevo Bay as foraging habitat.

Range in California: Disjunct breeding localities in Humboldt/Del Norte Counties and Santa Cruz County (Big Basin Redwoods and Butano State Parks). Winters along coast at least as far south as Santa Barbara County (irregular and rare). Telemetry studies show individual movements from Ano Nuevo area as far north as Point Arena. Another individual was detected to fly as far south as Point Piedras Blancas (California Department of Fish and Game unpub.).

Range in Big Basin Redwoods State Park: Breeds in old-growth Douglas-fir and coast redwood habitats; forages offshore of Waddell Beach; winters offshore of Waddell Beach in Ano Nuevo Bay.

Threats: Fragmentation and loss of old growth forest; gill-net fishing mortality; oil pollution; predation by unnaturally high populations of corvids (ravens and jays) in park situations where human food and garbage is readily available; loss of nest trees (or closely related physical parameters required for nesting) in developed areas by actions taken to alleviate tree safety concerns.

Management Recommendations: Conduct breeding surveys for this species in suitable habitat within the park unit. Protect breeding habitat. Consult with the Department of Fish and Game and/or US Fish and Wildlife Service regarding tree hazard removal actions proposed for old-growth redwood and Douglas-fir trees. Develop and implement a public education program aimed at curtailing the public's feeding of wildlife.

Consultation with California Department of Fish and Game and/or US Fish and Wildlife Service (formally or informally) is required for all land management actions and land use changes at Big Basin Redwoods State Park. The old-growth forest within the park is designated as critical habitat by the US Fish and Wildlife Service.

Name & Status: **Double-crested Cormorant** (*Phalacrocorax aruitus*); CSC

Habitat: Inland lakes, estuaries, and rocky shore.

Range in California: Statewide. Breeds in fresh and salt water situations; however, the species occurs sporadically and is declining. Sensitive status applies to nesting colonies.

Range in Big Basin Redwoods State Park: Unknown; not known to nest at the park.

Threats: Habitat destruction; boating activity near nesting colony; other human disturbance.

Management Recommendations: Maintenance of the integrity of the mouth of Waddell Creek for this and other species of waterfowl is recommended.

Name and Status: **California Black Rail** (*Laterallus jamaicensis coturniculus)*; CT

Habitat: Saline, brackish, and fresh emergent wetlands. In freshwater, usually found in bulrushes, cattails, and saltgrass.

Range in California: San Francisco Bay area, Sacramento-San Joaquin Delta,, the Salton Sea, and lower Colorado River area. Formerly a local resident in coastal wetlands form Santa Barbara Co. to San Diego Co.; still winters there rarely (Zeiner et al. 1990).

Range in Big Basin Redwoods State Park: Rancho del Oso in appropriate habitats (e.g., Turtle Pond).

Threats: Significant loss of saltwater and freshwater wetland habitat in recent decades probably has reduced populations.

Management Recommendations: Conduct surveys to determine if black rails are breeding at the park unit. Protect habitat.

Consultation with California Department of Fish and Game (formally or informally) is required for all land management actions and land use changes at Big Basin Redwoods State Park.

Name and Status: **Harlequin Duck** (*Histrionicus histrionicus*); CSC

Comments: Winters sporadically along the California coast. This species is very rare in California in any season and probably no longer nests in the state. Maintenance of the integrity of the mouth of Waddell Creek for this and other species of waterfowl is recommended.

Name and Status: **Western Snowy Plover** (*Charadrius alexandrinus nivosus)*; CSC, FT

Habitat: Nests on flat, open expanses devoid of or sparsely covered with vegetation or driftwood.

Range in California: Breeds in all mainland coastal counties except Los Angeles and San Francisco.

Range in Big Basin Redwoods State Park: Suitable habitat occurs at Waddell Beach, however most nesting occurs on Big Trees Lumber Company lands immediately to the south of park property.

Threats: Human and dog disturbance; *Ammophila* encroachment markedly depresses abundance of sand dune arthropods, favored food items for the species. *Ammophila* and other invasive dune plant species degrade nesting habitat by forming dense expanses of vegetation.

Management Recommendations: Perform annual surveys of Waddell Beach for continued snowy plover use. Provide nesting exclosures to protect nests from humans and predatory animals. Enforce regulations regarding dogs off leash, especially during breeding season (i.e., February through August). Work with property owners adjacent to Waddell Beach to control/eradicate *Ammophila*.

Consultation with California Department of Fish and Game and/or US Fish and Wildlife Service (formally or informally) is required for all land management actions and land use changes at Big Basin Redwoods State Park.

Name & Status: **Ashy Storm-Petrel** (*Oceanodroma homochroa*); CSC

Habitat: Offshore islands for nesting; otherwise, open ocean.

Range in California: Statewide. Monterey Bay and vicinity is an extremely important feeding area. From August through November, as many as 10,000 individuals have been noted at one time in Monterey Bay. This is virtually the world's population (Roberson 1985).

Range in Big Basin Redwoods State Park: Does not nest along the Santa Cruz coast. The closest colony is located on southeast Farallon Island. However, the species does occur offshore, year-round.

Threats: Oil pollution; nest site disturbance.

Management Recommendations: Departmental activities generally do not impact this species.

Name & Status: **Elegant Tern** (*Sterna elegans*); CSC

Comments: This species is a California Species of Special Concern (Remsen 1978) because of the extreme vulnerability of the nesting population to extirpation. Although the species does not nest north of San Diego County, it is noted during post-breeding dispersal at coastal locations as far as Northern California.

Name & Status: **California Spotted Owl** (*Strix occidentalis occidentalis*); CSC

Habitat: In northern California, spotted owl's reside in dense, old-growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats, from sea level up to approximately 2300 m (0-7600 ft.). They apparently prefer narrow, steep-sided canyons with north-facing slopes in the northern part of the state (Zeiner et. Al. 1990).

Range in California: An uncommon permanent resident in suitable habitat. Breeding range extends west of the Cascade Range through the North Coast Ranges, the Sierra Nevada, and in more localized areas of the Transverse and Peninsular Ranges. May move downslope in winter along the eastern and western slopes of the Sierra Nevada's, and in other areas. Shasta County provides critically important habitat as this is where the two subspecies (i.e., California and northern spotted owls) are sympatric (Verner et. al. 1992). The northern spotted owl is a federal listed Threatened species. Isolated populations of California spotted owls have been reported to occur in the Santa Cruz Mountains (Gould 1974 *in:* Remson 1978).

Range in Big Basin Redwoods S.P.: Unknown. There have been only a few sightings of spotted owls recorded in Big Basin Redwoods S.P., mainly near the Sky Meadow area. There appears to be appropriate habitat for this species in the park.

Threats: Logging; human disturbance.

Management Recommendations: Survey for nest sites in the park, and if found, map and protect from human disturbance by restricting visitor access during the nesting season. Protect nesting habitat. Report sightings to the California Natural Diversity Data Base.

Species Name & Status: **Willow Flycatcher** (*Empidonax traillii*); CE, FSS

Habitat: Willow riparian woodland; wet meadows.

Range in California: A rare to locally uncommon summer resident in wet meadow and montane riparian habitats in the Sierra Nevada and Cascade Range. Common spring and fall migrant at lower elevations, primarily riparian habitats throughout the state exclusive of the North Coast. Formerly bred commonly in willow thickets throughout most of lowland and montane California. Currently breeds only in Sierra Nevada and along Santa Margarita and San Luis Rey Rivers, San Diego County.

Range in Big Basin Redwoods S.P.: Unknown, although suitable willow riparian woodland habitat exists along lower Waddell Creek.

Threats: Habitat loss; nest failure due to brown-headed cowbird (*Molothrus ater)* brood parasitism.

Management Recommendations: Maintain riparian habitat integrity. Survey brown-headed cowbird populations and implement a control program if warranted. Especially evaluate cowbird problem in areas open to equestrians, as cowbirds find supplemental food items in the undigested grain of horse feces, as well as the insects that are attracted to it.

Species Name & Status: **Loggerhead Shrike** (*Lanius ludovicianus*); CSC

Habitat: Prefers open habitat with scattered shrubs, trees, posts, fences, utility lines, or other perches.

Range in California: Lowlands and foothills throughout California.

Range in Big Basin Redwoods S.P. Open habitats such as those occurring in the Waddell Valley. Reported as an occasional visitant in the Waddell by Hecht and Rusmore (1973).

Threats: Declines are not well understood. A predatory songbird that eats large insects and even small vertebrates, the shrike may face food shortages caused by pesticide spraying and changes in land use.

Management Recommendations: Continue to manage Rancho del Oso for natural habitats; avoid the use of insecticides.

Species Name & Status: **Black Swift** (*Cypseloides niger*); CSC

Habitat: Nests have been found only on cliffs behind or adjacent to waterfalls or steep coastal cliffs.

Range in California: Breeds very locally in four regions of California: the central and southern Sierra; the coastal cliffs and mountains of San Mateo, Santa Cruz, and Monterey Counties; the San Gabriel, San Bernardino, and San Jacinto mountains of southern California; and a limited area in the Cascade Range (Remson 1978).

Range in Big Basin Redwoods S.P.: Nests behind Berry Falls; forages unit-wide.

Threats: Rock-climbing in the vicinity of nests are a potential threat.

Management Recommendations: Protect habitat.

Species Name & Status: **Vaux's Swift** (*Chaetura vauxi*); CSC

Habitat: Feeds on flying insects high over most terrain and habitat types; also feeds at low levels in forest openings, above burns and especially above rivers. Nests in redwood, Douglas-fir and occasionally other coniferous forests (Zeiner et al. 1990). Prefers nest-sites in large hollow trees and snags, especially tall, burned-out stubs.

Range in California: Summer resident in northern California. Breeds commonly from Sonoma County north in the Coastal Ranges; in the Sierra Nevada and possibly in the Cascade Range. Breeds very locally south to Santa Cruz County (Zeiner et al. 1990).

Range in Big Basin Redwoods S.P: Observed uncommonly during the spring and fall and rarely in the summer at Rancho del Oso (Baumgartner 1995). Also, Vaux's swifts were observed in old-growth redwood forest at least 500 meters from campgrounds and day use areas of the Big Basin Redwoods S.P. Headquarters vicinity (Suddjian 1995).

Threats: Habitat destruction.

Management Recommendations: The most important habitat requirement appears to be an appropriate nest-site in a large, hollow tree or snag. Retention or replacement of hollow logs and snags should be factored into the unit's prescribed fire management program.

Species Name & Status: **Purple Martin** (*Progne subis*); CSC

Habitat: Montane hardwood, montane hardwood-conifer and riparian areas. Also occurs in coniferous habitats, including closed-cone pine-cypress, Douglas-fir and redwood (Zeiner et al. 1990). Often nests in tall, old trees near a body of water. Forages over riparian areas, forest, and woodland. Found in a variety of open habitats in migration.

Range in California: State-wide in appropriate habitats (absent from higher desert). Frequents old-growth, multi-layered, open forest with snags during breeding season.

Range in Big Basin Redwoods S.P: Occasionally observed in Rancho del Oso in the spring and fall. Reported by Meadows (1950) as a summer visitant on high ridges. Is not known to nest at the park.

Threats: Habitat destruction.

Management Recommendations: Protect habitat. Report sightings to the California Natural Diversity Database.

Species Name & Status: **Saltmarsh Common Yellowthroat** (*Geothlypis trichas sinuosa*); CSC

Habitat: Emergent salt-water marsh (Bent 1963; Zeiner 1990).

Range in California: Breeds in San Francisco Bay region; winters along the coast from San Francisco to San Diego.

Range in Big Basin Redwoods S.P: Possible winter visitant at Rancho del Oso; not to be confused with the Pacific common yellowthroat, (*G. t. arizela*), a race that breeds locally in the Waddell Valley (see Bent 1963).

Threats: Loss of habitat; water pollution.

Management Recommendations: Continue to manage Rancho del Oso for natural habitat.

Species Name & Status: **Yellow Warbler** (*Dendroica petechia*); CSC

Habitat: Riparian deciduous habitats. Also breeds in montane shrubbery in open conifer forests. Uses woodland, forest and shrub habitats in migration.

Range in California: Coastal and desert lowlands up to 2500 m (8000 ft) in Sierra Nevada. West of the southeastern deserts.

Range in Big Basin Redwoods S.P.: Appropriate habitat unitwide.

Threats: Destruction of riparian area for flood control and agriculture (Remsen 1978). Brood parasitism by brown-headed cowbirds is heavy and apparently has been a major cause of the drastic decline in numbers in lowland localities in recent decades (Zeiner et al. 1990).

Management Recommendations: Protect riparian habitat; survey for yellow warblers to determine nesting status in the park; survey brown-headed cowbird populations and implement a control program if warranted. Especially evaluate cowbird problem in areas open to equestrians, as cowbirds find supplemental food items in the undigested grain of horse feces, as well as the insects that are attracted to it.

Species Name & Status: **California Red-legged Frog** (*Rana aurora draytonii*); CSC, FT

Habitat: Ponds and quiet pools of streams and marshes. Habitat is characterized by dense, shrubby riparian vegetation associated with deep (<0.71 m), still or slow-moving water (Jennings and Hayes 1994). The shrubby vegetation that structurally appears to be most favorable includes arroyo willow (*Salix lasiolepis*), cattails (*Typha* sp.) and bulrushes (*Scirpus* sp.) (Jennings and Hayes 1994).

Distribution in California: Historic range in California extends through the Pacific slope drainages from Shasta County inland and Point Reyes southward to the Mexican border.

Distribution in Big Basin Redwoods S.P.: Present in limited numbers in Sempervirens Reservoir, despite the presence of bullfrogs. Suitable habitat also exists along Waddell Creek.

Threats: Human disturbance, introduction of exotic predators (e.g., bullfrogs, exotic crayfish), habitat alteration. Removal of riparian or aquatic vegetation, reduced stream flows, and sedimentation of pools often provide conditions detrimental to red-legged frogs but favorable for bullfrogs.

Management Recommendations: Develop and implement a dam and reservoir management plan to provide for the continuance of red-legged frogs in Sempervirens Reservoir. Protect appropriate habitat elsewhere in park as well. Conduct surveys for this species and map occurrence locations; report occurrences to the California Natural Diversity Database. Control/eradicate bullfrogs in the park.

Species Name & Status: **Foothill Yellow-legged Frog** (*Rana boylii*); CSC

Habitat: Shallow, flowing water, apparently preferentially in small to moderate-sizedstreams with at least some cobble-sized substrate (Jennings and Hayes 1994). May be found in suitable aquatic habitats in a variety of habitats, including valley-foothill hardwood conifer, valley-foothill riparian, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types (Zeiner et al. 1988).

Distribution in California: This species occurs in the Coast ranges from the Oregon border south to the Transverse Mts., in most of northern California west of the Cascade crest, and along the western side of the Sierra south to Kern Co. (Zeiner et al. 1988).

Distribution in Big Basin Redwoods S.P.: Potentially present in numerous streams and creeks within the park. Suitable habitat also exists along Waddell Creek, where this species has been documented in the past.

Threats: Introduction of exotic predators (e.g., bullfrogs, various exotic fish), reduced stream flows, and poorly timed releases from upstream dams which may scour away egg masses (Jennings and Hayes 1994). Sedimentation of streams and pools, and habitat alteration also adversely impact this species.

Management Recommendations: More information is needed about the distribution of this species in Big Basin Redwoods SP. Conduct surveys for this species and map occurrence locations; report occurrences to the California Natural Diversity Database. Protect suitable habitat. Control/eradicate bullfrogs in the park.

Species Name & Status: **Southwestern Pond Turtle** (*Clemmys marmorata pallida*); CSC, FSS.

Habitats: Require some slack or slow water aquatic habitat. Uncommon in high gradient streams probably because water temperatures, current velocity, food resources, or any combinations thereof may limit their local distribution (Holland 1991 in: Jennings and Hayes 1994). Hatchlings require shallow water habitat with relatively dense submergent or short emergent vegetation in which to forage. Western pond turtles also require an upland site in the vicinity of the aquatic sites. The majority of nesting sites are located within 200 meters from the aquatic habitat, however, at localities with less gradient, soil moisture gradients and soil type may cause nesting sites to be located at a significantly greater distance than where the majority are.

Range in California: Historically present in most Pacific slope drainages between Oregon and Mexico. Only known from two drainages on the desert slope in California. Found between sea level and 1430 meters in elevation.

Range in Big Basin Redwoods S.P.: In the Waddell Creek drainage, especially in the Rancho del Oso subunit (Turtle Pond & Waddell Marsh) (Smith et al. 1997).

Threats: Human disturbance, grazing, exotic aquatic predators (e.g., bullfrogs) and exotic competitors (e.g., sunfishes (*Lepomis* spp.)), disease, and fishing (individual pond turtles are frequently caught on baited hooks and are subsequently released carrying a hook that can significantly impair or entirely prevent normal feeding (Mader 1988 in: Jennings and Hayes 1994). Increased raccoon populations from human garbage may also impact this species. Statewide, illegal take by collectors poses a real threat to this species.

Management Recommendations: Survey the park unit for southwestern pond turtles and their nests. If found:

- Protect locations of occurrence, including movement corridors for adult females and young hatchlings from upland nests to the creek.

- Eradicate exotic predators and competitors.

- Evaluate and implement recommendations prescribed by Smith et al. (1997) as they pertain to pond turtles and DPR resource policy.

- In areas with significant pond turtle populations, regulations that prohibit fishing with baited hooks should be considered for implementation.

- Protect DPR water rights to Waddell Creek flows.

Species Name & Status: **Coast Horned Lizard** (*Phrynosoma coronatum frontale*); CSC

Habitat: Occurs in valley-foothill hardwood, conifer, riparian, annual grassland and pine-cypress habitats (Zeiner et al. 1990). Harrison (1984) reports this species from coastal scrub. Also known from mixed chaparral in the Sierra Nevada foothills (personal observation). Appear to prefer sandy areas, washes, flood plains and wind-blown deposits that provide suitable sites for burrowing.

Range in California: Ranges in the Central Valley from southern Tehama Co. south; in the Sierra foothills from Butte Co. to Tulare Co. below 1200 m (4000 ft); below 1800 m (6000 ft) in the mountains of southern California exclusive of desert regions; throughout the Coast Ranges south from Sonoma Co. One isolated population in Siskiyou Co. (Zeiner et al. 1990).

Range in Big Basin Redwoods S.P.: Unknown; reported in coastal scrub at Rancho del Oso (California Department of Parks and Recreation 1994). Likely is unitwide in appropriate habitats.

Threats: Habitat loss and fragmentation; loss of prey base by agricultural spraying; domestic predators like house cats (Jennings and Hayes 1994).

Management Recommendations: Survey appropriate habitats for horned lizards. Preserve natural habitats and natural processes.

Species Name & Status: **San Francisco Garter Snake** (*Thamnopsis sirtalis tetrataenia*); FE, CE, CFP

Habitat: Associated with permanent or semi-permanent bodies of water in a variety of habitats.

Range in California: Extremely scarce; occurs only in the vicinity of ponds and reservoirs in San Mateo County (Barry, cited in Zeiner et al. 1990), and more recently in very northern Santa Cruz County (Smith et al. 1997).

Range in Big Basin Redwoods S.P.: Rancho del Oso, in appropriate habitats.

Threats: Habitat loss and fragmentation.

Management Recommendations: Preserve natural habitats and natural processes. Follow recommendations by Smith, et al (1997).

REFERENCES

American Ornithologists' Union. 1998. Checklist of North American birds, 7th ed. American Ornithologists' Union, Washington, D. C.

_____. 2000. Forty-second supplement to the American Ornithologists' Union checklist of North American birds. Auk 117:847-858.

Anderson, R. 1988. Montane hardwood-conifer. Pages 70-71 *in* K. E. Mayer and W. G. Laudenslayer, Jr., eds. A Guide to Wildlife Habitats of California. Calif. Dept. Forestry and Fire Protection.

Arbib, R. 1977. The Blue List for 1978. American Birds 31:1087-1096.

Bakker, E. 1971. An Island Called California. University of California Press, Berkeley.

Belluomini, L. and G. Trapp. 1981. Ringtail distribution and abundance in the Central Valley of California *in* Warner, R. and K. Hendrix, eds., 1981. California Riparian Systems Ecology, Conservation, and Productive Management. University of California Press, Berkeley, CA.

Bailey, R. 1978. Descriptions of the Ecoregions of the United States. USDA Forest Service. Intermountain Region, Ogden, UT.

Baumgartner, L. 1995. Birds of Rancho del Oso and Vicinity. Waddell Creek Assn.

Becking, R.W. 1991. Eggshell Fragments of the Marbled Murrelet (*Brachyramphus marmoratus*) in San Mateo County, California. Northwestern Naturalist 72:74-76.

Bent, A.C. 1963. Life Histories of North American Wood Warblers. Dover Publications, Inc. New York.

Binford, L.C., B. G. Elliot and S. W. Singer. 1975. Discovery of a Nest and the Development of the Marbled Murrelet. The Wilson Bull. 87(3):303-319.

Biswell, H. H. 1989. Prescribed Burning in California Wildlands Vegetation Management. University of California Press, Berkeley, CA.

Brown, P.E. and E.D. Pierson. 1996. Natural History and Management of Bats in California and Nevada. Western Section of The Wildlife Society sponsored workshop: November 13-15, 1996. Unpublished report.

Burkett, Esther. 1997. Wildlife Biologist, California Department of Fish and Game. Personal Communication.

California Department of Parks and Recreation. 1984. Big Basin Redwoods State Park Resource Inventory. Unpub. rept.

California Natural Diversity Data Base (CNDDB). 2001. Element occurrences, Special Animals. Calif. Dept. Fish and Game, Sacramento, CA.

Detrich, P. and D. Garcelon. 1986. Criteria and Habitat Evaluation for Bald Eagle Reintroduction in Coastal California. California Department of Fish and Game, Wildlife Management Branch, Sacramento, CA.

England, A. S. 1988. Mixed chaparral. Pages 104-105 *in* K.E. Mayer and W. G. Laudenslayer, Jr., eds. A Guide to Wildlife Habitats of California. Calif. Dept. Forestry and Fire Protection.

Gordon, B. L. 1974. Monterey Bay Area: Natural History and Cultural Imprints. The Boxwood Press, Pacific Grove, CA.

Grinnell, J. 1913. A distributional list of the mammals of California. Proceedings form California Academy of Science. Series 4, 3:265-390.

Grinnell, J. and A. H. Miller. 1944. The distribution of birds of California. Pacific Coast Avifauna 27:1-608.

Hamer, T.E. and S. K. Nelson. 1995. Characteristics of marbled murrelet nest trees and nesting stands, pp. 69-82. In: C. J. Ralph, G. L. Hunt, Jr., M. G. Raphael, and J. F. Piatt (eds.), Ecology and Conservation of the Marbled Murrelet in North America. USDA For. Serv. Gen. Tech. Rep. PSW-GTR-152.

Hickman, S. 1990. Evidence of edge species attraction to nature trails within deciduous forests. Native Areas Journal 10(1):3-5.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Calif. Dept. Fish and Game, Sacramento, CA.

Ingles, L. G. 1965. Mammals of the Pacific States, California, Oregon and Washington. Stanford University Press, Stanford, CA.

Jenkins, R. 1976. Maintenance of Natural Diversity: Approach and Recommendations *from:* Transactions: Forty-first North American Wildlife and Natural Resource Conference. 1976, pages 441-451. Wildlife Management Institute, Washington, D.C.

Jennings and Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for California Department of Fish and Game Inland Fisheries Division, Rancho Cordova, CA.

Jones and Stokes Associates, Inc. 1981. Ecological Characteristics of the Central and Northern California coastal Region, Vol. I - IX. Prepared for Bureau of Land Management, U.S. Fish and Wildlife Service, Portland.

Jones, J. K., Jr., D. C. Carter, H. H. Genoways, R. S. Hoffman, D. W. Rice, and C. Jones. 1986. Revised checklist of North American mammals north of Mexico, 1986. Occasional Papers, Museum, Texas Tech University, No. 107.

Keel, Paul. State Park Ranger I. California Department of Parks and Recreation. Personal communication.

Kie, J. G. 1988. Annual grassland. Pages 118-119 *in* K. E. Mayer and W. G. Laudenslayer, Jr., (eds). A Guide to Wildlife Habitats of California. Calif. Dept. Forestry and Fire Protection.

Larsen, C.J. 1991. Report to the Fish and Game Commission: A Status Review of the Marbled Murrelet (*Brachyramphus marmoratus*) in California. Wildlife Management Division, Non-game Bird and Mammal Section. Dept. Candidate Species Status Report 91-1.

Laudenslayer, Jr., W. F., W. Grenflell, and D. Zeiner. 1989. A check-list of the Amphibians, Reptiles, Birds, and Mammals of California. USDA Forest Service and California Department of Fish and Game.

Linsdale, J. M. 1931. Facts concerning the use of Thallium in California to poison rodents - its destructiveness to game birds and other valuable wildlife. The Condor 33:92-106.

Lyon, L. J., H. S. Crawford, E. Czuhai, R. L. Fredricksen, R. F. Harlow, L. J. Metz, and H. A. Pearson. 1978. Effects of fire on fauna. U.S.D.A. For. Serv. Gen. Tech. Rep. WO-6. Washington, D.C.

MacKintosh, G. ed. 1989. Preserving Communities and Corridors. The Defenders of Wildlife. Washington, D. C.

Mayer, K. E. 1988. Redwood. Pages 60-61 *in* K. E. Mayer and W. G. Laudenslayer, Jr., eds. A Guide to Wildlife Habitats of California. Calif. Dept. Forestry and Fire Protection.

McBride, J. R., E. Norberg, S. Cheng and A. Mossadegh. 1991. Seedling Establishment of Coast Live Oak in Relation to Seed Caching by Jays. In: Standiford, R. B., tech. coord. Proceedings of the Symposium on Oak Woodlands and Hardwood Rangeland Management. Oct. 31-Nov. 2, 1990. Davis, CA. Gen. Tech. Rep. PSW 126, Berkeley, CA: U. S. Department of Agriculture. Forest Service. Pacific Southwest Research Station: 143-148.

McDonald, P. M. 1988. Montane hardwood. Pages 72-73 *in* K. E. Mayer and W. G. Laudenslayer, Jr., eds. A Guide to Wildlife Habitats of California. Calif. Dept. Forestry and Fire Protection.

Miner, Karen. 1996. Associate Resource Ecologist, California Department of Parks and Recreation. Personal communication.

Orr, R.T. 1942. A Study of the Birds of the Big Basin Region of California. American Midland Naturalist. 27(2):273-337.

Page, G. W. 1988. Nesting Success of Snowy Plovers in Central Coastal California in 1988. Pt. Reyes Bird Observatory, Stinson Beach, CA. Unpub. rep.

Paton, P.C., and C.J. Ralph. 1990. Distribution of the Marbled Murrelet at Inland Sites in California. Northwestern Naturalist. 71:72-84.

Pierson, E. D. 1989. The status of Townsend's big-eared bat (*Plecotus townsendii*) in California. Preliminary results: *P. t. townsendii* in Coastal California, 1987-1988. Calif. Dept. Fish and Game, Wildl. Manage. Div., Sacramento, CA.

Ralph, C. J., G. L. Hunt, Jr., M. G. Raphael, J. F. Piatt, eds. 1995. Ecology and Conservation of the Marbled Murrelet. U.S.D.A. Forest Service. General Technical Report PSW-GTR-152.

Remsen, J. V., Jr. 1978. Bird Species of Special Concern in California. Calif. Dept. Fish and Game, Wildl. Manage. Br. (Sacramento, Calif.), Adm. Rep. No. 78-1.

Rudd, R. 1954. Mammals of Santa Cruz County, California. Unpub. M.A. thesis, Univ. of CA.

Santa Cruz County of Watershed Management, 1976. Vegetation and Wildlife Technical Section of the Preliminary Report-San Lorenzo River Watershed Planning Process, Office of Watershed Management, Santa Cruz, CA.

Seymor, Rich. 1996. Naturalist, Coyote Creek Riparian Station. Personal communication.

Singer, Steve. 1996. Consulting Biologist. Personal communication.

Singer, S.W. 1977. Technical Section - Biotic Resources Section of the Santa Cruz County Growth Management Plan. County of Santa Cruz, Community Resources Agency, Office of Resources Planning.

Singer, S.W. and P.L. Fiedler. 1995. The Extent of Old-Growth Coniferous Forest in Big Basin Redwoods State Park, California. Supplemental Report to "Breeding Distribution of Marbled Murrelets in the Santa Cruz Mountains", California Department of Fish and Game Agreement No. FG2307WM-1. Unpub. Rep. 6 pp.

Singer, S.W., D. L. Suddjian and S.A. Singer. 1995. Fledging Behavior, Flight Patterns, and Forest Characteristics at Marbled Murrelet Tree Nests in California. Northwestern Naturalist 76:112-119.

Smith, Jerry. 1997. Fisheries Professor. San Jose State University. Personal communication.

Smith, J.J., J. Abel and C. Davis. 1997. Management Plan for Waddell Creek Lagoon and Surrounding Habitats. Dept. Bio. Sciences, San Jose State Univ. Unpub. Rep. 21 pp.

Stallcup, R. and R. Greenberg. 1974. The nesting season, Middle Pacific Coast Region. American Birds 28:942-947.

Stebbins, R. 1959. Reptiles and Amphibians of the San Francisco Bay Region. U. C. Press, Berkeley.

_____. 1985. A field guide to western reptiles and amphibians. 2nd Edition. Houghton Mifflin Co., Boston.

Suddjian, D. L. 1995. Preliminary Summary of a Study of Corvid Numbers in Big Basin Redwoods State Park in July 1995. Unpub. Rept. 4 pp.

U. S. Fish and Wildlife Service. 1992. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Washington, Oregon and California population of the Marbled Murrelet. USDI Fish and Wildl. Serv. Fed. Reg. 57:45328-45337.

_____. 1996. Endangered and Threatened Wildlife and Plants: Final Designation of Critical Habitat for the Marbled Murrelet. USDI Fish and

Wildl Serv. Fed. Reg. Online (wais.access.gpo.gov). Vol. 61:26255-26320.

_____. 1997. Recovery Plan for the Marbled Murrelet (Washington, Oregon, and California Populations). U.S. Fish and Wildlife Service, Portland, OR.

Verner, J. 1986. The importance of hardwood habitats for wildlife in California. Page 162 *in* Plumb, T. R. and N. H. Pillsbury, 1986. Proceedings of the Symposium on Multiple-Use Management of California's Hardwood Resources. U.S.D.A. Forest Service. Gen. Tech. Rep. PSW -100.

Weatherhead, P. 1989. Sex ratios, host-specific reproductive success, and impact of brown-headed cowbirds. Auk 106:358-366.

West-Bourke, Diane. 1996. Naturalist, Rancho del Oso Nature Center. Personal communication.

Williams, D. 1986. Mammalian Species of Special Concern in California. Calif. Dept. Fish and Game, Wildl. Manage. Br. (Sacramento, Calif.) Adm. Rep. No. 86-1.

Wright, H. A. and A. W. Bailey. 1982. Fire ecology. John Wiley and Sons, Inc., New York. Pp. 174-192.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. Mayer, and M. White (eds.). 1988. California's Wildlife Volume I, Amphibians and Reptiles. California Department of Fish and Game. Sacramento, CA.

Zeiner, D. C., W. F. Laudenslayer, Jr., K. Mayer, and M. White (eds.). 1990. California's Wildlife Volume II, Birds. California Department of Fish and Game. Sacramento, CA.