



Biological Resources - Volume 2 Special-Status Species Accounts

SANTA ROSA SUBREGIONAL LONG-TERM WASTEWATER PROJECT

Prepared for

**City of Santa Rosa
and
U.S. Army Corps of Engineers**

July 3, 1996

Prepared by

HARLAND BARTHOLOMEW & ASSOCIATES, INC.
2233 Watt Avenue, Suite 330, Sacramento, CA 95825 • 916/483-0481

and

SYCAMORE ENVIRONMENTAL CONSULTANTS, INC.
6355 Riverside Blvd., Suite C, Sacramento, CA 95831 • 916/427-0703

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INTRODUCTION

The purpose of the Biological Resources Technical Memorandum, Volume II - Special-Status Species Accounts is to identify and provide background information on special-status plant and animal species potentially affected by the project alternatives presented in the Santa Rosa Subregional Long-Term Wastewater Project EIR/EIS. Species potentially occurring in the project area are further categorized by their potential to be affected by the project alternatives. Potential impacts to species determined to be potentially affected by the project alternatives are analyzed in the Aquatic and Terrestrial Biological Resources Section of the EIR/EIS.

METHODOLOGY

For the purposes of this document, a species is considered to have special-status under any of the following conditions:

- legally protected, proposed, or a candidate for protection under the California Endangered Species Act (CESA) and/or Federal Endangered Species Act (FESA);
- designated as a species of special concern by the California Department of Fish and Game (CDFG);
- listed as fully protected in California by the CDFG; or
- listed in the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (1994).

An inventory of special-status species potentially occurring in the project area was compiled through discussions with resource agencies and local conservation groups, including the United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), the California Department of Fish and Game (CDFG), the California Native Plant Society (CNPS), and Madrone Audubon Society. A total of 182 special-status plant species and 102 special-status animal species, including 26 invertebrate species, 13 fish species, 4 amphibian species, 2 reptile species, 41 bird species, and 16 mammal species were identified in the project area.

Current federal regulatory status for both plant and animal species was derived through the aforementioned discussions and current federal register notices. Current state regulatory status data was determined through a literature review of CDFG documents including *Endangered and Threatened Animals of California* (revised January 1995) and *Special Animals* (revised August 1994). Additional special-status plant species information was found in the 1994 CNPS *Inventory of Rare and Endangered Vascular Plants of California*.

Species potentially occurring in the project area were evaluated to determine if the project alternatives could potentially result in effects based on one or more of the following factors: taxonomic validity, local spatial and temporal distribution (breeding and wintering), specific habitat requirements, relative abundance, and extirpation (localized extinction). Species determined not to be affected by the project alternatives were excluded from analysis. Species potentially affected by the project alternatives are considered in the impact analysis presented in the Aquatic and Terrestrial Biological Resources Section of the EIR/EIS.

RESULTS

Results of the evaluation are presented in Tables 1 and 2. Table 1 contains the special-status plant species potentially occurring in the project area. Table 2 contains the special-status animal species potentially occurring in the project area organized taxonomically (e.g. invertebrates, fish, amphibians, reptiles, birds, and mammals). Both tables provide the following information: common and scientific names; state legal status; federal legal status; other status (e.g., CNPS List 1 - 4 plant species); habitat requirements; potential threats; and potential to be affected by the project and explanation of this finding.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		
	State	Federal	CNPS	Source	Habitat	Potential Threats	Status in Study/Explanation
AQUATIC PLANTS							
<i>Alopecurus aequalis</i> var. <i>sonomensis</i> Sonoma alopecurus	--	FPE	1B	2,3,5,1 0	Freshwater marsh, riparian scrub, and wet meadow.	Grazing and wetland habitat loss.	This species is being considered in the analysis.
<i>Aster lentus</i> Suisun marsh aster	--	*	1B	6	Brackish and freshwater marsh.	Marsh habitat loss and alteration.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Sonoma or Marin counties
<i>Astragalus tener</i> var. <i>tener</i> Alkali milk-vetch	--	--	4	6	Valley grasslands (adobe clay), alkali flats, and vernal moist meadows.	Grazing, agriculture, and urbanization.	This species is being considered in the analysis.
<i>Blennosperma bakeri</i> Sonoma sunshine	SE	FE	1B	2,3,5	Found in association with vernal pools, wet grasslands, and drainage swells.	Urbanization, grazing, and agriculture.	This species is being considered in the analysis.
<i>Calamagrostis bolanderi</i> Bolander’s reed grass	--	--	4	6	Freshwater marsh, coastal scrub, bogs, moist meadows, and open woodlands.	Unknown.	This species is being considered in the analysis.
<i>Calamagrostis crassiglumis</i> Thurber’s reed grass	--	*	2	2,5	Coastal scrub (mesic) and freshwater marsh.	Grazing.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Campanula californica</i> Swamp harebell	--	*	1B	2,3,5	Bog/fen, freshwater marsh, north coast coniferous forest, closed-cone coniferous forest, and coastal marshy areas.	Grazing, development, and marsh habitat loss.	This species is being considered in the analysis.
<i>Carex albida</i> White sedge	SE	FPE	1B	2,3,5,10	Freshwater marsh. Believed to be limited to a single population at Pitkin Marsh.	Wetland drainage and spraying of chemical effluents.	This species is being considered in the analysis.
<i>Carex californica</i> California sedge	--	--	2	8	Meadows drier areas of swamps.	Unknown.	This species is being considered in the analysis.
<i>Carex comosa</i> Bristly sedge	--	--	2	6	Lake margins and wet places.	Marsh drainage.	This species is being considered in the analysis.
<i>Castilleja leschkeana</i> Point Reyes paintbrush	--	FC	--	11	Salt water marsh (behind dunes).	Marsh drainage.	Excluded from further consideration based on taxonomic reason: Not found in CA.; name misapplied to <i>Castilleja chrymactis</i> , native to Alaska, extinct waif in CA (CNPS 1994)
<i>Castilleja uliginosa</i> Pitkin Marsh Indian paintbrush	SE	*	1A	2,3,5,7	Freshwater marsh and moist places.	Grazing, development, and marsh habitat loss.	This species is being considered in the analysis.
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i> Point Reyes bird's-beak	--	*	1B	2,3,5	Coastal salt marsh.	Development, foot traffic, non-native plants, and altered hydrology.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Cordylanthus mollis</i> ssp. <i>mollis</i> Soft bird's-beak	SR	FPE	1B	2,3,5,7	Coastal salt marsh	Development, foot traffic, non-native plants, and altered hydrology.	This species is being considered in the analysis.
<i>Cuscuta howelliana</i> Bogg's Lake dodder	--	--	--	4	Chaparral, vernal pools.	Agriculture and urban development.	Excluded from further consideration based on taxonomic reason: A synonym for <i>Cuscuta indecora</i> var. <i>indecora</i> (CNPS 1994)
<i>Dichanthelium lanuginosum</i> var. <i>thermale</i> [<i>Panicum acuminatum</i> var. <i>acuminatum</i>] Geysers dichanthelium [panicum]	SCE	*	1B	8	Meadows and seeps in the vicinity of hot springs, marshes, and streambanks.	Energy development.	This species is being considered in the analysis.
<i>Downingia pusilla</i> Dwarf downingia	--	*	2	3	Valley-foothill grasslands (mesic), vernal pools, and roadside ditches.	Urbanization, agriculture, grazing, and off-road vehicles.	This species is being considered in the analysis.
<i>Eleocharis parvula</i> Small spikerush	--	--	4	6	Coastal salt marsh.	Unknown.	This species is being considered in the analysis.
<i>Eryngium constancei</i> Loch Lomond button celery	SE	FE	1B	2	Volcanic ash flow vernal pools; vernal pools in meadows.	Unknown.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Sonoma or Marin counties. Known only from one area in Lake County.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Gratiola heterosepala</i> Bogg's Lake hedge-hyssop	SE	*	1B	6	Vernal pools and lake margins.	Agriculture, development, grazing, trampling, and vehicles,	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties.
<i>Grindelia stricta</i> var. <i>angustifolia</i> Marsh gumplant	--	--	4	8	Coastal salt marsh and tidal areas.	Unknown.	This species is being considered in the analysis.
<i>Helianthus exilis</i> Serpentine sunflower	--	*	4	8	Seeps in cismontane woodland and chaparral with serpentine soils.	Unknown.	This species is being considered in the analysis.
<i>Lasthenia burkei</i> Burke's goldfields	SE	FE	1B	2,3,5	Vernal pools and wet meadows.	Agriculture, urbanization and grazing.	This species is being considered in the analysis.
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i> Delta tule pea	--	*	1B	9	Brackish and freshwater marsh, coastal and estuarine marshes.	Agriculture and water diversions.	This species is being considered in the analysis.
<i>Legenere limosa</i> Legenere	--	*	1B	2,3,5,7	Vernal pools and sloughs. Occurs in pools with <i>Downingia pusilla</i> .	Grazing and development.	This species is being considered in the analysis.
<i>Lilaeopsis masonii</i> Mason's lilaeopsis	SR	*	1B	9	Brackish or freshwater marsh, riparian scrub, and intertidal streambanks.	Development, flood control, recreation, erosion, and agriculture.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Lilium maritimum</i> Coast lily	--	--	1B	2,5,6	Coastal scrub, coastal prairie, bogs, broad-leaved upland forest, and gaps in coniferous forest.	Road maintenance, urbanization, and horticultural collecting.	This species is being considered in the analysis.
<i>Lilium pardalinum</i> ssp. <i>pitkinense</i> [<i>L. pitkinense</i>] Pitkin Marsh lily	SE	FPE	1B	2,3,5,10	Freshwater marsh and valley-oak scrub. Endemic to Vine Hill area.	Marsh habitat loss, horticultural collection, and grazing.	This species is being considered in the analysis.
<i>Limnanthes douglasii</i> ssp. <i>sulphurea</i> Point Reyes meadowfoam	SE	*	1B	2,5	Vernal pools, freshwater marsh, and wet meadows of coastal prairies.	Grazing, trampling, and non-native plants.	This species is being considered in the analysis.
<i>Limnanthes vinculans</i> Sebastopol meadowfoam	SE	FE	1B	2,3,5	Vernal pools and wet meadows. Endemic to Sonoma County.	Urbanization, agriculture, and grazing.	This species is being considered in the analysis.
<i>Navarretia leucocephala</i> ssp. <i>bakeri</i> Baker's navarretia	--	--	1B	3	Vernal pools, valley-foothill grasslands, cismontane woodland, and mesic meadows.	Unknown.	This species is being considered in the analysis.
<i>Navarretia leucocephala</i> ssp. <i>pauciflora</i> Few-flowered navarretia	ST	FPE	1B	2,3,5	Volcanic ash flow vernal pools, volcanic substrate vernal pools.	Grazing, development, and off-road vehicles.	Excluded from further consideration based on distribution and habitat reasons: No known recorded occurrences from Sonoma or Marin counties. Known only from Lake and Napa counties. Habitat (i.e., volcanic soil) not present in study area.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Navarretia leucocephala</i> ssp. <i>plieantha</i> [<i>N. plieantha</i>] Many-flowered navarretia	SE	FPE	1B	2,3,5	Vernal pools.	Grazing, development, and off-road vehicles.	This species is being considered in the analysis.
<i>Plagiobothrys glaber</i> Hairless popcorn-flower	--	*	1A	2	Wet alkaline soils in valleys and coastal salt marshes.	Grazing and development.	This species is being considered in the analysis.
<i>Plagiobothrys mollis</i> var. <i>vestitus</i> Petaluma popcorn-flower	--	*	1A	2,3,5,7	Wet sites in valley-foothill grassland.	Draining and development of marshes.	This species is being considered in the analysis.
<i>Plagiobothrys strictus</i> Calistoga popcorn-flower	ST	FC	1B	6, 11	Alkali sites near thermal springs and vernal pools in broadleaved upland forests and moist grasslands.	Urbanization, recreational activities, and airport maintenance.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Sonoma or Marin counties. Known only from 3 occurrences near thermal springs near Calistoga, Napa County (CNPS 1994)
<i>Pleuropogon hooverianus</i> North Coast semaphore grass	SR	*	1B	2,3,5	Broadleaved, upland forests and meadows; vernal pools; marshes; and redwood forests.	Unknown.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Poa napensis</i> Napa blue grass	SE	FC	1B	6, 11	Moist alkali meadows near hot springs. Sterile ground near hot springs.	Development, recreational activities, and airport maintenance.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Sonoma or Marin counties. Known only from 2 occurrences near thermal springs near Calistoga, Napa County (CNPS 1994)
<i>Pogogyne douglasii</i> ssp. <i>parviflora</i> [<i>P. douglasii</i>] Douglas pogogyne	--	*	3	8	Chaparral with serpentine soils, valley-foothill grasslands, vernal freshwater marshes, and vernal pools.	Urbanization and agriculture.	This species is being considered in the analysis.
<i>Polygonum marinense</i> Marin knotweed	--	*	3	2,3,5	Coastal salt marsh.	Coastal development.	This species is being considered in the analysis.
<i>Potentilla hickmanii</i> Hickman's cinquefoil	SE	FPE	1B	2,3,5,7	Vernally wet meadows and open pine forests.	Urbanization and recreational activities.	This species is being considered in the analysis.
<i>Ranunculus lobbii</i> Lobb's aquatic buttercup	--	--	4	6	Shallow water, vernal pools, valley and foothill grassland, oak woodland, and mixed forest.	Urbanization and agriculture.	This species is being considered in the analysis.
<i>Rhynchospora alba</i> White beaked-rush	--	--	4	6	Freshwater marsh.	Unknown.	This species is being considered in the analysis.
<i>Rhynchospora californica</i> California beaked-rush	--	*	1B	2,3,5	Meadows, freshwater marshes, seeps, and bogs.	Marsh habitat loss.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Rhynchospora globularis</i> var. <i>globularis</i> Round-headed beaked-rush	--	--	2		Freshwater marsh.	Marsh habitat loss.	This species is being considered in the analysis.
<i>Sidalcea calycosa</i> ssp. <i>rhizomata</i> Point Reyes checkerbloom	--	--	1B	8	Marshes near coast.	Unknown.	This species is being considered in the analysis.
<i>Sidalcea oregana</i> ssp. <i>valida</i> Kenwood Marsh checkerbloom	SE	FPE	1B	2,3,5,10	Freshwater marsh.	Grazing and habitat alteration.	This species is being considered in the analysis.
<i>Suaeda californica</i> California seablite	--	FPE	1B	2,5	Coastal salt marsh	Recreation, erosion, and alteration of marsh habitat. Development, foot traffic, non-native plants, and altered hydrology.	This species is being considered in the analysis.
TERRESTRIAL PLANTS							
<i>Abronia umbellata</i> ssp. <i>breviflora</i> Pink sand-verbena	--	*	1B	8	Coastal dunes	Vehicles and foot traffic.	This species is being considered in the analysis.
<i>Agrostis aristiglumis</i> Awned bent grass	--	C	--	11	Coastal prairie and valley-foothill grassland.	Unknown.	Excluded from further consideration based on taxonomic reason: <i>Agrostis aristiglumis</i> is a synonym of <i>Agrostis microphylla</i> , a common taxon (CNPS 1994)

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Agrostis blasdalei</i> var. <i>blasdalei</i> Blasdale's bent grass	--	*	1B	3,5	Coastal dunes, coastal bluff scrub, and coastal prairie, gravelly soils.	Agriculture and recreation.	This species is being considered in the analysis.
<i>Agrostis blasdalei</i> var. <i>marinensis</i> Marin bent grass	SR	--	--	2	Coastal dunes and coastal prairie	Agriculture and recreation.	This species is being considered in the analysis.
<i>Agrostis clivicola</i> var. <i>clivicola</i> Coastal bluff bent grass	--	*	--	1,4	Coastal bluff scrub.	Unknown	Excluded from further consideration based on taxonomic reason: <i>Agrostis clivicola</i> var. <i>clivicola</i> is a synonym of <i>Agrostis densiflora</i> , a common taxon (CNPS 1994).
<i>Agrostis clivicola</i> var. <i>punta-reyesensis</i> Point Reyes bent grass	--	*	--	1,2,4,5	Closed-cone pine forest, coastal prairie, coastal scrub.	Unknown	Excluded from further consideration based on taxonomic reason: <i>Agrostis clivicola</i> var. <i>punta-reyesensis</i> is a synonym of <i>Agrostis densiflora</i> , a common taxon (CNPS 1994).
<i>Amsinckia lunaris</i> Bent-flowered fiddleneck	--	--	4	6	Open woods, grassland, and mixed chaparral.	Limited distribution.	This species is being considered in the analysis.
<i>Antirrhinum subcordatum</i> Dimorphic snapdragon	--	*	1B	2	Ultramafic chaparral. Gentle, open slopes on serpentine. Lower montane coniferous forest.	Road maintenance and grazing.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Sonoma or Marin counties.
<i>Antirrhinum virga</i> Tall snapdragon	--	--	4	6	Openings in chaparral, rocky areas, often on serpentine.	Limited distribution.	This species is being considered in the analysis.

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PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
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<i>Arabis blepharophylla</i> Coast rock cress	--	*	4	6	Rocky soils, outcrops; chaparral; broadleaved, upland forests; coastal prairie; and coastal scrub.	Limited distribution.	This species is being considered in the analysis.
<i>Arctostaphylos bakeri</i> ssp. <i>bakeri</i> Baker's manzanita	SR	*	1B	2,3,5	Broadleaved, upland forests; and chaparral, often ultramafic; and serpentine outcrops.	Road construction, non-native plants, dumping, and development.	This species is being considered in the analysis.
<i>Arctostaphylos bakeri</i> ssp. <i>sublaevis</i> The Cedars manzanita	--	--	1B	8	Serpentine outcrops, ridges, and chaparral.	Rare throughout its range.	This species is being considered in the analysis.
<i>Arctostaphylos canescens</i> ssp. <i>sonomensis</i> Sonoma manzanita	--	--	1B	6	Ridges, slopes, chaparral, and forest.	Development.	This species is being considered in the analysis.
<i>Arctostaphylos densiflora</i> Vine Hill manzanita	SE	*	1B	2,3,5	Found in association with chaparral (acid marine sand), and shale outcrops.	Fungal infection.	This species is being considered in the analysis.
<i>Arctostaphylos hispidula</i> Howell's manzanita	--	*	4	8	Rocky, serpentine soils or sandstone; open sites; and forest.	Mining.	This species is being considered in the analysis.
<i>Arctostaphylos hookeri</i> ssp. <i>montana</i> Mount Tamalpais manzanita	--	*	1B	1,2,3	Valley foothill grasslands and chaparral, generally in association with serpentine soils and rocky outcrops.	Unknown.	Excluded from further consideration based on distribution reason: Known only from Mount Tamalpais area of Marin County.

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PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Arctostaphylos stanfordiana</i> ssp. <i>decumbens</i> Rincon manzanita	--	--	1B	3	Found in association with chaparral, open areas.	Development, road construction, vehicles, and viticulture.	This species is being considered in the analysis.
<i>Arctostaphylos stanfordiana</i> ssp. <i>raichei</i> Hopland manzanita	--	*	1B	7	Chaparral (often associated with serpentinite).	Urbanization.	This species is being considered in the analysis.
<i>Arctostaphylos virgata</i> Marin manzanita	--	*	1B	8	Broadleaved, upland forests; closed-cone coniferous forests; north coast forests; chaparral; sandstone; and granitic outcrops.	Fire suppression.	This species is being considered in the analysis.
<i>Asclepias solanoana</i> Serpentine milkweed	--	--	4	8	Cismontane woodland, conifer forest, serpentine outcrops, and chaparral.	Grazing, vehicles, logging, mining, and geothermal development.	This species is being considered in the analysis.
<i>Astragalus breweri</i> Brewer's milk-vetch	--	--	4	6	Cismontane woodland, open slopes, and grassy areas, sometimes on serpentine.	Development and road construction	This species is being considered in the analysis.
<i>Astragalus clarianus</i> Clara Hunt's milk-vetch	ST	FPE	1B	2,3,5,10	Cismontane woodland, valley-foothill grassland, and open grassy areas on thin soil.	Recreational development and non-native plants.	This species is being considered in the analysis.

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<i>Astragalus rattanii</i> var. <i>rattanii</i> Rattan's milk-vetch	--	--	4	8	Cismontane woodland, conifer forest, river banks, sandbars, and gravely streambanks.	Limited distribution.	This species is being considered in the analysis.
<i>Blennosperma nanum</i> var. <i>robustum</i> Point Reyes blennosperma	SR	*	1B	2,5	Coastal prairie, coastal scrub, grassy places in shrubs, and sandy soils.	Grazing.	This species is being considered in the analysis.
<i>Calamagrostis ophitidis</i> Serpentine reed grass	--	--	4	8	Chaparral, meadows, and valley-foothill grassland on serpentine.	Limited distribution.	This species is being considered in the analysis.
<i>Calandrinia breweri</i> Brewer's calandrinia	--	--	4	8	Sandy to loamy soils, disturbed places, burns, chaparral, and coastal scrub.	Limited distribution.	This species is being considered in the analysis.
<i>Calochortus raichei</i> The Cedars fairy-lantern	--	*	1B	2,5	Closed-cone coniferous forests, ultramafic chaparral, and open serpentine in woodlands.	Mining and road construction	This species is being considered in the analysis.
<i>Calochortus tiburonensis</i> Tiburon mariposa lily	ST	FPT	1B	2,5	Valley-foothill grasslands, ultramafic, Ring Mountain on the Tiburon Peninsula.	Known from only one occurrence.	This species is being considered in the analysis.
<i>Calyptridium quadripetalum</i> Four-petaled pussypaws	--	--	4	6	Chaparral, and sandy or gravely areas, generally on serpentine.	Limited distribution.	This species is being considered in the analysis.

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	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Calystegia collina</i> ssp. <i>oxyphylla</i> Mount Saint Helena morning-glory	--	*	4	2,3,5	Chaparral and serpentine chaparral; open, grassy or rock; open oak/pine woods; serpentine.	Limited distribution.	This species is being considered in the analysis.
<i>Cardamine pachystigma</i> var. <i>dissectifolia</i> Dissected-leaf toothwort	--	--	3	8	Chaparral and serpentine outcrops.	Lack of information and taxonomic uncertainty.	This species is being considered in the analysis.
<i>Castilleja affinis</i> ssp. <i>neglecta</i> [<i>C. neglecta</i>] Tiburon Indian paintbrush	ST	FE	1B	2,5	Associated with valley-foothill grasslands on serpentine soils and open serpentine slopes.	Development, gravel mining, and grazing.	This species is being considered in the analysis.
<i>Ceanothus confusus</i> Rincon Ridge ceanothus	--	*	1B	2,3,5	Serpentine and volcanic chaparral, closed-cone coniferous forest, and cismontane woodland on dry, shrubby slopes.	Development.	This species is being considered in the analysis.
<i>Ceanothus divergens</i> Calistoga ceanothus	--	*	1B	2,3,5	Found in association with serpentine chaparral; and dry, rocky, volcanic slopes.	Development in the Geysers geothermal area.	This species is being considered in the analysis.
<i>Ceanothus foliosus</i> var. <i>vineatus</i> Vine Hill ceanothus	--	*	1B	2,5	Chaparral and dry, rolling hills.	Rare throughout its range.	This species is being considered in the analysis.

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<i>Ceanothus gloriosus</i> var. <i>gloriosus</i> Point Reyes ceanothus	--	--	4	6	Coastal bluff scrub, closed-cone forest, coastal dunes, and coastal scrub/sandy.	Limited distribution.	This species is being considered in the analysis.
<i>Ceanothus gloriosus</i> var. <i>porrectus</i> Mount Vision ceanothus	--	*	1B	1,3,5	Valley foothill grasslands, closed cone coniferous forest, coastal prairie, coastal scrub. Known only from Mount Vision area.	Quarrying and grazing.	Excluded from further consideration based on distribution reason: Known from fewer than 15 occurrences in the Mount Vision area near Point Reyes, Marin County (CNPS 1994).
<i>Ceanothus masonii</i> Mason's ceanothus	SR	*	1B	2,3,5	Chaparral and dry, rocky slopes on Bolinas Ridge.	Rare throughout its range.	This species is being considered in the analysis.
<i>Ceanothus sonomensis</i> Sonoma ceanothus	--	*	1B	2,3,5	Chaparral, sandy soils, serpentine, volcanic soils; Hood Mountain Range.	Development.	This species is being considered in the analysis.
<i>Chlorogalum pomeridianum</i> var. <i>minus</i> Dwarf soaproot	--	--	1B	8	Serpentine outcrops in chaparral.	Rare throughout its range.	This species is being considered in the analysis.
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i> San Francisco Bay spineflower	--	*	1B	8	Sandy places, coastal dunes, coastal prairie, and coastal scrub; Merced Lake.	Rare throughout its range.	This species is being considered in the analysis.
<i>Chorizanthe cuspidata</i> var. <i>villosa</i> Woolly-headed spineflower	--	--	1B	8	Sandy places, coastal dunes, coastal prairie, and coastal scrub.	Rare throughout its range.	This species is being considered in the analysis.

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PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
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<i>Chorizanthe pungens</i> var. <i>pungens</i> Monterey spineflower	--	FPE	1B	6	Sandy places, coastal dunes, coastal strand, and closed-cone coniferous forest	Urbanization, recreational development and activities.	Excluded from further consideration based on distribution reason: Known only from Monterey and Santa Cruz counties.
<i>Chorizanthe valida</i> Sonoma spineflower	SE	FE	1B	2,3,5	Coastal prairie (sandy).	Rare throughout its range.	This species is being considered in the analysis.
<i>Cirsium andrewsii</i> Franciscan thistle	--	--	4	6	Broadleaved, upland forest; bluffs; ravines, and seeps.	Limited distribution.	This species is being considered in the analysis.
<i>Cirsium hydrophilum</i> var. <i>vaseyi</i> Mount Tamalpais thistle	--	*	1B	2,5	Chaparral and broadleaved upland forests on serpentine soil, and serpentine seeps.	Road construction and non-native plant invasions.	This species is being considered in the analysis.
<i>Clarkia concinna</i> ssp. <i>raichei</i> Raichei's red ribbons; Tomales clarkia	--	*	1B	2,5,7	Exposed sites. Known from only one occurrence near Tomales in Marin County.	Limited distribution.	This species is being considered in the analysis.
<i>Clarkia imbricata</i> Vine Hill clarkia	SE	FPE	1B	2,3,5,10	Meadows, valley-foothill grasslands, chaparral, clearings, and roadsides.	Development and road maintenance	This species is being considered in the analysis.
<i>Collinsia corymbosa</i> Round-headed Chinese houses	--	--	1B	8	Coastal dunes.	Rare throughout its range.	This species is being considered in the analysis.

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PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Cordylanthus tenuis</i> ssp. <i>brunneus</i> Serpentine bird's-beak	--	--	4	8	Closed-cone forest, chaparral, and cismontane woodland/serpentine.	Limited distribution.	This species is being considered in the analysis.
<i>Cordylanthus tenuis</i> ssp. <i>capillaris</i> Pennell's bird's-beak	SR	FE	1B	2,3,5	Closed-cone coniferous forests, ultramafic chaparral, and serpentine chaparral.	Dumping, vehicles, road maintenance, and development.	This species is being considered in the analysis.
<i>Cupressus goveniana</i> ssp. <i>pigmaea</i> Pygmy cypress	--	*	1B	2,5	Closed-cone pine/cypress forests and coastal terrace.	Development and vehicles.	This species is being considered in the analysis.
<i>Cypripedium californicum</i> California lady's-slipper	--	*	4	6	Serpentine seeps and streambanks, and mixed or coniferous forest.	Horticultural collecting and logging.	This species is being considered in the analysis.
<i>Cypripedium fasciculatum</i> Clustered lady's-slipper	--	*	4	6	Lower montane coniferous forest, north coast forest, usually serpentine seeps and streambanks.	Horticultural collecting and logging.	Excluded from further consideration based on distribution and habitat reasons: No known recorded occurrences from Marin or Sonoma counties. Habitat not present in study area.
<i>Cypripedium montanum</i> Mountain lady's-slipper	--	*	4	6	Moist areas, dry slopes, and mixed or coniferous forest.	Logging.	This species is being considered in the analysis.
<i>Delphinium bakeri</i> Baker's larkspur	SR	FC	1B	2,3,5	Coastal scrub. One population known from Salmon Creek Canyon.	Agriculture, grazing, and road maintenance.	This species is being considered in the analysis.

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<i>Delphinium luteum</i> Yellow larkspur	SR	FC	1B	2,3,5	Coastal scrub, moist sites, cliffs, coastal prairie, chaparral, and rock outcrops.	Development and grazing.	This species is being considered in the analysis.
<i>Dichondra occidentalis</i> Western dichondra	--	*	4	6	Cismontane woodland, slopes, chaparral, coastal scrub, and headlands under shrubs.	Limited distribution.	This species is being considered in the analysis.
<i>Dirca occidentalis</i> Western leatherwood	--	--	1B	6	Moist, rocky slopes in partial shade; chaparral; broadleaved, upland forest; and riparian woodland.	Rare throughout its range.	This species is being considered in the analysis.
<i>Elymus californicus</i> California bottle-brush grass	--	*	4	6	North Coast coniferous forest.	Limited distribution.	This species is being considered in the analysis.
<i>Eriastrum brandegeae</i> Brandegee's eriastrum	--	*	1B	8	Chaparral and cismontane woodlands on barren volcanic soils.	Grazing, vehicular traffic, recreation, and development.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties.
<i>Erigeron angustatus</i> Narrow-leafed daisy	--	--	1B	8	Serpentine chaparral.	Rare throughout its range.	This species is being considered in the analysis.
<i>Erigeron biolettii</i> Streamside daisy	--	--	3	8	North Coast forest, broadleaved upland forest, slopes, rocks, and ledges along rivers.	Lack of information and taxonomic uncertainty.	This species is being considered in the analysis.

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<i>Erigeron serpentinus</i> Serpentine daisy	--	--	1B	8	Serpentine chaparral.	Rare throughout its range.	This species is being considered in the analysis.
<i>Erigeron supplex</i> Supple daisy	--	*	1B	2,5,6	Coastal prairie and bluffs.	Coastal development.	This species is being considered in the analysis.
<i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	--	*	3	8	Chaparral, coastal prairie, valley-foothill grasslands, and open serpentine.	Development and non-native plants.	This species is being considered in the analysis.
<i>Eriogonum nervulosum</i> Snow Mountain buckwheat	--	*	1B	2,3,5	Found in association with serpentine chaparral, and serpentine outcrops.	Rare throughout its range.	This species is being considered in the analysis.
<i>Eriogonum ternatum</i> Ternate buckwheat	--	--	4	8	Lower montane conifer forest and serpentine outcrops.	Limited distribution.	This species is being considered in the analysis.
<i>Erysimum franciscanum</i> San Francisco wallflower	--	*	4	2,5	Coastal scrub and coastal dune, serpentine outcrops, and valley-foothill grassland.	Limited distribution.	This species is being considered in the analysis.
<i>Erythronium helenae</i> Saint Helena fawn lily	--	--	4	8	Chaparral, cismontane woodland, valley-foothill grassland, and dry woodlands on serpentine.	Horticultural collecting, road construction, and geothermal development.	This species is being considered in the analysis.

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<i>Fritillaria liliacea</i> Fragrant fritillary	--	*	1B	2,3,5	Coastal scrub, coastal prairie, and valley-foothill grasslands.	Grazing, agricultural and urban development.	This species is being considered in the analysis.
<i>Fritillaria purdyi</i> Purdy's fritillary	--	--	4	8	Chaparral, valley foothill grassland, dry ridges, generally on serpentine soils.	Unknown.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties.
<i>Grindelia hirsutula</i> var. <i>maritima</i> [<i>G. maritima</i>] San Francisco gumplant	--	*	1B	2,5	Coastal bluff scrub, coastal scrub, and valley-foothill grassland/sandy; and serpentinite.	Coastal development and non-native plants.	This species is being considered in the analysis.
<i>Gutierrezia californica</i> California matchweed	--	--	--	1	Valley foothill grassland, chaparral, and foothill woodland.	Unknown.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties.
<i>Helianthella castanea</i> Diablo helianthella	--	*	1B	3	Broadleaved upland forest and chaparral; valley-foothill grassland; and open grassy areas.	Urbanization, grazing, and fire suppression.	This species is being considered in the analysis.
<i>Hemizonia congesta</i> ssp. <i>leucocephala</i> Hayfield tarplant	--	--	3	6	Coastal scrub and valley-foothill grassland; serpentine.	Agriculture, urban development.	This species is being considered in the analysis.

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<i>Hemizonia mutlicaulis</i> ssp. <i>maulticaulis</i> Seaside tarplant	--	*	--	1,5	Coastal bluff scrub.	Unknown.	Excluded from further consideration based on taxonomic reason: <i>Hemizonia multicaulis</i> ssp. <i>multicaulis</i> is a synonym of <i>H. congesta</i> ssp. <i>congesta</i> , a common taxon (CNPS 1994).
<i>Hemizonia mutlicaulis</i> ssp. <i>vernalis</i> Tiburon tarplant	--	*	--	1,5	Valley foothill grassland.	Unknown.	Excluded from further consideration based on taxonomic reason: <i>Hemizonia multicaulis</i> ssp. <i>vernalis</i> is a synonym of <i>H. congesta</i> ssp. <i>congesta</i> , a common taxon (CNPS 1994).
<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i> Short-leafed evax	--	--	4		Sandy bluffs and flats, and coastal dunes.	Limited distribution.	This species is being considered in the analysis.
<i>Hesperolinon adenophyllum</i> Glandular western flax	--	*	1B	2,5	Found in chaparral, valley foothill grassland in serpentine soils.	Geothermal development, recreation, and grazing.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties.
<i>Hesperolinon bicarpellatum</i> Two-carpellate western flax	--	*	1B	2,5	Serpentine chaparral.	Development and grazing.	This species is being considered in the analysis.
<i>Hesperolinon congestum</i> Marin western flax	ST	FT	1B	2,3,5	Chaparral and valley-foothill grasslands in association with serpentine soils.	Development and foot traffic.	This species is being considered in the analysis.

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<i>Holocarpha macradenia</i> Santa Cruz tarplant	CE	FC	1B	2,5	Valley-foothill grasslands and coastal prairie (often clay).	Urbanization, agriculture, and non-native plants.	This species is being considered in the analysis.
<i>Horkelia bolanderi</i> Bolander's horkelia	--	*	1B	2,5	Lower montane coniferous forest (mesic). Meadows and margins of vernal pools.	Vehicles and development.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties
<i>Horkelia cuneata</i> ssp. <i>sericea</i> Kellogg's horkelia	--	*	1B	2,5	Closed-cone forest and coastal scrub.	Coastal development.	This species is being considered in the analysis.
<i>Horkelia marinensis</i> Point Reyes horkelia	--	*	1B	2,3,6	Sandy coastal flats, coastal dunes, coastal prairie, and coastal scrub.	Rare throughout its range.	This species is being considered in the analysis.
<i>Horkelia tenuiloba</i> Thin-lobed horkelia	--	--	1B	6	Sandy soils in open chaparral.	Rare throughout its range.	This species is being considered in the analysis.
<i>Layia carnosa</i> Beach layia	SE	FE	1B	2,5	Coastal dunes.	Coastal development, off-vehicles, and non-native plants.	This species is being considered in the analysis.
<i>Layia septentrionalis</i> Colusa layia	--	--	1B	3	Serpentine or sandy soils in chaparral, cismontane woodlands, and valley-foothill grasslands.	Development.	This species is being considered in the analysis.
<i>Lessingia arachnoidea</i> Crystal Springs lessingia	--	*	1B	7	Cismontane woodlands, coastal scrub, and valley-foothill grasslands.	Rare throughout its range.	This species is being considered in the analysis.

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<i>Lessingia hololeuca</i> Woolly-headed lessingia	--	--	3	8	Coastal scrub, lower montane coniferous forest, and valley-foothill grasslands, clay, serpentinite, fields, and roadside ditches.	Grazing.	This species is being considered in the analysis.
<i>Lessingia micradenia</i> var. <i>micradenia</i> Tamalpais lessingia	--	*	1B	2,5	Chaparral; thin, gravely soils of serpentine outcrops; and roadcuts.	Rare throughout its range.	This species is being considered in the analysis.
<i>Lilium rubescens</i> Redwood lily	--	--	4	6	Chaparral, lower montane coniferous forest, and sometimes serpentinite.	Urbanization, horticultural collection, and grazing.	This species is being considered in the analysis.
<i>Linanthus acicularis</i> Bristly linanthus	--	--	4	8	Grassy areas in woodlands, coastal prairie, and chaparral.	Limited distribution.	This species is being considered in the analysis.
<i>Linanthus grandiflorus</i> Large-flower linanthus	--	--	4	8	Coastal bluff and scrub, coastal prairie, valley-foothill grassland, open grassy flats, and cismontane woodland; generally in sandy soil.	Development.	This species is being considered in the analysis.
<i>Lomatium repostum</i> Napa lomatium	--	--	4	6	Pine/oak woodland and chaparral, often on serpentine.	Limited distribution.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Lupinus eximius</i> (<i>L. arboreus</i> var. <i>eximius</i>) San Mateo tree lupine	--	*	3	8	Chaparral and coastal scrub.	Lack of information, taxonomic uncertainty.	This species is being considered in the analysis.
<i>Lupinus sericatus</i> Cobb mountain lupine	--	*	1B	6	Chaparral, cismontane woodland, montane coniferous forest, and open wooded slopes.	Geothermal development, logging, and road widening.	This species is being considered in the analysis.
<i>Lupinus tidestromii</i> Tidestrom's lupine	SE	FE	1B	8	Coastal dunes.	Coastal development, trampling, and non-native plants.	This species is being considered in the analysis.
<i>Lupinus tidestromii</i> var. <i>layneae</i> Point Reyes clover lupine	SE	FE	1B	2,5	Coastal dunes.	Coastal development, trampling, and non-native plants.	This species is being considered in the analysis.
<i>Madia nutans</i> Nodding madia	--	--	4	6	Rocky soils, cismontane woodland, and chaparral.	Limited distribution.	This species is being considered in the analysis.
<i>Micropus amphibolus</i> Mount Diablo cottonweed	--	--	4	6	Broadleaved, upland forest; cismontane woodland; valley-foothill grasslands; and bare, grassy or rocky slopes.	Limited distribution.	This species is being considered in the analysis.
<i>Monardella undulata</i> Curly-leafed monardella	--	--	4	8	Chaparral, coastal dunes, coastal scrub, and lower montane coniferous forest.	Coastal development, sand mining, and non-native plants.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Monardella frutescens</i> San Luis Obispo monardella	--	*	1B	8	Chaparral, coastal dunes, coastal scrub, and lower montane coniferous forest.	Coastal development, sand mining, and non-native plants.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties. Known only from Santa Barbara and San Luis Obispo counties.
<i>Monardella villosa</i> ssp. <i>globosa</i> Robust monardella	--	--	1B	8	Openings in oak woodland and chaparral.	Rare throughout its range.	This species is being considered in the analysis.
<i>Monardella viridus</i> ssp. <i>viridus</i> Green monardella	--	--	4	6	Rocky soils, open woodland, chaparral, and serpentine.	Limited distribution.	This species is being considered in the analysis.
<i>Navarretia subuligera</i> Awl-leaved navarretia	--	--	4	6	Open, rocky, wet places; cismontane woodland, lower montane coniferous forest.	Unknown.	Excluded from further consideration based on distribution reason: No known recorded occurrences from Marin or Sonoma counties.
<i>Orobanche valida</i> ssp. <i>howellii</i> Howell's broomrape	--	--	4	6	Chaparral, volcanic, and serpentine slopes. Generally parasitic on <i>Garrya</i> sp.	Limited distribution.	This species is being considered in the analysis.
<i>Parvisedum leiocarpum</i> Lake County stonecrop	SE	--	1B	3	Valley-foothill grasslands, dry vernal pools, cismontane woodlands, and rocky depressions.	Trampling, grazing, and development.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Penstemon newberryi</i> var. <i>sonomensis</i> Sonoma beardtongue	--	--	1B	6	Chaparral, outcrops, and talus.	Rare throughout its range.	This species is being considered in the analysis.
<i>Pentachaeta bellidiflora</i> White-rayed pentachaeta	SCE	PE	1B	7	Valley-foothill grasslands with serpentine soils; rocky areas.	Historical occurrences lost to development.	This species is being considered in the analysis.
<i>Perideridia gairdneri</i> ssp. <i>gairdneri</i> Gairdner's yampah	--	*	4	7	Moist soil of flats, meadows, streamsides, grasslands, and pine groves.	Agriculture and urban development.	This species is being considered in the analysis.
<i>Phacelia insularis</i> var. <i>continentis</i> North Coast phacelia	--	*	1B	2,5	Sandy soils, bluffs, coastal dunes, coastal bluffs, and coastal scrub.	Foot traffic, non-native plants, and grazing.	This species is being considered in the analysis.
<i>Piperia candida</i> White-flowered rein orchid	--	--	4	8	Open to shaded sites, generally coniferous forests, sometimes serpentinite.	Limited distribution.	This species is being considered in the analysis.
<i>Pityopus californicus</i> California pinefoot	--	*	4	6	Mixed or coniferous forest.	Logging.	This species is being considered in the analysis.
<i>Quercus lobata</i> Valley oak	--	--	--	4	Cismontane woodland, riparian forest.	Development and grazing.	Too common: Rejected as a special-status species by CNPS (1994).
<i>Ribes divaricatum</i> var. <i>pubiflorum</i> Straggly gooseberry	--	--	--	4	Broadleaved upland forests, north coast forests.	Unknown.	Too common: Rejected as a special-status species by CNPS (1994).

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Ribes victoris</i> Victor's gooseberry	--	--	4	8	Canyon forests; broadleaved, upland forest; and chaparral.	Limited distribution.	This species is being considered in the analysis.
<i>Sidalcea hickmanii</i> ssp. <i>viridis</i> Marin checkerbloom	--	*	1B	2,5,6	Chaparral and serpentine.	Development.	This species is being considered in the analysis.
<i>Stebbinsoseris decipiens</i> [<i>Microseris decipiens</i>] Santa Cruz microseris	--	--	1B	8	Broadleaved, upland forests; chaparral; coastal prairie and scrub; and open, sandy, shale, or serpentine sites.	Grazing.	This species is being considered in the analysis.
<i>Streptanthus batrachopus</i> Tamalpais jewel-flower	--	*	1B	2,5	Chaparral, closed-cone coniferous forests with serpentine soils, and serpentine barrens.	Rare throughout its range.	This species is being considered in the analysis.
<i>Streptanthus brachiatus</i> ssp. <i>brachiatus</i> Socrates Mine jewel-flower	--	--	1B	2,3,5	Closed-cone coniferous forests and chaparral with serpentine soils.	Rare throughout its range.	This species is being considered in the analysis.
<i>Streptanthus brachiatus</i> ssp. <i>hoffmanii</i> Freed's jewel-flower	--	--	1B	8	Serpentine barrens, chaparral, and open woodlands.	Rare throughout its range.	This species is being considered in the analysis.
<i>Streptanthus glandulosus</i> var. <i>hoffmanii</i> [<i>S. glandulosus</i> ssp. <i>secundus</i>] Secund jewel-flower	--	*	1B	2,5	Chaparral, cismontane woodlands, serpentine and non-serpentine soils.	Rare throughout its range.	This species is being considered in the analysis.

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Streptanthus morrisonii</i> ssp. <i>elatus</i> Three Peaks jewel-flower	--	*	1B	6	Serpentine barrens, chaparral, open woodlands, and cypress/knobcone pine woodlands.	Rare throughout its range.	This species is being considered in the analysis.
<i>Streptanthus morrisonii</i> ssp. <i>hirtiflorus</i> Dorr's Cabin jewel-flower	--	FC	1B	2,5	Serpentine barrens, chaparral, open woodlands, and cypress/knobcone pine woodlands.	Limited distribution.	This species is being considered in the analysis.
<i>Streptanthus morrisonii</i> ssp. <i>kruckebergii</i> Kruckeberg's jewel-flower	--	*	1B		Cismontane woodlands, serpentine barrens, chaparral, and cypress/knobcone pine woodlands.	Gold mining.	This species is being considered in the analysis.
<i>Streptanthus morrisonii</i> ssp. <i>morrisonii</i> Morrison's jewel-flower	--	*	1B	2,5	Serpentine barrens, chaparral, and cypress/knobcone pine woodlands.	Rare throughout its range.	This species is being considered in the analysis.
<i>Streptanthus niger</i> Tiburon jewel-flower	SCE	PE	1B	2,5	Valley-foothill grasslands with serpentine soils, and outcrops in grassland.	Road construction, foot traffic, and development on Tiburon Peninsula.	This species is being considered in the analysis.
<i>Streptanthus tortuosus</i> var. <i>suufrutescens</i> Mountain jewel-flower	--	--	--	4	Hood Peak.	Unknown	Too common: Rejected as a special-status species by CNPS (1994).

Table 1

Special-Status Plant Species

PLANT SPECIES	STATUS				MANAGEMENT CONCERNS		Status in Study/Explanation
	State	Federal	CNPS	Source	Habitat	Potential Threats	
<i>Tracyina rostrata</i> Beaked tracyina	--	*	1B	8	Cismontane woodland, valley-foothill grasslands, and grassy slopes.	Rare throughout its range.	This species is being considered in the analysis.
<i>Trifolium amoenum</i> Showy Indian clover	--	FPE	1B	2,3,5,10	Valley-foothill grassland; heavy soils, disturbed soils.	Urbanization and agriculture.	This species is being considered in the analysis.
<i>Triphysaria floribunda</i> [<i>Orthocarpus floribunda</i>] San Francisco owl's-clover	--	*	1B	2,5	Coastal prairie, valley-foothill grasslands; on serpentine slopes.	Grazing and trampling.	This species is being considered in the analysis.
<i>Veratrum fimbriatum</i> Fringed false-hellebore	--	*	4	8	Meadows, coastal scrub, and North Coast forest (mesic).	Limited distribution.	This species is being considered in the analysis.

Source: Harland Bartholomew & Associates, Inc., 1996

Notes:

- * In a series of federal register notices (50 CFR Part 17, Volume 61, Number 40, 7457-7463 and 7595-7613, February 28, 1996), the USFWS reclassified 96 candidate taxa of plants and animals. The USFWS now only recognize a single federal candidate status. These taxa are considered by the USFWS as candidates for possible addition to the List of Endangered and Threatened Plants and Animals. Many species were removed from the candidate list and are not considered special-status species in this document.
- State status data taken from CDFG documents, Endangered and Threatened Animals of California (Revised January 1995) and Special Animals (Revised August 1994).
 CE = State-listed Endangered
 CT = State-listed Threatened
 CR = State-listed Rare
 SCE = State Candidate Endangered
 SSC = Species of Special Concern
 CFP = Listed as Fully Protected by the CDFG

2. Federal status and probable distribution in Marin and Sonoma counties determined by correspondence with Laurie Simons-USFWS, 9 February 1994.
FC = Federal Candidate
FE = Federal-listed Endangered
FT = Federal-listed Threatened
PE = Proposed Endangered
PT = Proposed Threatened
3. NDDDB = Natural Diversity Data Base, CDFG, 15 March 1995.
4. Distribution of State-listed species and Species of Special Concern confirmed with California Statewide Wildlife Habitat Relationships System, CDFG April 1990.
5. USFWS letter from Cay Goude, 16 February 1995.
6. Species requested to be included by Caitlin Bean, CDFG Biologist, Region 3.
7. USFWS letter from Joel Medlin, 22 June 1995.
8. CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS, 1994).
9. USFWS Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review (Federal Register 58(188): 51144-51190, 30 September 1993).
10. USFWS Plant Taxa for Listing as Endangered Species; Proposed Rule (Federal Register 60 (148): 39314-39326, 2 August 1995)
11. Federal Register 59(219): 58982-59028

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
INVERTEBRATES							
<i>Adella oplerella</i> Opler's longhorn moth	--	*	--	5	Found in serpentine grasslands. Main food plant is cream cups (<i>Platystemon californicus</i>).	Habitat destruction due to agricultural and urban development.	Excluded from further consideration based on regulatory status change.
<i>Branchinecta conservatio</i> Conservancy fairy shrimp	--	FE	--	1	Valley-foothill grasslands in vernal pools.	Habitat destruction due to agricultural and urban development.	Project area is outside of the known range for this species. ¹³
<i>Branchinecta longiantennae</i> Longhorn fairy shrimp	--	FE	--	1	Valley-foothill grasslands in vernal pools.	Habitat destruction due to agricultural and urban development.	Project area is outside of the known range for this species. ¹³
<i>Branchinecta lynchi</i> Vernal pool fairy shrimp	--	FT	--	1	Valley-foothill grasslands in vernal pools.	Habitat destruction due to agricultural and urban development.	Project area is outside of the known range for this species. ¹³

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Caecidotea tomalensis</i> Tomales isopod	--	*	--	3	Localized freshwater ponds and slow moving streams. Found in the detritus layer on stream bottoms. Can survive periods of dryness.	Habitat loss, water quality degradation through pesticides and livestock use, dam construction, altering existing flow regimes, and exotic predators.	Excluded from further consideration based on regulatory status change.
<i>Carterocephalus palaemon</i> <i>ssp.</i> Sonoma artc skipper	--	*	--	2,5	Undisturbed wet meadows and forest openings.	Habitat destruction due to agricultural and urban development, and livestock grazing.	Excluded from further consideration based on regulatory status change.
<i>Cicindella hirticollis gravida</i> Sandy beach tiger beetle	--	*	--	5	Range lies within or immediately adjacent to the project area. However, it is associated with habitats that occur between the high tide line and dune areas.	Habitat destruction and off-road vehicle use.	Excluded from further consideration based on regulatory status change.
<i>Coelus globosus</i> Globose dune beetle	--	*	--	5	Range lies within or immediately adjacent to the project area. However, it is associated with habitats that occur between the high tide line and dune areas.	Habitat destruction and off-road vehicle use.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Danaus plexippus</i> Monarch butterfly	--	--	NDDB	3	Colonial roost sites on large wind protected tree groves (eucalyptus, Monterey pine, cypress) during migration.	Habitat loss and fragmentation.	Excluded from further consideration: Known roosting sites will not be affected by proposed project activities. ³
<i>Dubiraphia brunnescens</i> Brownish dubiraphian riffle beetle	--	*	--		Known only from among willow roots along the rocky shores of Clear Lake.	Habitat degradation	Excluded from further consideration based on regulatory status change.
<i>Haplotrema durantii</i> Durant's snail		--	--	1	Inhabits dry leaf litter in woodlands and forests.	Habitat degradation.	Excluded from further consideration based on regulatory status change.
<i>Helminthoglypta arrosa williamsi</i> William's bronze shoulderband snail	--	*	--	7	Unknown.	Habitat destruction, overcollection.	Excluded from further consideration based on regulatory status change.
<i>Hydrochara rickseckeri</i> Rickseker's water scavenger beetle	--	*	--	2,3,5	Inhabits ponds and other aquatic habitats.	Habitat degradation.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Hydroporus leechi</i> Leech's skyline diving beetle	--	*	--	5	Inhabits ponds and pools. Currently known only from San Mateo County	Habitat degradation.	Excluded from further consideration based on regulatory status change.
<i>Icaricia icarioides missionensis</i> Mission blue butterfly	--	FE	--	2,5	Found on the coast in association with lupines on the San Francisco Peninsula and Marin headlands.	Habitat degradation.	Project area is outside of the known range for this species. ¹¹
<i>Icaricia icarioides ssp.</i> Point Reyes blue butterfly	--	*	--	5	Generally associated with dune habitats; though may occur outside of this habitat if its food plant, coastal lupine, <i>Lupinus chamisonis</i> , is present.	Habitat degradation.	Excluded from further consideration based on regulatory status change.
<i>Incisalia mossii</i> Marin elfin butterfly	--	*	--	5	Occurs along the immediate coast on the north end of Point Reyes. Found on bluffs above the shoreline.	Habitat degradation.	Excluded from further consideration based on regulatory status change

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Incisalia mossii bayensis</i> San Bruno elfin butterfly	--	FE	--	5	The northern most known occurrence for this species is San Bruno Mountain in San Mateo County. Frequents rocky outcrops where stonecrop (<i>Sedum spathulifolium</i>) and <i>Dudleya</i> sp. are present.	Habitat degradation.	Project area is outside of the known range for this species. ¹¹
<i>Lepidurus packardi</i> Vernal pool tadpole shrimp	--	FE	--	1	Valley-foothill grasslands in vernal pools.	Habitat loss and degradation.	Project area is outside of the known range for this species. ¹⁴
<i>Lichnanthe ursina</i> Bumblebee scarab beetle (Pacific sand bear)	--	*	--	2,3,5	Found in association with coastal sand dunes.	Habitat degradation.	Excluded from further consideration based on regulatory status change.
<i>Linderiella occidentalis</i> California linderiella	--	*	--	2	Valley-foothill grasslands in vernal pools. Known to occur in Sonoma County.	Loss and degradation of habitat.	Excluded from further consideration based on regulatory status change.
<i>Speyeria callipe callipe</i> Callippe silverspot butterfly	--	PE	--	5	Inhabits native grasslands and adjacent habitats. Females lay eggs on larval foodplant, Johnny jump-up (<i>Viola pedunculata</i>).	Habitat degradation, over collection, off-road vehicle use, and livestock grazing.	Project area is outside of the known range for this species. ¹⁵

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Speyeria zerene behrensii</i> Behren's silverspot butterfly	--	PE	--	2	Inhabits coastal terrace prairie and adjacent habitats. Females lay eggs on the larval food plant, <i>Viola adunca</i> .	Habitat degradation, over collection, off-road vehicle use, and livestock grazing.	Project area is outside of the known range for this species. ¹⁵
<i>Speyeria zerene myrtleae</i> Myrtle's silverspot butterfly	--	FE	--	2,5	Inhabits coastal sage scrub habitat.	Habitat degradation, over collection, off-road vehicle use, and livestock grazing.	Coastal dune, coastal scrub and coastal terrace prairie habitat that this species inhabits will not be affected by proposed project activities. ¹¹
<i>Syncaris pacifica</i> California freshwater shrimp	--	FE	--	2,3,5	Suitable habitat in streams with riparian tree cover and submerged roots and branches along undercut banks.	Degradation of water quality, loss of annual stream flow, introduction of exotic predatory fish.	This species is being considered in the analysis.
<i>Tryonia imitator</i> California brackishwater snail	--	*	--	1	Slow moving relatively shallow brackishwater habitats. Usually found in association with widgeon grass, or floating mats of algae.	Habitat degradation.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
FISH							
<i>Acipenser mediroseris</i> Green sturgeon	--	*	--	2,5	Occurs in ocean waters including San Pablo Bay and lower reaches of large rivers from San Francisco Bay north.	Degradation of water quality and changes in flow regimes.	Excluded from further consideration based on regulatory status change.
<i>Eucyclogobius newberryi</i> Tidewater goby	SSC	FE	--	2,3,5	Brackish water habitats. Still, but not stagnant, water.	Degradation of habitat and water quality and changes in flow and salinity.	This species is being considered in the analysis.
<i>Hypomesus transpacificus</i> Delta smelt	ST	FT	--	7	Confined to the upper Sacramento-San Joaquin River estuary in shallow waters near the entrapment zone.	Degradation of water quality and changes in flow and salinity.	Project area is outside of the known range for this species. ^{16, 22}
<i>Hysterocarpus traskii pomo</i> Russian River tule perch	SSC	*	--	3,5	Confined to the Russian River and its tributaries.	Degradation of water quality and habitat.	This species is being considered in the analysis.
<i>Lampetra ayresi</i> River lamprey	SSC	*	--	7	Coastal streams and rivers from San Francisco north.	Degradation of habitat and water quality and changes in flow regimes.	This species is being considered in the analysis.
<i>Lampetra tridentata</i> Pacific lamprey	--	*	--	7	Most coastal streams and rivers of California.	Degradation of habitat and water quality and changes in flow regimes.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Lavinia symmetricus navarroensis</i> Navarro roach	SSC	--	--	2,5	Slower, warmer reaches of streams in the Russian and Navarro River drainages.	Degradation of water quality, changes in flow regimes, and competition from introduced species.	This species is being considered in the analysis.
<i>Mylopharodon conocephalus</i> Hardhead	SSC	--	--	1	Large pools with little silt in the Sacramento-San Joaquin and Russian River systems.	Competition from introduced centrarchids, habitat loss	This species is being considered in the analysis.
<i>Oncorhynchus kisutch</i> Coho salmon	SSC	PT	--	7	Most coastal streams and rivers from San Lorenzo Creek in Santa Cruz County north.	Damming, agricultural development, logging, and improper watershed management.	This species is being considered in the analysis.
<i>Oncorhynchus mykiss</i> Steelhead	--	*	--	7	Coastal streams and river from the Santa Clara River north.	Damming, agricultural development, logging, and improper watershed management.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Oncorhynchus tshawytscha</i> Winter-run chinook salmon	SE	FE	--	1,2,5	Sacramento River and Delta, including San Pablo Bay and northern San Francisco Bay. Spawns only in the upper Sacramento River, does not occur in any other streams.	Habitat loss, degradation of water quality and changes in flow regimes.	Although the waters of San Pablo Bay and northern San Francisco Bay (excluding tidal sloughs) are included in the Critical Habitat for this species, these waters are not considered to be part of the project area. ¹⁷
<i>Pogonichthys macrolepidotus</i> Sacramento splittail	SE	PT	--	2,5	Backwater slough areas in the lower Delta, San Pablo Bay, and the Petaluma River.	Habitat loss, degradation of water quality and changes in flow regimes.	This species is being considered in the analysis.
<i>Spirinchus thaleichthys</i> Longfin smelt	SSC	*	--	2,5	Prefers moderately saline waters in major bays and estuaries from San Francisco Bay northward.	Degradation of water quality and changes in flow regimes.	Project area is outside of the known range for this species. ^{18, 22}

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
AMPHIBIANS							
<i>Ambystoma californiense</i> California tiger salamander	SSC	FC	--	2,4,5	Oak savannah, valley-foothill grasslands, and vernal pools.	Habitat destruction due to agricultural and urban development.	This species is being considered in the analysis.
<i>Rana aurora draytoni</i> California red-legged frog	SSC	FT	--	2,3,4,5	Marshes, streams, lakes, reservoirs, and ponds in foothills and grasslands.	Habitat destruction due to agricultural and urban development. Introduction of exotic predators. Degradation of water quality and changes in flow regimes.	This species is being considered in the analysis.
<i>Rana boylei</i> Foothill yellow-legged frog	SSC	*	--	2,4,5	Fast-moving streams and rivers in chaparral, forests, and woodlands.	Habitat destruction due to agricultural and urban development. Introduction of exotic predators. Degradation of water quality and changes in flow regimes.	This species is being considered in the analysis.
<i>Scaphiopus hammondi</i> Western spadefoot toad	SSC	*	--	7	Freshwater seasonal marsh (primarily vernal pools for breeding), grassland, oak woodland.	Loss of breeding habitat.	Project area is outside of the known range for this species. ²¹

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
REPTILES							
<i>Clemmys marmorata marmorata</i> Northwestern pond turtle	SSC	*	--	2,3,4	Lakes, ponds, reservoirs, and slow-moving streams and rivers, primarily in foothills and lowlands.	Habitat destruction, degradation of water quality and changes in flow regimes.	This species is being considered in the analysis.
<i>Phrynosoma coronatum frontale</i> California horned lizard	SSC	*	--	7	Sandy open areas in riparian woodland, grassland, coastal scrub, mixed chaparral, and oak woodland.	Habitat loss and loss of native ant prey base.	Although verified museum records exist for this species in Sonoma County, it is believed to be extinct within that part of its range. Additionally this species was not observed during any of the biological surveys for this project. ²¹

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
BIRDS							
<i>Accipiter cooperii</i> Cooper's hawk	SSC	--	--	4	Prefers riparian habitat for nesting, primarily in the foothills and the valley.	Pesticide poisoning, habitat loss and degradation.	This species is being considered in the analysis.
<i>Accipiter striatus</i> Sharp-shinned hawk	SSC	--	--	4	Prefers broken woodlands of coniferous, deciduous, or mixed forests as nesting habitat.	Pesticide poisoning, habitat loss and degradation.	This species is being considered in the analysis.
<i>Agelaius tricolor</i> Tricolored blackbird	SSC	*	--	2,4,5	Nesting habitat is primarily composed of freshwater marshes with dense stands of cattails or bulrushes. Occasionally will utilize willows, thistles, mustard, blackberry thickets, and dense shrubs and grains for nesting as well.	Pesticide poisoning, habitat loss and degradation.	This species is being considered in the analysis.
<i>Amphispiza belli belli</i> Bell's sage sparrow	SSC	*	--	7	Chaparral in the inner Coast Ranges.	Habitat loss and degradation.	This species is being considered in the analysis.
<i>Aquila chrysaetos</i> Golden eagle	SSC CFP	--	--	4	Nests primarily on cliffs or tall trees. Forages in open country. Large portions of project site may serve as hunting grounds.	Poisoning of prey species, habitat loss and degradation.	This species is being considered in the analysis.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Ardea herodias</i> (Rookery site) Great blue heron	--	--	NDDB	3	Nesting habitat includes dense groves of tall dead or live trees. Colonial nester in tall trees, cliff sides, and sequestered spots in marshes.	Habitat degradation, loss of colonial nesting trees.	This species is being considered in the analysis.
<i>Asio flammeus</i> Short-eared owl	SSC	--	--	4	Inhabits swamplands, fresh and salt water marshes. Nests in dense tule patches or stands of tall grasses.	Habitat destruction due to agricultural and urban development.	Very rare winter resident. Nocturnal ecological equivalent to the northern harrier. Therefore mitigation measures that benefit northern harrier will also benefit short eared owl, should they occur in the project area. ^{12, 25}
<i>Asio otus</i> Long-eared owl	SSC	--	--	4	Nests in coniferous or mixed-deciduous forests, usually near riparian systems.	Habitat degradation.	No nesting records. Project area is outside of the known range of the species. ^{12, 25}

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Brachyramphus marmoratus</i> Marbled murrelet	CE	FT	--	1,2,4,5	Nests in old growth forests near the coast.	Habitat degradation and loss.	Project area outside of known breeding range. No habitat present in the project area. ^{12, 25}
<i>Bucephala islandica</i> Barrow's goldeneye	SSC	--	--		No longer nests in California. Wintering habitat includes lakes, bays, lagoons, estuaries, and large rivers.	Habitat degradation and loss.	Wintering habitat for this species occurs offshore outside of the influence of the project area. ²⁵
<i>Buteo regalis</i> Ferruginous hawk	SSC	*	--	2,4,5	Foraging habitat includes valley-foothill grassland, agricultural lands, and pastures. Nests rarely in extreme northeastern California.	Habitat degradation and loss.	This species is being considered in the analysis.
<i>Cerorhinca monocerata</i> Rhinoceros auklet	SSC	--	--	3,4	Nests primarily on off-shore islands, and forages in open waters along the coast. Rarely nests on mainland.	Habitat degradation.	Wintering habitat for this species occurs offshore outside of the influence of the project area. ²⁵

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Charadrius alexandrinus nivosus</i> Western snowy plover	SSC	FT	--	1,2,3,4,5	Drier portions of tidal estuaries, bay shore sand flats, sand spits, and sandy beaches.	Habitat degradation and loss, off-road vehicle use, introduced predators.	Wintering habitat for this species occurs offshore outside of the influence of the project area. ²⁵
<i>Circus cyaneus</i> Northern harrier	SSC	--	--	4	Coastal freshwater and saltwater marshes. Nests and forages in grasslands.	Habitat destruction due to agricultural and urban development.	This species is being considered in the analysis.
<i>Coccyzus americanus occidentalis</i> Western yellow-billed cuckoo	CE	--	--	1,3,4	Inhabits dense riparian forests and woodlands along large rivers.	Habitat destruction due to agricultural and urban development.	No recent records of this species in the project area. Project area is now outside of the known range of this species. ^{12, 25}
<i>Cypseloides niger</i> Black swift	SSC	--	--	4	Nests near or behind waterfalls, and sea bluffs above surf.	Human disturbance to nesting sites.	Project area is outside of the known range of this species. ²⁵
<i>Chaetura vauxi</i> Vaux's swift	SSC	--	--	1,4	Woodlands near lakes and rivers. Nests in hollow trees in coniferous forests.	Loss of old growth forests which provide nesting habitat.	This species is being considered in the analysis.
<i>Dendroica petechlia</i> Yellow warbler	SSC	--	--	4	Coastal and valley riparian forests and woodlands.	Habitat degradation and loss, brood parasitism.	This species is being considered in the analysis.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Elanus caeruleus</i> White-tailed kite	CFP	--	--	4	Grasslands, agricultural lands, meadows, and marshes for foraging. Nests and perches in dense topped trees.	Habitat destruction due to agricultural and urban development.	This species is being considered in the analysis.
<i>Empidonax trailii brewsteri</i> Little willow flycatcher	CE	*	--	1,7	Willow and alder thickets in the Sierras and Coast Ranges.	Habitat destruction, livestock grazing, and brown-headed cowbird parasitism.	No nesting records for this species in Sonoma County. ¹²
<i>Eremophila alpeseris actia</i> California horned lark	SSC	*	--	2,4,5	Nesting habitat primarily includes grasslands and agricultural fields.	Habitat destruction due to agricultural and urban development.	Excluded from further consideration based on regulatory status change.
<i>Falco columbarius</i> Merlin	SSC	--	--	1,4	Coastal habitats, tidal estuaries, open woodlands, savannahs, edges of grasslands and deserts. Also occurs near farms and ranches.	Pesticide poisoning, collision with powerlines, habitat degradation.	This species is being considered in the analysis.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Falco mexicanus</i> Prairie falcon	SSC	--	--	1,4	Grasslands, sagebrush flats, desert, agricultural land, ranches and coastal plains for hunting. Requires cliffs, rocky promontories or similar features adjacent to open country for breeding.	Pesticide poisoning, collision with powerlines, habitat degradation.	This species is being considered in the analysis.
<i>Falco peregrinus anatum</i> American peregrine falcon	CE	FE	--	1,2,4,5	Nesting habitat includes cliffs, ridges, and rocky promontories.	Pesticide poisoning, collision with powerlines, habitat degradation.	No breeding habitat within the project area. ²⁵
<i>Fratercula cirrhata</i> Tufted puffin	SSC	--	--	3,4	Nests primarily on off-shore islands, and forages in open waters along the coast. Rarely nests on mainland.	Habitat degradation.	No habitat for this species within the project area. ²⁵
<i>Geothlypis trichas sinuosa</i> Salt marsh common yellowthroat	SSC	*	--	2,3,4,5	Fresh and saltwater marshes. Needs thick continuous cover down to the water surface for foraging.	Habitat degradation and loss.	This species is being considered in the analysis.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Haliaeetus leucocephalus</i> Bald eagle	CE CFP	FT	--	1,2,4,5	Nesting habitat includes coniferous forests around larger lakes, reservoirs, and rivers.	Habitat degradation, pesticide poisoning, illegal shooting.	Limited foraging habitat, and no breeding habitat within the project area. ²⁵
<i>Icteria virens</i> Yellow-breasted chat	SSC	--	--	4	Inhabits dense riparian habitats.	Brood parasitism and habitat degradation and loss.	This species is being considered in the analysis.
<i>Lanius ludovicianus</i> Loggerhead shrike	SSC	*	--	2,4	Nests in dense shrubs and brush near open foraging areas.	Pesticide poisoning and loss and degradation of nesting habitat.	Excluded from further consideration based on regulatory status change.
<i>Larus californicus</i> California gull	SSC	--	--	4	Nests primarily at Mono Lake and along the coast on islands and on salt water evaporation ponds.	Pollution and contamination of food sources.	No rookery habitat within the project area. ²⁵
<i>Laterallus jamaicensis coturniculus</i> California black rail	CT	*	--	1,2,3,4,5	Inhabits salt, brackish, and freshwater marshes bordering larger bays and rivers.	Habitat destruction and loss, introduced predators, pesticide poisoning.	This species is being considered in the analysis.
<i>Melospiza melodia smaueilis</i> San Pablo song sparrow	SSC	*	--	2,4,5	Inhabits tidal salt marshes dominated by pickleweed (<i>Salicornia</i> sp.).	Habitat loss and fragmentation due to urban development, pollution, and human disturbance.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Numenius americanus</i> Long-billed curlew	SSC	*	--	2,4,5	Nests in grasslands with nearby marshes and lakes. Foraging habitat includes grasslands, agricultural fields, and tidal mudflats.	Habitat destruction due to agricultural and urban development.	This species is being considered in the analysis.
<i>Pandion haliaetus</i> Osprey	SSC	--	--	3,4	Nests in tall trees near freshwater lakes, reservoirs, large rivers, estuaries, and bays.	Pesticide poisoning, habitat degradation and loss.	This species is being considered in the analysis.
<i>Pelecanus occidentalis californicus</i> California brown pelican	CE	FE	--	1,2,4,5	Inhabit off-shore islands, sea coasts, and large bays and estuaries.	Pesticide poisoning.	No habitat for this species within the project area. ²⁵
<i>Phalacrocorax auritus</i> Double-crested cormorant	SSC	--	--	3,4	Inhabits large freshwater lakes, reservoirs, rivers, bays, marshes, and along the immediate sea coast.	Pesticide poisoning.	This species is being considered in the analysis.
<i>Progne subis</i> Purple martin	SSC	--	--	1	Nests in large trees with cavities near open foraging areas.	Habitat loss. Loss of nesting sites due to competition with introduced birds.	This species is being considered in the analysis.
<i>Rallus longirostris obsoletus</i> California clapper rail	CE	FE	--	1,2,3,4,5	Inhabits salt marshes composed primarily of pickleweed and cordgrass.	Habitat destruction, introduced predators.	This species is being considered in the analysis.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Riparia riparia</i> Bank swallow	CT	--	--	1,3,4	Nests in colonies along sandy banks of rivers and streams and on sandy bluffs along the coast.	Habitat degradation and loss, flood control practices along streams.	No nesting records for Sonoma County. ¹²
<i>Speotyto cunicularia hypugaea</i> Western burrowing owl	SSC	*	--	3,4	Valley-foothill grasslands	Habitat destruction due to agricultural and urban development.	This species is being considered in the analysis.
<i>Strix occidentalis caurina</i> Northern spotted owl	SSC	FT	--	2,3,4,5	Inhabits old-growth coniferous forests and mixed-coniferous deciduous forest.	Habitat loss and degradation due to logging practices and residential development.	Habitat for this species will not be affected by proposed project activities. ²⁵

MAMMALS

<i>Antrozous pallidus</i> Pallid bat	SSC	--	--	1,4	Roosts in buildings, crevices caves, mines, hollow trees and other shelters.	Habitat loss, pesticide use, human disturbance of maternity and night roosts.	This species is being considered in the analysis.
<i>Aplodontia rufa phaea</i> Point Reyes mountain beaver	SSC	*	--	2,4,5	Inhabits riparian systems with dense understories, especially along north-facing slopes.	Habitat destruction due to agricultural and urban development.	Project area is outside of the known range for this species. ²⁴
<i>Arborimus pomo</i> California red tree vole	SSC	*	--	7	Inhabits coastal coniferous forests.	Habitat destruction and degradation.	Project area is outside of the known range for this species. ²⁰

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Bassariscus astutus</i> Ringtail	CFP	--	--	4	Inhabits riparian systems with moderately dense understories and rocky outcroppings.	Habitat destruction due to agricultural and urban development.	This species is being considered in the analysis.
<i>Eumops perotis californicus</i> Greater western mastiff-bat	SSC	*	--	2,4,5	Breeds in rugged, rocky canyons and forages in a variety of habitats.	Habitat loss, pesticide use, nest-site disturbance.	Project area is outside of the known range for this species. ²⁰
<i>Microtus californicus sanpabloensis</i> San Pablo vole	SSC	*	--	4	Inhabits salt marshes and associated grassland and riparian habitats near San Pablo Bay.	Habitat degradation and loss, poisoning.	Project area is outside of the known range for this species. ¹⁹
<i>Myotis evotis</i> Long-eared myotis	--	*	--	5	Inhabits woodlands and forests up to approximately 8,200 feet in elevation.	Habitat loss, pesticide use, human disturbance of maternity and night roosts.	Excluded from further consideration based on regulatory status change.
<i>Myotis thysanodes</i> Fringed myotis	--	*	--	5	Inhabits a variety of habitats including pinyon-juniper woodland, valley-foothill hardwood, hardwood-conifer forests, and desert scrub.	Habitat loss, pesticide use, human disturbance of maternity and night roosts.	Excluded from further consideration based on regulatory status change.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Myotis volans</i> Long-legged myotis	--	*	--	5	Inhabits forests and woodland habitats, primarily oak and juniper woodlands.	Habitat loss, pesticide use, human disturbance of maternity and night roosts.	Excluded from further consideration based on regulatory status change.
<i>Myotis yumanensis</i> Yuma myotis bat	--	*	--	7	Occurs in open forests and woodlands below 8,000 feet in close association with water bodies.	Disturbance or destruction of maternity roosts, day roosts, or hibernacula.	Excluded from further consideration based on regulatory status change.
<i>Plecotus townsendii townsendii</i> Pacific western big-eared bat	SSC	*	--	2,4,5	Inhabits oak and conifer woodlands, conifer and broadleaved forests, arid grasslands, deserts, and high mountain meadows.	Habitat loss, pesticide use, human disturbance of maternity and night roosts.	This species is being considered in the analysis.
<i>Reithrodontomys raviventris</i> Saltmarsh harvest mouse	CE CFP	FE	--	1,2,3,4,5	Restricted to salt marshes of San Francisco Bay and its tributaries.	Habitat loss and degradation.	This species is being considered in the analysis.
<i>Sorex ornatus sinuosus</i> Suisun ornate shrew	SSC	*	--	2,3,4,5	Inhabits tidal salt marshes dense with pickleweed.	Habitat loss and degradation.	Project area is outside of the known range for this species. ¹⁹
<i>Sorex vagrans halicoetes</i> Salt marsh wandering shrew	SSC	*	--	4	Inhabits tidal salt marshes dense with pickleweed around south San Francisco Bay.	Habitat loss and degradation.	This species is being considered in the analysis.

Table 2

Special-Status Animal Species

Species	STATUS				MANAGEMENT CONCERNS		
	State	Federal	Other	Source	Habitat	Potential Threats	Status in Study/Explanation
<i>Taxidea taxus</i> American badger	SSC	--	--	4	Inhabits valley-foothill grasslands.	Habitat loss and degradation, and poisoning of rodent prey.	This species is being considered in the analysis.
<i>Zapus trinitatus oratus</i> Point Reyes jumping mouse	SSC	*	--	2,4,5	Inhabits upland bunchgrass marshes and is restricted to a small area of the Point Reyes peninsula.	Habitat loss and degradation (heavy grazing), and poisoning.	Project area is outside of the known range for this species. ¹⁹

* In a series of federal register notices (50 CFR Part 17, Volume 61, Number 40, 7457-7463 and 7595-7613, February 28, 1996), the USFWS reclassified 96 candidate taxa of plants and animals. The USFWS now only recognize a single federal candidate status. These taxa are considered by the USFWS as candidates for possible addition to the List of Endangered and Threatened Plants and Animals. Many species were removed from the candidate list and are not considered special-status species in this document.

1. State status data taken from CDFG documents, Endangered and Threatened Animals of California (Revised January 1995) and Special Animals (Revised August 1994).

CE = State-listed Endangered
 CT = State-listed Threatened
 CR = State-listed Rare
 SCE = State Candidate Endangered
 SSC = Species of Special Concern
 CFP = Listed as Fully Protected by the CDFG

2. Federal status and probable distribution in Marin and Sonoma counties determined by correspondence with Laurie Simons-USFWS, 9 February 1994.

FC = Federal Candidate
 FE = Federal-listed Endangered
 FT = Federal-listed Threatened
 PE = Proposed Endangered
 PT = Proposed Threatened

3. NDDDB = Natural Diversity Data Base, CDFG, 15 March 1995.
4. Distribution of State-listed species and Species of Special Concern confirmed with California Statewide Wildlife Habitat Relationships System, CDFG April 1990.
5. USFWS letter from Cay Goude, 16 February 1995.
6. Species requested to be included by Caitlin Bean, CDFG Biologist, Region 3.
7. USFWS letter from Joel Medlin, 22 June 1995.
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SPECIES ACCOUNTS

AQUATIC PLANTS

The abbreviations used in the following species accounts are explained below in Table 3.

Table 3

Abbreviations for Plant Species Accounts

Code	Explanation	Code	Explanation
Distribution Codes			
ALA	Alameda	SBA	Santa Barbara
ALP	Alpine	SBD	San Bernardino
AMA	Amador	SBR	Santa Barbara Isl. (SBA Co.)
ANA	Anacapa Isl. (VEN Co.)	SBT	San Benito
BUT	Butte	SCL	Santa Clara
CAL	Calaveras	SCM	San Clemente Isl. (LAX Co.)
CCA	Contra Costa	SCR	Santa Cruz
COL	Colusa	SCT	Santa Catalina Isl. (LAX Co.)
DNT	Del Norte	SCZ	Santa Cruz Isl. (SBA Co.)
ELD	El Dorado	SDG	San Diego
FAR	Farallon Isls. (SFO Co.)	SFO	San Francisco
FRE	Fresno	SHA	Shasta
GLE	Glenn	SIE	Sierra
HUM	Humboldt	SDG	San Diego
IMP	Imperial	SFO	San Francisco
INY	Inyo	SHA	Shasta
KNG	Kings	SIE	Sierra
KRN	Kern	SIS	Siskiyou
LAK	Lake	SJQ	San Joaquin
LAS	Lassen	SLO	San Luis Obispo
LAX	Los Angeles	SNI	San Miguel Isl. (SBA Co.)
MAD	Madera	SMT	San Mateo
MPA	Mariposa	SMI	San Nicolas Isl. (VEN Co.)

Table 3

Abbreviations for Plant Species Accounts

Code	Explanation	Code	Explanation
MRN	Marin	SOL	Solano
MEN	Mendocino	SON	Sonoma
MER	Merced	SRO	Santa Rosa Isl. (SBA Co.)
MOD	Modoc	STA	Stanislaus
MNO	Mono	SUT	Sutter
MNT	Monterey	TEH	Tehama
NAP	Napa	TRI	Trinity
NEV	Nevada	TUL	Tulare
ORA	Orange	TUO	Tuolumne
PLA	Placer	VEN	Ventura
PLU	Plumas	YOL	Yolo
RIV	Riverside	YUB	Yuba
SAC	Sacramento	AZ	Arizona
BA	Baja California	SA	South America
GU	Isla Guadalupe, Baja	SO	Sonora, Mexico
ID	Idaho	TX	Texas
NM	New Mexico	UT	Utah
NV	Nevada	WA	Washington
OR	Oregon	WY	Wyoming

Distribution Codes

+	Occurs in this state and others
++	Widespread outside of California
*	Extirpated from preceding quad or county
?	Uncertainty about distribution or identity
?*	Uncertainty about distribution, but extirpated if once present
(*?)	Occurrence confirmed, but possibly extirpated

Source: CNPS Electronic Inventory (Skinner and Pavlik 1995)

Sonoma Alopecurus

Alopecurus aequalis Sobol. var. *sonomensis* Rubtsoff

Family: Poaceae

CNPS List: 1B

State/Fed. Status: /PE

Distribution: MRN, SON

Study Area?: Yes; Sebastopol, Camp Meeker, Two Rock

Habitat: Marshes and Swamps (freshwater), Riparian Scrub

Life Form: Perennial herb

Blooming: May-July

Notes: Known from fewer than five native occurrences Two occurrences introduced in 1987 (485C, 485D), but as of 1993 both appear to have failed. Historical localities need field surveys. Threatened by cattle trampling, wetland habitat loss, and non-native plants. See *A. aequalis* in *The Jepson Manual*.

Suisun Marsh Aster

Aster lentus Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: CCA, NAP, SAC, SJQ, SOL

Study Area?: None

Habitat: Marshes and Swamps (brackish and fresh water)

Life Form: Perennial herb (rhizomatous)

Blooming: May-November

Notes: Seriously threatened by marsh habitat alteration and loss. Intergrades into *A. chilensis*. USFWS uses the name *A. chilensis* var. *lentus*. See *Manual of the Botany of the Region of San Francisco Bay*, p. 180 (1894) by E. Greene for original description.

Alkali Milk-vetch

Astragalus tener Gray var. *tener*

Family: Fabaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA*, CCA*, MER, MNT*, NAP, SBT*, SCL*, SFO*, SJQ*, SOL, SON*, STA*, YOL

Study Area?: Yes; Petaluma*

Habitat: Playas, Valley and Foothill Grasslands (adobe clay), Vernal Pools (alkaline)

Life Form: Annual herb

Blooming: March-June

Notes: Last Bay Area collection in 1959. Threatened by habitat destruction, especially agricultural conversion, and protected only at Jepson Prairie Preserve (TNC), SOL Co. See *Proceedings of the American Academy of Arts and Sciences* 6:206 (1864) for original description, and *Systematic Botany* 17(3):367-379 (1992) for distributional information.

Sonoma Sunshine

Blennosperma bakeri Heiser

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: SON

Study Area?: Yes; Sears Point, Santa Rosa, Cotati, Glen Ellen, Sebastopol

Habitat: Valley and Foothill Grasslands (mesic), Vernal Pools

Life Form: Annual herb

Blooming: March-April

Notes: Threatened by urbanization, grazing, and agriculture. See *Madroño* 9:103-104 (1947) for original description.

Bolander's Reed Grass

Calamagrostis bolanderi Thurb.

Family: Poaceae

CNPS List: 4

State/Fed. Status: None

Distribution: HUM, MEN, SON

Study Area?: None

Habitat: Bogs and Fens, Closed-cone Coniferous Forests, Coastal Scrub, Meadows and Seeps (mesic), Marshes and Swamps (freshwater), North Coast Coniferous Forest

Life Form: Perennial herb (rhizomatous)

Blooming: June-August

Thurber's Reed Grass

Calamagrostis crassiglumis Thurb.

Family: Poaceae

CNPS List: 2

State/Fed. Status: None

Distribution: DNT, HUM?, MEN, MRN, SON, WA, ++

Study Area?: Yes; Sebastopol

Habitat: Coastal Scrub (mesic), Marshes and Swamps (freshwater)

Life Form: Perennial herb (rhizomatous)

Blooming: June-July

Notes: Known in CA from fewer than ten occurrences. Undocumented in HUM Co.; need quad. Threatened by grazing at Pt. Reyes NS. State-listed as Threatened in WA. See *C. stricta* ssp. *inexpansa* in *The Jepson Manual*. See *Botany of California* 2:281 (1880) for original description.

Serpentine Reed Grass

Calamagrostis ophitidis (J. T. Howell) Nygren

Family: Poaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, MRN, NAP, SON

Study Area?: None

Habitat: Chaparral, Lower Montane Coniferous Forest, Meadows and Seeps, Valley and Foothill Grasslands / serpentinite

Life Form: Perennial herb

Blooming: April-June

Swamp Harebell

Campanula californica (Kell.) Heller

Family: Campanulaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN, SCR*, SON

Study Area?: Yes; Sebastopol*

Habitat: Bogs and Fens, Closed-cone Coniferous Forests, Coastal Prairie, Meadows and Seeps, Marshes and Swamps (freshwater), North Coast Coniferous Forest / mesic

Life Form: Perennial herb (rhizomatous)

Blooming: June-September

Notes: Many occurrences have few plants. Threatened by grazing, development, and marsh habitat loss. See *Proceedings of the California Academy of Sciences* I 2:158 (1861) for original description.

White Sedge

Carex albida Bailey

Family: Cyperaceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: SON

Study Area?: Yes; Sebastopol, Camp Meeker

Habitat: Bogs and Fens, Marshes and Swamps (freshwater)

Life Form: Perennial herb (rhizomatous)

Blooming: May-July

Notes: Known from only one confirmed extant occurrence at Pitkin Marsh, with fewer than 1,000 plants as of 1993; three historical occurrences extirpated by wetland drainage and spraying of chemical effluents. Threatened by competition with other plants, and potentially by altered hydrology. See *Memoirs of the Torrey Botanical Club* 1:9 (1889) for original description, and *Leaflets of Western Botany* 8(7):178-180 (1957) for taxonomic discussion.

California Sedge

Carex californica Bailey

Family: Cyperaceae

CNPS List: 2

State/Fed. Status: None

Distribution: MEN, SON, ID, OR, WA+

Study Area?: Yes; Sebastopol

Habitat: Bogs and Fens, Closed-cone Coniferous Forests, Coastal Prairie, Meadows and Seeps, Marshes and Swamps (margins)

Life Form: Perennial herb (rhizomatous)

Blooming: May-August

Notes: Sensitive in ID. See *Memoirs of the Torrey Botanical Club* 1:9 (1889) for original description.

Bristly Sedge

Carex comosa Boott

Family: Cyperaceae

CNPS List: 2

State/Fed. Status: None

Distribution: CCA, LAK, SBD(*?), SCR*, SFO*, SHA, SJQ, SON, ID, OR, WA, ++

Study Area?: None

Habitat: Marshes and Swamps (lake margins)

Life Form: Perennial herb (rhizomatous)

Blooming: May-September

Notes: Location, rarity, and endangerment information needed; need quad for SBD and SFO counties. Fairly widely distributed, but apparently rarely collected. Threatened by marsh drainage. Endangered in ID, on review list in OR, and state-listed as Sensitive in WA.

Pitkin Marsh Indian Paintbrush

Castilleja uliginosa Eastw.

Family: Scrophulariaceae

CNPS List: 1A Last Seen: 1987

State/Fed. Status: CE/

Distribution: SON*

Study Area?: No

Habitat: Marshes and Swamps (freshwater)

Life Form: Perennial herb, hemiparasitic

Blooming: June-July

Notes: Known from two occurrences in Pitkin Marsh and Trembley's Marsh. Last known remaining plant died in 1987, despite management efforts; field surveys needed, although no access allowed by landowner after 1987. See *C. miniata* ssp. *miniata* in *The Jepson Manual*. See *Leaflets of Western Botany* 3:166-117 (1942) for original description.

Point Reyes Bird's-beak

Cordylanthus maritimus Benth. ssp. *palustris* (Behr) Chuang & Heckard

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA*, HUM, MRN, SCL*, SMT*, SON, OR

Study Area?: Yes; Novato, Petaluma River, Valley Ford

Habitat: Marshes and Swamps (coastal salt)

Life Form: Annual herb (hemiparasitic)

Blooming: June-October

Notes: Once rather common in proper habitat; now greatly reduced by development. Also threatened by foot traffic, non-native plants, altered hydrology, and cattle grazing and trampling. State listed as Endangered in OR. See *Brittonia* 25:135-158 (1973) for original description, and *Madroño* 41(4):316-327 (1994) for ecological discussion.

Soft Bird's-beak

Cordylanthus mollis Gray ssp. *mollis*

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: CR/PE

Distribution: CCA, MRN*, NAP, SAC*, SOL, SON*

Study Area?: Yes; Petaluma River*, Sears Point*

Habitat: Marshes and Swamps (coastal salt)

Life Form: Annual herb, hemiparasitic

Blooming: July-November

Notes: Known from ten occurrences. Threatened by erosion and marsh drainage. See *Proceedings of the American Academy of Arts and Sciences* 7:327-402 (1867) for original description, and *Madroño* 25:107 (1978) for rediscovery in NAP Co.

California Lady's-slipper

Cypripedium californicum Gray

Family: Orchidaceae

CNPS List: 4

State/Fed. Status: None

Distribution: BUT, DNT, HUM, MRN*, PLU, SHA, SIS, SON, TRI, OR

Study Area?: None

Habitat: Bogs and Fens, Lower Montane Coniferous Forest / serpentinite seeps and streambanks

Life Form: Perennial herb (rhizomatous)

Blooming: April-August

Notes: Threatened by horticultural collecting and logging. Many protected populations on USFS land not reproducing. On watch list in OR. See *Fremontia* 17(2):17-19 (1989) for species account.

Dwarf Downingia

Downingia pusilla (D. Don) Torr.

Family: Campanulaceae

CNPS List: 2

State/Fed. Status: None

Distribution: MER, MPA, NAP, PLA, SAC, SOL, SON, STA, TEH, SA

Study Area?: Yes; Sears Point, Glen Ellen, Sebastopol, Healdsburg

Habitat: Valley and Foothill Grasslands (mesic), Vernal Pools

Life Form: Annual herb

Blooming: March-May

Notes: Threatened by urbanization, agriculture, grazing, vehicles, and forestry.

Small Spikerush

Eleocharis parvula (R. & S.) Link

Family: Cyperaceae

CNPS List: 4

State/Fed. Status: None

Distribution: BUT, CCA, GLE, HUM, NAP, ORA, SIS, SLO, SON, VEN, ++

Study Area?: None

Habitat: Marshes and Swamps

Life Form: Perennial herb

Blooming: June-September

Notes: On review list in OR. See *Wasmann Journal of Biology* 33 (1-2):98 (1975) for a discussion of California distribution.

Loch Lomond Button-celery

Eryngium constancei Sheikh

Family: Apiaceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: LAK

Study Area?: None

Habitat: Vernal Pools

Life Form: Annual/Perennial herb

Blooming: April-June

Notes: Only known occurrence protected at Loch Lomond ER (DFG), but entire watershed not protected. Previously damaged by dredging of vernal lake. See *Madroño* 30(2):93-101 (1938) for original description.

Boggs Lake Hedge Hyssop

Gratiola heterosepala Mason & Bacig.

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: CE/

Distribution: FRE, LAK, LAS, MAD, MOD, PLA, SAC, SHA, SJQ, SOL, TEH, OR

Study Area?: None

Habitat: Marshes and Swamps (lake margins), Vernal Pools / clay

Life Form: Annual herb

Blooming: April-June

Notes: Threatened by agriculture, development, grazing, trampling, and vehicles. Known for one occurrence in OR, where state listed as Threatened. USFWS and BLM have completed draft conservation strategy. See *Madroño* 12:150-152 (1954) for original description.

Marsh Gumplant

Grindelia stricta DC. var. *angustifolia* (Gray) M.A. Lane

Family: Asteraceae

CNPS List: 4

State/Fed. Status: None

Distribution: ALA, CCA, MNT, MRN, NAP, SCL, SFO, SMT, SOL, SON

Study Area?: None

Habitat: Marshes and Swamps (coastal salt)

Life Form: Perennial herb

Blooming: August-October

Notes: Hybridizes with *G. camporum* var. *camporum*. See *Novon* 2(3):215-217 (1992) for revised nomenclature.

Burke's Goldfields

Lasthenia burkei (Greene) Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: LAK, MEN, SON

Study Area?: Yes; Sebastopol, Jintown, Healdsburg

Habitat: Meadows and Seeps (mesic), Coastal Prairie

Life Form: Annual herb

Blooming: April-June

Notes: Threatened by agriculture, urbanization, and grazing. See *Bulletin of the California Academy of Sciences* 2(6):151 (1887) for original description, and *American Journal of Botany* 56(9):1042-1047 (1969) for information on origin and relationships.

Delta Tule Pea

Lathyrus jepsonii Greene var. *jepsonii*

Family: Fabaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA, CCA, FRE, MRN, NAP, SAC, SBT, SCL, SJQ, SOL

Study Area?: None

Habitat: Marshes and Swamps (freshwater and brackish)

Life Form: Perennial herb

Blooming: May-September

Notes: Threatened by agriculture and water diversions. See *Pittonia* 2:158 (1890) for original description.

Legenere

Legenere limosa (Greene) McVaugh

Family: Campanulaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, PLA, SAC, SMT, SOL, SON*, STA*, TEH

Study Area?: Yes; Glen Ellen*

Habitat: Coastal Prairie

Life Form: Annual herb

Blooming: May-June

Notes: Many historical occurrences extirpated. Threatened by grazing, development, and industrial forestry. See *Pittonia* 2:81 (1890) for original description, *North American Flora* 32(1):13-14 (1943) for revised nomenclature, and *Wasmann Journal of Biology* 33(1-2):91 (1975) for distributional information.

Mason's Lilaeopsis

Lilaeopsis masonii Math. & Const.

Family: Apiaceae

CNPS List: 1B

State/Fed. Status: CR/

Distribution: ALA, CCA, MRN?, NAP, SAC, SJQ SOL

Study Area?: None

Habitat: Marshes and Swamps (brackish or freshwater), Riparian Scrub

Life Form: Perennial herb

Blooming: April-October

Notes: Locally common in Suisun Bay. Threatened by erosion, channel stabilization, development, flood control projects, recreation, agriculture, and shading resulting from marsh succession. Many populations ephemeral, exploiting newly deposited or exposed sediments. See *Madroño* 24:81 (1977) for original description.

Pitkin Marsh Lily

Lilium pardalinum Kell. ssp. *pitkinense* (Beane & Vollmer) M. Skinner

Family: Liliaceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: SON

Study Area?: Yes; Sebastopol, Two Rock

Habitat: Cismontane Woodland, Meadows and Seeps, Marshes and Swamps (freshwater) / mesic, sandy

Life Form: Perennial herb (bulbiferous)

Blooming: June-July

Notes: Known from only two occurrences near Sebastopol, totaling 200 individual plants as of 1993. Most of marsh habitat has been destroyed; also threatened by horticultural collecting, grazing, and competition from other plants. State-listed as *L. pitkinense*.

Point Reyes Meadowfoam

Limnanthes douglasii R. Br. ssp. *sulphurea* (C. T. Mason) C. T. Mason

Family: Limnanthaceae

CNPS List: 1B

State/Fed. Status: CE/

Distribution: MRN, SMT

Study Area?: None

Habitat: Coastal Prairie, Meadows and Seeps (mesic), Marshes and Swamps (freshwater), Coastal Prairie

Life Form: Annual herb

Blooming: March-May

Notes: Known from approximately ten occurrences. Threatened by grazing, trampling, and non-native plants. See *University of California Publications in Botany* 25:477 (1952) for original description.

Sebastopol Meadowfoam

Limnanthes vinculans Ornduff

Family: Limnanthaceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: NAP?, SON

Study Area?: Yes; Santa Rosa, Cotati, Sebastopol, Camp Meeker*, Two Rock

Habitat: Meadows and Seeps, Valley and Foothill Grasslands, Coastal Prairie / vernally mesic

Life Form: Annual herb

Blooming: April-May

Notes: Only NAP Co. occurrence (500A) may be introduced; protected in part at Napa River ER (DFG). Threatened by urbanization, agriculture, and grazing. See *Brittonia* 21:11-14 (1969) for original description.

Baker's Navarretia

Navarretia leucocephala Benth. ssp. *bakeri* (Mason) Day

Family: Polemoniaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL, LAK, MEN, MRN, NAP, SOL, SON, TEH

Study Area?: Yes; Petaluma River, Santa Rosa, Sebastopol, Healdsburg

Habitat: Cismontane Woodland, Lower Montane Coniferous Forest, Meadows and Seeps (mesic), Valley and Foothill Grasslands, Coastal Prairie

Life Form: Annual herb

Blooming: May-July

Notes: May be more widespread; need information. Need quads for COL Co. *N. leucocephala* on review list in OR. See *Madroño* 8(6):198 (1946) for original description, and *Novon* 3(4):331-340 (1993) for revised nomenclature.

Few-flowered Navarretia

Navarretia leucocephala Benth. ssp. *pauciflora* (Mason) Day

Family: Polemoniaceae

CNPS List: 1B

State/Fed. Status: CT/PE

Distribution: LAK, NAP

Study Area?: None

Habitat: Coastal Prairie (volcanic ash flow)

Life Form: Annual herb

Blooming: May-June

Notes: Known from approximately six occurrences. Threatened by altered hydrology, erosion, grazing, vehicles, and recreation. Intergrades rarely with ssp. *plieantha*. State-listed as *N. pauciflora*. See *Madroño* 8:200 (1946) for original description, and *Novon* 3(4):331-340 (1993) for revised nomenclature.

Many-flowered Navarretia

Navarretia leucocephala Benth. ssp. *plieantha* (Mason) Day

Family: Polemoniaceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: LAK, SON

Study Area?: Yes; Healdsburg

Habitat: Coastal Prairie (volcanic ash flow)

Life Form: Annual herb

Blooming: May-June

Notes: Known from approximately seven occurrences. Threatened by grazing, development, and vehicles. Protected in part at Loch Lomond ER (DFG). State-listed as *N. plieantha*. USFWS also uses this name. See *Madroño* 8:199 (1946) for original description, and *Novon* 3(4):331-340 (1993) for revised nomenclature.

Gairdner's Yampah

Perideridia gairdneri (H. & A.) Math. ssp. *gairdneri*

Family: Apiaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, HUM, KRN, LAS, LAX*, MEN, MNT, MOD, MRN, NAP, ORA*, SBT, SCL, SCR, SDG*, SIS, SLO, SMT(*?), SOL, SON, TRI

Study Area?: None

Habitat: Broadleafed Upland Forest, Chaparral, Valley and Foothill Grasslands, Vernal Pools / mesic

Life Form: Perennial herb

Blooming: June-October

Notes: Endangered in the southern portion of its range; status of occurrences uncertain. Can be relatively common locally, especially in northern counties. Threatened by agriculture and urbanization. See *University of California Publications in Botany* 55:1-74 (1969) for taxonomic treatment.

Hairless Popcorn-flower

Plagiobothrys glaber (Gray) Jtn.

Family: Boraginaceae

CNPS List: 1A Last Seen: 1954

State/Fed. Status: None

Distribution: ALA*, MER*, MRN*, SBT*, SCL*

Study Area?: None

Habitat: Meadows and Seeps (alkaline), Marshes and Swamps (coastal salt)

Life Form: Annual herb

Blooming: March-May

Notes: All collections since 1930's located in the Hollister area; plant should be looked for there. Possibly a variety of *P. stipitatus*. See *Proceedings of the American Academy of Arts and Sciences* 17:227 (1882) for original description.

Petaluma Popcorn-flower

Plagiobothrys mollis (Gray) Jtn. var. *vestitus* (Greene) Jtn.

Family: Boraginaceae

CNPS List: 1A Last Seen: 1888

State/Fed. Status: None

Distribution: SON*

Study Area?: Yes; Petaluma*

Habitat: Marshes and Swamps? (coastal salt), Valley and Foothill Grasslands (mesic)

Life Form: Perennial herb

Blooming: June-July

Notes: Known only from the type collection near Petaluma. Field work needed.

Calistoga Popcorn-flower

Plagiobothrys strictus (Greene) Jtn.

Family: Boraginaceae

CNPS List: 1B

State/Fed. Status: CT/FC

Distribution: NAP

Study Area?: None

Habitat: Broadleafed Upland Forest, Meadows and Seeps, Valley and Foothill Grasslands, Vernal Pools / alkaline areas near thermal springs

Life Form: Annual herb

Blooming: March-June

Notes: Known from only two extant occurrences near Calistoga. Threatened by urbanization, recreational activities, and airport maintenance.

North Coast Semaphore Grass

Pleuropogon hooverianus (L. Benson) J. T. Howell

Family: Poaceae

CNPS List: 1B

State/Fed. Status: CR/

Distribution: MEN, MRN, SON

Study Area?: Yes; Cotati, Sebastopol, Camp Meeker

Habitat: Broadleafed Upland Forest, Meadows and Seeps, North Coast Coniferous Forest, Coastal Prairie / mesic

Life Form: Perennial herb (rhizomatous)

Blooming: May-August

Notes: Known from approximately twelve occurrences. See *American Journal of Botany* 28:360 (1941) for original description, *Leaflets of Western Botany* 4(10):247 (1946) for revised nomenclature, and *Taxon* 27(4):375 (1978) for alternate nomenclature.

Napa Blue Grass

Poa napensis Beetle

Family: Poaceae

CNPS List: 1B

State/Fed. Status: CE/FC

Distribution: NAP

Study Area?: None

Habitat: Meadows and Seeps, Valley and Foothill Grasslands / alkaline, near hot springs

Life Form: Perennial herb

Blooming: May-August

Notes: Known from only two occurrences in the Calistoga area. Threatened by development, recreational activities, and airport maintenance. See *Leaflets of Western Botany* 4:289 (1946) for original description.

Douglas's Pogogyne

Pogogyne douglasii Benth. ssp. *parviflora* (Benth.) J. T. Howell

Family: Lamiaceae

CNPS List: 3

State/Fed. Status: None

Distribution: BUT?, LAK, MEN, NAP, SAC?, SON

Study Area?: Yes; Santa Rosa, Cotati, Sebastopol, Healdsburg

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest, Meadows and Seeps, Marshes and Swamps, Valley and Foothill Grasslands, Coastal Prairie / mesic

Life Form: Annual herb

Blooming: May-July

Notes: Move to List 4? Many new occurrences found recently, but threatened by urbanization and agriculture; some populations have been extirpated. Taxonomic questions; is ssp. distinct? See *P. douglasii* in *The Jepson Manual* See *Proceedings of the California Academy of Sciences* IV 20:117 (1931) for revised nomenclature.

Marin Knotweed

Polygonum marinense Mertens & Raven

Family: Polygonaceae

CNPS List: 3

State/Fed. Status: None

Distribution: MRN, NAP, SON

Study Area?: Yes; Petaluma River

Habitat: Marshes and Swamps (coastal salt)

Life Form: Annual herb

Blooming: April-October

Notes: Move to List 1B? Known from fewer than fifteen occurrences. Taxonomic status uncertain, related to *P. aviculare*; possible synonym of *P. robertii*, a non-native plant. Immediate taxonomic study needed. Threatened by coast development.

Hickman's Cinquefoil

Potentilla hickmanii Eastw.

Family: Rosaceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: MNT, SMT*, SON*

Study Area?: Yes; Two Rock*

Habitat: Coastal Bluff Scrub, Closed-cone Coniferous Forests, Meadows and Seeps (vernally mesic), Marshes and Swamps (freshwater)

Life Form: Perennial herb

Blooming: April-August

Notes: Known from only one occurrence on the Monterey Peninsula, totaling 24 individual plants as of 1992. Seriously threatened by urbanization and recreational activities. See *Bulletin of the Torrey Botanical Club* 29:77-78 (1902) for original description, and *Fremontia* 21(1):25-29 (1993) for species account.

Lobb's Aquatic Buttercup

Ranunculus lobbii Gray

Family: Ranunculaceae

CNPS List: 4

State/Fed. Status: None

Distribution: ALA, CCA, MEN, MRN, NAP SCL, SOL, SON, OR+

Study Area?: None

Habitat: Cismontane Woodland, North Coast Coniferous Forest, Valley and Foothill Grasslands, Coastal Prairie / mesic

Life Form: Annual herb, aquatic

Blooming: March-May

Notes: Threatened by urbanization and agriculture.

White Beaked-rush

Rhynchospora alba (L.) Vahl

Family: Cyperaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT?, LAS, MEN, NEV?, PLU, SON, ID, ++

Study Area?: None

Habitat: Bogs and Fens, Marshes and Swamps (freshwater)

Life Form: Perennial herb (rhizomatous)

Blooming: July-August

Notes: Threatened in ID.

California Beaked-rush

Rhynchospora californica Gale

Family: Cyperaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: BUT, MPA, MRN, SON

Study Area?: Yes; Sebastopol, Two Rock

Habitat: Bogs and Fens, Lower Montane Coniferous Forest, Meadows and Seeps (seeps), Marshes and Swamps (freshwater)

Life Form: Perennial herb (rhizomatous)

Blooming: May-July

Notes: Known from fewer than ten occurrences. Threatened by marsh habitat loss. See *Rhodora* 46:272-273 (1944) for original description, and *Madroño* 33(2):150 (1986) for information on BUT Co. collection.

Round-headed Beaked-rush

Rhynchospora globularis (Chapm.) Small var. *globularis*

Family: Cyperaceae

CNPS List: 2

State/Fed. Status: None

Distribution: SON, ++

Study Area?: Yes; Sebastopol, Two Rock

Habitat: Marshes and Swamps (freshwater)

Life Form: Perennial herb (rhizomatous)

Blooming: July-August

Notes: Seriously threatened by marsh habitat loss.

Point Reyes Checkerbloom

Sidalcea calycosa M. E. Jones ssp. *rhizomata* (Jeps.) Munz

Family: Malvaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN, SON

Study Area?: Yes; Petaluma, Valley Ford

Habitat: Marshes and Swamps (freshwater, near coast)

Life Form: Perennial herb (rhizomatous)

Blooming: April-September

Notes: See *Manual of the Flowering Plants of California*, p. 629 (1925) by W. L. Jepson for original description.

Kenwood Marsh Checkerbloom

Sidalcea oregana (Nutt.) Gray ssp. *valida* (Greene) C. L. Hitchc.

Family: Malvaceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: SON

Study Area?: None

Habitat: Marshes and Swamps (freshwater)

Life Form: Perennial herb (rhizomatous)

Blooming: June-September

Notes: Known from only three small occurrences: one in Knights Valley and two in Kenwood Marsh. Threatened by grazing and hydrology alteration, and possibly by competition with native and non-native plants. See *Pittonia* 3:157-158 (1897) for original description, and *University of Washington Publications in Biology* 18:56-58 (1957) for revised nomenclature.

California Seablite

Suaeda californica Wats.

Family: Chenopodiaceae

CNPS List: 1B

State/Fed. Status: /PE

Distribution: ALA*, SCL*, SLO

Study Area?: None

Habitat: Marshes and Swamps (coastal salt)

Life Form: Shrub (evergreen)

Blooming: July-October

Notes: Formerly known from San Francisco Bay area, where extirpated by development; now extant only in Morro Bay. Remains from adobe bricks indicate plant may once have occurred along the Petaluma River, SON Co. Threatened by recreation, erosion, and alteration of marsh habitat.

Fringed False-hellebore

Veratrum fimbriatum Gray

Family: Liliaceae

CNPS List: 4

State/Fed. Status: None

Distribution: MEN, SON

Study Area?: None

Habitat: Bogs and Fens, Coastal Scrub, Meadows and Seeps, North Coast Coniferous Forest / mesic

Life Form: Perennial herb

Blooming: July-September

AQUATIC WILDLIFE

Invertebrate Species

Brownish Dubiraphian Riffle Beetle

Brownish dubiraphian riffle beetle (*Dubiraphia brunnescens*) was listed as a federal category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the riffle beetle is no longer considered a federal candidate species. The species is not listed by the State of California.

Brownish dubiraphian riffle beetle was described in 1925 from among willow roots along rocky shores of Clear Lake, California. It has never been reported from any other locality. However, a closely related species, *Dubiraphia giulianii*, is widely distributed over California in similar habitats, including slow-moving sections of the Russian River on roots of riparian vegetation. "These two species may be synonymized due to overlapping characters. Although most individuals of each species are distinguished by different color patterns, some specimens of *D. giulianii* have been found with the color of *D. brunnescens*" (Shepard 1993). Moreover, Leech and Chandler (1956) stated that "both of these [*D. brunnescens* and *D. giulianii*] may prove to be synonyms or subspecies of *D. vittata* Melshimer, which is common throughout the eastern U. S., with one record from Utah."

Unless further evidence is found that brownish dubiraphian riffle beetle differs from closely-related species in larval or adult biology, it would appear likely that it will be synonymized with more widely distributed relatives.

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California Brackishwater Snail

California brackishwater snail (*Tryonia imitator*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), California brackishwater snail is no longer considered a federal candidate species. The species is not listed by the State of California.

California brackishwater snail historically ranged in coastal lagoons and marshes from Sonoma County to San Diego County, California (Kellogg 1980). In Sonoma County the species is known to occur around the mouth of Salmon Creek (CNDDDB 1994). Recent collections from known California brackish water snail sites and other sites with suitable habitat over this entire length of coast (34 sites) yielded about 14 sites with populations of this species, all but two of which were located from Monterey County southward (Kellogg 1985). In some cases, the snail was once thought to be extirpated from a site, but was subsequently found there. California brackish water snail was not found near the mouth of Petaluma Creek in 1979 (Kellogg 1980), but a population was found there four years later (Kellogg 1985). Kellogg concluded that this snail is more likely to occur in the southern part of its range.

California brackishwater snail lives subtidally (i.e., below the low tide level) in coastal lagoons and tidal marshes (Kellogg 1980). The species inhabits a variety of sediment types and is tolerant to a wide daily variation in salinity (CNDDDB 1994; Kellogg 1980). California brackishwater snail is usually associated with relatively slow moving brackishwater areas that support widgeon grass, floating algae, or other aquatic vegetation (Michael Kellogg, Biologist, Moss Landing Marine Laboratory, personal communication 1994). Although populations are rare, when they are found they usually are in abundance (Michael Kellogg, Biologist, Moss Landing Marine Laboratory, personal communication 1994).

California brackish water snail is preyed upon by various bird species and by small fishes such as the threepine stickleback, but recent population declines are primarily attributed to reduction of salt marsh habitat due to development.

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California Freshwater Shrimp

The California freshwater shrimp (*Syncharis pacifica*) is both federally and state listed as endangered by the USFWS and CDFG, respectively (Federal Register 53(210): 43884-43889 [1988]; CDFG 1996).

California freshwater shrimp occur in permanent waters in low gradient freshwater streams with heavy riparian or other vegetative cover that hangs into the water. The shrimp hide in the submerged roots and branches along treelined undercut banks.

The species is able to persist in isolated pools along seasonally dry stream corridors as long as the pools retain water. California freshwater shrimp are known to survive in these isolated pools even when anaerobic conditions caused by cattle waste was known to be killing carp (Larry Serpa, Invertebrate Ecologist, The Nature Conservancy, personal communication 1994). There are currently only 15 known populations distributed over Marin, Napa and Sonoma counties (Larry Serpa, Invertebrate Ecologist, The Nature Conservancy, personal communication 1994). Extensive searches for remaining populations of the freshwater shrimp during the last 20 years have revealed 15 streams that currently support populations of this species. These streams include tributaries of the Russian and Napa rivers and coastal streams in Marin and Sonoma counties. Within the project area, California freshwater shrimp has been found in Stemple Creek and Salmon Creek (both coastal) as well as Blucher Creek and Green Valley Creek (Russian River tributaries). In many cases only very small populations could be found.

The species continues to be endangered by habitat reduction, construction of dams, erosion control and flood control structures, removal of riparian vegetation, stream alteration and channelization, altered flow regimes, introduction of predators, pollution, soil erosion, and cattle grazing (CDFG 1992).

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California Linderiella

The California linderiella (*Linderiella occidentalis*) was listed as a category 3 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), California linderiella is no longer considered a federal candidate species. The species is not listed by the State of California.

The California linderiella has been found from Riverside County in the southern Coast Range to Lake County (i.e., Bogg's Lake) in the central Coast Range and in the Central Valley from Madera County (east of Madera) north to Tehama County (east of Red Bluff). It is known from 40 separate occurrences within this range. Individuals have been observed from October to early May (Nagano 1992).

California linderiella are typically found in sandstone depressions within clear-water pools or in alluvial soils underlain by clay hardpan, in seasonal grass-bottomed pools in unplowed grasslands. They are found less commonly in slightly turbid waters of mud-bottomed vernal pools. The typical diet of California linderiella includes rotifers, protozoa, algae, and bits of detritus (Nagano 1992).

Loss and degradation of vernal pools are the primary factors contributing to the decrease in California linderiella populations. Increasing residential and agricultural development, livestock grazing, highway projects, water-storage projects, and utility projects have led to this loss and degradation of habitat. Protection of remaining vernal pool habitat, restoration of degraded habitat, and creation of new vernal pool habitat are actions that can be taken to stabilize California linderiella numbers.

References

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Conservancy Fairy Shrimp

The Conservancy fairy shrimp (*Branchinecta conservatio*) is federally listed as endangered by the USFWS (Federal Register 59: 48136 [1994]). The species is not listed by the State of California.

This species is a small aquatic invertebrate that dwells in seasonal pools and is endemic to California. It occurs in isolated populations in Tehama, Colusa, Napa, Solano, Ventura, and Merced counties. Conservancy fairy shrimp is not currently known to occur in Sonoma County.

Loss and degradation of vernal pools are the primary factors contributing to the decrease in Conservancy fairy shrimp populations. Increasing residential and agricultural development, livestock grazing, highway projects, water-storage projects, and utility projects have led to this loss and degradation of habitat. Protection of remaining vernal pool habitat, restoration of degraded habitat, and creation of new vernal pool habitat are actions that can be taken to stabilize Conservancy fairy shrimp numbers.

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Leech's Skyline Diving Beetle

Leech's skyline diving beetle (*Hydroporus leechi*) was listed as a federal category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the skyline diving beetle is no longer considered a federal candidate species. The species is not listed by the State of California.

Leech's skyline diving beetle is a small dytiscid beetle species that was described in 1981 from a locality on Skyline Drive in San Mateo County. Hafernik (1989) searched unsuccessfully for this species at the type locality, and concluded that it had been extirpated from the site. Extensive collecting throughout the Bay Area counties also failed to reveal Leech's skyline diving beetle. However, Gordon's examination of specimens in the collection of the California Academy of Sciences revealed the occurrence of 31 adult *H. leechi* individuals from ten widely separated localities in California, as well as sites in Colorado, Oregon, and Washington. Thus, he recommended that the species be removed from consideration for listing.

Nothing is known of the natural history of this species. It is a member of a species group whose members are difficult to identify.

References

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Longhorn Fairy Shrimp

The longhorn fairy shrimp (*Branchinecta longiantennae*) is federally listed as endangered by the USFWS (Federal Register 59: 48136 [1994]). The species is not listed by the State of California.

Longhorn fairy shrimp dwells in seasonal pools as isolated populations, occurring along the western edge of the Central Valley of California in Contra Costa and Merced counties. They are also found in San Luis Obispo County. Longhorn fairy shrimp are not currently known to occur in Sonoma County.

Longhorn fairy shrimp occur in vernal pools and other seasonal bodies of water that hold water for eight weeks or more. They typically dwell in the open water column, usually swimming in loosely organized schools.

Loss and degradation of vernal pools are the primary factors contributing to the decrease in longhorn fairy shrimp populations. Increasing residential and agricultural development, livestock grazing, highway projects, water-storage projects, and utility projects have led to this loss and degradation of habitat. Protection of remaining vernal pool habitat, restoration of degraded habitat, and creation of new vernal pool habitat are actions that can be taken to stabilize longhorn fairy shrimp numbers.

References

Eng, L.L., D. Belk, and C.H. Eriksen. 1990. Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2): 247-277.

Ricksecker's Water Scavenger Beetle

Ricksecker's water scavenger beetle (*Hydrochara rickseckeri*) was listed as a federal category 2 candidate species (Federal Register 59(219): 58982-59028

[1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the water scavenger beetle is no longer considered a federal candidate species. The species is not listed by the State of California.

Ricksecker's water scavenger beetle was described in 1895 from a single specimen collected near Santa Rosa, Sonoma County. It appears to be a very rare insect, only fifteen individuals have ever been observed. These individuals were found in Santa Clara, San Mateo, Alameda, Marin, and Sonoma counties. A single specimen was collected in 1993 (Serpa 1994) at the Jepson Prairie Preserve in Solano County. This latter record is the first since 1969. Hafernik (1989) searched many Bay Area sites, including areas where the species had been previously observed, but was unable to find Ricksecker's water scavenger beetle.

Nothing is known about the natural history of this species (Smetana 1980).

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Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp (*Branchinecta lynchi*) is federally listed as threatened by the USFWS (Federal Register 59: 48136 [1994]). The species is not listed by the State of California.

The vernal pool fairy shrimp is a small aquatic invertebrate, endemic to California, that inhabits in vernal pools and other seasonal pools. The species occurs throughout much of the Central Valley from Shasta to Tulare counties, and from El Dorado to Contra Costa counties. Isolated populations occur in San Benito, Santa Barbara, and Riverside Counties. Vernal pool fairy shrimp is not currently known from Sonoma County.

Loss and degradation of vernal pools are the primary factors contributing to the decrease in vernal pool fairy shrimp populations. Increasing residential and agricultural development, livestock grazing, highway projects, water-storage

projects, and utility projects have led to this loss and degradation of habitat. Protection of remaining vernal pool habitat, restoration of degraded habitat, and creation of new vernal pool habitat are actions that can be taken to stabilize vernal pool fairy shrimp numbers.

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Eng, L.L., D. Belk, and C.H. Eriksen. 1990. Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2): 247-277.

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardii*) is federally listed as endangered by the USFWS (Federal Register 59: 48136 [1994]). The species is not listed by the State of California.

Vernal pool tadpole shrimp occur mainly in the Central Valley of California from Shasta to Merced counties and from El Dorado to Solano counties, with an isolated population in Alameda County. Vernal pool tadpole shrimp are not known to occur in Sonoma County.

Vernal pool tadpole shrimp occur in vernal pools and other seasonal bodies of water that hold water for eight weeks or more. They typically dwell along the bottom of the pools in ruts and pits and around the edges of the pools. Vernal pool tadpole shrimp are predatory, feeding on fairy shrimp and other aquatic invertebrates.

Loss and degradation of vernal pools are the primary factors contributing to the decrease in vernal pool tadpole shrimp populations. Increasing residential and agricultural development, livestock grazing, highway projects, water-storage projects, and utility projects have led to this loss and degradation of habitat. Protection of remaining vernal pool habitat, restoration of degraded habitat, and creation of new vernal pool habitat are actions that can be taken to stabilize vernal pool tadpole shrimp numbers.

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Tomales Isopod

The Tomales isopod (*Caecidotea tomalensis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to

recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), Tomales isopod is no longer considered a federal candidate species. The species is not listed by the State of California.

Tomales isopod was originally described from specimens collected near Tomales Bay in 1877. The type specimen was lost and no others were available for study. Williams (1970, 1972) considered *C. tomalensis* to be a synonym of *C. occidentalis*, a species known from Oregon, Washington, and British Columbia. When additional specimens were found in the early 1970's in San Mateo, San Francisco, and Marin counties, these were studied by Bowman (1974), who concluded that *C. tomalensis* was indeed a separate species from *C. occidentalis*. In addition to the three localities reported by Bowman, Serpa (1991) reported occurrences near the town of Mendocino in Mendocino County and at the Nature Conservancy's Fairfield Osborn Preserve in Sonoma County. These five localities were the only known sites for *C. tomalensis* until the species was found by Serpa when conducting a survey at the proposed Two Rock storage reservoir site in 1991. Specimens from this collection were confirmed as *C. tomalensis* by T. E. Bowman. In subsequent surveys at proposed reservoir sites by HBA, an asellid assumed to be *C. tomalensis* was again found at the Two Rock storage reservoir site in May and in August 1995. In August 1995, it was also found at the proposed Carroll Road storage reservoir site and at the proposed Valley Ford storage reservoir site. The Two Rock storage reservoir site is on a tributary of Stemple Creek and the Carroll Road and Valley Ford storage reservoir sites are on tributaries of Americano Creek. Thus, there are now eight known populations of the Tomales isopod, extending from San Mateo to Mendocino counties along the California coast, assuming that the specific identity of the recently collected specimens are confirmed by an isopod expert.

Tomales isopods dwell in shallow and seasonal streams that have a low gradient flow and are devoid of fish. They occur primarily in the detritus at the bottom of the stream bed, rarely entering the open water column. During the dry season, isopods are known to estivate in the dried mud and detritus of the streambeds or follow the roots of plants up into moist soil.

Habitat destruction associated with channelization of waterways and the conversion of natural lands to agriculture or development are probably the major causes for the decline of this species. However, the introduction of predatory fish and the widespread use of pesticides are also detrimental to this species.

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Fish Species

Winter-run Chinook Salmon

The winter-run chinook salmon (*Oncorhynchus tshawytscha*) is listed as both a federally threatened species by the USFWS (Federal Register 58(114): 33212-33219 [1993]) and a state threatened species by the CDFG (1992). Designated critical habitat for this strain of chinook includes all of the Sacramento River from Keswick Dam (Shasta County) downstream to Chipps Island (River Mile 0), all the waters from Chipps Island westward to Carquinez Bridge, and all the waters (except for tidal sloughs) of San Pablo Bay and San Francisco Bay north of the Oakland/San Francisco Bay Bridge and west to the Golden Gate Bridge (Federal Register 58(114):33212-33219 [1993]).

Adult winter-run chinook move up the Sacramento River to spawn from December to May, with peak spawning in May and June (Moyle et al. 1989). Spawning is limited to a very small area of the mainstem of the Sacramento River, immediately downstream of Keswick Dam, where release of cold water from Shasta Dam allows for successful spawning at this time of year, well downstream of the historic spawning grounds in the Upper Sacramento River, McCloud River, and Pit River (prior to construction of Shasta Dam). After emerging from the gravel, most chinook fry immediately begin moving downstream, reaching the ocean only two to four months after hatching (Moyle et al. 1989). A small percentage of juveniles may spend up to a year in fresh water or estuaries before going to sea.

Winter-run chinook require clean, cold water (six to 14° C) and coarse gravel (one to four centimeters diameter) in deep riffles for successful spawning and incubation (Moyle et al. 1989). Because the eggs incubate during summer

months, any reduction in the supply of cold water from Shasta Dam (as in past drought years) may have critically damaging effects on the viability of the tiny population of this strain that remains.

Improper watershed management has been the primary cause for the decline of winter-run chinook salmon populations. Activities associated with improper watershed management include damming of historical spawning tributaries, agricultural development (including diversion of water from tributaries and the dumping of animal waste into streams), and siltation of spawning tributaries due to erosion associated with logging activities. Degradation of water quality due to pesticide runoff and other pollutants is another factor which may also have led to the decline of winter-run chinook salmon.

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Coho Salmon

The Coho salmon (*Oncorhynchus kisutch*) is listed as a federally proposed threatened species by the USFWS (Federal Register 60(142): 38011-38030 [1995]). It is also listed as a species of special concern by the CDFG (1994).

Coho are one of six species of Pacific salmon (*Oncorhynchus*) found in California. They are anadromous, spending their first year of life in coastal streams, then descending to the sea as 10-13 cm. smolts in the late spring, then spending one or two growing seasons at sea before returning to their natal streams as adults to spawn and die. Some males may return to spawn after only one growing season at sea (as two year old fish), but most males and nearly all females spawn as three year olds, after spending two growing seasons at sea (Shapovalov and Taft 1954).

Coho require certain types of habitat for nest-building and spawning, for successful incubation of the eggs, and for feeding and rearing of the young fish

prior to their becoming smolts and making their downstream migration to the sea. The water depths reported for spawning sites for coho in California range from 10 to 54 centimeters (Moyle et al. 1989). The general requirements include coarse, clean, well-oxygenated gravel for making redds (nests) and spawning, where the embryos will be allowed to develop undisturbed, at appropriate temperatures and with ample water movement to supply oxygen and remove metabolic wastes. The optimal temperature range is approximately 4 to 14° C (Reiser and Bjornn 1979; Moyle et al. 1989). Water temperatures above about 18° C are generally unfavorable, and sustained temperatures above 22 to 25° C are lethal to embryos and juveniles.

Developing embryos require high dissolved oxygen levels (near saturation) within the redd (Reiser and Bjornn 1979; Moyle et al. 1989). Maintenance of high oxygen levels depends on a continuous flow of well-oxygenated water through the gravel; thus, the gravel must be fairly coarse (usually 2 to 10 centimeters diameter), stream velocity above the gravel in the range of 20 to 90 centimeters/second, and the gravel must be free from excessive quantities of suspended or deposited sediment. Accumulations of fine sediment (<2 millimeter particle size) resulting from erosion, logging, poor agricultural practices, reduced stream velocity, etc., directly affect viability of embryos, emerging fry, and juveniles. In addition, sedimentation reduces the carrying capacity of the stream by reducing invertebrate food production and available shelter in crevices beneath cobble and boulders (Shapovalov and Taft 1954; Allen 1969; Hall and Lantz 1969; Bratovich and Kelley 1988).

After emerging from the gravel, juvenile coho continue to require well-aerated, cool, clean water free from excessive loads of sediment. A supply of invertebrate food is required and shelter is needed for resting and protection from predators. Juveniles prefer deep, shady pools with lots of woody debris and overhead cover (Moyle et al. 1989).

Spawning populations of Coho currently range from San Lorenzo Creek in Santa Cruz County to Alaska. Coho historically spawned in many of the same small coastal streams in California that are used by steelhead trout, but have disappeared from many streams as the stocks have greatly declined in recent decades throughout the northwestern United States (Nehlsen et al. 1991). Loss of spawning and rearing habitat (through sedimentation, elevated temperatures, water diversions, clearing of riparian vegetation, and other problems resulting from poor watershed management) is widely regarded as the primary cause of the decline of coho stocks (Moyle et al. 1989; Nehlsen et al. 1991).

Coho most historically spawned annually in Sonoma County streams including Stemple and Americano Creeks, tributaries of the Laguna de Santa Rosa such as Santa Rosa Creek and Mark West Creek, and possibly other Laguna tributaries such as Blucher Creek, Crane Creek, or Copeland Creek. Currently, coho are

known to spawn annually only in the Green Valley/Atascadero Creek system, and possibly in very small numbers in Santa Rosa Creek (Merritt Smith Consulting 1995).

Improper watershed management has been the primary cause for the decline of coho salmon populations. Activities associated with improper watershed management include damming of historical spawning tributaries, agricultural development (including diversion of water from tributaries and the dumping of animal waste into streams), and siltation of spawning tributaries due to erosion associated with logging activities.

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Delta Smelt

The delta smelt (*Hypomesus transpacificus*) is listed as both a federally threatened species by the USFWS (CDFG 1996) and a state threatened species by the CDFG (1992). Designated critical habitat for this species consists of all waters of Suisun Bay; Montezuma Slough; and the existing contiguous waters contained within the Delta, as defined by Section 12220, of the California Water Code of 1969 (a complex of bays, sloughs, channels, and marshlands upstream of the Carquinez Bridge)--50 CFR Part 17.95, Federal Register, December 19, 1994. There is no critical habitat located within San Pablo Bay.

The following account of the distribution of Delta smelt is taken directly from Moyle, et al. (1989):

Delta smelt are endemic to the upper Sacramento-San Joaquin estuary. They occur primarily below Isleton on the Sacramento River side, below Mossdale on the San Joaquin River side, and in Suisun Bay. When outflows from the Sacramento and San Joaquin rivers are high (mainly during March-mid June), the smelt congregate in upper Suisun Bay and Montezuma Slough. During high outflow periods, the smelt may be washed into San Pablo Bay, but they do not establish permanent populations there. Since 1982, the center of Delta smelt abundance has been the northwestern Delta in the channel of the Sacramento River. It has become rare in Suisun Bay and is virtually absent from Suisun Marsh where it was once seasonally common.

Habitat requirements for Delta smelt include brackish water rarely exceeding 10 to 12 parts per thousand salinity, and fresh water for spawning at temperatures from about 7 to 15° C (Moyle et al. 1989). Well oxygenated, relatively cool water (less than 22° C in summer) is necessary for all life stages. These fish

generally school in open, surface waters of the Delta and Suisun Bay, and are usually concentrated near the "null zone"(where salt water and fresh water mix), where zooplankton (their primary food) are usually most dense. Spawning takes place from February to June. Eggs are attached to the substrate, and probably hatch in about two weeks. Juvenile growth is rapid, and adult size is attained within 7 to 9 months. Indirect evidence suggests strongly that most adults die after spawning (Moyle et al. 1989).

Although the waters of San Pablo Bay are not included in the critical habitat for Delta smelt, these fish are sometimes washed downstream into San Pablo Bay, as discussed above.

Increased diversion of freshwater leading to changes in flow regimes and salinity, degradation of water quality due to presence of toxic compounds (pesticide and urban runoff), and displacement of native copepods (smelt prey item) by exotic species are considered the primary factors in the recent decline of Delta smelt.

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Green Sturgeon

Green sturgeon (*Acipenser medirostris*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), green sturgeon is no longer considered a federal candidate species. It is not listed by the State of California.

Green sturgeon are found in ocean waters from Mexico to the Bering Sea and Japan, and also in the lower reaches of large rivers north from the Sacramento-San Joaquin Delta (Moyle 1976). Green sturgeon are much less abundant than white sturgeon, and little is known about their life history. They seem to spend less time in estuaries and fresh waters than do white sturgeon, and seldom penetrate as far upstream. Juveniles are found in freshwater areas of the Sacramento-San Joaquin Delta, so it is presumed that green sturgeon spawn in

this system. According to Moyle (1976), their diet is similar to that of white sturgeon (small fish and epibenthic invertebrates).

Green sturgeon are not known to occur in the Russian River. Sturgeon are occasionally caught by fishermen in the Russian River estuary, but these are thought to be white sturgeon (Bill Cox, Biologist, CDFG - Region 3, personal communication 1995). Green sturgeon are known occur in San Pablo Bay.

Degradation of water quality due to pesticide runoff and untreated wastewater and changes in flow regimes due to diversion of water from tributaries are probably the major causes for the decline of this species.

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Hardhead

The hardhead (*Mylopharodon conocephalus*) is listed as a species of special concern by the CDFG (1994).

Hardhead typically occur in warm, clear streams that have large, deep pools with rock or sand bottoms (Moyle 1976). Hardhead are almost always associated with the more common Sacramento squawfish and Sacramento sucker, and are rarely found where squawfish are absent. Hardhead are usually found near the bottom of pools, where they feed on benthic plants and invertebrates.

Hardhead are believed to spawn in May and June (Moyle et al. 1989), although little information is available on the reproduction or other aspects of their life history. They are presumed to migrate upstream into smaller tributaries to spawn. This presumption is supported by observed upstream migrations of hardhead (and squawfish) adults in March and April of 1994 and 1995 at a fyke net station located near the confluence of Maacama Creek and the Russian River (Merritt Smith Consulting 1995). Hardhead reach sexual maturity following their second year of growth (at which time they are about 140 millimeters in length). The oldest fish known are aged at nine to ten years and are about 450 millimeters in length (Feather River). However, much larger and older fish probably exist in the Sacramento River (Moyle et al. 1989).

Hardhead are now much less abundant throughout their range than they once were and have disappeared from many locations in the Sacramento-San Joaquin River system (Moyle et al. 1989). A population formerly known from the Napa

River is now presumed extinct. Hardhead have historically been common in newly built reservoirs for the first few years, and then disappear as introduced fishes, especially centrarchids, become abundant (Moyle 1976). Moyle identifies Shasta Lake, Folsom Lake, Lake Berryessa, Don Pedro Reservoir, and Millerton Reservoir as examples of reservoirs where this decline has occurred.

In Sonoma County, hardhead are common in the Russian River and Maacama Creek and rare in Santa Rosa and Mark West Creeks (Merritt Smith Consulting 1995). Moyle, et al. (1989) suggest that there are some (unspecified) indications that hardhead have declined in the Russian River, and that this population should be closely monitored.

Competition from introduced centrarchids (members of the Sunfish Family) is considered to be the primary cause for the decline in hardhead numbers.

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Longfin Smelt

The longfin smelt (*Spirinchus thaleichthys*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the longfin smelt is no longer considered a federal candidate species. It is not currently listed by the State of California.

Longfin smelt are euryhaline (able to live in waters of a wide range of salinities), and are found in waters ranging from fresh to oceanic (Moyle 1976). Their diet consists mainly of mysids, but other small crustaceans are also taken. Spawning in the Sacramento-San Joaquin Delta occurs from December through February. Eggs are adhesive and are probably deposited on rocks or aquatic plants. Most

longfin smelt apparently spawn and die after their second year of growth, at a size of 9 to 11 centimeters, but some individuals may live another year and spawn again, reaching lengths of 12 to 14 centimeters (Moyle 1976).

The following description of the seasonal distribution of longfin smelt in the Sacramento-San Joaquin estuary is taken directly from Moyle (1976):

---"they are most abundant in San Pablo and Suisun bays, where salinities normally are greater than 10 parts per thousand. They seem to occupy mostly the middle and bottom of the water column. They also have definite seasonal migrations, spending early summer in San Pablo and San Francisco Bays, and then moving into Suisun Bay in August. In the winter they congregate for spawning at the upper end of Suisun Bay and in the lower reaches of the Delta. There is a mass movement of young smelt downstream into the bays in April and May. The pattern of movement between Humboldt Bay and the Eel River seems to be similar."

Longfin smelt are found in estuaries from San Francisco Bay north to Prince William Sound, Alaska (Moyle 1976). They are known to occur in the Eel River estuary, but have not been reported in the Russian River, in CDFG surveys conducted in 1954, 1955, 1968, and 1984 (file reports provided by Bill Cox), nor in more recent surveys conducted in the Russian River estuary in 1992-1993 (Goodwin et al. 1984).

Degradation of water quality due to pesticide runoff and untreated wastewater, and changes in flow regimes due to diversion of water from tributaries, especially for agricultural practices, are probably the major causes for the decline of this species.

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Navarro Roach

The Navarro roach (*Lavinia symmetricus navarroensis*) is listed as a species of special concern by the CDFG (1994).

This particular species of roach is a form or possible subspecies of the California roach (*L. symmetricus*) that is found in the Russian and Navarro River systems. The systematic status of the populations of roach occupying different drainages

throughout California has been in dispute for a long time (Moyle et al. 1989). Slight morphological differences among fish from the different areas are detectable, but whether the different populations should be recognized as species, subspecies, or strains has yet to be resolved. Moyle et al. (1989) recognize the Navarro roach as a distinct form.

California roach are usually found in small, warmwater streams including intermittent streams, but may also be found in the main channels of larger streams such as the Russian River (Moyle et al. 1989). They are tolerant of high temperatures (up to 35° C) and low oxygen (one to two parts per million), and along with introduced species such as fathead minnow and mosquitofish, are among the last fish to survive deteriorating conditions in intermittent streams during the dry season (M. Fawcett, Fisheries Biologist, Merritt Smith Consulting, personal observations). They feed primarily on filamentous algae, but also ingest small insects and crustaceans, and may obtain much of their protein requirements from small animals eaten along with the algae. In Sonoma County streams they are usually associated with mats of emergent vegetation (M. Fawcett, Fisheries Biologist, Merritt Smith Consulting, personal observations).

California roach breed from March to July, laying adhesive eggs in gravel or emergent vegetation in flowing water (Moyle 1976). In Santa Rosa Creek large numbers of roach in breeding colors move upstream in March and April (Merritt Smith Consulting 1995). From April through the end of summer large numbers of juvenile roach occupy the shallow stream edges of Santa Rosa Creek (as well as Mark West Creek, Maacama Creek, and other area streams). Juvenile roach grow rapidly during the warm season. Sexual maturity is reached by the second year at a size of about 45 millimeters (Moyle et al. 1989). Navarro roach in the Russian River reach 90 millimeters in their third year. Few individuals live beyond three years (Moyle 1976).

The Navarro roach is abundant throughout the Russian River system and the Navarro River, and appears to be in no danger at the present time (Moyle et al. 1989). Roach populations have, however, disappeared from a number of Sierra Nevada foothill streams, and Moyle (1976) cautions that recolonization possibilities are limited by impassable dams and possibly by the widespread introduction of green sunfish, which have similar habitat requirements, attain larger size than the roach, and are aggressive and piscivorous (fish-eating). Green sunfish and numerous other introduced centrarchids (bass, crappies, bluegill) are now widespread throughout the Russian River system (M. Fawcett, Fisheries Biologist, Merritt Smith Consulting, personal observations) and may pose a threat to long-term viability of roach populations.

Degradation of water quality due to pesticide runoff and untreated wastewater, and changes in flow regimes due to diversion of water from tributaries, especially for agricultural practices, are probably the major causes for the decline of this

species. In addition, competition from introduced fish species may be detrimental to this species.

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Pacific Lamprey

The Pacific lamprey (*Lampetra tridentata*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Pacific lamprey is no longer considered a federal candidate species. It is not listed by the State of California.

Pacific lamprey occur in most coastal streams from the Santa Ana River (Los Angeles County) to Alaska (Moyle 1976), and were considered abundant prior to 1976 in most of their native habitats (although dams have obviously prevented access to former spawning grounds in many streams). Recent information on this species (Page and Burr 1991) suggests that it is still common in many streams.

Pacific lamprey adults are parasitic or predatory. The oral disc and tongue are used to latch onto the sides of larger fish and rasp away the skin and flesh, which is eaten. Lampreys are anadromous, migrating from the ocean or estuaries up rivers to spawn. Eggs are laid and fertilized in redds excavated in gravel riffles, generally in the same types of habitat that are used for spawning by anadromous salmonids (Moyle 1976; M. Fawcett, Fisheries Biologist, Merritt Smith Consulting, personal observations). After hatching, juvenile lampreys (called ammocoetes, similar in form to the adults, but without eyes), move downstream into pools with silty sand or mud bottoms, where they burrow into the substrate and spend the next four to seven years eating algae and detritus. They then metamorphose into the adult form and migrate downstream to an estuary or the

ocean, where they remain for only six to 18 months before going back upstream to spawn and die. Thus, most of their lives are spent as larvae (Moyle 1976).

Pacific lamprey generally make their spawning migration between April and late July (Moyle 1976). Adults moving upstream to spawn in Russian River tributaries (Mark West, Santa Rosa, and Maacama Creeks) have been routinely captured in fyke nets in April and May (Merritt Smith Consulting 1995). Ammocoetes reach 14 to 16 centimeters in length prior to metamorphosis (Moyle 1976).

The primary cause for the decline of the Pacific lamprey is degradation of habitat, including estuaries and freshwater tributaries. Degradation of water quality due to pesticide runoff and untreated wastewater, and changes in flow regimes due to diversion of water from tributaries, especially for agricultural practices, probably also contribute to the decline of this species.

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River Lamprey

The river lamprey (*Lampetra ayresi*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the river lamprey is no longer considered a federal candidate species. The river lamprey is listed as a species of special concern by the CDFG(1994).

Very little is known about the specific life history or distribution of river lamprey in California. Studies conducted on this species in British Columbia (Moyle et al. 1989) indicate that its life history is typical of lampreys in general, and that it spawns in small tributaries of larger rivers. The river lamprey is thought to be common in coastal streams from San Francisco north to Juneau, Alaska, and it is presumably abundant in the Sacramento-San Joaquin River system (Moyle et al. 1989). It probably also occurs in the Russian River system, but has not been reported there (although Pacific lamprey have been routinely captured, and brook lamprey have been observed spawning on several occasions) (Merritt Smith Consulting 1995). Ammocoetes can easily be found at any time in the Russian River and its tributaries (local fishermen dig them up for bait). However, it is nearly impossible to distinguish the species of ammocoetes, since their mouths lack the bony plates used to distinguish adults (Moyle 1976).

Lamprey adults are parasitic. The oral disc and tongue are used to latch onto the sides of larger fish and rasp away the skin and flesh, which is eaten. Lampreys are anadromous, migrating from the ocean or estuaries up rivers to spawn. Eggs are laid and fertilized in redds excavated in gravel riffles, generally in the same types of habitat that are used for spawning by anadromous salmonids (Moyle 1976; M. Fawcett, Fisheries Biologist, Merritt Smith Consulting, personal observations). After hatching, juvenile lampreys (ammocoetes), move downstream into pools with silty sand or mud bottoms, where they burrow into the substrate and spend the next four to seven years eating algae and detritus. They then metamorphose into the adult form and migrate downstream to an estuary or the ocean, where they remain for only six to 18 months before going back upstream to spawn and die. Thus, most of their lives are spent as larvae (Moyle 1976).

The primary cause for the decline of the river lamprey is degradation of habitat, including estuaries and freshwater tributaries. Degradation of water quality due to pesticide runoff and untreated wastewater, and changes in flow regimes due to diversion of water from tributaries, especially for agricultural practices, probably also contribute to the decline of this species.

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Russian River Tule Perch

The Russian River tule perch (*Hysterocarpus traskii pomo*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Russian River tule perch is no longer considered a federal candidate species. The species is listed as a species of special concern by the CDFG (1994).

The Russian River Tule Perch is one of three subspecies of the tule perch (*Hysterocarpus traskii*), all of which are endemic to California (Moyle et al. 1989). Tule perch are the only freshwater members of the family Embiotocidae (surfperches). The Russian River tule perch is confined to the Russian River and its tributaries. The other two subspecies are found in the Clear Lake basin (*H. t. lacunae*) and Sacramento-San Joaquin River system (*H. t. traskii*).

Tule perch require clear, moving water and abundant cover, especially submergent and emergent plants, and overhanging instream branches (Moyle et al. 1989). They feed on small invertebrates found on the bottom or among vegetation, and sometimes eat plankton. They are schooling fishes except during the mating season (July through September), when males defend territories. Tule perch are live-bearers, with each female producing from 22 to 83 young in May or June. Russian River tule perch reach five to eight centimeters in length by the end of their first summer, and 10 to 11 centimeters by the end of their third year (Moyle 1976). They seldom survive beyond five years.

Tule perch have occasionally been captured in fyke nets or seines in Santa Rosa Creek, Mark West Creek, Laguna de Santa Rosa, Maacama Creek, and Green Valley Creek (Merritt Smith Consulting 1995).

Degradation of both habitat and water quality are thought to be the primary causes associated with the decline of this species. Pesticide residue in runoff from agricultural lands and toxic compounds associated with urban runoff are the main factors associated with degradation of water quality. Moyle et al. (1989) argues that tule perch are sensitive to turbidity and to any kind of pollution, and that the Russian River population is at risk from declining water quality and habitat conditions in the river system.

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Sacramento Splittail

The Sacramento splittail (*Pogonichthys macrolepidotus*) is a federally proposed threatened species and a state endangered species (CDFG 1996).

Sacramento splittail are primarily freshwater fish, but can tolerate salinities of 10 to 12 parts per thousand (Moyle et al. 1989). Little is known of the species' life history, but their dentition, barbels, and mouth structure suggest that they feed on benthic and epibenthic invertebrates. There have been a few observations of splittail feeding on small clams, salmon eggs, and earthworms in flooded areas (Moyle 1976). Spawning occurs from early March to mid-May, and they seem to prefer flooded vegetation for spawning and rearing of young. Reproductive success has been found to be positively correlated with years of higher than normal winter runoff (Daniels and Moyle 1983). No information is available on growth rate, but they are believed to reach sexual maturity in their second or third years (at a size of 180 to 200 millimeters) and live to be about five years old (Moyle et al. 1989).

Sacramento splittail were formerly widely distributed in the Central Valley, but are now found mainly in the Sacramento-San Joaquin Delta, Suisun Bay, Suisun Marsh, and Napa Marsh, and occasionally in San Pablo Bay, during periods of high runoff (Moyle 1976; Moyle et al. 1989). They also regularly use the Petaluma River (Bill Cox, Biologist, CDFG - Region 3, personal communication 1995), and apparently also existed at one time in Coyote Creek in southern San Francisco Bay (Moyle 1976).

Degradation of both habitat and water quality are thought to be the primary causes associated with the decline of this species. Pesticide residue in runoff

from agricultural lands and toxic compounds associated with urban runoff are the main factors associated with degradation of water quality. Changes in flow regimes due to diversion structures for agricultural irrigation is another factor that may contribute to the decline of the species.

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Steelhead Trout

The steelhead trout (*Oncorhynchus mykiss*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the steelhead trout is no longer considered a federal candidate species. The species is not listed by the State of California.

Steelhead are an anadromous strain of rainbow trout (formerly known as *Salmo gairdneri*, but recently renamed *Oncorhynchus mykiss* and now considered one of six species of Pacific salmon). Like other salmon, steelhead migrate from the ocean to freshwater streams to spawn. Unlike other salmon, many steelhead survive and return to the sea after spawning, and may spawn again in subsequent years (Shapovalov and Taft 1954; Barnhart 1986).

In addition to their ability to spawn more than once, steelhead demonstrate more variability in other aspects of their life history than other species of Pacific salmon. Juveniles may spend one to four years in freshwater before going to sea for the first time, or may never go to sea. Once in the ocean, juveniles may spend from one to four years there before returning to fresh water to spawn, although one to two years is more typical (Barnhart 1986). Such variability is believed to

be an important adaptation that allows steelhead populations to be more resilient to adverse environmental conditions than coho populations, which spawn (or formerly spawned) in many of the same streams as steelhead (Kelley and Entrix, Inc. 1992).

Habitat requirements for spawning and juvenile rearing of steelhead are quite similar to those for coho salmon: coarse, clean, well aerated gravel for spawning in water 10 to 70 centimeters deep, optimal water temperature four to 14°C (sustained temperatures exceeding about 22° being lethal), clean water free from excessive quantities of sediment, an abundant supply of invertebrate food and shelter for resting and protection from predators (Shapovalov and Taft 1954; Allen 1969; Hall and Lantz 1969; Reiser and Bjornn 1979; Barnhart 1986). When rearing in streams also occupied by juvenile coho, juvenile steelhead are inclined to occupy riffles while the coho occupy pools (Barnhart 1986), but in many small California streams, riffle areas are greatly diminished during the dry season relative to pools and both species are found mainly in pools for several months of the year (Cross 1975; Merritt Smith Consulting 1995).

Steelhead formerly spawned in streams ranging from northern Baja California, to the Bering Sea, but now the southernmost population is in the Santa Clara River (Ventura County), and steelhead have disappeared from many coastal streams throughout California (Barnhart 1986). Factors believed to be responsible for most of the decline in steelhead populations in recent decades are the same as those cited for declines in other salmon populations: loss of spawning and rearing habitat through sedimentation, elevated temperatures, water diversions, dams, clearing of riparian vegetation, and other problems resulting from poor watershed management (Nehlsen et al. 1991).

Within the Project area, steelhead still spawn annually in Santa Rosa Creek, Mark West Creek, Green Valley Creek, Atascadero Creek, Maacama Creek, Big Sulphur Creek, Squaw Creek, and Sausal Creek (Price and Mamika 1980; McMillan 1985; Merritt Smith Consulting 1995). Additionally, steelhead may still spawn occasionally in one unnamed tributary of Americano Creek located within the proposed Carroll Road storage reservoir site (M. Fawcett, Fisheries Biologist, Merritt Smith Consulting, personal observations), and in Adobe Creek (Bill Cox, Biologist, CDFG - Region 3, personal communication 1995). In the past, steelhead probably spawned annually in Americano Creek, Stemple Creek, Blucher Creek, Crane Creek, Copeland Creek, Franz Creek, and possibly other Project area streams (Bill Cox, Biologist, CDFG - Region 3, personal communication 1995).

Improper watershed management has been the primary cause for the decline of steelhead trout populations. Activities associated with improper watershed management include damming of historical spawning tributaries, agricultural development (including diversion of water from tributaries and the dumping of

animal waste into streams), and siltation of spawning tributaries due to erosion associated with logging activities.

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Tidewater Goby

The tidewater goby (*Eucyclogobius newberryi*) is listed as a federally endangered species by the USFWS (CDFG 1996). It is also listed as a species of special concern by the CDFG (1994).

The tidewater goby is restricted to brackish water (salinity usually less than 10 parts per thousand salinity) at the upper ends of coastal lagoons (Swift et al. 1989; Moyle et al. 1989). They live on soft substrates of sand or mud, usually in areas of abundant submergent and emergent vegetation, in loose schools of a few to hundreds of individuals. Breeding occurs in April and May (Swift et al. 1989). Eggs are deposited inside burrows that are constructed and guarded by males until they hatch in about 10 days. Length frequency analysis suggests that the tidewater goby has an annual life cycle, with most adults dying soon after spawning.

The tidewater goby is found only in California, from San Diego to the mouth of the Smith River in Del Norte County (Swift et al. 1989). Populations have been declining or disappearing since the turn of the century, and Swift (1989) south of Morro Bay since 1900. They have also apparently disappeared from nine out of 10 former sites in San Francisco Bay (Moyle et al. 1989). Because of its narrow range of habitat requirements, low reproductive rate, and low ability to disperse to new areas, populations of tidewater goby are easily extirpated.

Recent surveys reported in Swift et al. (1989) located populations in several coastal lagoons or stream mouths in Marin and Sonoma Counties, including Rodeo Lagoon, Lagunitas Creek, Walker Creek, Estero de San Antonio, Estero Americano, Cheney Gulch, and Salmon Creek. Otter trawl surveys conducted by Merritt Smith Consulting in 1988 to 1990 found tidewater goby to be abundant in

Estero de San Antonio, and relatively scarce in Estero Americano (Merritt Smith Consulting 1989, 1995). Episodes of hypersalinity documented occasionally in summer in the upper end of Estero Americano (Merritt Smith Consulting 1995) could be an important factor in the relatively low density of tidewater goby in that system (Swift 1989).

Degradation of both habitat and water quality are thought to be the primary causes associated with the decline of this species. Pesticide residue in runoff from agricultural lands, toxic compounds associated with urban runoff, siltation, are the main factors associated with degradation of water quality. Changes in flow regimes and salinity, both attributed to diversion structures for agricultural irrigation, and the introduction of predatory fishes are other factors which may contribute to the decline of the species (Moyle et al. 1989; Swift et al. 1989).

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Amphibian Species

California Red-legged Frog

The California red-legged frog (*Rana aurora draytoni*) is listed as a federally threatened species by the USFWS (Federal Register 61(101): 25813-25833 [1996]) It is also listed as a species of special concern by the CDFG (1994).

California red-legged frog were formerly distributed throughout the Central Valley of California and from the Sierra foothills to the coast. Along the coast, California red-legged frog occur from Sonoma County south to northern Baja California. They have been demonstrating a steady decline throughout their range since the turn of the century and are currently considered to be extirpated in the Central Valley and much of the Sierras. However, they still seem to be holding on in the coastal parts of their range.

California red-legged frog prefer areas of deep quiet water that is well shaded by overhanging vegetation. Dense submergent vegetation is required as cover for the larvae. California red-legged frog is known to retreat into small mammal burrows during periods of inactivity. Juveniles feed on a variety of terrestrial and aquatic invertebrates while adults will additionally take many small vertebrates, such as deer mice and smaller frogs.

The decline of the California red-legged frog is linked to destruction of habitat from development, cattle activity, and the introduction of non-native predators such as fish and bullfrogs.

References

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California Tiger Salamander

The California tiger salamander (*Ambystoma californiense*) is listed as a federal candidate species by the USFWS (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]). It is also listed as a species of special concern by the CDFG (1994).

California tiger salamander occur primarily in the Central Valley and surrounding foothills from Butte County to Tulare County. They are also found along the central coast region of California from Sonoma County to Santa Barbara County.

The California tiger salamander inhabits grasslands and low foothills that have numerous small mammal burrows such as those made by California ground squirrel and pocket gopher. Adults are rarely seen outside of these underground retreats, except during periods of aseasonal rainfall or disturbance of their burrow. During the rainy season mass migrations occur as the salamanders congregate at breeding ponds. Seasonal pools or cattle tanks that lack fish are required as breeding sites. The larvae feed on aquatic invertebrates and insects, while adults eat a variety of small terrestrial and aquatic invertebrates. The larvae generally metamorphose before the pools dry up, but require at least 10 weeks to accomplish this.

Destruction of habitat for development and cattle activity is the primary cause for the decline of this species; however, introduced predators and widespread pesticide use also take their toll.

References

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Foothill Yellow-legged Frog

The foothill yellow-legged frog (*Rana boylei*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the foothill yellow-legged frog is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

Foothill yellow-legged frog was formerly distributed in appropriate habitat throughout the State. It is known to have historically been common in upland drainages throughout Sonoma County, but has been disappearing from much of its range in recent years.

Foothill yellow-legged frog require shallow flowing water, usually in small to moderate streams, with varying amounts of cobble sized or larger rock substrate. This type of habitat is their primary breeding habitat.

The decline of the foothill yellow-legged frog is linked to destruction of habitat and the introduction of non-native predators such as fish and the bullfrog.

References

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Western Spadefoot Toad

The western spadefoot toad (*Scaphiopus hammondi*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the spadefoot toad is no longer considered a federal candidate species. It is listed as a species of special of concern by the CDFG (1994).

Western spadefoot toad ranges throughout the Central Valley and bordering foothills. The species is also known from the Coast Range south of San Francisco Bay into northwestern Baja California (Stebbins 1985). The California Natural Diversity Database lists no occurrences of this species in Sonoma County (CNDDDB 1994). Phil Northen, a biology Professor at Sonoma State University, is very familiar with the biology and vocalizations of spadefoot toads, has never sighted the species during extensive seasonal wetland surveys that he has conducted in Sonoma County (Phil Northen, Professor of Biology, Sonoma State University, personal communication 1995). He does not believe that the species occurs in Sonoma County (Phil Northen, Professor of Biology, Sonoma State University, personal communication 1995).

Western spadefoot toad is found in valley and foothill grassland, open chaparral and pine-oak woodland in areas that are subject to seasonal flooding (Jennings 1995; Stebbins 1985). They typically spend eight to nine months of the year estivating underground, emerging during the late winter and early spring to breed in the seasonal pools left behind after the rains (Jennings 1995; Stebbins 1985). Western spadefoot toads are also known to breed in stock ponds that lack predatory fishes and bullfrogs.

The decline of the western spadefoot toad is linked to destruction of habitat from conversion of grasslands to agriculture, urban development, cattle grazing, and the introduction of non-native predators such as fish and bullfrogs (Jennings 1995).

References

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Reptile Species

Northwestern Pond Turtle

The northwestern pond turtle (*Clemmys marmorata marmorata*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the pond turtle is no longer considered a federal candidate species. It is listed as a species of special of concern by the CDFG (1994).

Northwestern pond turtle is found over much of the northern half of California, ranging west of the Sierras from the Oregon border to the San Francisco Bay. There are several known occurrences of northwestern pond turtle throughout Sonoma County.

This species of pond turtle is wholly aquatic, and is found in still to slow moving water in ponds, marshes, streams, rivers and irrigation ditches that occur in association with grassland, woodland and open forest. They bask on logs or other objects that jut out of the water, on floating mats of vegetation, or by floating in the warmer surface layer of the water with their heads above of the water. Juveniles require shallow water with dense submergent or short emergent vegetation. Mating occurs in late April or early May and the females will travel up to 400 meters or more to an upland nesting site where 1-13 eggs will be laid. The diet of the northwestern pond turtle consists of plants, insects, worms, fish, and carrion.

Primary causes for decline are habitat degradation and destruction. There has been some evidence that bullfrogs may prey upon the juveniles.

References

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TERRESTRIAL PLANTS

The abbreviations used in the following plant species accounts are explained in Table 3, which is located under Aquatic Plants.

Pink Sand-verbena

Abronia umbellata Lam. ssp. *breviflora* (Standl.) Munz

Family: Nyctaginaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: DNT, HUM, MEN, SON, OR

Study Area?: None

Habitat: Coastal Dunes

Life Form: Perennial herb

Blooming: July-October

Notes: Most occurrences have few plants. Threatened by vehicles, non-native plants, and foot traffic. State-listed as Endangered in OR.

Agrostis aristiglumis

Considered but rejected: A synonym of *A. microphylla*; a common taxon

Blasdale's Bent Grass

Agrostis blasdalei Hitchc.

Family: Poaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN, SCR, SON

Study Area?: Yes; Valley Ford

Habitat: Coastal Bluff Scrub, Coastal Dunes, Coastal Prairie

Life Form: Perennial herb (rhizomatous)

Blooming: May-July

Notes: Known from fewer than fifteen occurrences. Historical occurrences need field surveys. Threatened by agriculture and recreation. Includes *A. blasdalei* var. *marinensis*, which is state-listed Rare.

Agrostis blasdalei var. *blasdalei*

See *Agrostis blasdalei*

Agrostis blasdalei var. *marinensis*

See *Agrostis blasdalei*

Agrostis clivicola var. *clivicola*

Considered but rejected: A synonym of *A. densiflora*; a common taxon

Agrostis clivicola var. *punta-reyesensis*

Considered but rejected: A synonym of *A. densiflora*; a common taxon

Bent-flowered Fiddleneck

Amsinckia lunaris Macbr.

Family: Boraginaceae

CNPS List: 4

State/Fed. Status: None

Distribution: ALA, CCA, LAK, MRN, SCR, SHA, SIS

Study Area?: None

Habitat: Cismontane Woodland, Valley and Foothill Grasslands

Life Form: Annual herb

Blooming: March-June

Notes: Most Bay Area records are old; current status unknown.

Dimorphic Snapdragon

Antirrhinum subcordatum Gray

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL, GLE, LAK, TEH

Study Area?: None

Habitat: Chaparral, Lower Montane Coniferous Forest / sometimes serpentinite

Life Form: Annual herb

Blooming: April-July

Notes: Threatened by road maintenance and grazing. See *Proceedings of the American Academy of Arts and Sciences* 20:306 (1884) for original description.

Tall Snapdragon

Antirrhinum virga Gray

Family: Scrophulariaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, MEN, NAP, SON

Study Area?: None

Habitat: Chaparral (rocky openings, often serpentinite)

Life Form: Perennial herb

Blooming: June-July

Notes: See *Proceedings of the American Academy of Arts and Sciences* 7:373 (1868) for original description, and *Systematic Botany Monographs* 22:53-57 (1988) for taxonomic treatment.

Coast Rock Cress

Arabis blepharophylla H. & A.

Family: Brassicaceae

CNPS List: 4

State/Fed. Status: None

Distribution: CCA, MRN, SCR, SFO, SMT, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Coastal Bluff Scrub, Coastal Prairie, Coastal Scrub

Life Form: Perennial herb

Blooming: February-April

Notes: See *Rhodora* 43(511):348-349 (1941) for taxonomic treatment, and *Contributions from the Gray Herbarium* 204:149-154 (1973) for taxonomic information.

Baker's Manzanita

Arctostaphylos bakeri Eastw. ssp. *bakeri*

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: CR/

Distribution: SON

Study Area?: Yes; Camp Meeker, Jintown

Habitat: Broadleafed Upland Forest, Chaparral / often serpentinite

Life Form: Shrub (evergreen)

Blooming: February - April

Notes: Known from fewer than ten occurrences. Threatened by road construction and widening, non-native plants, and dumping, and potentially by development. See *Leaflets of Western Botany* 1:115 (1934) for original description.

The Cedars Manzanita

Arctostaphylos bakeri Eastw. ssp. *sublaevis* Wells

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SON

Study Area?: None

Habitat: Closed-cone Coniferous Forest, Chaparral / serpentinite seeps

Life Form: Shrub (evergreen)

Blooming: April-May

Notes: See *Four Seasons* 8(2):58-68 (1988) for original description.

Sonoma Manzanita

Arctostaphylos canescens Eastw. ssp. *sonomensis* (Eastw.) Wells

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: HUM, LAK, MEN, SON, TEH

Study Area?: Yes; Santa Rosa

Habitat: Chaparral, Lower Montane Coniferous Forest / sometime serpentinite

Life Form: Shrub (evergreen)

Blooming: January-March

Notes: Much of Rincon Ridge (SON Co.) threatened by development. See *Four Seasons* 7 (3):42-46 (1985) for status update, and *Madroño* 35 (4):330-341 (1988) for revised nomenclature.

Vine Hill Manzanita

Arctostaphylos densiflora M. S. Baker

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: CE/

Distribution: SON

Study Area?: Yes; Sebastopol

Habitat: Chaparral (acid marine sand)

Life Form: Shrub (evergreen)

Blooming: February-March

Notes: Known from only one extant occurrence on the Sonoma Barren near Forestville. Threatened by fungal infection. See *Leaflets of Western Botany* 1(4):31-32 (1932) for original description.

Howell's Manzanita

Arctostaphylos hispidula Howell

Family: Ericaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, HUM, SON, OR

Study Area?: None

Habitat: Chaparral (serpentinite or sandstone)

Life Form: Shrub (evergreen)

Blooming: March-April

Notes: Threatened by mining. Endangered in OR.

Mt. Tamalpais Manzanita

Arctostaphylos hookeri D. Don ssp. *montana* (Eastw.) Wells

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Chaparral, Valley and Foothill Grasslands / serpentinite

Life Form: Shrub (evergreen)

Blooming: February-April

Notes: Known from fewer than twenty occurrences in the Mt. Tamalpais area. See *Madroño* 19(6):193-210 (1968) for revised nomenclature.

Rincon Manzanita

Arctostaphylos stanfordiana Parry ssp. *decumbens* Wells

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SON

Study Area?: Yes; Santa Rosa, Guerneville

Habitat: Chaparral (rhyolitic)

Life Form: Shrub (evergreen)

Blooming: February-April

Notes: Known from fewer than ten occurrences. Seriously threatened by development, road construction, vehicles, and viticulture. See *Four Seasons* 4(2):16-17 (1972) for original description and 9(2):60-63 (1992) for revised nomenclature.

Raiche's Manzanita

Arctostaphylos stanfordiana Parry ssp. *raichei* Knight

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, MEN

Study Area?: None

Habitat: Chaparral, Lower Montane Coniferous Forest (openings) / rocky often serpentinite

Life Form: Shrub (evergreen)

Blooming: February-April

Notes: Threatened by urbanization. See *Four Seasons* 7(3):6-20 (1985) for original description.

Marin Manzanita

Arctostaphylos virgata Eastw.

Family: Ericaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Broadleafed Upland Forest, Closed-cone Coniferous Forest, Chaparral, North Coast Coniferous Forest / sandstone or granitic

Life Form: Shrub (evergreen)

Blooming: January-March

Notes: Known from fewer than twenty occurrences. Threatened by fire suppression.

Serpentine Milkweed

Asclepias solanoana Woodson

Family: Asclepiadaceae

CNPS List: 4

State/Fed. Status: None

Distribution: COL, GLE, LAK, MEN, NAP, SHA, SON, TEH, TRI, YOL

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest / serpentinite

Life Form: Perennial herb

Blooming: May-August

Notes: Not common where it occurs. Some occurrences threatened by grazing, vehicles, logging, mining, or geothermal development. See *Proceedings of the American Academy of Arts and Sciences* 10:76 (1874) for original description, and *Madroño* 24(3):159-177 (1977) for information on floral ecology.

Brewer's Milk-vetch

Astragalus breweri Gray

Family: Fabaceae

CNPS List: 4

State/Fed. Status: None

Distribution: COL, LAK, MEN, MRN, NAP, SON, YOL

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Meadows and Seeps, Valley and Foothill Grasslands / often serpentinite, volcanic

Life Form: Annual herb

Blooming: April-June

Notes: Populations have been lost to development and road construction. See *Systematic Botany* 17(3):367-379 (1992) for distributional information.

Clara Hunt's Milk-vetch

Astragalus clarianus Jeps.

Family: Fabaceae

CNPS List: 1B

State/Fed. Status: CT/PE

Distribution: NAP, SON

Study Area?: None

Habitat: Chaparral (openings), Cismontane Woodland, Valley and Foothill Grasslands / serpentinite, volcanic, rocky, clay

Life Form: Annual herb

Blooming: March-April

Notes: Known from only five occurrences. Threatened by urbanization, recreational development, and non-native plants; largest known population covered by dredge material in 1990. See *Manual of the Flowering Plants of California*, p. 578 (1925) by W. L. Jepson for original description, and *Systematic Botany* 17(3):367-379 (1992) for distributional information.

Cleveland's Milk-vetch

Astragalus clevelandii Greene

Family: Fabaceae

CNPS List: 4

State/Fed. Status: None

Distribution: COL, LAK, NAP, SBT, YOL

Study Area?: None

Habitat: Chaparral, Cismontane Woodland / serpentinite seeps

Life Form: Perennial herb

Blooming: June-September

Rattan's Milk-vetch

Astragalus rattanii Gray var. *rattanii*

Family: Fabaceae

CNPS List: 4

State/Fed. Status: None

Distribution: COL, GLE, HUM, LAK, MEN, SON, TEH, TRI

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest / gravelly streambanks

Life Form: Perennial herb

Blooming: April-July

Notes: See *Systematic Botany* 17(3):367-379 (1992) for distributional information.

Point Reyes Blennosperma

Blennosperma nanum (Hook.) Blake var. *robustum* J. T. Howell

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: CR/

Distribution: MEN, MRN

Study Area?: None

Habitat: Coastal Prairie, Coastal Scrub

Life Form: Annual herb

Blooming: March

Notes: Known from fewer than fifteen occurrences. Possibly threatened by grazing. Plants found near Fort Bragg in 1988 appear closest to this taxon. Some Pt. Reyes populations intermediate to var. *nanum*. See *Leaflets of Western Botany* 5:105-108 (1948) for original description.

Brewer's Calandrinia

Calandrinia breweri Wats.

Family: Portulacaceae

CNPS List: 4

State/Fed. Status: None

Distribution: CCA, LAX, MEN, MNT, MPA, MRN, NAP, SBA, SBD, SCL, SCR, SCZ, SDG, SLO, SMT, SON, VEN, BA

Study Area?: None

Habitat: Chaparral, Coastal Scrub / sandy or loamy, disturbed sites, and burns

Life Form: Annual herb

Blooming: March-June

Notes: Plant appears to be widely scattered but uncommon everywhere, and most collections are old. Field surveys needed. See *Proceedings of the American Academy of Arts and Sciences* 11:124 (1876) for original description.

The Cedars Fairy-lantern

Calochortus raichei Farwig & Girard

Family: Liliaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SON

Study Area?: None

Habitat: Closed-cone Coniferous Forest, Chaparral / serpentinite

Life Form: Perennial herb (bulbiferous)

Blooming: May-August

Notes: Endemic to The Cedars near Guerneville. Potentially threatened by mining and road construction. See *Herbertia* 43(1):2-9 (1987) for original description, and *Fremontia* 15(2):18 (1987) for species account.

Tiburon Mariposa Lily

Calochortus tiburonensis Hill

Family: Liliaceae

CNPS List: 1B

State/Fed. Status: CT/FT

Distribution: MRN

Study Area?: None

Habitat: Valley and Foothill Grasslands (serpentinite)

Life Form: Perennial herb (bulbiferous)

Blooming: March-June

Notes: Known from only one occurrence at Ring Mtn. Preserve (TNC) on the Tiburon Peninsula. See *Madroño* 22(2):100-104 (1973) for original description, and *Journal of Ecology* 75:977-995 (1987) for population biology.

Four-petaled Pussypaws

Calyptridium quadripetalum Wats.

Family: Portulacaceae

CNPS List: 4

State/Fed. Status: None

Distribution: GLE, LAK, NAP, SON, TEH, TRI

Study Area?: None

Habitat: Chaparral, Lower Montane Coniferous Forest / sandy or gravelly, usually serpentinite

Life Form: Annual herb

Blooming: April-June

Notes: Threatened by vehicles. See *Proceedings of the American Academy of Arts and Sciences* 20:356 (1885) for original description.

Mt. Saint Helena Morning-glory

Calystegia collina (Greene) Brummitt ssp. *oxyphylla* Brummitt

Family: Convolvulaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, NAP SON

Study Area?: None

Habitat: Chaparral (serpentinite)

Life Form: Perennial herb (rhizomatous)

Blooming: May-June

Notes: See *Kew Bulletin* 35(2):328 (1980) for original description.

Dissected-leaf Toothwort

Cardamine pachystigma (Wats.) Roll. var. *dissectifolia* (Detl.) Roll.

Family: Brassicaceae

CNPS List: 3

State/Fed. Status: None

Distribution: BUT, GLE, MEN, PLA, SON, TEH

Study Area?: Yes; The Geysers

Habitat: Chaparral, Lower Montane Coniferous Forest / usually serpentinite, rocky

Life Form: Perennial herb (rhizomatous)

Blooming: February-May

Notes: Move to List 1B? Location, rarity, and endangerment information needed. See *American Journal of Botany* 23:575 (1936) for original description, and *Harvard Papers in Botany* 4:43-48 (1993) for revised nomenclature.

Tiburon Indian Paintbrush

Castilleja affinis H. & A ssp. *neglecta* (Zeile) Chuang & Heckard

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: CT/FE

Distribution: MRN, NAP, SCL

Study Area?: None

Habitat: Valley and Foothill Grasslands / serpentinite

Life Form: Perennial herb, hemiparasitic

Blooming: April-June

Notes: Known from six occurrences. Protected in part at Ring Mtn. Preserve (TNC), MRN Co. Threatened by development, gravel mining, and grazing. State-listed as *C. neglecta*, USFWS also uses this name.

Castilleja leschkeana

Considered but rejected: Not in CA; name misapplied to *C. chrymactis*, native to Alaska, extinct waif in CA

Castilleja neglecta

See *Castilleja affinis* ssp. *neglecta*

Rincon Ridge Ceanothus

Ceanothus confusus J. T. Howell

Family: Rhamnaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, MEN, NAP, SON

Study Area?: Yes; Santa Rosa, Sebastopol*, Guerneville

Habitat: Closed-cone Coniferous Forest, Chaparral, Cismontane Woodland / volcanic or serpentinite

Life Form: Shrub (evergreen)

Blooming: February-April

Notes: Threatened by development. Closely related to *C. prostratus*. See *Leaflets of Western Botany* 2:160-162 (1939) for original description.

Calistoga Ceanothus

Ceanothus divergens Parry

Family: Rhamnaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: Yes; Santa Rosa

Habitat: Chaparral (serpentinite or volcanic, rocky)

Life Form: Shrub (evergreen)

Blooming: February-March

Notes: Threatened by development in The Geysers geothermal area. Closely related to *C. purpureus*.

Vine Hill Ceanothus

Ceanothus foliosus Parry var. *vineatus* McMinn

Family: Rhamnaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN*, SON

Study Area?: Yes; Sebastopol

Habitat: Chaparral

Life Form: Shrub (evergreen)

Blooming: March-May

Notes: Nearly extirpated in SON Co.; now confirmed from only one native population. Known from one historical occurrence in MEN Co., but unable to relocate.

Point Reyes Ceanothus

Ceanothus gloriosus J. T. Howell var. *gloriosus*

Family: Rhamnaceae

CNPS List: 4

State/Fed. Status: None

Distribution: MEN, MRN, SON

Study Area?: None

Habitat: Coastal Bluff Scrub, Closed-cone Coniferous Forest, Coastal Dunes, Coastal Scrub / sandy

Life Form: Shrub (evergreen)

Blooming: March-May

Mt. Vision Ceanothus

Ceanothus gloriosus J. T. Howell var. *porrectus* J. T. Howell

Family: Rhamnaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Closed-cone Coniferous Forest, Coastal Prairie, Coastal Scrub, Valley and Foothill Grasslands

Life Form: Shrub (evergreen)

Blooming: March-May

Notes: Known from fewer than fifteen occurrences in the Mt. Vision area near Pt. Reyes. Some plants destroyed by quarrying; occurs in areas grazed by cattle.

Mason's Ceanothus

Ceanothus masonii McMinn

Family: Rhamnaceae

CNPS List: 1B

State/Fed. Status: CR/

Distribution: MRN

Study Area?: Yes; Point Reyes NE

Habitat: Chaparral (serpentinite, rocky)

Life Form: Shrub (evergreen)

Blooming: March-April

Notes: Known from approximately five occurrences. May be a variety of *C. gloriosus*. See *Madroño* 6:171-173 (1942) for original description.

Sonoma Ceanothus

Ceanothus sonomensis J. T. Howell

Family: Rhamnaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: NAP, SON

Study Area?: None

Habitat: Chaparral (sandy, serpentinite or volcanic)

Life Form: Shrub (evergreen)

Blooming: February-April

Notes: Known from approximately ten occurrences; only one occurrence known from NAP Co. Seriously threatened by development. Closely related to *C. cuneatus*.

Dwarf Soaproot

Chlorogalum pomeridianum (DC.) Kunth var. *minus* Hoov.

Family: Liliaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL, LAK, SLO, SON, TEH

Study Area?: None

Habitat: Chaparral (serpentinite)

Life Form: Perennial herb (bulbiferous)

Blooming: May-August

Notes: See *Madroño* 5(5):144 (1940) for original description.

San Francisco Bay Spineflower

Chorizanthe cuspidata Wats. var. *cuspidata*

Family: Polygonaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA*, MRN, SCL?, SFO, SMT, SON

Study Area?: None

Habitat: Coastal Bluff Scrub, Coastal Dunes, Coastal Prairie, Coastal Scrub / sandy

Life Form: Annual herb

Blooming: April-August

Notes: Plant may occur in SCL Co.; need more information. Closely related to *C. pungens*. Some plants from Point Reyes (MRN Co.) probably intermediate to var. *villosa*. See *C. cuspidata* in *The Jepson Manual*. See *Proceedings of the Davenport Academy of Natural Sciences* 4:60 (1884) for original description, and *Phytologia* 66(2):127-129 (1989) for taxonomic treatment.

Woolly-headed Spineflower

Chorizanthe cuspidata Wats. var. *villosa* (Eastw) Munz

Family: Polygonaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN, SON

Study Area?: Yes; Valley Ford

Habitat: Coastal Dunes, Coastal Prairie, Coastal Scrub / sandy

Life Form: Annual herb

Blooming: May-August

Notes: Endemic to coastline from Bodega Bay to Point Reyes. See *C. cuspidata* in *The Jepson Manual*. See *Bulletin of the Torrey Botanical Club* 30:485 (1903) for original description, and *Phytologia* 66(2):127-130 (1989) for taxonomic treatment.

Monterey Spineflower

Chorizanthe pungens Benth. var. *pungens*

Family: Polygonaceae

CNPS List: 1B

State/Fed. Status: /PE

Distribution: MNT, SCR, SLO*

Study Area?: None

Habitat: Chaparral (maritime), Cismontane Woodland, Coastal Dunes, Coastal Scrub, Valley and Foothill Grasslands / sandy

Life Form: Annual herb

Blooming: April-June

Notes: Collected only once (1842) in SLO Co. Threatened by urbanization, recreational development, and recreational activities, and possibly by non-native plants. See *C. pungens* in *The Jepson Manual*. See *Phytologia* 66(2):123-125 (1989) for taxonomic treatment.

Sonoma Spineflower

Chorizanthe valida Wats.

Family: Polygonaceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: MRN, SON*

Study Area?: Yes; Sebastopol*

Habitat: Coastal Prairie (sandy)

Life Form: Annual herb

Blooming: June-August

Notes: Thought extinct for 77 years; only known extant occurrence was rediscovered in 1980 at Point Reyes NS. Closely related to *C. pungens*. See *Proceedings of the American Academy of Arts and Sciences* 12:271 (1877) for original description, *Phytologia* 66(2):132-134 (1989) for taxonomic treatment, *Fremontia* 18(1):17-18 (1990) for species account, and *Madroño* 39(4):271-280 (1992) for ecological study.

Franciscan Thistle

Cirsium andrewsii (Gray) Jeps.

Family: Asteraceae

CNPS List: 4

State/Fed. Status: None

Distribution: MRN, SFO, SMT, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Coastal Bluff Scrub, Coastal Scrub / sometimes serpentinite

Life Form: Perennial herb

Blooming: March-July

Mt. Tamalpais Thistle

Cirsium hydrophilum (Greene) Jeps. var. *vaseyi* (Gray) J. T. Howell

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Broadleafed Upland Forest, Chaparral / serpentinite seeps

Life Form: Perennial herb

Blooming: May-July

Notes: Known from fewer than ten occurrences on Mt. Tamalpais. Threatened by road construction and non-native plants. See *Synoptical Flora of North America* 1(2):403-404 (1884) for original description.

Raiche's Red Ribbons

Clarkia concinna Fisch. & Mey. (Greene) ssp. *raichei* G. Allen, V. Ford & L. Gottlieb

Family: Onagraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Coastal Bluff Scrub

Life Form: Annual herb

Blooming: April-May

Notes: Known from only one occurrence near Tomales. See *Madroño* 37(4):305-310 (1990) for original description.

Vine Hill Clarkia

Clarkia imbricata Lewis & Lewis

Family: Onagraceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: SON

Study Area?: Yes; Sebastopol

Habitat: Chaparral, Valley and Foothill Grasslands / acidic sandy loam

Life Form: Annual herb

Blooming: June-August

Notes: Known from only two occurrences, one of which is introduced; a third, natural occurrence has been extirpated. Threatened by development and road maintenance. See *Madroño* 12:33-39 (1953) for original description.

Round-headed Chinese Houses

Collinsia corymbosa Herder

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: HUM, MEN, MRN?, SFO*, SON

Study Area?: None

Habitat: Coastal Dunes

Life Form: Annual herb

Blooming: April-June

Notes: Scattered distribution. May intergrade with *C. bartsiiifolia* var. *bartsiiifolia*.

Serpentine Bird's-beak

Cordylanthus tenuis Gray ssp. *brunneus* (Jeps.) Munz

Family: Scrophulariaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: None

Habitat: Closed-cone Coniferous Forest, Chaparral, Cismontane Woodland / serpentinite

Life Form: Annual herb, hemiparasitic

Blooming: July-August

Notes: See *Systematic Botany Monographs* 10:50-62 (1986) for taxonomic treatment.

Pennell's Bird's-beak

Cordylanthus tenuis Gray ssp. *capillaris* (Penn.) Chuang & Heckard

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: CR/FE

Distribution: SON

Study Area?: Yes; Camp Meeker

Habitat: Closed-cone Coniferous Forest, Chaparral / serpentinite

Life Form: Annual herb, hemiparasitic

Blooming: June-July

Notes: Known from fewer than five occurrences near Occidental. Threatened by dumping, vehicles, and road maintenance, and potentially by development. See *Systematic Botany Monographs* 10:50-62 (1986) for taxonomic treatment.

Pygmy Cypress

Cupressus goveniana Gord. ssp. *pigmaea* (Lemmon) Bartel

Family: Cupressaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, SON

Study Area?: None

Habitat: Closed-cone Coniferous Forest (podzol-like soil)

Life Form: Tree (evergreen)

Blooming: N/A

Notes: Threatened by development and vehicles. See *Phytologia* 70(4):229-230 (1990) for revised nomenclature.

Cuscuta howelliana

Considered but rejected: Too common

Clustered Lady's-slipper

Cypripedium fasciculatum Wats.

Family: Orchidaceae

CNPS List: 4

State/Fed. Status: None

Distribution: BUT, DNT, HUM, NEV, PLU, SCL, SCR*, SHA, SIE, SIS, SMT, TEH, TRI, YUB, ID, OR, UT, WA+

Study Area?: None

Habitat: Lower Montane Coniferous Forest, North Coast Coniferous Forest / usually serpentinite seeps and streambanks

Life Form: Perennial herb (rhizomatous)

Blooming: March-July

Notes: Many occurrences but most contain few plants. Threatened by logging and horticultural collecting. Monitoring needed for protected populations on USFS lands to assess reproduction, which may be inadequate. Threatened in ID, a candidate for state listing in OR, and state-listed as Threatened in WA. See *Proceedings of the American Academy of Arts and Sciences* 17:380 (1882) for original description, *Lindleyana* 2(1):553-57 (1987) for distributional information, and *Fremontia* 17(2):17-19 (1989) for species account.

Mountain Lady's-slipper

Cypripedium montanum Lindl.

Family: Orchidaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, HUM, MAD, MEN, MOD, MPA, PLU, SIE, SIS, SMT, SON, TEH, TRI, TUO, OR, WA, ++

Study Area?: None

Habitat: Broadleafed Upland Forest, Lower Montane Coniferous Forest

Life Form: Perennial herb (rhizomatous)

Blooming: March-July

Notes: Many protected populations on USFS land not reproducing. Possibly threatened by logging. On watch list in OR. See *Fremontia* 17(2):17-19 (1989) for species account.

Baker's Larkspur

Delphinium bakeri Ewan

Family: Ranunculaceae

CNPS List: 1B

State/Fed. Status: CR/FC

Distribution: MRN, SON*

Study Area?: Yes; Petaluma, Point Reyes NE, Camp Meeker

Habitat: Coastal Scrub

Life Form: Perennial herb

Blooming: March-May

Notes: Known from fewer than five occurrences. Threatened by agriculture and grazing, and potentially by road maintenance. See *Bulletin of the Torrey Botanical Club* 69:144 (1942) for original description.

Yellow Larkspur

Delphinium luteum Heller

Family: Ranunculaceae

CNPS List: 1B

State/Fed. Status: CR/FC

Distribution: SON

Study Area?: Yes; Sebastopol*, Valley Ford*

Habitat: Chaparral, Coastal Prairie, Coastal Scrub

Life Form: Perennial herb

Blooming: March-May

Notes: Known from only two occurrences near Bodega Bay. Plants from MRN Co. apparently hybrids with *D. decorum* ssp. *decorum*; also hybridizes with *D. nudicaule*. Threatened by development and grazing. See *Bulletin of the Southern California Academy of Sciences* 2:68-69 (1903) for original description.

Geyser's Dichanthelium

Dichanthelium lanuginosum (Ell.) Gould var. *thermale* (Boland.) Spellenberg

Family: Poaceae

CNPS List: 1B

State/Fed. Status: CE/

Distribution: SON

Study Area?: Yes; The Geysers

Habitat: Closed-cone Coniferous Forest, Riparian Forest, Valley and Foothill Grasslands / hydrothermally-altered soil

Life Form: Perennial herb

Blooming: June-August

Notes: Endemic to The Geysers geothermal area. Threatened by energy development. A synonym of *Panicum acuminatum* var. *acuminatum* in *The Jepson Manual*. See *Madroño* 23(3):151 (1975) for taxonomic treatment.

Western Dichondra

Dichondra occidentalis House

Family: Convolvulaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAX?, MRN?, ORA, SBA, SCT, SCZ, SDG, SMI, SRO, VEN, BA

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Coastal Scrub, Valley and Foothill Grasslands

Life Form: Perennial herb (rhizomatous)

Blooming: January-May

Notes: Records for MRN Co. are questionable; report from LAX Co. needs confirmation. See *Muhlenbergia* 1:130-131 (1906) for original description.

Western Leatherwood

Dirca occidentalis Gray

Family: Thymelaeaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA, CCA, MRN, SCL, SMT, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Closed-cone Coniferous Forest, Chaparral, Cismontane Woodland, North Coast Coniferous Forest, Riparian Forest, Riparian Woodland / mesic

Life Form: Shrub (deciduous)

Blooming: January-April

Notes: Populations declining; not reproducing well.

California Bottle-brush Grass

Elymus californicus (Bol.) Gould

Family: Poaceae

CNPS List: 4

State/Fed. Status: None

Distribution: MNT, MRN, SCR, SMT, SON

Study Area?: None

Habitat: Cismontane Woodland, North Coast Coniferous Forest, Riparian Woodland

Life Form: Perennial herb

Blooming: June-August

Brandeggee's Eriastrum

Eriastrum brandegeae Mason

Family: Polemoniaceae

CNPS List: 1B

State/Fed Status: None

Distribution: COL, GLE, LAK, SCL, THE, TRI

Study Area?: Yes; The Geysers

Habitat: Chaparral, Cismontane Woodland / volcanic

Life Form: Annual herb

Blooming: May-August

Notes: Threatened by grazing, vehicles, recreation, and development. Includes *E. tracyi*, which is state-listed Rare. See *Madroño* 8:88-89 (1945) for original description.

Narrow-leaved Daisy

Erigeron angustatus Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: Yes; Camp Meeker

Habitat: Chaparral (serpentinite)

Life Form: Perennial herb

Blooming: May-September

Notes: See *Bulletin of the Southern California Academy of Sciences* 1:88 (1885) for original description, and *Phytologia* 72(3):157-208 (1992) for taxonomic treatment.

Streamside Daisy

Erigeron biolettii Greene

Family: Asteraceae

CNPS List: 3

State/Fed. Status: None

Distribution: HUM, MEN, MRN, NAP, SOL, SON

Study Area?: Yes; Camp Meeker

Habitat: Broadleafed Upland Forest, Cismontane Woodland, North Coast Coniferous Forest / rocky, mesic

Life Form: Perennial herb

Blooming: June-September

Notes: Move to List 1B? Location, rarity, and endangerment information needed, especially quad for MRN Co. Most collections are very old. Intergrades with *E. inornatus*. See *Manual of the Botany of the Region of San Francisco Bay*, p. 181 (1894) by E. Greene for original description, and *Phytologia* 72(2):157-208 (1992) for taxonomic treatment.

Serpentine Daisy

Erigeron serpentinus Nesom

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SON

Study Area?: None

Habitat: Chaparral (serpentinite)

Life Form: Perennial herb

Blooming: May-August

Notes: Endemic to The Cedars. Similar to *E. angustatus*. See *Phytologia* 72(3):157-208 (1992) for original description.

Supple Daisy

Erigeron supplex Gray

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN*, SON

Study Area?: None

Habitat: Coastal Bluff Scrub, Coastal Prairie

Life Form: Perennial herb

Blooming: May-June

Notes: Threatened by coastal development. See *Proceedings of the American Academy of Arts and Sciences* 24:83 (1889) for original description, and *Madroño* 33(4):308-309 (1986) for distributional information.

Tiburon Buckwheat

Eriogonum luteolum Greene var. *caninum* (Greene) Reveal

Family: Polygonaceae

CNPS List: 3

State/Fed. Status: None

Distribution: ALA, COL, LAK, MRN, NAP, SCL, SMT, SON*

Study Area?: Yes; Petaluma, Camp Meeker*

Habitat: Chaparral, Coastal Prairie, Valley and Foothill Grasslands / serpentinite

Life Form: Annual herb

Blooming: June-September

Notes: Move to List 1B? Location information needed, especially quad for COL Co. Easily confused with var. *luteolum*. Threatened by development and non-native plants. Protected in part at Ring Mtn. Preserve (TNC), MRN Co. See *Flora Franciscana*, pp. 150-151 (1891) by E. Greene for original description, and *Phytologia* 66(4):378-379 (1989) for alternative treatment which restricts var. *caninum* to ALA and MRN counties.

Snow Mtn. Buckwheat

Eriogonum nervulosum (S. Stokes) Reveal

Family: Polygonaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL, GLE?, LAK, NAP, SON, YOL

Study Area?: Yes; The Geysers

Habitat: Chaparral (serpentinite)

Life Form: Perennial herb (rhizomatous)

Blooming: June-September

Notes: Known from approximately twenty occurrences. Threatened by energy development, mining, and vehicles. See *Phytologia* 40:467 (1978) for revised nomenclature and 66(4):350 (1989) for taxonomic treatment.

Ternate Buckwheat

Eriogonum ternatum Howell

Family: Polygonaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, SIS, SON, TEH, OR

Study Area?: None

Habitat: Lower Montane Coniferous Forest (serpentinite)

Life Form: Perennial herb

Blooming: June-August

Notes: On watch list in OR. See *Phytologia* 66(4):348-349 (1989) for taxonomic treatment.

San Francisco Wallflower

Erysimum franciscanum G. Rossb.

Family: Brassicaceae

CNPS List: 4

State/Fed. Status: None

Distribution: MRN, SCL, SCR, SFO, SMT, SON

Study Area?: None

Habitat: Coastal Dunes, Coastal Scrub, Valley and Foothill Grasslands (often serpentinite or granitic)

Life Form: Perennial herb

Blooming: March-June

Notes: Rare and declining in SCR Co. Includes *E. franciscanum* var. *crassifolium*. Inland plants approach *E. capitatum*. See *Aliso* 4(1):118-121 (1958) for original description.

St. Helena Fawn Lily

Erythronium helenae Appleg.

Family: Liliaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest, Valley and Foothill Grasslands / volcanic or serpentinite

Life Form: Perennial herb (bulbiferous)

Blooming: March-May

Notes: Approximately fifteen NAP Co. occurrences are all near Mt. St. Helena; rare in SON Co. Threatened by horticultural collecting, road construction, and geothermal development. See *Contributions from the Dudley Herbarium* 1:188 (1933) for original description.

Fragrant Fritillary

Fritillaria liliacea Lindl.

Family: Liliaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA, CCA, MNT, MRN, SBT, SCL, SFO, SMT, SOL, SON

Study Area?: Yes; Novato, Point Reyes NE, Santa Rosa, Cotati*, Camp Meeker

Habitat: Coastal Prairie, Coastal Scrub, Valley and Foothill Grasslands / often serpentinite

Life Form: Perennial herb (bulbiferous)

Blooming: February-April

Notes: Threatened by grazing and loss of habitat to agriculture and urbanization. Quite variable.

Purdy's Fritillary

Fritillaria purdyi Eastw.

Family: Liliaceae

CNPS List: 4

State/Fed. Status: None

Distribution: COL, GLE, HUM, LAK, MEN, NAP, TEH, TRI, YOL

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest / serpentinite

Life Form: Perennial herb (bulbiferous)

Blooming: March-June.

San Francisco Gumplant

Grindelia hirsutula H. & A. var. *maritima* (Greene) M.A. Lane

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MNT, MRN, SCR, SFO, SLO, SMT

Study Area?: None

Habitat: Coastal Bluff Scrub, Coastal Scrub, Valley and Foothill Grasslands / sandy, serpentinite

Life Form: Perennial herb

Blooming: August-September

Notes: Most collections are old; need current information on distribution and rarity. Threatened by coastal development and non-native plants. See *Pittonia* 2:289 (1892) for original description, and *Novon* 2(3):215-217 (1992) for revised nomenclature.

Gutierrezia californica

Considered but rejected: too common.

Diablo Helianthella

Helianthella castanea Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA, CCA, MRN*, SFO*, SMT

Study Area?: None

Habitat: Broadleafed Upland Forest, Chaparral, Cismontane Woodland, Coastal Scrub, Riparian Woodland, Valley and Foothill Grasslands

Life Form: Perennial herb

Blooming: April-June

Notes: Threatened by urbanization, grazing, and fire suppression.

Serpentine Sunflower

Helianthus exilis Gray

Family: Asteraceae

CNPS List: 4

State/Fed. Status: None

Distribution: COL, GLE, LAK, NAP, SHA, SIS, SON, TEH, TRI

Study Area?: None

Habitat: Chaparral, Cismontane Woodland / serpentinite seeps

Life Form: Annual herb

Blooming: July-November

Notes: Difficult to distinguish from *H. bolanderi*, refer to that species in *The Jepson Manual*.

Hemizonia congesta ssp. *congesta*

See *Hemizonia congesta* ssp. *leucocephala*

Hayfield Tarplant

Hemizonia congesta DC. ssp. *leucocephala* (Tanowitz) Keil

Family: Asteraceae

CNPS List: 3

State/Fed. Status: None

Distribution: MEN, MRN, SON

Study Area?: Yes; Novato, Sebastopol, Camp Meeker, Valley Ford, Two Rock, Healdsburg

Habitat: Coastal Scrub, Valley and Foothill Grasslands

Life Form: Annual herb

Blooming: April-October

Notes:. CNPS proposes List 1B status. Precise location, rarity, and endangerment information needed. Intergrades with ssp. *congesta*; dried plants may be indistinguishable. Many herbarium collections are misidentified. Threatened by agriculture and urbanization. See *Bulletin of the Torrey Botanical Club* 110:15 (1983) for original description, and *Phytologia* 73(3):259-260 (1992) for revised nomenclature.

Hemizonia multicaulis ssp. *multicaulis*

Considered but rejected: A synonym of *H. congesta* ssp. *congesta*; a common taxon

Hemizonia multicaulis ssp. *vernalis*

Considered but rejected: A synonym of *H. congesta* ssp. *congesta*; a common taxon

Short-leaved Evax

Hesperervax sparsiflora (Gray) Greene var. *brevifolia* (Gray) Morefield

Family: Asteraceae

CNPS List: 4

State/Fed. Status: None

Distribution: HUM, MEN, MRN, SCR, SFO, SON, OR

Study Area?: None

Habitat: Coastal Bluff Scrub (sandy), Coastal Dunes

Life Form: Annual herb

Blooming: April-June

Notes: On review list in OR. See *Synoptical Flora of North America* 1(2):229 (1884) for original description, and *Systematic Botany* 17:293-310 (1992) for revised nomenclature.

Glandular Western Flax

Hesperolinon adenophyllum (Gray) Small

Family: Linaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: HUM*, LAK, MEN

Study Area?: Yes; The Geysers

Habitat: Chaparral, Cismontane Woodland, Valley and Foothill Grasslands / serpentinite

Life Form: Annual herb

Blooming: May-August

Notes: Threatened by geothermal development, recreation, and grazing. See *Proceedings of the American Academy of Arts and Sciences* 8:624-625 (1873) for original description, and *University of California Publications in Botany* 32:235-314 (1961) for taxonomic treatment.

Two-carpellate Western Flax

Hesperolinon bicarpellatum H. K. Sharsm.

Family: Linaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: None

Habitat: Chaparral (serpentine)

Life Form: Annual herb

Blooming: May-July

Notes: Previously confused with *H. serpentinum*, which also occurs on serpentine soils in the same general area. Threatened by development and grazing. See *University of California Publications in Botany* 32:235-314 (1961) for taxonomic treatment.

Marin Western Flax

Hesperolinon congestum (Gray) Small

Family: Linaceae

CNPS List: 1B

State/Fed. Status: CT/FT

Distribution: MRN, SFO, SMT

Study Area?: Yes; Novato

Habitat: Chaparral, Valley and Foothill Grasslands / serpentine

Life Form: Annual herb

Blooming: May-July

Notes: Known from fewer than twenty occurrences. Protected in part at Ring Mtn. Preserve (TNC), MRN Co. Threatened by development and foot traffic. See *Proceedings of the American Academy of Arts and Sciences* 6:521 (1865) for original description, and *University of California Publications in Botany* 32:235-314 (1961) for taxonomic treatment.

Santa Cruz Tarplant

Holocarpha macradenia (DC.) Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: CE/FC

Distribution: ALA*, CCA*, MNT, MRN*, SCR

Study Area?: None

Habitat: Coastal Prairie, Valley and Foothill Grasslands / often clay

Life Form: Annual herb

Blooming: June-October

Notes: All extant CCA Co. occurrences are introduced; nearly half have failed as of 1995. Last remaining natural population in the S.F. Bay Area extirpated in 1993. Seriously threatened by urbanization, agriculture, non-native plants, and lack of appropriate ecological disturbance. See *Fremontia* 5(4):1516 (1978) for species account.

Bolander's Horkelia

Horkelia bolanderi Gray

Family: Rosaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL*, LAK, MEN

Study Area?: None

Habitat: Chaparral, Lower Montane Coniferous Forest, Meadows and Seeps, Valley and Foothill Grasslands / edges, vernal mesic areas

Life Form: Perennial herb

Blooming: June-August

Notes: Known from only five extant occurrences. Threatened by vehicles and possibly by development. See *Systematic Botany* 18(1):137-144 (1993) for taxonomic treatment.

Kellogg's Horkelia

Horkelia cuneata Lindl. ssp. *sericea* (Gray) Keck

Family: Rosaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA*, MRN*, MNT, SBA, SCR, SFO*, SLO, SMT

Study Area?: None

Habitat: Closed-cone Coniferous Forest, Chaparral (maritime), Coastal Scrub / sandy or gravelly, openings

Life Form: Perennial herb

Blooming: April-September

Notes: Historical occurrences need field surveys. Threatened by coastal development. Occurrence from the Crocker Hills probably last remaining location in S.F. Bay. Remaining plants less distinct from ssp. *cuneata* than those formerly occurring near San Francisco.

Point Reyes Horkelia

Horkelia marinensis (Elmer) Crum

Family: Rosaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN, SCR, SMT

Study Area?: Yes; Valley Ford

Habitat: Coastal Dunes, Coastal Prairie, Coastal Scrub / sandy

Life Form: Perennial herb

Blooming: May-September

Notes: Known from fewer than twenty occurrences. Populations from near Ft. Bragg, MEN Co. may be varietally distinct. Threatened by residential development. See *Systematic Botany* 18(1):137-144 (1993) for distributional information.

Thin-lobed Horkelia

Horkelia tenuiloba (Torr.) Gray

Family: Rosaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN, SON

Study Area?: Yes; Sebastopol, Camp Meeker, Guerneville

Habitat: Chaparral (mesic openings, sandy)

Life Form: Perennial herb

Blooming: May-July

Notes: See *Report of the Pacific Railroad Expedition* 4(5):84 (1857) for original description and *Systematic Botany* 18(1):137-144 (1993) for taxonomic treatment.

Beach Layia

Layia carnososa (Nutt.) T. & G.

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: HUM, MNT, MRN, SBA*, SFO*

Study Area?: None

Habitat: Coastal Dunes

Life Form: Annual herb

Blooming: May-July

Notes: Threatened by coastal development, vehicles, and non-native plants. Protected in part at Manila Dunes ACEC and Mattole Beach ACEC (both BLM), HUM Co.

Colusa Layia

Layia septentrionalis Keck

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL, LAK, MEN, NAP, SON, SUT, TEH, YOL

Study Area?: Yes; The Geysers

Habitat: Chaparral, Cismontane Woodland, Valley and Foothill Grasslands / sandy, serpentinite

Life Form: Annual herb

Blooming: April-May

Notes: Threatened by development. See *Aliso* 4(1):106 (1958) for original description.

Crystal Springs Lessingia

Lessingia arachnoidea Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SMT, SON?

Study Area?: Yes; Camp Meeker

Habitat: Cismontane Woodland, Coastal Scrub, Valley and Foothill Grasslands / serpentinite, often roadsides

Life Form: Annual herb

Blooming: July-October

Notes: Known only from seven occurrences near Crystal Springs Reservoir (SMT Co.); occurrences from SON Co. need taxonomic verification. Threatened by non-native

plants. See *Leaflets of Botanical Observation and Criticism* 2:29 (1910) for original description.

Woolly-headed Lessingia

Lessingia hololeuca Greene

Family: Asteraceae

CNPS List: 3

State/Fed. Status: None

Distribution: ALA, MNT, MRN, NAP, SCL, SMT, SOL, SON, YOL

Study Area?: Yes; Petaluma River, Novato, Point Reyes NE, Camp Meeker

Habitat: Coastal Scrub, Lower Montane Coniferous Forest, Valley and Foothill Grasslands / clay, serpentinite

Life Form: Annual herb

Blooming: June-October

Notes: Move to List 4? Need location, rarity, and endangerment information. Probably more widespread in the southern Sacramento Valley, southern North Coast Ranges, and northern S.F. Bay. Possibly threatened by grazing. See *Flora Franciscana*, p. 377 (1897) by E. L. Greene for original description, and *University of California Publications in Botany* 16:40 (1929) for taxonomic treatment.

Tamalpais Lessingia

Lessingia micradenia Greene var. *micradenia*

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Chaparral, Valley and Foothill Grasslands / usually serpentinite, often roadsides

Life Form: Annual herb

Blooming: June-September

Notes: Known from only four occurrences in the Mt. Tamalpais area. See *Leaflets of Botanical Observation and Criticism* 2:28 (1910) for original description, and *University of California Publications in Botany* 16:39-40 (1929) for taxonomic treatment.

Coast Lily

Lilium maritimum Kell.

Family: Liliaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN*, SFO?*, SMT*, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Closed-cone Coniferous Forest, Coastal Prairie, Coastal Scrub, North Coast Coniferous Forest

Life Form: Perennial herb (bulbiferous)

Blooming: May-July

Notes: Populations along Highway 1 are routinely disturbed by road maintenance; also threatened by urbanization, horticultural collecting, and habitat fragmentation. Hybridizes with *L. pardalinum* ssp. *pardalinum*. See *Proceedings of the American Academy of Arts and Sciences* 6:140 (1875) for original description.

Redwood Lily

Lilium rubescens Wats.

Family: Liliaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, HUM, LAK, MEN, NAP, SCR*, SHA, SIS, SON, TRI

Study Area?: None

Habitat: Broadleafed Upland Forest, Chaparral, Lower Montane Coniferous Forest, Upper Montane Coniferous Forest / sometimes serpentinite

Life Form: Perennial herb (bulbiferous)

Blooming: June-July

Notes: Increasingly rare in southern portion of range. Threatened by urbanization, horticultural collection, and grazing. See *Proceedings of the American Academy of Arts and Sciences* 14:256 (1879) for original description.

Bristly Linanthus

Linanthus acicularis Greene

Family: Polemoniaceae

CNPS List: 4

State/Fed. Status: None

Distribution: ALA, BUT, CCA?, FRE, HUM, LAK, MEN, MRN, NAP, SMT, SON

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Coastal Prairie, Valley and Foothill Grasslands

Life Form: Annual herb

Blooming: April-July

Notes: Historical occurrences need verification. See *Pittonia* 2:259 (1892) for original description.

Large-flower Linanthus

Linanthus grandiflorus (Benth.) Greene

Family: Polemoniaceae

CNPS List: 4

State/Fed. Status: None

Distribution: ALA, KRN, MAD, MER, MNT, MRN, SBA*, SCL, SCR, SFO, SLO, SMT, SON

Study Area?: None

Habitat: Coastal Bluff Scrub, Closed-cone Coniferous Forest, Cismontane Woodland, Coastal Dunes, Coastal Prairie, Coastal Scrub, Valley and Foothill Grasslands / usually sandy

Life Form: Annual herb

Blooming: April-July

Notes: Many historical occurrences extirpated by development; need information. Other taxa often misidentified as *L. grandiflorus*. See *Pittonia* 2:260 (1892) for original description.

Napa Lomatium

Lomatium repostum (Jeps.) Math.

Family: Apiaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, NAP, SOL, SON

Study Area?: None

Habitat: Chaparral, Cismontane Woodland / serpentinite

Life Form: Perennial herb

Blooming: April-May

San Mateo Tree Lupine

Lupinus eximius Davy

Family: Fabaceae

CNPS List: 3

State/Fed. Status: None

Distribution: SMT, SON?

Study Area?: None

Habitat: Chaparral, Coastal Scrub

Life Form: Shrub (evergreen)

Blooming: April-July

Notes: Move to List 1B? SON Co. plants need taxonomic confirmation. Identification is very difficult; study needed. See *L. arboreus* in *The Jepson Manual*. USFWS uses the name *L. arboreus* var. *eximius*. See *Erythea* 3:116 (1895) for original description.

Cobb Mtn. Lupine

Lupinus sericatus Kell.

Family: Fabaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: COL, LAK, NAP, SON

Study Area?: Yes; The Geysers

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest

Life Form: Perennial herb

Blooming: March-June

Notes: Threatened by geothermal development, logging, and road widening; will colonize disturbed sites. See *Fremontia* 13(3):21-22 (1985) for account of re-establishment project in The Geysers geothermal area.

Tidestrom's Lupine

Lupinus tidestromii Greene

Family: Fabaceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: MNT, MRN, SON

Study Area?: None

Habitat: Coastal Dunes

Life Form: Perennial herb (rhizomatous)

Blooming: May-June

Notes: Seriously threatened by coastal development, trampling, and non-native plants; properly timed grazing may be beneficial. Includes *L. tidestromii* var. *layneae*. Only MNT Co. plants are state-listed Endangered as var. *tidestromii*. See *Erythea* 3:17 (1895) for original description.

Lupinus tidestromii var. *layneae*

See *Lupinus tidestromii*

Nodding Madia

Madia nutans (Greene) Keck

Family: Asteraceae

CNPS List: 4

State/Fed. Status: None

Distribution: NAP, SON

Study Area?: None

Habitat: Chaparral, Cismontane Woodland / rocky, volcanic

Life Form: Annual herb

Blooming: April-May

Mt. Diablo Cottonweed

Micropus amphibolus Gray

Family: Asteraceae

CNPS List: 4

State/Fed. Status: None

Distribution: ALA, CCA, LAK, MNT, MRN, NAP, SCR, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Cismontane Woodland, Valley and Foothill Grasslands

Life Form: Annual herb

Blooming: April-May

Microseris decipiens

See *Stebbinsoseris decipiens*.

San Luis Obispo Monardella

Monardella frutescens (Hoov.) Jokerst

Family: Lamiaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SBA, SLO

Study Area?: None

Habitat: Coastal Dunes, Coastal Scrub (sandy)

Life Form: Perennial herb (rhizomatous)

Blooming: May-July

Notes: Threatened by coastal development and vehicles. Hybridizes with *M. crispa*. See *Leaflets of Western Botany* 5:179-182 (1949) for original description, and *Phytologia* 72(1):9-16 (1992) for revised nomenclature.

Curly-leaved Monardella

Monardella undulata Benth.

Family: Lamiaceae

CNPS List: 4

State/Fed. Status: None

Distribution: MNT, MRN, SBA, SCR, SFO, SLO, SMT, SON

Study Area?: None

Habitat: Chaparral, Coastal Dunes, Coastal Scrub, Lower Montane Coniferous Forest (ponderosa pine sandhills)

Life Form: Annual herb

Blooming: May-July

Notes: Threatened by coastal development, sand mining, and non-native plants.

Robust Monardella

Monardella villosa Benth. ssp. *globosa* (Greene) Jokerst

Family: Lamiaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: ALA, CCA, HUM, LAK, MRN, NAP, SMT, SON

Study Area?: Yes; Valley Ford

Habitat: Chaparral (openings), Cismontane Woodland

Life Form: Perennial herb (rhizomatous)

Blooming: June-July

Notes: Known from ten occurrences. See *Pittonia* 5:82 (1902) for original description, and *Phytologia* 72(1):9-16 (1992) for revised nomenclature.

Green Monardella

Monardella viridis Jeps. ssp. *viridis*

Family: Lamiaceae

CNPS List: 4

State/Fed. Status: None

Distribution: LAK, NAP, SOL, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Chaparral, Cismontane Woodland

Life Form: Perennial herb (rhizomatous)

Blooming: July-September

Notes: Hybridizes with *M. villosa* ssp. *villosa*.

Awl-leaved Navarretia

Navarretia subuligera Greene

Family: Polemoniaceae

CNPS List: 4

State/Fed. Status: None

Distribution: AMA, BUT, DNT, LAK, MEN, MOD, NAP?, SHA, TEH, OR

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Lower Montane Coniferous Forest / rocky, mesic

Life Form: Annual herb

Blooming: April-August

Howell's Broomrape

Orobanche valida Jeps. ssp. *howellii* Heckard & Collins

Family: Orobanchaceae

CNPS List: 4

State/Fed. Status: None

Distribution: GLE, LAK, MEN, NAP, SON, TEH

Study Area?: None

Habitat: Chaparral (serpentinite or volcanic)

Life Form: Perennial herb, parasitic

Blooming: June-September

Notes: Generally parasitic on *Garrya* spp. See *Madroño* 29(2):95-100 (1982) for original description.

Lake County Stonecrop

Parvisedum leiocarpum (H. K. Sharsm.) Clausen

Family: Crassulaceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: LAK

Study Area?: None

Habitat: Cismontane Woodland, Valley and Foothill Grasslands. Vernal Pools / vernal mesic depressions in volcanic outcrops

Life Form: Annual herb

Blooming: April-May

Notes: Known from approximately five occurrences. Extremely vulnerable to trampling; also threatened by grazing, altered hydrology, and development. See *Madroño* 5:192-194 (1940) for original description, and *Cactus and Succulent Journal* 18:58 (1946) for revised nomenclature.

Sonoma Beardtongue

Penstemon newberryi Gray var. *sonomensis* (Greene) Jeps.

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: None

Habitat: Chaparral (rocky)

Life Form: Perennial herb

Blooming: April-July

White-rayed Pentachaeta

Pentachaeta bellidiflora Greene

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: CE/PE

Distribution: MRN*, SCR*, SMT

Study Area?: None

Habitat: Valley and Foothill Grasslands (often serpentinite)

Life Form: Annual herb

Blooming: March-May

Notes: Known from only one extended occurrence bisected by Highway 280; historical occurrences lost to development. See *Bulletin of the California Academy of Sciences* 1:86 (1885) for original description, and *University of California Publications in Botany* 65:1-41 (1973) for taxonomic treatment.

North Coast Phacelia

Phacelia insularis Munz var. *continentis* J. T. Howell

Family: Hydrophyllaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MEN, MRN

Study Area?: None

Habitat: Coastal Bluff Scrub, Coastal Dunes / sandy

Life Form: Annual herb

Blooming: March-May

Notes: Known from approximately seven occurrences. Threatened by foot traffic, non-native plants, and grazing. See *American Midland Naturalist* 33:474 (1945) for original description.

White-flowered Rein Orchid

Piperia candida Morgan & Ackerman

Family: Orchidaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, HUM, MEN, SCR, SIS, SMT, SON, TRI, OR, WA+

Study Area?: None

Habitat: Lower Montane Coniferous Forest, North Coast Coniferous Forest / sometimes serpentinite

Life Form: Perennial herb

Blooming: May-August

Notes: Difficult to identify from herbarium material. See *Lindleyana* 5(4):205-211 (1990) for original description.

California Pinefoot

Pityopus californicus (Eastw.) Copel. f.

Family: Ericaceae

CNPS List: 4

State/Fed. Status: None

Distribution: DNT, FRE, HUM, LAK, MEN, MRN, NAP, SIS, SON, TUL, OR

Study Area?: None

Habitat: Broadleafed Upland Forest, Lower Montane Coniferous Forest, North Coast Coniferous Forest, Upper Montane Coniferous Forest

Life Form: Perennial herb

Blooming: May-July

Notes: Threatened by logging.

Quercus lobata

Considered but rejected: Too common

Ribes divaricatum var. *pubiflorum*

Considered but rejected: Too common

Victor's Gooseberry

Ribes victoris Greene

Family: Grossulariaceae

CNPS List: 4

State/Fed. Status: None

Distribution: Yes; MEN, MRN, NAP, SOL, SON

Study Area?: None

Habitat: Broadleafed Upland Forest, Chaparral

Life Form: Shrub (deciduous)

Blooming: March-April

Marin Checkerbloom

Sidalcea hickmanii Greene ssp. *viridis* C. L. Hitchc.

Family: Malvaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN, NAP, SMT, SON

Study Area?: None

Habitat: Chaparral (serpentine)

Life Form: Perennial herb

Blooming: May-June

Notes: Possibly threatened by development.

Santa Cruz Microseris

Stebbinsoseris decipiens (Chambers) Chambers

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MNT, MRN, SCR

Study Area?: None

Habitat: Broadleafed Upland Forest, Closed-cone Coniferous Forest, Chaparral, Coastal Prairie, Coastal Scrub / open areas, sometimes serpentinite

Life Form: Annual herb

Blooming: April-May

Notes: Known from fewer than twenty occurrences. Threatened by grazing. USFWS uses the name *Microseris decipiens*. See *Contributions from the Dudley Herbarium* 4:290-291 (1955) for original description, and *American Journal of Botany* 78(8):1015-1027 (1991) for revised nomenclature.

Tamalpais Jewel-flower

Streptanthus batrachopus Morrison

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN

Study Area?: None

Habitat: Closed-cone Coniferous Forest, Chaparral / serpentinite

Life Form: Annual herb

Blooming: April-June

Notes: Known from fewer than ten occurrences in the Mt. Tamalpais area. Similar plants from the southern North Coast Ranges may be an undescribed new taxon. Intergrades with *S. barbiger*.

Socrates Mine Jewel-flower

Streptanthus brachiatus F. W. Hoffm. ssp. *brachiatus*

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: NAP, SON

Study Area?: Yes; The Geysers

Habitat: Closed-cone Coniferous Forest, Chaparral / serpentinite

Life Form: Perennial herb

Blooming: June

Notes: Known from fewer than ten occurrences. Plants from LAK Co. (517B, 533C) are more appropriately assigned to *S. brachiatus* ssp. *hoffmanii*. See *Madroño* 36(1):36 (1989) for revised nomenclature.

Freed's Jewel-flower

Streptanthus brachiatus F. W. Hoffm. ssp. *hoffmanii* Dolan & LaPre

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, SON

Study Area?: None

Habitat: Chaparral, Cismontane Woodland / serpentinite

Life Form: Perennial herb

Blooming: May-July

Notes: Known from approximately ten occurrences. See *Madroño* (1):36 (1989) for original description.

Secund Jewel-flower

Streptanthus glandulosus Hook. ssp. *hoffmanii* Kruckeberg

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SON

Study Area?: None

Habitat: Chaparral, Cismontane Woodland, Valley and Foothill Grasslands (often serpentinite)

Life Form: Annual herb

Blooming: April-July

Notes: Historical occurrences need field surveys. See *S. glandulosus* ssp. *secundus* in *The Jepson Manual*. See *Madroño* 14(7):223 (1958) for original description, and *Systematic Botany* 19(4): 57-574 (1994) for discussion of *S. glandulosus* complex.

Mt. Tamalpais Jewel-flower

Streptanthus glandulosus Hook. ssp. *pulchellus* (Greene) Kruckeberg

Family: Brassicaceae

CNPS List: 1

State/Fed. Status: None

Distribution: MRN

Study Area?: Yes; Novato

Habitat: Chaparral, Valley and Foothill Grasslands / serpentinite

Life Form: Annual herb

Blooming: May-July

Notes: Endemic to the Mt. Tamalpais area. See *Systematic Botany* 19(4):557-574 (1994) for discussion of *S. glandulosus* complex.

Three Peaks Jewel-flower

Streptanthus morrisonii F. W. Hoffm. ssp. *elatus* F. W. Hoffm.

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: None

Habitat: Chaparral (serpentine)

Life Form: Perennial herb

Blooming: June-September

Notes: See *Streptanthus morrisonii* in *The Jepson Manual*. See *Madroño* 11 (6):228 (1952) for original description and 36(1):33-40 (1989) for additional information.

Dorr's Cabin Jewel-flower

Streptanthus morrisonii F. W. Hoffm. ssp. *hirtiflorus* F. W. Hoffm.

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: /FC

Distribution: SON

Study Area?: None

Habitat: Chaparral, Closed-cone Coniferous Forest / serpentine

Life Form: Perennial herb

Blooming: June

Notes: Known from only one small occurrence in The Cedars. See *Streptanthus morrisonii* in *The Jepson Manual*. See *Madroño* 11 (6):228 (1952) for original description and 36(1):33-40 (1989) for additional information.

Kruckeberg's Jewel-flower

Streptanthus morrisonii F. W. Hoffm. ssp. *kruckebergii* Dolan & LaPre

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: LAK, NAP, SON

Study Area?: Yes; The Geysers

Habitat: Cismontane Woodland (serpentine)

Life Form: Perennial herb

Blooming: April-July

Notes: Possibly threatened by gold mining activities. See *Streptanthus morrisonii* in *The Jepson Manual*. See *Madroño* 36(1):38 (1989) for original description.

Morrison's Jewel-flower

Streptanthus morrisonii F. W. Hoffm. ssp. *morrisonii*

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: SON

Study Area?: None

Habitat: Chaparral (serpentine)

Life Form: Perennial herb

Blooming: May-September

Notes: See *Streptanthus morrisonii* in *The Jepson Manual*. See Madroño 11 (6):225 (1952) for original description and 36(1):33-40 (1989) for additional information.

Tiburon Jewel-flower

Streptanthus niger Greene

Family: Brassicaceae

CNPS List: 1B

State/Fed. Status: CE/FE

Distribution: MRN

Study Area?: None

Habitat: Valley and Foothill Grasslands (serpentinite)

Life Form: Annual herb

Blooming: May-June

Notes: Known from only three occurrences on the Tiburon Peninsula. Threatened by road construction, foot traffic, and development. See *Bulletin of the Torrey Botanical Club* 13:141 (1886) for original description and Madroño 14(7):217-227 (1958) for taxonomic treatment, and *Systematic Botany* 19(4):557-574 (1994) for discussion of *S. glandulosus* complex.

Streptanthus tortuosus var. *suffrutescens*

Considered but rejected: Too common

Beaked Tracyina

Tracyina rostrata Blake

Family: Asteraceae

CNPS List: 1B

State/Fed. Status: None

Distribution: HUM, LAK, SON

Study Area?: None

Habitat: Cismontane Woodland, Valley and Foothill Grasslands

Life Form: Annual herb

Blooming: May-June

Notes: Known from fewer than twenty occurrences.

Showy Indian Clover

Trifolium amoenum Greene

Family: Fabaceae

CNPS List: 1B

State/Fed. Status: /PE

Distribution: ALA*, MEN*, MRN*, NAP*, SCL*, SOL*, SON(*?)

Study Area?: Yes; Petaluma*, Santa Rosa*, Cotati*, Sebastopol*, Camp Meeker*, Valley Ford*

Habitat: Valley and Foothill Grasslands (sometimes serpentinite)

Life Form: Annual herb

Blooming: April-June

Notes: Rediscovered in 1993 by P. Conners; only one plant found, and subsequent surveys in 1994-1995 unsuccessful. Now only exists in cultivation. Historical habitat lost to urbanization and agriculture. See *Flora Franciscana*, p. 27 (1891) by E. Greene for original description, and *Fremontia* 22(2):3-7 (1994) for account of rediscovery.

San Francisco Owl's Clover

Triphysaria floribunda (Benth.) Chuang & Heckard

Family: Scrophulariaceae

CNPS List: 1B

State/Fed. Status: None

Distribution: MRN, SFO, SMT

Study Area?: Yes; Point Reyes NE, Valley Ford

Habitat: Coastal Prairie, Valley and Foothill Grasslands / serpentinite

Life Form: Annual herb

Blooming: April-May

Notes: Threatened by grazing and trampling. See *Systematic Botany* 16(4):644-666 (1991) for revised nomenclature.

TERRESTRIAL WILDLIFE

Invertebrate Species

Behren's Silverspot Butterfly

The Behren's silverspot butterfly (*Speyeria zerene behrensii*) is federally proposed as endangered by the USFWS (Federal Register 59(24): 5377-5384 [1994]). The species is not listed by the State of California.

Behren's silverspot butterfly inhabits coastal dunes, coastal terrace prairie and adjacent habitats such as coastal bluff scrub and grassland. Behren's silverspot butterfly emerge and fly in July and August and live for about three weeks. The females lay their eggs only on the dried stems and leafy debris of the western dog violet (*Viola adunca*). The larvae emerge in the spring and feed on the new leaves of the violets (Federal Register 59(24): 5377-5384).

Behren's silverspot butterfly formerly occurred from coastal Sonoma County, north of the mouth of the Russian River, to southern Mendocino County near Point Arena. Having been extirpated from much of its former range, the only known extant population occurs on private lands near Point Arena in Mendocino County (Federal Register 59(219): 58982-59028).

Urban development and introduced grasses have extirpated Behren's silverspot butterfly from much of its former range, and continue to threaten the remaining population (Federal Register 59(219): 58982-59028).

References

Biosystems. 1994. *Life on the Edge*. Biosystems Books, Santa Cruz, California.

Bumblebee Scarab Beetle (Pacific Sand Bear)

Pacific sand bear (*Lichnanthe ursina*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Pacific sand bear is no longer considered a federal candidate species. The species is not listed by the State of California.

Pacific sand bear occurs along the coast from Sonoma County to San Mateo County. Known localities in the project area include the vicinity of Doran Beach on Bodega Bay (CDFG 1994).

Pacific sand bear inhabit coastal sand dunes. They are known to fly close to the surface of the sand near the crest of the dunes (CDFG 1994).

Threats include destruction of their dune habitat by offroad vehicle use and urban development.

References

California Department of Fish and Game. 1994. Natural Diversity Database. California Department of Fish and Game, Natural Heritage Division, Sacramento, CA.

Callippe Silverspot Butterfly

Callippe silverspot butterfly (*Speyeria callippe callippe*) is federally proposed as endangered by the USFWS (Federal Register 59(24): 5377-5384 [1994]). The species is not listed by the State of California.

Callippe silverspot butterfly inhabits coastal dunes, coastal terrace prairie, and adjacent habitats such as coastal bluff scrub and grassland. Callippe silverspot butterflies emerge and fly from mid May to late July and live for about three weeks. The females lay their eggs only on the dried stems and leafy debris of the Johnny jump-up (*Viola pedunculata*) (Federal Register 59(24): 5377-5384 [1994]). The larvae emerge in the spring and feed on the new leaves of the violets.

Callippe silverspot butterfly formerly occurred along the inner coast range from Contra Costa County to the Castro Valley area in Alameda County. The western portion of it's range extended from San Francisco south to the vicinity of La Honda in San Mateo County. There are no records for Callippe silverspot butterfly north of the Golden Gate Bridge or the Carquinez Straits. Having been extirpated from much of it's former range, the only known extant population occurs on San Bruno Mountain in San Mateo County (Federal Register 59(24): 5377-5384).

Urban development and introduced grasses have resulted in the extirpation of Callippe silverspot butterfly from much of it's former range, and continue to threaten the remaining population (Federal Register 59(219): 58982-59028).

References

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Durant's Snail

Durant's snail (*Haplotrema durantii*) currently has no federal or state listing status (CDFG 1994).

Durant's snail is a small snail that dwells in the upper layers of leaf litter along dry stream beds. It also occurs under rocks, branches, logs, and other debris (CDFG 1994; Roth 1972).

Durant's snail is restricted to Santa Barbara and San Nicolas Islands in Los Angeles County, and Santa Cruz Island in Santa Barbara County (CDFG 1994; Roth 1972).

Threats to this species are associated with the populations vulnerability due to its restricted range.

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Globose Dune Beetle

Globose dune beetle (*Coelus globosus*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the dune beetle is no longer considered a federal candidate species. The species is not listed by the State of California.

Globose dune beetle occurs in sandy dune habitats in coastal regions of central California (Dick Arnold, Entomologist, Entomological Consulting Services, personal communication 1995).

In Sonoma County, this species is restricted to sandy beach and dune habitats that occur from the high tide line to dune habitats along the immediate coast (Dick Arnold, Entomologist, Entomological Consulting Services, personal communication 1995).

Threats to this species include destruction of their dune habitat by offroad vehicle use and urban development.

Marin Elfin Butterfly

Marin elfin butterfly (*Incisalia mossii* spp.) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Marin elfin butterfly is no longer considered a federal candidate species. The species is not listed by the State of California.

Marin elfin butterfly feeds primarily on fennel (*Lomatium utriculatum*) as an adult, but uses stonecrop (*Sedum spathulifolium*) as a larval food plant (Dick Arnold, Entomologist, Entomological Consulting Services, personal communication 1995).

Marin elfin butterfly is currently known only from Marin County at the northern end of Point Reyes (USFWS 1995; Dick Arnold, Entomologist, Entomological Consulting Services, personal communication 1995).

Threats to this species include destruction of habitat by offroad vehicle use and urban development.

Mission Blue Butterfly

Mission blue butterfly (*Icaria icariodes missionensis*) is listed as a federally endangered species by the USFWS (CDFG 1996). The species is not listed by the State of California.

Mission blue butterfly occurs in cool foggy coastal scrub and grasslands (Biosystems 1994). The species makes a brief appearance from March through early July (Biosystems 1994). The larval food plant for this species are the three perennial lupines *Lupinus albifrons*, *L. variicolor* and *L. formosus* (Biosystems 1994).

Mission blue butterfly's range extends from the southern tip of Marin County south to San Francisco and San Mateo Counties. The species is not known to occur in Sonoma County or Northern Marin County.

Threats to the Mission blue butterfly include destruction of its habitat by urban development, agriculture, grazing, and the spread of aggressive exotic plants (Biosystems 1994).

References

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Monarch Butterfly

Monarch butterfly (*Danaus plexippus*) is one of the best known butterflies in the United States. Although monarch butterfly have no official legal status under either the state or federal endangered species acts CDFG considers the wintering roost sites a sensitive biological resource, and tracks them for the Natural Diversity Data Base.

A member of a tropical family, this species migrates south during the cooler months to a number of locations along the Pacific Coast. Thousands of individuals often cover the upper portions of a small number of trees at these locations.

The location of roost sites for this species in northern California includes groves of eucalyptus trees in Pacific Grove in Monterey County and near Bodega Bay in Sonoma County. The primary threat to this species is the destruction or disturbance of their winter roosting trees.

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Myrtle's Silverspot Butterfly

Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*) is listed as a federally endangered species by the USFWS (Federal Register 57(120): 27848-27858 [1992]). The species is not listed by the State of California.

Myrtle's silverspot butterfly inhabits coastal dunes, coastal terrace prairie, coastal bluff scrub, and grassland. Myrtle's silverspot butterfly emerge and fly from late June to early September and live for about three weeks. The females lay their eggs only on the dried stems and leafy debris of the western dog violet (*Viola adunca*). The larvae emerge in the spring and feed on the new leaves of the violets (Biosystems 1994).

Myrtle's silverspot butterfly formerly occurred from coastal Sonoma County, south of Jenner, to southern San Mateo County. The species has been extirpated from the portion of its range south of central Marin County. In Sonoma County the species entire range is located within eight miles of the coast. In Marin County the species is found on both sides of Tomales Bay and over much of the Point Reyes Peninsula (Biosystems 1994).

Urban development, sand mining and introduced beach grasses have resulted in the extirpation of Myrtle's silverspot butterfly from much of its former range (Biosystems 1994). These factors continue to pose a threat in the remaining range of this species that does not occur on public lands.

References

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Opler's Longhorn Moth

Opler's longhorn moth (*Adella oplerella*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Opler's longhorn moth is no longer considered a federal candidate species. The species is not listed by the State of California.

Opler's longhorn moth occurs on south and west facing slopes in serpentine associated grasslands. The species is found almost exclusively in association with cream cups (*Platystemon californicus*) which serves as its larval host plant (Murphy 1991).

Opler's longhorn moth is known to occur in Sonoma, Marin, San Francisco, Santa Clara and Santa Cruz Counties. The known population in Sonoma County occurs in a serpentine associated grassland located approximately 3.5 miles north of the intersection of Lakeville Highway and State Route 37, and approximately 2 miles northwest of the Sears Point Raceway (Murphy 1991).

Threats to this species include destruction of habitat by urban development, overgrazing, and aggressive exotic plant species that displace the native flora.

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Point Reyes Blue Butterfly

Point Reyes blue butterfly (*Icaricia icariodes* spp.) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Point Reyes blue butterfly is no longer considered a federal candidate species. The species is not listed by the State of California.

Point Reyes blue butterfly occurs in dune habitats, but may occur outside of this habitat if it's larval food plants (i.e., *Lupinus chamissonus* and *L. arboreus*) are present. The species is currently known only from Point Reyes National Seashore in Marin County (Dick Arnold, Entomologist, Entomolical Consulting Services, personal communication 1995).

Threats to this species include destruction of their dune habitat by offroad vehicle use and urban development.

San Bruno Elfin Butterfly

San Bruno elfin butterfly (*Incisalia mossii bayensis*) is listed as a federally endangered species by the USFWS (CDFG 1996). The species is not listed by the State of California.

The northern-most known locality for San Bruno elfin butterfly is San Bruno Mountain in San Mateo County (Dick Arnold, Entomologist, Entomolical Consulting Services, personal communication 1995). There are currently no records of this species in Sonoma or Marin Counties (CDFG 1994).

The primary threat to the San Bruno elfin butterfly is conversion of it's habitat due to urban development and aggressive exotic plants that displace their larval food plants.

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Sandy Beach Tiger Beetle

Sandy beach tiger beetle (*Cicindella hirticollis gravida*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the tiger beetle is no longer considered a federal candidate species. The species is not listed by the State of California.

Sandy beach tiger beetle dwells in sandy areas near water (Dick Arnold, Entomologist, Entomological Consulting Services, personal communication 1995).

In Sonoma County, this species is restricted to sandy beaches between the high tide line and dune habitats located along the immediate coast (Dick Arnold, Entomologist, Entomological Consulting Services, personal communication 1995).

Threats to this species include destruction of their dune habitat by offroad vehicle use and urban development.

Sonoma Arctic Skipper

Sonoma arctic skipper (*Carterocephalus palaemon*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Sonoma arctic skipper is no longer considered a federal candidate species. The species is not listed by the State of California.

Sonoma arctic skipper have a restricted distribution, occurring mainly in Marin and Sonoma Counties. Although locally common in Sonoma County, it is considered rare in Marin County (Garth 1986).

It inhabits undisturbed wet meadows and forest openings (Garth 1986). The adults are known to visit flowers of *Iris* spp., often perching head down (Garth 1986). The larval food plant is purple reed grass (*Calamagrostis purpurascens*) (Garth 1986)

Habitat destruction within their restricted range is presumably the primary cause for decline.

References

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William's Bronze Shoulderband Snail

William's bronze shoulderband snail (*Helminthoglypta arrosa williamsi*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), this snail is no longer considered a federal candidate species. The species is not listed by the State of California.

William's bronze shoulderband snail is a terrestrial snail that occurs on Hog Island, a small islet in Tomales Bay, Marin County (Roth 1972). Habitat requirements for the broadly ranging *H. arrosa arrosa* vary widely from redwood forest to limestone shrub habitat (David Wright, Biologist, USFWS ,personal communication 1995).

Threats to this species, according to A. G. Smith (1938 in Roth 1972) "Although the colony is a strong one at present, it could be severely decimated if not completely wiped out by indiscriminate collecting."

References

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Reptile Species

California Horned Lizard

The California horned lizard (*Phrynosoma coronatum frontale*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the horned lizard is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The California horned lizard historically occurred over much of the Central Valley and the surrounding foothills (Jennings 1995, Stebbins 1985). The species also occurred throughout much of the Coast Range from Sonoma County south to northern Santa Barbara County where it intergrades with the San Diego horned lizard (*P. c. blainvillii*) (Jennings 1995). There are no recent records from Sonoma County and the species may be extinct there (Jennings 1995).

The California horned lizard occurs in a wide variety of habitats including chaparral, grassland, broadleaf woodland, and clearings in riparian areas (Jennings 1995, Stebbins 1985). The preferred soil type is sandy loam, but this lizard may also be found in gravelly soils (Jennings 1995, Stebbins 1985).

The primary cause for decline is the destruction of habitat by conversion to agriculture and development (Jennings 1995). However, the introduction of the Argentine ant has also had an impact by displacing the native ants that the horned lizards feed upon almost exclusively (Jennings 1995).

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Bird Species

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) is listed as both federally and state endangered by the USFWS and CDFG, respectively (Federal Register 30(199) [1970]; CDFG 1994a).

The nesting season of the peregrine falcon extends from March through July (Ehrlich et al. 1988). During the winter months, the resident breeding birds are joined by migrants from the north, substantially increasing the numbers of peregrine falcon in the state.

The American peregrine falcon was historically considered a fairly common permanent resident throughout the length of California (Grinnell and Miller 1944). Nesting was concentrated along the coast, offshore islands, and at higher elevations in the Sierra Nevada and Cascades. Nesting was also known from mountain ranges in the southeastern deserts and in the vicinity of the Colorado River. Two hundred historical nesting localities are known in California (Platt and Enderson 1989). The current breeding range includes the Sierra Nevada, Cascades, Klamath Mountains, inland north coastal mountains, central and southern coasts and the Channel Islands. An estimated 113 breeding pairs were documented in California in 1992 (California Department of Fish and Game 1994b). There are one probable and two confirmed recent nesting records for Sonoma County (Burridge 1995). The two confirmed nesting records are east of Santa Rosa and north of Jenner, and the probable nesting record is southeast of Jenner (Burridge 1995).

Nesting habitat of the peregrine falcon includes rocky promontories, cliffs, ridges, tall buildings and towers, viaducts, and bridges within hunting range of abundant avian prey (i.e., seabirds, shorebirds, waterfowl, pigeons, starlings, and swifts). Nest sites or eyries are usually located near large shallow interior lakes, coastal sea cliffs, or offshore island cliffs (Small 1994), while wintering habitat may be provided by a variety of low elevation habitats that are associated with abundant prey.. The coast and Central Valley are the primary wintering locations for this species.

The nesting peregrine falcon population in California declined to a low of two to five pairs by 1970 due to the effects of DDT and its derivatives. These latter compounds in California is known to cause eggshell thinning and reduced reproductive success. The peregrine falcon are still threatened by the widespread use of the pesticide dicofol (primarily in the Central Valley). This compound causes DDE contamination and effects that are similar to DDT (CDFG 1994b; Small 1994; Johnsgard 1990). Other potential threats include collisions with

power lines, elimination and deterioration of hunting habitat (particularly along the coast and in the Central Valley), shooting, and trapping for falconry (Small 1994). Due largely to a captive propagation and release program, the population trend for American peregrine falcon in California is stable to increasing, with population increases in most regions of the state (CDFG 1994b).

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Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is listed as federally threatened by the USFWS (Federal Register 60(133): 36000-36010) and state endangered by the CDFG (1994). The bald eagle is also protected under the federal Bald Eagle Protection Act (16 U.S.C. 668-668c).

The nesting season of the bald eagle typically occurs from late February through July. Resident bald eagles are joined by northern migrants beginning in mid-October with most wintering bald eagles having arrived in the state by December. Wintering eagles remain in California until late March or early April (CDFG 1988).

Prior to the late 1800s, the bald eagle nested throughout California, with the exception of the southern California deserts (CDFG 1988). Breeding pairs nested along the entire coastal zone including the Channel Islands. Inland nesting territories were located in the Central Valley along the western slope of the Sierra Nevada and Cascades north to the Modoc Plateau. Historically, winter range occurred throughout the state in areas with abundant fish, large concentrations of waterfowl, or large herds of ungulates (CDFG 1988). Currently, the breeding range includes scattered areas in the Sierra Nevada foothills, northeastern California, and north-central California (Small 1994). Bald eagles are being reintroduced into the Channel Islands and Big Sur coast in hopes of reestablishing historic nesting territories (Small, 1994). The estimated breeding population in California is currently 70 pairs (Small 1994). An average of 900 to 1,000 bald eagles winter annually in California, with the largest concentration centered around the Klamath Basin (up to 300 birds). Another 100 bald eagles winter in the Central Valley while the rest occur primarily west of the southeastern deserts and Sierra Nevada crest in the northern half of the state (Small 1994).

The nesting territories of bald eagles in California are primarily found in ponderosa pine or mixed conifer forest surrounding larger lakes, reservoirs, and rivers (Small 1994). Nest trees are predominantly tall ponderosa pines which

provide an unobstructed view of the associated water body. Formerly, bald eagles nested on rocky seacoast cliffs, offshore islands, coastal rivers, mountain lakes and rivers, and interior valley streams and wetlands (Detrich 1986). Wintering habitat consists of large freshwater lakes, larger rivers, marshes, reservoirs, and the seacoast (Small 1994).

The three major threats to the bald eagle population in California are habitat loss, poisoning, and shooting. The most important long-term threat to this species is habitat loss. Clearing of forests for agricultural and urban development, logging, and mining are all factors in the loss of bald eagle habitat. Pesticide and lead poisoning through ingestion of contaminated prey cause egg-shell thinning, reproductive failure, and direct mortality in bald eagles (Detrich 1986). Illegal shooting of bald eagles is also an important cause of mortality in California. Detrich (1986) found that shooting was the leading cause of mortality and injury among bald eagles examined in California between 1977 and 1986.

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Bank Swallow

The bank swallow (*Riparia riparia*) is listed as threatened by the CDFG (1994a) and is protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The breeding season of the bank swallow occurs from April through early August (McCaskie et al. 1988). Bank swallows winter in South America (Ehrlich et al. 1988).

The historic breeding distribution of the bank swallow included the Owens River, Sacramento River, Placerville, Lake Merced, San Mateo and Santa Cruz County coasts, Salinas River, Santa Barbara, Santa Clara River Valley, Los Angeles River, Port Los Angeles, San Pedro, Long Beach, Whittier, Huntington Beach, Newport, and Oceanside (Grinnell and Miller 1944). There are no known breeding colonies remaining in southern California. The current breeding distribution is centered around the Sacramento River from Contra Costa County north to Shasta County (Small 1994). There are several nesting colonies in the Shasta Valley and Klamath Basin, Fall River Valley, Modoc Plateau, and Basin and Ranges region of Modoc and Lassen counties (Small 1994). A few colonies are present along the North Coast, central California, Mono Basin, and Crowley

Lake (Small 1994). There are no recent nesting records for Sonoma County (Burridge 1995).

The bank swallow nests in small to large colonies. Nest sites consist of burrows excavated from the steep sides of riverbanks, borrow pits, road cuts, or sea cliffs (Ehrlich et al. 1988). Bank swallows primarily nest in steep earthen riverbanks throughout their present range in California. These river banks are subject to frequent erosion that occurs primarily during the winter months (CDFG 1994b). Bank swallow foraging habitat generally consists of open water, crop lands, and grasslands adjacent to nesting colonies.

The bank swallow has declined in California, where it was once considered locally abundant. It has been extirpated as a breeding bird in much of its former range in California. In response to ongoing population declines and extirpation of many remaining nesting colonies, a statewide recovery plan for the bank swallow was recently completed (CDFG 1992). The bank swallow is limited by the availability of nest sites, which are often transient in nature because of frequent erosion. Flood and erosion control practices along rivers and streams threaten to eliminate a large portion of existing nesting habitat for this species, particularly along the Sacramento River (CDFG 1994b).

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Barrow's Goldeneye

Barrow's goldeneye (*Bucephala islandica*) is listed as a species of special concern by the the CDFG (1994).

Barrow's goldeneye is an uncommon overwintering species in California. It can occur coastally in southern Mendocino County, Sonoma County, Marin County, and throughout San Francisco Bay (Zeiner et al. 1990). They can also be found infrequently in several other areas of California including the north delta, northern Sierra Nevada Mountains and southern Cascade Mountains (Zeiner et al. 1990). It does not occur in California during the summer.

Coastal regions and inland mountain streams are the preferred habitats for this species. Although no breeding of Barrow's goldeneye occurs in California, breeding habitat consists of cavities in trees (live or dead) near water (Ehrlich 1988).

Barrow's goldeneye is a "diving duck" which means that it pursues its prey (i.e., insects and crustaceans) by diving under the surface of the water. Plants also make up a portion of its diet (Ehrlich 1988).

Reasons for the sparse populations in California are unknown although shooting, boating, fishing and possibly dead tree removal (nesting habitat) are believed to be significant factors (Remsen 1978).

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Bell's Sage Sparrow

The Bell's sage sparrow (*Amphispiza belli belli*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613), the Bell's sage sparrow is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

With the exception of the northern populations which are migratory, the Bell's sage sparrow is considered uncommon to locally fairly common resident throughout its range (Small 1994). Bell's sage sparrow is the westernmost of the sage sparrow subspecies and was formerly considered fairly common to common in California (Grinnell and Miller 1944). On the coast, the breeding range of the Bell's sage sparrow extends from San Diego County north to Marin County. In the interior, this subspecies breeds from the valleys and foothills to the western limit of the deserts, and from the Mexican border north to San Bernardino County. The breeding range also extends into the inner North Coast Range north to Shasta and Trinity counties. In addition, there are isolated resident populations of Bell's sage sparrow from Mariposa County to El Dorado County, in the northwestern foothills of the Sierra Nevada (Small 1994). In the eastern portions of Sonoma County, where the largest continuous stands of dry chaparral exist, the Bell's sage sparrow is uncommon and distributed locally (Burrige 1995). The nesting season of the Bell's sage sparrow extends from mid-April through mid-August (McCaskie et al. 1988).

The Bell's sage sparrow breeds primarily in the "hard" chaparral of the interior. These areas are typically dominated by fairly dense or continuous stands of

chamise (*Adenostoma* sp.) that are two to five feet in height. (Small 1994, Grinnell and Miller 1944). However, populations of this species also breed in coastal sage scrub in the southern portion of its range and in *Baccharis* and *Artemisia* brush in the northern portion of its range (Grinnell and Miller 1944). This subspecies is also occasionally found in chaparral habitat dominated by medium-sized arid chaparral shrubs in other parts of its range (Small 1994). Bell's sage sparrows forage primarily for insects and seeds. Foraging generally occurs on the ground within small openings located deep within the shrub stand (Burridge 1995).

The amount of available Bell's sage sparrow habitat has been greatly reduced by the practice of long-term fire suppression and the increasing development of previously undisturbed chaparral. These conditions over the last 20 years have caused significant encroachment on the breeding habitat of the Bell's sage sparrow, contributed to the patchy distribution of this subspecies, and rendered the bird increasingly more vulnerable to local extinction (Burridge 1995).

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Black Swift

The black swift (*Cypseloides niger*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The nesting season of the black swift occurs from mid-May to late August (Small 1994). Black swifts winter from Mexico south to Costa Rica and the Greater Antilles (Ehrlich et al. 1988).

The historical nesting distribution of the black swift included the San Bernardino and San Jacinto mountains, southern and central Sierra Nevada, and coastal belt in Monterey and Santa Cruz counties (Grinnell and Miller 1944). Currently, nesting colonies are known from Burney Falls (20+ pairs), the central California coast (primarily Santa Cruz and Monterey counties), Mosbrae Falls on the Sacramento River, Packer's Peak in the Trinity Alps Primitive Area, Feather Falls, the northern Sierra Nevada, Yosemite Valley, Kings River, Kaweah River, Devil's Postpile National Monument, and the San Bernardino, San Gabriel, and San Jacinto mountains (Small 1994). There are no known nesting colonies of black swift in Sonoma County (Burridge 1995).

Nesting habitat consists of cavities or crevices within steep cliffs or ocean bluffs with ledges (Small 1994). Nest sites are usually located behind waterfalls. (either inland in deep canyons or along the ocean) (Small 1994; Grinnell and Miller 1944). Black swifts forage for insects at great heights and distances from the nest site and can be found flying over canyons, forests, plains, and valleys in search of prey. Specific attributes of nest sites include darkness, high relief, inaccessibility, unobstructed flyways, and adjacent water (Forester and Collins 1990).

The primary threat to black swift nesting colonies in California is human disturbance due to rock climbing. Since the number of breeding black swifts in California is very small and the colonies are widely scattered, the individual nesting colonies are extremely vulnerable to local extinction.

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California Black Rail

The California black rail (*Laterallus jamaicensis coturniculus*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613), the California black rail is no longer considered a federal candidate species. It is listed as a threatened species by the CDFG (1995).

The former breeding distribution of the California black rail encompassed the lower Colorado River, Salton Sea, Riverside-San Bernardino area, Pacific Coast from northern Baja California to Tomales Bay, and Sacramento/San Joaquin River Delta (Delta) (Grinnell and Miller 1944). The current breeding range has been reduced to several scattered locations along the coast of California, Bay Area and Delta, Salton Sea, and lower Colorado River (Harvey et al. 1992). The major population concentration is located around the north San Francisco Bay including around the mouth of the Petaluma River, Napa Marsh, and San Pablo Bay (Harvey et al. 1992). Small, highly fragmented populations also nest at Tomales Bay, Bolinas Lagoon, Morro Bay, the Salton Sea, the lower Colorado

River, and the Delta (Harvey et al. 1992). The black rail no longer nests on the southern California coast, or along central and southern San Francisco Bay area (Evens et al. 1991). There is a recent probable breeding record from the mouth of the Petaluma River in Sonoma County (Burridge 1995). The nesting season of the black rail extends from May through August (Harrison 1979). The California black rail winters on the California coast from Sonoma County south to Baja (Harvey et al. 1992; California Department of Fish and Game 1987).

Although the California black rail inhabits freshwater, brackish, and saltwater marshes; tidal marshes containing higher elevation habitat are preferred by this species. Undisturbed low-growing plant cover, minimal tidal fluctuations, absence of amphipods, and presence of insects are critical habitat requirements of the California black rail (Evens et al. 1991). Relatively low salinity is another factor which seems to be important in habitat choice by black rails. Black rails locate their nests in high marsh vegetation, beyond the range of extreme high tides.

Habitat destruction is the primary threat to California black rail populations. Former breeding populations in the central and south San Francisco Bay area have disappeared due to the loss or conversion of 95 percent of the tidal marshes along San Francisco Bay, particularly the loss of high marsh habitat (California Department of Fish and Game 1994). In areas which are generally suitable for black rail habitation (South San Francisco Bay), the lack of escape cover during extreme high tides renders black rails extremely susceptible to unusually high rates of predation by large wading birds and raptors (Evens and Page 1986). The lack of higher elevation marsh nesting habitat in this area also leads to the inundation of nests during very high tides and subsequent reproductive failure. Additional threats include introduced predators and mercury poisoning (Harvey et al. 1992).

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California Brown Pelican

California Brown pelican (*Pelecanus occidentalis californicus*) is listed as federally endangered by the USFWS and state endangered by the CDFG (1996).

The California brown pelican prefers open sea, offshore islands, sea coast, large bays, estuaries harbors and breakwaters along the entire length of California (Small 1994) including coastal Sonoma County.

The California brown pelican diet consists of fish and crustaceans which are often captured near the surface of the water. Spectacular, headfirst dives from up to 50 feet high are a common foraging technique and can be performed singularly or in groups (Farrand 1983). The prey is scooped up into the net-like throat pouch and then swallowed whole.

From February to early May, the California brown pelican is at its lowest numbers in California. From July through December, numbers of California brown pelicans are at their highest in Northern California and can be attributed to the northward movement of post-breeding individuals. Breeding typically takes place from February through April in southern California from the Channel Islands southward. Nests are built of sticks, reeds and grass in trees or consist of shallow depressions in the ground (Ehrlich et al. 1988). An average of three eggs are laid. Incubation lasts about four weeks. Young from tree nests require approximately 63 days to fledge while the ground nesting young require about 35 days (Ehrlich et al. 1988)

DDT was the main cause of a serious population decline of the California brown pelican in the 1950's, 1960's, and early 1970's. DDE (a metabolite of DDT) caused hormonal fluctuations in females resulting in eggshell thinning and crushed eggs (Steinhart 1990). Banning of DDT within the United States allowed for an upturn in numbers of this species and by 1994, 7,000 breeding pairs have been reported in California (Small 1994).

Threats to the California brown pelican persist. Oil spills, human disturbance, over harvest of its prey item (Pacific sardine), loss of post-breeding roost sites and fishing gear entanglements are all hazards to the current California brown pelican population (Harvey et al. 1992).

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California Clapper Rail

The California clapper rail (*Rallus longirostis obsoletus*) is listed as federally endangered by the USFWS and state endangered by the CDFG (1996).

The California clapper rail occurs in tidal salt and brackish water marshes in San Francisco and San Pablo Bays and sporadically in coastal marshes around Morro Bay. This species currently occurs in similar habitat in coastal southern California but moves to brackish water habitat along the Colorado River and the Salton Sea from April through September (Zeiner et al. 1990). The California clapper rail occurs in only a few areas in Sonoma County including the Napa River Marsh, Hudeman Slough (Small 1994), and the Petaluma River Slough to the Highway 101 overpass (Burridge 1995).

The California clapper rail is found primarily in tidal marshes, criss-crossed with tidal channels. Typical vegetation associated with this species are cord grass, pickleweed, salt grass (Gill 1979; Evens and Page 1984), and occasionally gumplant and bullrushes (Gill 1979; Harvey 1980).

The California clapper rail feeds along exposed tidal mudflats and exposed channel banks. Prey items taken include crabs, mussels, clams, snails and other invertebrates. Prey are obtained by probing, digging or gleaning. Crayfish, clams and insects are taken by populations in inland southern California (Zeiner et al. 1990).

Breeding for this species occurs from January through July until the parents and offspring separate. Nests are usually built near a tidal channel (Harvey 1980; Evans and Page 1984) and are woven from cordgrass.

The primary reason for the decline of the California clapper rail is believed to be due to loss of emergent wetland habitat to filling and diking. Predation of young and eggs by rats, as well as inundation of nest sites by very high tides results in many nest failures (Zeiner et al. 1990). This species is especially sensitive during its reproductive season and it is recommended that human activity in marshes at that time be limited.

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California Gull

The California gull (*Larus californicus*) is listed as a species of special concern by the CDFG (1994).

The California gull is distributed extensively throughout California and can be found in all seasons along the entire coastal region, Central Valley, and Modoc Plateau (Zeiner et al. 1990). This same seasonal distribution occurs in eastern, southern, and western Sonoma County (Zeiner et al. 1990).

Habitat preference by this species is very diverse and includes off shore islands, open ocean, beaches, estuaries, salt and fresh water marshes, bays, harbors, trash dumps, lakes, rivers, agricultural lands and city parks (Small 1994).

As an omnivorous species, the California gull feeds on garbage, carrion, earthworms, insects and other young birds (Zeiner et al. 1990).

Nesting habitat consists of alkali and fresh water lacustrine habitats. There are no known reports of recent nesting California gulls in Sonoma County.

Once the worlds largest nesting colony of California gulls, the Mono Lake rookery on Negit Island is now destroyed due to the receding water level of Mono Lake. Predators were allowed to cross the recently emerged land bridge and prey upon nesting birds (Remsen 1978; Zeiner et al. 1990). Salt ponds on San Francisco Bay have supported a new nesting colony of as many as 670 nests as late as 1983 (Zeiner et al. 1990). Nesting colonies are sparsely distributed across California's northeastern plateau and Mono Lake. Decreasing water levels throughout this range pose a continuing threat to these populations (Remsen 1978).

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California Horned Lark

The California horned lark (*Eremophila alpestris actia*) was listed as a category 3 candidate species (Federal Register 59(219): 58982-59028) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613), the California horned lark is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The breeding distribution of the California horned lark includes coastal California, primarily from Sonoma County south to the Mexican boundary in San Diego County, throughout most of the San Joaquin Valley, and east to the Sierra Nevada foothills (Grinnell and Miller 1944). This subspecies also nests sparingly north to Humboldt County along the coast. Within Sonoma County, the California horned lark has been confirmed as a breeding species south of Jenner along the coast, between Santa Rosa and Petaluma, and at several locations south and east of Petaluma (Burridge 1995). The nesting season extends from April through September.

The California horned lark utilizes a variety of habitat types including alkali flats, "bald" hills, fallow grain fields, mountain meadows, level or rolling short-grass prairie, and open coastal plains (Grinnell and Miller 1944). Nesting occurs in open country, including grasslands and agricultural fields (Ehrlich et al. 1988).

The current population trend of the California horned lark is unknown. The primary threats are loss of habitat to urban and commercial development and agricultural operations which destroy many nests. (Ehrlich et al. 1988).

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Cooper's Hawk

The Cooper's hawk (*Accipiter cooperii*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

The breeding season extends from mid-April through August (McCaskie et al. 1988). Transients and wintering birds appear from mid-September to mid-April, and the peak migration period is mid-September through mid-October and is concentrated on the coast and Cascade-Sierra crest (Small 1994). In California, Cooper's hawk are found as breeders, migrants, and winter residents. The number of Cooper's hawk residing in California during the winter months increases due to an influx of migrants from the north.

Historically, the Cooper's hawk was considered a common permanent resident throughout the state below the Canadian life zone, with the exception of the southeastern deserts and extreme northwest coastal belt (Grinnell and Miller 1944). This species was considered abundant in fall migration. The Cooper's hawk is now considered a rare to uncommon nesting species in California (Small 1994). The current breeding range extends from San Diego County north to Siskiyou County and includes the interior portion of the Coast Range south of Humboldt County, Central Valley, western foothills of the Sierra Nevada, and the canyons of various mountain ranges from the Mexican border to the Oregon border (Small 1994). In southeastern California, breeding also rarely occurs in the Owens and Saline valleys, White and Inyo mountains, and Morongo Valley (Small 1994). There are eight confirmed and six probable recent breeding records for Cooper's hawk in the interior woodlands and valleys of Sonoma County, concentrated east of a line which extends from Cloverdale to Petaluma (Burridge 1995).

The Cooper's hawk demonstrates a preference for lowland riparian forests, which include scattered stands of live or blue oaks as nesting habitat. Some pairs nest in more xeric woodland and forest habitats found in foothill canyons and other upland sites. The Cooper's hawk has also been found to nest uncommonly in mixed conifer pine forests (Beedy and Granholm 1985). The nest is usually

placed in dense canopy near a clearing and is close to water (Ehrlich et al. 1988). During migration and winter, the Cooper's hawk can occur in virtually any habitat with adequate tree or shrub cover for roosting.

The Cooper's hawk has suffered severe population declines throughout its historic range in California. The principal causes of these declines are habitat loss and pesticide poisoning. Reduction of riparian forests in California has led to large and widespread reductions in nesting and foraging habitat. Pesticide contamination and the unrestricted poisoning of prey species are recognized as significant secondary concerns for migrant Cooper's hawks which nest in California and winter outside the continental United States (Evans 1982). In California, intensive management of coniferous forests produces large tracts of monotypic habitat. Within these monotypic habitats, there is a reduced availability of prey species and nest sites for the Cooper's hawk (Evans 1982).

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Double-crested Cormorant

The double-crested cormorant (*Phalacrocorax auritus*) is listed as a species of special concern by the CDFG (1994) and is protected under the Federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

In California, double-crested cormorants breed along coastlines, rivers, inland lakes, and reservoirs. Most (approximately 1200) of the estimated 2,000 coastal breeding birds nest from Cape Mendocino in Humboldt County to the Oregon border. In addition, approximately 650 double-crested cormorants breed on large off-shore islands. In the Central Valley, the double-crested cormorant is a rare nesting species from Tulare County north. The San Mateo, Richmond, and Bay Bridges harbor nesting colonies of double-crested cormorants in the San Francisco Bay area. Marshes and lakes of Lassen, Modoc, and Siskiyou Counties also support large numbers of breeding double-crested cormorants. In southern California, breeding colonies of double-crested cormorants are present along the lower Colorado River, both ends of the Salton Sea, and near the coast at Anaheim (Small 1994). The only confirmed nesting site for the double-crested cormorant in Sonoma County is from near the mouth of the Russian River. At this site, 422 individuals and 176 nests were counted in 1989 (Burridge 1995). The nesting season extends from mid-April through August (Cogswell 1977). Double-crested

cormorants are year-round residents in Sonoma County, with the largest concentrations occurring along the coast and on large inland water bodies such as Lake Ralphine and Spring Lake (Burridge 1995). This species winters along the coast and on large unfrozen lakes, rivers, and reservoirs.

Double-crested cormorants construct their nests out of an assortment of sticks and twigs. The nest is located either on the ground or in large trees (both live and dead) along lakes, reservoirs, rivers, or the ocean (Ehrlich et al. 1988). Cormorants usually nest in large colonies where the older, more experienced nesters are usually the earliest breeders in the colony. Large bodies of water not only provide foraging and roosting habitat for the double-crested cormorant, but also accommodate their long, labored take-offs (Beedy and Granholm 1985). Double-crested cormorants dive from the surface of the water to pursue prey such as small fish and crustaceans (Ehrlich et al. 1988).

The presence of DDT residues in marine food chains caused severe population declines of double-crested cormorants in California during the 1960s and early 1970s (Small 1994). The banning of DDT and the construction of numerous reservoirs in California decreased the toxicity of cormorant prey and expanded the suitable breeding and foraging habitat for this species. This expansion led to the partial recovery of double-crested populations in the late 1970s through the 1980s. The loss of primary prey species such as anchovy and sardine in marine food chains coupled with El Nino events in the early 1980s has prevented the complete recovery of double-crested cormorant populations in California (Small 1994). Inland nesting sites are vulnerable because of draining and development of wetlands and riparian communities. In addition, regeneration of potential nest trees is adversely affected from overgrazing by livestock.

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Ferruginous Hawk

The ferruginous hawk (*Buteo regalis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613), the ferruginous hawk is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The breeding season of the ferruginous hawk occurs from March or April through August (Johnsgard 1990). Wintering birds begin arriving in California in late August and may stay as late as the end of April (Small 1994).

Historically, a few pairs of ferruginous hawks nested sporadically in extreme northeastern California in Modoc County (Grinnell and Miller 1944). During the summer of 1988, the first recent confirmed nesting of the ferruginous hawk was documented in Lassen County on the Madeline Plains (Small 1994). Nesting occurred at this location possibly through 1990 (Small 1994). The winter distribution of the ferruginous hawk in California extended from the Oregon line to the Mexican border, west of the Colorado desert and east of the northern humid coastal belt. Currently, ferruginous hawks winter within this same range, although in reduced numbers (Harlow and Bloom 1989). There is no historical or recent confirmed nesting of ferruginous hawks in Sonoma County (Burridge 1995), but small numbers of ferruginous hawks winter in the county. An average of three to four ferruginous hawks are recorded on the Western Sonoma Christmas Bird Count each year (American Birds 42(4)-47(4), 1988-1993).

Expansive short-grass prairie in semiarid regions of the Great Plains, with scattered tall trees, hills, and rock outcrops, is the preferred breeding habitat of the ferruginous hawk. Nests are usually built in tall elms, oaks, or cottonwoods along streams or rivers, and in junipers that provide a commanding view of the surrounding valley grasslands (Bent 1960). Where trees are in short supply; other structures such as cliffs, hills, boulders, and man-made structures are often utilized as nesting substrate. During migration and post-breeding periods in the southern portions of their breeding range, ferruginous hawk occasionally wander up into mountain grasslands. Open grassland is the primary wintering habitat of ferruginous hawk (Johnsgard 1990).

The primary threat to ferruginous hawk populations is the loss and alteration of habitat. Sagebrush replaces grasses in many areas where overgrazing has occurred and renders an area less suitable as foraging habitat for ferruginous hawks. Grassland habitat has also been replaced by agriculture in many areas. Nest desertion frequently occurs because of human disturbance during the critical incubation period. Electrocution from powerlines and shooting (while the bird is perched on roadside fenceposts) also contribute significantly to ferruginous hawk mortality. The ferruginous hawk appears to be declining throughout much of its breeding range in the United States and Canada (Harlow and Bloom 1989). The entire breeding population during the early 1980s was estimated at 3,000 to 4,000 pairs (Schmutz 1984).

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Golden Eagle

The golden eagle (*Aquila chrysaetos*) is listed as a species of special concern and is fully protected by the CDFG (1994). It is also provided federal protection by the Bald Eagle Protection Act (16 U.S.C. 668-668c).

Historically, the golden eagle was considered a common permanent resident within suitable habitat in California (Grinnell and Miller 1944). The golden eagle was recorded as a nesting species primarily west of the Sierra Nevada throughout the length of the state, but sparingly west of the narrow humid coastal belt and in the southeastern deserts. It was also considered a fairly common nesting species in the interior mountains of Humboldt County and the Warner Mountains of northeastern California (Grinnell and Miller 1944). The golden eagle is currently considered an uncommon nesting species throughout the historical breeding range, with the exception of the Central Valley from which it has been extirpated as a breeder (Small 1944). There are six confirmed and nine probable recent breeding records for the golden eagle in Sonoma County (Burridge 1995). The golden eagle may be found in a variety of habitats throughout California during the winter months, including many areas not occupied during the breeding season. Resident golden eagles are joined by migrants from the north during the winter.

Nesting habitat of the golden eagle includes medium-to-tall trees in open woodland and steep cliffs adjacent to more open country (Small 1994). The

golden eagle is known to hunt in a variety of habitats that range from lowland grasslands to alpine meadows. The reproductive success of this species depends heavily on the abundance of cyclical prey such as lagomorphs (Harlow and Bloom 1989). During post-breeding dispersal and the winter months, golden eagles may be found ranging over sagebrush flats, larger valleys, grassy plains, desert edges, chaparral, broken woodlands and savannahs, and agricultural lands (Small 1994).

As of 1987, there were an estimated 500 pairs of golden eagles nesting in California and the species was generally considered to be declining in the state (Harlow and Bloom 1989). The threats to the golden eagle population in California include habitat loss, human disturbance at nest sites, shooting, electrocution due to collisions with power lines, rodenticide poisoning of prey, and lead poisoning. Lead poisoning and habitat loss are the two major factors limiting golden eagle populations. Lead has been found in high levels in the blood of golden eagles in southern California and lead toxicosis has been identified as a major cause of eagle deaths (Harlow and Bloom 1989). There has also been increasing demand for development of public lands, and subsequent detrimental effects on golden eagle habitat. The creation of large tracts of monotypic habitat due to logging practices also reduces availability of golden eagle prey species (Evans 1982).

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Great Blue Heron

The great blue heron (*Ardea herodias*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

Historically, the great blue heron was considered a locally abundant and widespread permanent resident of California (Grinnell and Miller 1944). The breeding range encompassed most of the state including the Channel Islands, coast, and interior. However, population decline was noted in the southern part of the state in the 1940's (Grinnell and Miller 1944). Currently, the great blue heron is categorized as a fairly common and widespread resident throughout California. The present breeding distribution includes most of the historic range, with the exception of the southeastern portion of the state where it is now known

to nest only along the lower Colorado River and the Salton Sea (Small 1994). Nest colonies are known from Eagle Lake, Clear Lake, Tule Lake National Wildlife Refuge, Lower Klamath National Wildlife Refuge, and the Smith River south sparingly west of the Sierra Nevada and including the San Joaquin and Sacramento valleys south to Imperial, Riverside, and San Diego counties (Small 1994). The nesting season of the great blue heron in California generally occurs from February through May (McCaskie et al. 1988). The great blue heron wanders widely in the nonbreeding season and concentrates on the coast from late July through October (Small 1994). In Sonoma County, there are one probable and 14 confirmed recent nesting records scattered throughout the county (Burridge 1995).

The great blue heron forages in a wide variety of habitats including estuaries, freshwater marshes, lagoons, lakes, mudflats, near-shore kelp beds, rivers, rocky shores, and flooded agricultural fields (Small 1994). Nesting occurs in colonies, often in association with great egrets. Nesting habitat usually consists of live or dead groves of trees, including California buckeye, cottonwoods, eucalyptus, oaks and redwoods (Small 1994, Harvey et al. 1992). Old duck blinds and windmills are occasionally used as nesting substrate (Harvey et al. 1992).

Great blue heron populations appear to be decreasing nationwide (Ehrlich et al. 1988). The great blue heron is also threatened in California by the loss of wetlands and their associated foraging and nesting habitat. Rookeries are vulnerable to over-grazing by cattle. Since over-grazing prevents the regeneration of trees and thereby eliminates potential future nest sites.

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Little Willow Flycatcher

The little willow flycatcher (*Empidonax traillii brewsteri*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613), the little willow flycatcher is no longer considered a federal candidate species. It is listed as a state endangered species by the CDFG (1995).

Formerly, the little willow flycatcher was considered to be widely distributed and common in suitable riparian habitat throughout California (Grinnell and Miller 1944). Currently, there is an estimated maximum of 140 to 150 breeding pairs of little willow flycatchers remaining in California (Small 1994). The breeding range of the little willow flycatcher extends north from Fresno County, from the Sierra Nevada crest to the coast (Harris et al. 1987). Breeding populations of this subspecies are concentrated in the Cascades/Sierra Nevada region in the central Sierra Nevada from Shaver Lake in the Sierra National Forest to Ackerson Meadow in the Stanislaus National Forest and between Westwood Meadow in the Lassen National Forest and the Little Truckee River in the Tahoe National Forest (Small 1994). In Sonoma County, there are no known recent breeding records, but the little willow flycatcher is considered an uncommon to fairly common spring and fall migrant (Burridge 1995). The abbreviated nesting season of the willow flycatcher extends from June through mid-August (McCaskie et al. 1988). Willow flycatchers winter from southern Mexico to Panama (Ehrlich et al. 1988).

The little willow flycatcher has very specialized breeding habitat requirements that are provided in extensive dense willow stands (usually three to eight feet high) in mountain meadows, springs, and seeps; broad floodplains and canyons; and along rivers and streams in riparian woodlands (Small 1994). The nest is typically located from 2 to 10 feet high in a slanting or upright fork of a willow. The compact nest is composed of bark, grass, and weed stems. The nest is lined with feathers, hair, grass, and plant down (Ehrlich et al. 1988). Willow flycatchers feed primarily on insects, captured in the air by sallying out from an exposed perch (Ehrlich et al. 1988).

Threats to little willow flycatcher populations are largely associated with human impacts to breeding habitat. Over-browsing by cattle, clearing for recreational development, water diversion, and flooding by reservoirs have eliminated many willow stands. The loss of essential breeding habitat has led to a serious decline in little willow flycatcher populations in California (Beedy and Granholm 1985). The increase in human activity in California has also led to a dramatic increase in brown-headed cowbird populations, which thrive in disturbed habitats, such as dairies and stockyards. This increase in the cowbird population poses a serious threat to willow flycatcher breeding populations since they are especially vulnerable to cowbird nest parasitism (Beedy and Granholm 1985).

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Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) was listed as a category 3 candidate species (Federal Register 59(219): 58982-59028) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613), the loggerhead shrike is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The nesting season of the loggerhead shrike is from April to September (Small 1994). The historic breeding distribution of the loggerhead shrike in California included most of the state, except for the Sierra Nevada-Cascade system, high elevation desert ranges in southeastern California, and the northwest coast (Grinnell and Miller 1944). Loggerhead shrikes formerly nested on the California coast from the Mexican border in San Diego County to Sonoma County (Grinnell and Miller 1944).

Currently, nesting loggerhead shrike are widespread throughout California, but are absent from southern Mendocino County to Del Norte County along the coast, heavily timbered inland portions of the northwest, heavily forested high mountains, and high portions of the desert ranges (Small 1994). Loggerhead shrikes have been confirmed nesting south of Bodega Bay on the coast, south and east of Santa Rosa, and east of Petaluma within Sonoma County (Burrige 1995).

Loggerhead shrikes nest in a variety of habitats including broken woodlands, desert oases, desert scrub and washes, Joshua tree woodlands, pinyon-juniper woodlands, savannah, and sparsely populated suburbs and farms (Small 1994). Nests are usually placed in small deciduous trees, brush or dense shrubs (Ehrlich et al. 1988). Shrikes require open country for hunting, with an abundance of elevated perches to scan for prey and watch for predators. This requirement for open habitat with hunting perches applies to both the breeding and nonbreeding seasons (Small 1994).

Loggerhead shrike populations appear to be declining on a local scale in some parts of California (Small 1994), while populations remain relatively stable on a statewide basis (Morrison 1981). Current threats to shrike populations include insecticides, intensive agricultural practices, habitat destruction, and possibly collisions with cars on roads within nesting and hunting territories (Ehrlich et al. 1992).

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Long-billed Curlew

The long-billed curlew (*Numenius americanus*) is listed as a species of special concern by the CDFG (1994).

The long-billed curlew is distributed throughout California, but is rare in the northwest coastal region. Up to 10,000 individuals at one time may occur as fall transients and winter visitors in the central valley and the larger valleys of southern California (Small 1994). Preferred winter habitat is tidal mudflats, salt water marshes, grasslands and agricultural fields with short grass. Grasslands with nearby lakes or marshes are utilized as breeding habitat (Small 1994).

Long-billed curlew mostly feed on insects but will also consume worms, crustaceans, mollusks, toads, eggs and nestlings of other birds (Ehrlich 1988).

The breeding range of the long-billed curlew has been greatly reduced and is still declining. This decline is primarily due to habitat loss and degradation (Ehrlich 1988). Poisoning from organochlorine compounds is also responsible for the decline of this species (Ehrlich 1988).

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Long-eared Owl

The long-eared owl (*Asio otus*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The nesting season of the long-eared owl extends from early April to September (McCaskie et al. 1988). The long-eared owl will sometimes nest in loose colonies. This is thought to be related to food supply (Ehrlich et al. 1988).

The long-eared owl formerly nested commonly throughout California east of the northern humid coastal belt (Grinnell and Miller 1944). There were three recognized centers of abundance. These areas included San Diego County, the Central Valley, and northeastern Great Basin (Grinnell and Miller 1944). The northernmost known breeding records are from Sebastopol and Bodega in Sonoma County. The current known breeding distribution includes the Inyo, New York, San Bernardino, San Jacinto, and White mountains in interior southern California (rare to uncommon); Santa Barbara north to southern Lake and Sonoma counties in the Coast Range (discontinuous); the western foothills of the Sierra Nevada and Cascades (scarce and local); Owens Valley (scarce and local); and the Modoc Plateau and northeastern Great Basin region (scarce and local) (Small 1994). A few pairs nest at Yaqui Well, Morongo Valley, Mojave River, Antelope Valley, Prado Basin, Cottonwood Springs, Santa Barbara Canyon, lower Colorado River Valley, and near Oceanside in extreme southern California (Small 1994). Communal wintering aggregations of up to 45 individuals are found sporadically in the lower Colorado River Valley, southeastern deserts, Antelope Valley, interior and Coast Range valleys from Sonoma County south, and in the Central Valley (Small 1994). There are no

recent nesting records for long-eared owl in Sonoma County (Burridge 1995).

The long-eared owl usually nests in coniferous or mixed-deciduous forests where it occupies a nest abandoned by a crow, magpie, or hawk. Most nesting occurs in dense stands of live oaks on streamside terraces, riparian-bordered watercourses, and extensive riparian bottomlands (Small 1994). The long-eared owl requires an open hunting area with a sufficient food supply (primarily small rodents) near the nest or roost. Winter roosts may be located in a variety of habitats including rocky cliffs, deep arroyos, tamarisk groves, orchards, windbreaks along farms and ranches, dense riparian woodlands, and desert oases (Small 1994).

Destruction and degradation of nesting and roosting habitats has led to the decline of the long-eared owl as a nesting species in California (Small 1994). Human impacts to breeding and wintering habitats continue to be the major threat to long-eared owl populations. Many of these areas have been altered by water diversion, cleared for agriculture, or inundated by reservoirs (Beedy and Granholm 1985).

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Marbled Murrelet

The marbled murrelet (*Brachyramphus marmoratus*) is listed as federally threatened by the USFWS (Federal Register 53: 40479) and state endangered by the CDFG (California Department of Fish and Game 1992).

The marbled murrelet occurs along the entire coast of California (Small 1994). During the non-breeding season this species tends to prefer inshore waters off rocky headlands, among kelp beds. They also can be found off piers and breakwaters but rarely in protected harbors. Dense humid coastal forests are sometimes utilized for night roosting. These forests are also used during the breeding season when the marbled murrelet can range up to 24 miles inland (Small 1994). There are two principal California breeding areas, which occur from the Oregon border south to Eureka and from Pillar Point/Half-Moon Bay south to Santa Cruz. Preferred breeding habitat is dense old-growth humid coastal evergreen forests (i.e., redwood and Douglas fir forests)(Small 1994). This species is chiefly identified by its vocalizations as it flies to and from these roosting sites at dusk and dawn (Small 1994).

Habitat loss due to the harvesting of old growth coniferous forests is the primary cause for the decline of the marbled murrelet in California. Other reasons include oil spills, increased predation by flourishing ravens and crows (CDFG 1992).

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Merlin

The merlin (*Falco columbarius*) is listed as a species of special concern by the CDFG (1994) and is protected under the Federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The merlin is considered a rare to very uncommon spring and fall migrant and winter visitor in California (usually September through March). Most merlins are observed along the coast, although merlins are widespread and have been recorded throughout the state. Point Reyes National Seashore and Humboldt Bay are favored merlin wintering locations (Small 1994). Preferred inland wintering sites include the Antelope Valley, Fish Lake Valley, Owens Valley, Sacramento Valley, Santa Clara Valley, and Klamath Basin (Small 1994). There are no breeding records for merlin in Sonoma County (Burrige 1995).

Although preferring the coast (e.g., coastal estuaries and tidal mudflats), merlins are also found in a variety of other habitats including edges of grasslands and deserts, farms, freshwater marshes, open woodlands, ranches, and savannahs (Small 1994). In open country, clumps or groves of trees are required for roosting habitat. Where prey is abundant (particularly small shorebirds and open-country passerines), transient and wintering merlins may take up residence, while others roam widely over the land searching for prey. Birds make up an average of 82 percent of the diet of merlins (Johnsgard 1990). A low, fast, horizontal flight is the usual method of attack (Johnsgard 1990).

Merlin populations declined during the 1960s and 1970s due to eggshell thinning (caused by the concentration of DDT in prey items) and the loss of grassland foraging habitats. Based on Audubon Christmas Bird Count records for the early 1980s, the wintering merlin populations in Canada and the United States have shown a 43 percent increase since the late 1960s (Johnsgard 1990).

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Northern Harrier

The northern harrier (*Circus cyaneus*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

In California, the breeding season of the northern harrier extends from mid-April through August (McCaskie et al. 1988). During years with high vole abundance, numbers of breeding birds, clutch size, and reproductive success are all substantially higher (Johnsgard 1990). Wintering birds are present in the state from September through April.

In California, the northern harrier formerly nested throughout the Central Valley, western Sierra Nevada foothills, Klamath Basin, Great Basin, and coastal plains and valleys (Small 1994). Although nesting records are known from Kern, Los Angeles, Marin, Mono, Orange, San Bernardino, San Diego, San Luis Obispo, San Mateo, Santa Clara, Siskiyou, and Ventura counties (Grinnell and Miller 1944), the current breeding distribution is concentrated in the northern Sacramento Valley, Great Basin, and Klamath Basin (Small 1994). Wintering harrier may occur throughout the state in appropriate habitat, but the largest concentrations are in the Central Valley. There are five recent confirmed nesting records for Sonoma County. Two records are from along the Petaluma River south of Petaluma, while the other three records are from around the upland margin of Bodega Bay (Burridge 1995).

Non-forested habitat types such as agricultural lands, grasslands, fresh- and saltwater marshes, and occasionally mountain meadows and brushlands are utilized as foraging and nesting habitat by the northern harrier. In the winter, harrier sometimes roost communally. These communal roosts are typically located on the ground in relatively undisturbed marshes or fields (Evans 1982).

The breeding range of the northern harrier has been greatly reduced in the state in recent years, particularly in southern California, the San Joaquin Valley, and the northwest coast (Small 1994). The primary reasons for this population decline are disappearance of suitable habitat due to agricultural and urban development, and human disturbance (Small 1994). Winter harrier populations appear to be stable, with an estimated 13,200 individuals present in California each year (Johnsgard 1990).

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Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) is listed as a threatened species by the USFWS (USFWS 1990). It also listed as a species of special concern by the CDFG (1994).

The nesting season of the northern spotted owl typically extends from March through September (United States Forest Service 1991). Pairs defend the same territory each year, but do not nest annually. Northern spotted owls are sedentary, remaining within the vicinity of nesting territories year-round.

The historical breeding distribution of the northern spotted owl was considered to include the northwest coastal belt, from Marin County north to western Siskiyou and Del Norte counties (Grinnell and Miller 1944). The current breeding distribution includes the northern Coast Range and Klamath Mountains region from eastern Siskiyou and Del Norte counties at the Oregon border south to Marin County (Small 1994). The northern spotted owl was once considered locally common (Grinnell and Miller 1944), but the entire state population is now estimated at approximately 829 pairs (United States Forest Service 1991). The northern spotted owl has recently been confirmed nesting in Sonoma County southeast of Santa Rosa, east of Jenner, north and east of Bodega Bay, along the inland margin of the northwest coast due west of Geyserville, and in the northeastern corner of the county (Burridge 1995).

The northern spotted owl prefers mature to old-growth forests at low to middle elevations, usually with large, 100 to 200 year old trees. These forests in California are generally composed of some combination of conifers such as western hemlock, red fir, white fir, redwood, Douglas fir, ponderosa pine, and western cedar, or are composed of mixed hardwood-conifer habitat that includes tan oak, black oak, and coast live oak (United States Forest Service 1991). Northern spotted owls occupy an average home range of 2,200 acres in California (United States Forest Service 1991). High structural diversity is important to provide shade for the spotted owl, because the bird is intolerant of high temperatures. High structural diversity also provides more habitat for woodrats and flying squirrels, the primary prey of the northern spotted owl.

The greatest threat to the northern spotted owl is the loss of its old-growth forest habitat. The timber industry continues to cut old-growth forest at a rapid rate. Most timber harvesting rotations are on a 50- to 100-year cycle, which means that northern spotted owl habitat is being destroyed without replacement (United States Forest Service 1991). The requirement for large tracts of forest in the 150- to 200-year range renders the northern spotted owl especially vulnerable to logging pressure since these stands contain the most commercially valuable timber (United States Forest Service 1991).

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Osprey

The osprey (*Pandion haliaetus*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

The nesting season of the osprey occurs from March or April through September (Evans 1982). Most ospreys in California winter along the southern California coast, lower Colorado River, or coastal Baja California (Johnsgard 1990).

The former breeding distribution of the osprey in California encompassed the entire length of the state and included the lakes of the northeastern plateau region, the San Joaquin and Sacramento rivers, the mouths of larger mainland streams, and nearly all the offshore islands (Grinnell and Miller 1944). The current

breeding distribution is confined to Lake Almanor, Eagle Lake, and Goose Lake in northeastern California, the upper Sacramento River, and along rivers from the Coast Range and Klamath Mountains in Del Norte and Siskiyou counties south to Marin and Sonoma counties (including Glenn, Humboldt, Mendocino, Shasta, and Trinity counties) (Small 1994). Osprey no longer nest on the Channel Islands and are extremely rare nesters in southern California. The present breeding population in California is approximately 400 pairs (Small 1994). Nesting ospreys have recently been confirmed at several locations in Sonoma County including the Russian River and the coast north of Jenner (Burridge 1995).

Ospreys inhabit coastal lagoons, estuaries, freshwater lakes and reservoirs, large bays, large rivers, offshore islands, and the seacoast (Small 1994). Ospreys construct large nests of sticks and twigs in the tops of snags or flat-crowned trees. Deciduous and coniferous trees are both utilized as nest sites (Beedy and Granholm 1985). These perennial nests are unique and can be used in locating osprey territories during air and ground searches (Evans 1982). Ospreys require relatively shallow, clear water as foraging habitat and feed almost exclusively on fish.

The decline of osprey populations from the 1950s to 1970s was primarily due to eggshell thinning as a result of bioaccumulation of DDT and its derivatives. The major threats to the osprey at this time are threefold. First, the use of persistent organochlorine pesticides on wintering grounds in Mexico, and Central and South America contaminates prey species. Second, forestry practices, such as snag removal, lead to the decreased availability of natural nest trees. Third, the recreational use of lakes and the effects of acid rain reduce the available foraging habitat. Nesting ospreys in northern California, Oregon, and Washington are particularly vulnerable to these threats (Ehrlich et al. 1988, Evans 1982).

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Prairie Falcon

The prairie falcon (*Falco mexicanus*) is listed as a species of special concern by the CDFG (1994) and is protected under the Federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

In California, the prairie falcon is considered an uncommon permanent resident, with nesting occurring throughout the state where suitable habitat exists. The largest number of nesting territories are located in the Mojave Desert and Central Coast regions, while northwest California and the Sierra Nevada support the smallest number of nesting territories. Prairie falcon nest sites are also concentrated in the Great Basin, Klamath Basin, Modoc Plateau, and around the margins of the Sacramento and San Joaquin valleys in arid open lands of the

interior (Small 1994). An estimated 300 to 500 pairs of prairie falcons attempt to nest in California each year (Boyce et al. 1986). The breeding season extends from mid-March through mid-August (McCaskie et al. 1988). There are no recent nesting records for prairie falcon in Sonoma County (Burridge 1995). In the winter, the resident prairie falcon population in California increases by 80 percent due to an influx of migrants from the north (Small 1994).

Prairie falcons nest on cliff ledges and in rock crevices. Nest sites are typically located adjacent to open habitat, usually in the high intermontane valleys or lowlands (Small 1994). The nest is usually an unlined scrape located at least 30 to 40 feet above the ground (Ehrlich et al. 1988). Foraging habitat includes agricultural land, coastal plains, deserts, grasslands, ranches, and sagebrush flats (Small 1994). Prairie falcons usually take their prey on or near the ground after rapid, horizontal aerial pursuit (Ehrlich et al. 1988). The primary prey are birds and small mammals. During the breeding season, ground squirrels comprise a large part of the diet in many areas. Conversely, horned larks are one of the major prey items taken during the winter (Garrett and Mitchell 1973).

Prairie falcons are declining near major agricultural areas and within the Mojave Desert. In contrast, the Central Coast population has shown an increase in occupied territories (Boyce et al. 1986). The primary threats to California prairie falcon populations are agricultural practices and human disturbance. In many agricultural areas, vertebrate control programs eliminate large numbers of birds and mammals which constitute the prey base of the prairie falcon. In particular, the loss of ground squirrels and horned larks has a significant negative impact on prairie falcon populations. Prairie falcons withdraw from areas in which these prey items are unavailable or in short supply (Boyce et al. 1986). In addition, poisoning of seed-eating birds such as the horned lark can result in pesticide accumulation in prairie falcons, which may then lead to eggshell thinning and decreased reproductive success (Ehrlich et al. 1988).

Harassment by falconers and recreationists has also led to abandonment of many prairie falcon nest sites. Large numbers of people utilize the Mojave Desert for recreation on weekends, holidays, and summer vacations. This high level of human disturbance has been implicated in decreased fledgling survivorship in the Mojave Desert (Boyce et al. 1986). Prairie falcons are particularly vulnerable to disturbance because of their low nest-site tenacity.

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Purple Martin

The purple martin (*Progne subis*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The nesting season of the purple martin extends from April through August (Small 1994). Purple martins winter primarily in South America (Ehrlich et al. 1988).

The breeding range of the purple martin in California historically extended the length of the state west of the Sierra Nevada-Cascade axis (Grinnell and Miller 1944). Martins nested from the Mexican boundary in San Diego County to the Oregon State line in Del Norte County (Grinnell and Miller 1944). The current breeding distribution includes the east slope of the Cascade-Sierra Nevada crest from Lava Beds National Monument south to northeast Sierra County, the inner Coast Range (Lake and northern Napa County), and the northern Coast Range and Siskiyou Mountains down to central Sonoma County (Small 1994). A few pairs nest in the western foothills of the Sierra Nevada and there is an isolated population nesting along the Sacramento River and under freeway overpasses in

downtown Sacramento (Small 1994). In addition, there is a small nesting population in southern California including Los Angeles and Santa Barbara counties, and the Cuyamaca, Laguna, San Bernardino, and San Jacinto mountains (Small 1994). There are recent confirmed nesting records for extreme northwestern Sonoma County along the coast north of Jenner, and a few probable breeding occurrences in northeast Sonoma County (Burridge 1995).

Purple martins require large trees with cavities for nesting and open areas for foraging. Habitat types used by this species include broken, burned, or partially logged coastal coniferous forests, montane deciduous-coniferous forests, oak woodlands, pure coniferous forests, and riparian woodlands (Small 1994). Nest trees include redwood, cottonwood, Douglas fir, oaks, western sycamore, and various pines (Small 1994). Recently, purple martins have been found nesting under freeway overpasses in the Sacramento vicinity. In Lava Beds National Monument, they have even been known to nest in lava tubes (Small 1994).

The purple martin has undergone general population declines over much of its continental range, but the most serious declines have been noted in the west (Arbib 1979). Although small numbers of purple martins have adapted to nesting in crevices or holes under highway bridges, there has been very little success in inducing these swallows to accept "martin houses" in California (Small 1994). The purple martin suffers from competition for available nest sites with house sparrow, European starling, and other exotic cavity-nesting species. The common forestry practice of removing dead snags has also greatly decreased the availability of natural nest sites. Unless declines are reversed, the future of nesting purple martins in California is in doubt (Small 1994). Public and private natural resource management agencies and organizations in California are participating in a nationwide effort to locate and monitor all active purple martin breeding colonies (Ehrlich et al. 1988).

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Rhinoceros Auklet

Nesting colonies of Rhinoceros auklet (*Cerorhinca monocerata*) is listed as a species of special concern by the CDFG (1994).

The rhinoceros auklet occupies marine pelagic habitat along the entire coast of California (Zeiner, et. al 1990). The majority of overwintering birds occur from Sonoma County, south to Santa Barbara County (Small 1994). A nest is built at the rear of a tunnel, usually excavated by the adults. These tunnels can be up to 20 feet in length (Ehrlich et al. 1988). Eggs are laid from mid-May to mid-June and young fledge through August (Zeiner et al. 1990). Foraging and nest provisioning occurs nocturnally. Diet consists of small fish and marine invertebrates.

Although rhinoceros auklet were once very scarce along the California coast, numbers have been increasing in recent years (Remsen 1978). However, major threats to the well being of this species remain. Human disturbance and future oil spills are among the hazards to which this species seems particularly vulnerable (Remsen 1978).

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Salt Marsh Common Yellowthroat

The salt marsh common yellowthroat (*Geothlypis trichas sinuosa*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the salt marsh common yellowthroat is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

During the breeding season (mid-March through August), the salt marsh common yellowthroat is confined to freshwater and salt marshes from the vicinity of San Jose in Santa Clara County north to the Napa sloughs in southern Sonoma County and Tomales Bay in Marin County, and east to the Carquinez Strait (Grinnell and Miller 1944). In the winter (October to March) the salt marsh common yellowthroat disperses to occupy salt marshes from San Diego north to the San Francisco Bay region. The salt marsh common yellowthroat has been confirmed as a breeding species along the Petaluma River and San Antonio Creek southeast of Petaluma and as a probable breeder around Jenner and Bodega Bay in Sonoma County (Burridge 1995).

Willow thickets, tule patches, and tall grasses provide nesting habitat for the salt marsh common yellowthroat. Nests are usually placed low in dense vegetation and over the water. Fresh water marshes seem to be preferred during the breeding season, while salt and brackish marshes are favored during the fall and winter months. Continuous cover is an important habitat requirement to provide concealment while foraging on the mud or near the water surface. Most salt marsh common yellowthroat activity occurs within three to six feet of the water (Grinnell and Miller 1944).

The most recent survey of salt marsh common yellowthroat nesting populations found a total of 569 pairs at 23 locations (Harvey et al. 1992). The reduction and alteration of salt marsh yellowthroat habitat over the past 100 years has led to an estimated 80 to 95 percent population decrease. This decrease is primarily due to the loss of marshes to agricultural conversion, creation of salt ponds, and urban

development. The fragmenting of formerly continuous corridors of freshwater/brackish/salt marshes has inhibited seasonal movements by adults and successful dispersion of fledglings (Harvey et al. 1992). The decrease of marsh vegetation and insects due to the reduced freshwater inflow from creeks and rivers has also been postulated to negatively affect salt marsh common yellowthroat populations (Harvey et al. 1992).

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San Pablo Song Sparrow

The San Pablo song sparrow (*Melospiza melodia samuelis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the San Pablo song sparrow is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The historic distribution of San Pablo song sparrow included the north side of San Francisco and San Pablo bays, the Carquinez Straits west to Richardson Bay, and San Pablo Point on the Richmond headland northeast to San Pablo Bay (Grinnell and Miller 1944). This subspecies is now limited to the northern side of San Pablo and San Francisco bays (Small 1994). The San Pablo song sparrow has been recently confirmed as a breeding species along the sloughs and rivers feeding into San Pablo Bay, as well as around the margin of San Pablo Bay in Sonoma County (e. g., Petaluma River, Second Napa Slough) (Burridge 1995).

San Pablo song sparrow are found almost exclusively in tidal salt marshes dominated by pickleweed, and in the vicinity of taller gumplant bushes. (Small 1994; Harvey et al. 1992; Grinnell and Miller 1944). Territories often include portions of tidal sloughs, creeks, or the bayshore where tidal flow is unimpeded by channels, dikes, or levees (Harvey et al. 1992). Foraging usually occurs at or around the water's edge, in close association with low tangles of pickleweed. The gumplant bushes present within the sparrow's territory serve multiple functions including as a refuge from predators at high tide, singing post for territorial advertisement and mate attraction, and as nesting habitat (Grinnell and Miller 1944).

San Pablo song sparrow populations are highly sedentary with adults using the same territories in successive years (Basham and Mewaldt 1987). Juvenile dispersal distances (i. e., from hatching to breeding sites) are also extremely short, and, combined with the sedentary nature of adults, leads to small highly isolated populations which are subject to an increased likelihood of local extinction (Basham and Mewaldt 1987). San Pablo song sparrow populations and suitable habitat have been greatly reduced by the conversion and destruction of tidal salt marshes. Current threats to this subspecies include habitat fragmentation leading to genetic isolation of subpopulations, loss of high marsh nesting cover leading to increased vulnerability to nest predation and inundation by high tides, vulnerability to contaminants through the food web and due to toxic spills, and residential and commercial development adjacent to tidal wetlands resulting in increased predation by feral animals, human disturbance, and pollution (Harvey et al. 1992).

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Sharp-shinned Hawk

The sharp-shinned hawk (*Accipiter striatus*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

The breeding season extends from mid-April to September (McCaskie et al. 1988). Transients and wintering birds appear from mid-September to mid-April with peak migration occurring from mid-September through mid-October. Migration is concentrated on the coast and Cascade-Sierra Nevada crest (Small 1994).

The historical breeding distribution of the sharp-shinned hawk included the Cuyamaca Mountains in southern California through the Inyo and White mountains and along the Sierra Nevada. The breeding range also encompassed the coast belt from Monterey and Alameda counties north to the Oregon border. The sharp-shinned hawk was considered an uncommon and local nesting bird and an abundant winter visitor throughout portions of the state that do not experience heavy winter snow (Grinnell and Miller 1944). Currently, it is considered a scarce breeding species and uncommon to fairly common transient and winter visitor in California (Small 1994). Confirmed nesting has occurred from the

Transverse Ranges north to the Warner Mountains (inland) and Humboldt County (along the coast), including the Inyo and White mountains (Small 1994). The coastal breeding distribution is primarily north of San Francisco Bay (Reynolds 1989). There are two confirmed and one probable recent breeding record for Sonoma County (Burridge 1995). The confirmed nest sites were north and east of Santa Rosa, while the probable nest site was northeast of Petaluma.

Preferred breeding habitat for the sharp-shinned hawk consists of deciduous, coniferous, and mixed forest or broken woodlands. This species seems to favor young successional stands of forest with relatively high crown canopy on north-facing slopes near water (Johnsgard 1990). During migration and the winter months, the sharp-shinned hawk is found in a wide variety of habitats including orchards, farms with planted windbreaks or groves of trees, and residential neighborhoods. The species appears to avoid marshes, grasslands, and deserts (Small 1994).

Sharp-shinned hawk populations underwent serious population declines prior to the ban on DDT in the United States. Today, the primary threat is coniferous forest management practices which create large blocks of monotypic habitat, thus reducing available nest sites and prey species. The reduction in riparian woodlands at all elevations also threatens nesting, foraging, and roosting habitat, while the continued use of organochlorine pesticides in the southern portions of their wintering range (i. e., Mexico, Central America, and South America) contaminates prey species and results in decreased reproductive success (Ehrlich et al. 1988).

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Short-eared Owl

The short-eared owl (*Asio flammeus*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The nesting season of the short-eared owl occurs from late April through early July (Heintzelman 1985). The location of the nest and size of the clutch depends on prey availability.

The historic nesting distribution of the short-eared owl included the entire length of California west of the deserts in suitable habitat (Grinnell and Miller 1944). The short-eared owl was considered an intermittent local breeder in small numbers throughout the western portion of the state (Grinnell and Miller 1944). Nesting records are known from Mono Lake, the southern coast, San Joaquin Valley, Sacramento Valley, Moss Landing, islands in San Francisco Bay, and the mouth of the Salinas River (Remsen 1978). However, the current nesting distribution has been reduced to two major areas: 1) northeastern California from Honey Lake north to the Great Basin region, Modoc Plateau, and Klamath

Mountains; and 2) the Grizzly Island Wildlife Management Area in the Sacramento/San Joaquin River delta (Small 1994). Nesting occasionally occurs in the southern Sacramento Valley and the San Francisco Bay area south to Monterey Bay, but only rarely occurs in southern California (Small 1994). Wintering and migrant birds concentrate in areas of high rodent populations and may be found primarily west of the Sierra Nevada. There are no recent breeding records for short-eared owl in Sonoma County (Burridge 1995).

Short-eared owls require stands of tall grasses in dry or wet lowland habitats for nesting and roosting (Small 1994). Hunting occurs in agricultural lands, freshwater and saltwater marshes, grasslands, meadows, and river margins (Small 1994).

The short-eared owl is declining as a nesting species in California, primarily because of agriculture, conversion of natural grasslands to cattle grazing, marsh drainage, recreational development, shooting, and urbanization (Small 1994). Short-eared owls are still locally uncommon to common transients and winter residents in California due to an annual influx of migrants from the north.

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Tricolored Blackbird

The tricolored blackbird (*Agelaius tricolor*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the tricolored blackbird is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The bulk of the tricolored blackbird nesting season occurs from mid-April through late May (Small 1994). Tricolored blackbird nested historically throughout the San Joaquin and Sacramento valleys, in the Sierra Nevada foothills from Kern County north to Shasta County, along the coast from the Mexican boundary to Sonoma County, and sporadically on the Modoc Plateau east of the Sierra-Cascade axis (Grinnell and Miller 1944). Wintering flocks occur throughout the breeding range, but concentrate around San Francisco, San Pablo, and Suisun bays, as well as the Sacramento/San Joaquin River delta (Grinnell and Miller 1944). The current breeding distribution includes primarily the Central Valley from Glenn, Napa, Butte, and Yolo counties south to western Kern County and the Sacramento River delta (Small 1994). Nesting colonies also occur in the Klamath and Honey Lake basins, and in McArthur Swamp and Big Lake in northeastern California; sporadic nesting also occurs along the north coast in Mendocino and Humboldt counties, the central coast in southern Sonoma and western Alameda counties, around Clear Lake, and rarely in Los Angeles, Orange, Riverside, San Diego, San Luis Obispo, Santa Barbara, and Ventura counties (Small 1994).

Between the years 1960 and 1977 nesting records exist for Copeland Creek near Rohnert Park, Stony Point and Roblar roads west of Cotati, Willow Creek, the Sonoma County Airport, Americano Creek near Valley Ford, and southwest Sonoma County (Beedy et al. 1991). These nesting colonies ranged from 200 to

3,000 individuals (Beedy et al. 1991). The last confirmed nesting occurred in 1990 and the colony was located on the coast west of Petaluma and south of Bodega Bay (Burridge 1995).

Tricolored blackbird typically nest in emergent freshwater marshes with cattails, tules, or willows with a reliable water source and an abundant supply of terrestrial insects (Small 1994). Many nesting colonies are also located in blackberry, mustard, thistles, and nettles which provide protection from mammalian predators and disturbance by livestock (Beedy et al. 1991). The abundance of local insect populations seems to determine the density and distribution of nesting colonies (Small 1994). Nesting colonies may number from several hundred to tens of thousands of individuals. Agricultural fields, grasslands, and pastures are used extensively during the winter months.

The breeding population of tricolored blackbird in California has been estimated at 250,000 adults (Small 1994). This represents a 70 to 90 percent decline over the last 60 years. Historical causes for this decline included the draining and reclamation of freshwater marshes and market hunting (Harvey et al. 1992). Current threats include primarily loss of wetland nesting habitat, food supplies, and water. Other potential threats to tricolored blackbird populations include human disturbance, predation, competition with red-winged blackbird, and poisoning (herbicides and insecticides) (Harvey et al. 1992).

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Tufted Puffin

The tufted puffin (*Fratercula cirrhata*) is listed as a species of special concern by the CDFG (1994).

The tufted puffin was once a common breeder along some of California's coastal cliffs and offshore islands as far south as the Channel Islands (Remsen 1978). Currently, the California population consists of approximately 250 individuals and is sparsely distributed along the California coast from Prince Island in Del Norte County to the southern end of Big Sur (Zeiner et al. 1990). Locally, a probable nesting pair has been reported at the mouth of the Russian River (Burridge 1995). The tufted puffin has also been reported breeding on Arch Rock, off the Sonoma County coast as late as 1978 (Remsen 1978).

This species prefers pelagic waters in the non-breeding season but settles near coastal or island cliffs during the breeding season which is April through August (Zeiner et al. 1990).

The nest of the tufted puffin typically lies at the rear of a short burrow dug into the soft dirt of a cliff. One egg is produced and the young emerge from the burrow in about 80-90 days (Zeiner et al. 1990).

The diet of the tufted puffin consists of small fish (i.e., sardines, smelt, or herring) and marine invertebrates (Zeiner et al. 1990).

The decline of the tufted puffin in California may be due to the near disappearance of sardines off the California coast. Other contributing factors may be oil spills and human disturbance (Remsen 1978).

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Vaux's Swift

The Vaux's swift (*Chaetura vauxi*) is listed as a species of special concern by the CDFG (1994).

The Vaux's swift is a widespread and common transient throughout most of western California, from the Sierra Nevada-Cascade axis to the coast. Most individuals migrate further north to nest in Oregon and Washington, but small populations nest from Sonoma County north to the Oregon border in the Sierra Nevada (as far south as Sequoia National Park), Klamath Mountains, North Coast Range and along the immediate coast. This species is also a rare nester in isolated portions of Santa Cruz, San Mateo, and Marin counties (Small 1994). In Sonoma County, the Vaux's swift is a summer resident along the northwestern coast, with evidence of breeding in inland coastal valleys near southern Sebastopol, Santa Rosa, Healdsburg, Geyserville, and Cloverdale. This species is also known to nest near Salmon Creek along the Sonoma County coast (Burridge 1995)

Nesting occurs primarily in hollowed-out trees and snags in mature and old-growth coniferous forest. Vaux's swifts have also been to occasionally nest in chimneys in residential areas of Healdsburg, Santa Rosa, and Sebastopol (Burridge 1995).

Threats to Vaux's swift include the loss of forested nesting habitat throughout its range and forestry practices that involve snag removal. This species is particularly vulnerable due to its reliance on older-aged stands of coniferous forest for nesting, a habitat type that is rapidly disappearing in California.

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Western Burrowing Owl

The western burrowing owl (*Speotyto cunicularia hypugea*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the western burrowing owl is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The nesting season of the burrowing owl extends from March through early September (Evans 1982).

Nesting burrowing owls were formerly distributed throughout California in agricultural areas and warmer grasslands of the Central Valley, Imperial Valley, coastal valleys, and Great Basin. Noticeable declines have occurred in California since at least the 1940s (Grinnell and Miller 1944). The burrowing owl winters throughout its breeding range, although there is some north-south movement during the nonbreeding season (Ehrlich et al. 1992). Burrowing owls are still widely distributed throughout proper habitat in the lowlands of California, but are now extremely rare east of the Sierra Nevada crest and the coast north of Marin County (Small 1994). Nesting burrowing owls occur in the Central Valley, central and southern California coastal plains, coastal valleys, northeastern Modoc Plateau, and Great Basin region of the state (Small 1994). The only location where this species can still be considered a common nester is in the Imperial Valley. Burrowing owls are rare residents and occasional nesters on the Channel Islands (Small 1994). The burrowing owl has been virtually extirpated as a nesting species in Sonoma County. The only recent nesting records are of two pairs southwest of Sears Point in 1993 (Ruhlen 1994) and one pair on the Skaggs Island Naval Base in 1986 (Burridge 1995).

The burrowing owl inhabits deserts, open grasslands, prairies, and savannah, but also lives in open areas near human habitation such as airports and golf courses. They nest in abandoned rodent burrows, which they modify each year. Burrows

also provide thermoregulatory shelter and protection from predators (Coulombe 1971). Burrowing owls forage in areas with short vegetation adjacent to the nest sites (Ehrlich et al. 1988). Another important habitat requisite is the availability of elevated perches, which provide hunting posts and a means of surveillance for potential predators.

Burrowing owls are currently declining in their California range due to a combination of factors. Extensive ground squirrel poisoning has led to loss of habitat and secondary poisoning of the owls. Agricultural and urban development have also contributed to the loss of nesting and foraging habitat. Widespread use of pesticides may further lead to burrowing owl declines due to elimination of seasonally important invertebrate prey.

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Western Snowy Plover

The western snowy plover (*Charadrius alexandrinus*) is federally listed as threatened by the USFWS (Federal Register 58(42): 12864-12874 [1993]). It is also listed as a species of special concern by the CDFG (1994).

The western snowy plover may be found in coastal areas along the entire length of California. This species also inhabits some of California's inland alkali lakes (Small 1994). In Sonoma County the western snowy plover occupies coastal habitat (Zeiner et al. 1990). The largest breeding colony of this species in California is located in San Francisco Bay (Small 1994). The most recent population estimate places the number of adults along coastal California at 3,031 (Page et al. 1991).

Preferred habitat for this species is beaches, dry mud or salt flats, sand margins of rivers, lakes, and ponds (Ehrlich 1988). Nesting occurs from April through August. Clutch size averages three eggs. Precocial young fledge at 29 to 47 days of age. The diet of this species consists of insects, worms, crustaceans, mollusks and fish (Ehrlich 1988).

Decline of the western snowy plover is due to habitat degradation caused by industrial and residential development, intense recreational use, off road vehicles, and beach grooming (Shuford 1993).

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Western Yellow-billed Cuckoo

The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is listed as a state endangered species by the CDFG (1994a) and is protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

The breeding season of the western yellow-billed cuckoo is from mid-May through early September (Grinnell and Miller 1944). This species winters in South America (Ehrlich et al. 1988). The historic breeding range of the western yellow-billed cuckoo extended from Sebastopol in Sonoma County south to the Mexican border in San Diego County and through the San Joaquin and Sacramento valleys from Kern County north to Shasta County (Grinnell and Miller 1944). The current breeding distribution includes the upper Sacramento River between Colusa and Red Bluff, Feather River and Butte Sinks, the Mojave Narrows north of Blythe, along the lower Colorado River, South Fork Kern River Preserve, Prado Basin Preserve and Santa Ana River, and Amargosa River near Tecopa, Lone Pine, and Baker Creek (Small 1994).

There are no recent nesting records of western yellow-billed cuckoo in Sonoma County (Burridge 1995).

The western yellow-billed cuckoo requires mixed old growth riparian forests dominated by willows and cottonwoods, with an understory composed of dense tangles of blackberry, wild grape, and nettles (Laymon and Halterman 1987). Each nesting pair of cuckoos requires approximately 17 hectares (42 acres) of foraging habitat (Laymon and Halterman 1987). Nests are placed almost entirely in willows and foraging occurs mainly in the canopy of cottonwoods (Laymon and Halterman 1987).

Approximately 50 to 75 pairs of breeding yellow-billed cuckoo occur annually in California (Small 1994). This number of pairs represents a decline from the 122 to 163 pairs estimated for the state in 1977 (CDFG 1994b). The primary factor responsible for this decline is the destruction and degradation of riparian habitat. Currently, only one percent of the original suitable habitat remains (CDFG

1994b, Small 1994). Other threats include water projects (i. e., flood control), development (urban and agricultural), pesticides, poisons and contaminants, livestock grazing, and off-road vehicles (CDFG 1994b; Small 1994).

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White-tailed Kite

White-tailed kite (*Elanus leucurus*) is listed as a fully protected species by the California Department of Fish and Game (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

The breeding season of the white-tailed kite in California extends from April to August and in years of high microtine rodent abundance, this species often has multiple broods (McCaskie et al. 1988). During the winter months, the Central Valley of California supports the densest wintering population of white-tailed kite in the United States (Johnsgard 1990).

The historical breeding distribution of the white-tailed kite encompassed the coastal valleys and mesas from the Mexican border in San Diego County north to the Oregon border and throughout the Central Valley in lowland areas west of the Sierra Nevada (Grinnell and Miller 1944). The current breeding distribution of the white-tailed kite mirrors the historic distribution, but also now includes the southeastern deserts. The species is also believed to now be breeding in the Owens Valley and near Cantil in Kern County (Small 1994). Recently, there have been 16 confirmed breeding records of white-tailed kite in Sonoma County. All of these records are from south and east of Healdsburg (Burridge 1995).

Nesting habitat of the white-tailed kite includes grassy foothill slopes and savannah interspersed with oaks, marshy bottomlands, open cultivated fields with scattered tall trees, and orchards (Small 1994). Nests are typically placed in dense foliage at the top of an oak, willow, or sycamore and nest sites are usually located in lowland groves of trees along a perennial water course (Beedy and Granholm 1985). Irrigated agricultural fields, grasslands, and oak savannahs are the most frequently used foraging habitat. In winter, kites often roost communally in dense stands of trees or orchards. Groups of over 100 individuals have been recorded at these roosts (Ehrlich et al. 1988).

The principal threat to the white-tailed kite is the loss of riparian nesting areas. Riparian habitat is disappearing at a rapid rate due to agriculture, urban development, and recreation. The white-tailed kite population in the Central Valley has expanded due to the increase in the number of irrigated agricultural fields. These fields provide suitable foraging habitat for the California vole, which is the preferred prey species of kites. White-tailed kites have undergone tremendous historical population fluctuations. Before the turn of the century, kites were reported to be common in California (Grinnell and Miller 1944). Between 1900 and 1940, shooting and the expansion of incompatible agriculture reduced populations almost to extinction. Due to modern farming practices and prohibition of shooting since the late 1940s, white-tailed kite made a strong comeback in the state through the 1970s (Martin 1989). During the 1980s, kite populations suffered declines in California, particularly in coastal and near-

coastal southern California (Small 1994). The recent declines have been attributed to rapid urbanization and loss of irrigated agricultural lands (Small 1994).

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Yellow-breasted Chat

The yellow-breasted chat (*Icteria virens*) is listed as a species of special concern by the CDFG (1994) and is protected by the federal Migratory Bird Treaty Act (16 U. S. C. 703-711).

The breeding season of the yellow-breasted chat extends from early April to late August (Small 1994). Historically, the yellow-breasted chat nested throughout California, with the exception of the higher mountains, coastal islands. The largest nesting populations occurred in the interior (Grinnell and Miller 1944). The current breeding distribution is concentrated in four regions of California and includes the Klamath Mountains region (local and uncommon), Kern River, Santa Ana River, Owens Valley, Mojave River, and Morongo Valley of southern California (uncommon and local), lower Colorado River Valley (locally common) and the Central Valley (decreasing) (Small 1994). Nesting also occurs in the Modoc Plateau and valleys of the Great Basin, southern Coast Range, south coast, western slope of the Sierra Nevada, White Mountains, and, possibly, in Death Valley National Monument and Tecopa (Small 1994). Within Sonoma County, there are no confirmed nesting records of yellow-breasted chat, although there are several probable breeding occurrences within an area bounded by Jenner on the west, Healdsburg on the north, and Santa Rosa on the south (Burridge 1995).

Yellow-breasted chat nest in dense riparian thickets composed of dense brush, vine tangles, and willows associated with border of small ponds, streams, and swampy ground (Small 1994). Chats often utilize the upper canopy of alders and cottonwoods for singing perches. Nesting and foraging usually occur within ten feet of the ground and dense plant cover is required by the chat for shade and concealment (Grinnell and Miller 1944). Similar habitats are used in migration, with most foraging concentrated under the canopy of shrubs (Small 1994).

The widespread destruction and degradation of riparian habitat has resulted in population declines of yellow-breasted chat and a change in status from fairly common/common to rare/uncommon summer visitor in California (Small 1994). Brood parasitism by the brown-headed cowbird has probably also contributed to this decline (Small 1994).

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Yellow Warbler

The yellow warbler (*Dendroica petechia brewsteri*) is listed as a species of special concern by the CDFG (1994) and is protected under the Federal Migratory Bird Treaty Act (16 U.S.C. 703-711).

Yellow warblers breed in riparian thickets throughout much of California, but have disappeared from many former nesting areas in the Sacramento and San Joaquin River valleys (Remsen 1978). Yellow warblers are currently considered locally uncommon to fairly common breeders throughout their broad range in California, including the foothills and valleys of the Peninsular and Transverse ranges, eastern and western slopes of the Sierra Nevada, western slope of the Sierra Nevada-Cascade axis, Central Valley, and Coast Range (Small 1994). This species is an early migrant and usually leaves the state by early September. The wintering range extends from Mexico through Central and South America (Ehrlich et al. 1988). In Sonoma County, the yellow warbler is a common breeder in riparian habitat along Mark West, Santa Rosa, and Sonoma Creeks, the Russian River, and uncommonly in the eastern foothills of the county (Burridge 1995). The nesting season extends from May to early August (Small 1994).

The preferred foraging and nesting habitat of the yellow warbler is streamside thickets of tangled, thick underbrush interspersed among mature alders, cottonwoods, and willows (Ehrlich et al. 1988). Yellow warblers breed from the mixed conifer zone down to the foothill woodlands and throughout the interior valleys of California (Beedy and Granholm 1985). This species builds its nest in the forking stems of low shrubs. The nest is strong, compact, and built of shredded bark, grass and weed stalks. It is lined with various fine materials such as spider. Yellow warblers feed primarily on flying insects captured by gleaning and hawking (Ehrlich et al. 1988).

Yellow warblers are vulnerable in California because their populations have been substantially reduced by riparian habitat loss and degradation, and brown-headed cowbird nest parasitism. Yellow warblers seem to prefer mature, relatively undisturbed riparian thickets in the western United States (Ehrlich et al. 1988). Water diversions, dam construction, and logging have substantially reduced streamside habitat. Agricultural and urban development have also contributed to the rapid loss of riparian areas and the increase in brown-headed cowbird populations.

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Mammal Species

American Badger

The American badger (*Taxidea taxus*) is listed as a species of special concern by the CDFG (1994).

Principal environmental factors required by badgers include sufficient food, friable soil, and relatively open, uncultivated ground (Williams 1986). The badger is found throughout California, except for the northern North Coast region. Where this species occurs, it is an uncommon permanent resident. The badger can most often be found in drier open stands of forest, shrubs and herbaceous habitat (Zeiner et al. 1990). This species is both a nocturnal and diurnal carnivore. Digging with long, powerful claws, the badger preys on fossorial (animals that burrow in the ground) rodents including ground squirrels, pocket gophers, rats, mice, and chipmunks. Badgers may also consume various invertebrates, birds, and carrion. Being active all year long, the badgers diet will vary with the seasons (Zeiner et al. 1990).

The badger excavates its own burrows for cover. Old burrows can be reused or a new one can be dug each night. Females use dry burrows, often dug in sandy soils, for giving birth. Badgers mate in the late summer or early fall. Using delayed implantation, the gestation period can last from 183 to 265 days. Births occur from March through April with an average of three young born. Badgers have been known to live up to 15 years (Zeiner et al. 1990).

Within the last century, badger populations in California have been drastically reduced (Grinnell et al., 1937; Longhurst, 1940), primarily due to agriculture and urban development (Williams 1986). This decline has also affected the badger populations from Mendocino County, southward, with the extirpation of badgers from many parts of Southern California (Williams 1986). Napa County has experienced a near disappearance of badgers since 1940 (Longhurst 1940). Other reasons for the decline of badgers are direct killing and the consumption of poisoned rodents and predators (Williams 1986).

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California Red Tree Vole

The California red tree vole (*Arborimus pomo [longicaudus]*) is listed as a species of special concern by the CDFG (1994).

The California red tree vole is found north of San Francisco Bay, in coastal forests of the humid fog belt. The red tree vole is a strictly tree-dwelling species confined to a narrow band of coastal Douglas fir (*Pseudotsuga menziesii*) forests near the coast. It does not occur in the drier Douglas fir forests that are present in the interior regions.

Unlike other mouse species, the California red tree vole does not eat forbs, grasses, insects, or seeds. Instead, the species has an extremely specialized diet, feeding almost exclusively on Douglas fir needles. Nests are usually built on the outer branches of a Douglas fir, from three to 20 meters above the ground (Jameson and Peeters 1988).

The primary predator on red tree voles is the northern spotted owl. Populations of the California red tree vole are widely separated and are disappearing due to forest removal and logging (Whitaker 1980). The remaining populations are especially vulnerable due to their specialized habitat requirements and limited distribution.

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Fringed Myotis

The fringed myotis (*Myotis thysanodes*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the fringed myotis is no longer considered a federal candidate species. The species is not listed by the State of California.

Although widespread throughout most of California, the abundance of the fringed myotis seems to be irregular. This bat occurs along the entire California coast, within the Sierra Nevada and Cascade Mountain ranges, as well as in northeastern California's Great Basin region. Limited populations also occur in the Providence and Granite Mountains in the Mojave Desert (Zeiner et al. 1990). Additional locational information from the California Department of Fish and Game is not available. However, this bat is expected to occur in the area of Sonoma and Marin counties (Dixie Pierson, Bat Biologist, personal communication 1995).

The fringed myotis occurs from sea level to 2850 meters in a variety of habitats. Preferred habitats are pinyon-juniper woodland, valley foothill hard wood, hardwood-conifer forests, (Zeiner et al. 1990) and desert scrub (Barbour and Davis 1969).

Although a cavity roosting species which utilizes caves mines and buildings, the fringed myotis also uses crevices in rock and old buildings as well (Zeiner et al. 1990). This bat is highly colonial and can occur in groups of several hundred (Barbour and Davis 1969). Within the roost, adults and subadults generally form separate groups (Zeiner et al. 1990). Night roosts are separate from day roosts (Zeiner et al. 1990). The species is migratory, making relatively short movements to suitable hibernacula (Zeiner et al. 1990).

The diet consists mostly of beetles, but also moths, spiders, and crickets (Zeiner et al. 1990). Foraging takes place near the vegetation canopy, with prey being located by echolocation and gleaned from foliage and off the ground (Schmidly

1991). The fringed myotis' flight is described as slow and highly maneuverable and it is also capable of hovering (Schmidley 1991).

Mating occurs in the fall and the young are born from May through July (Zeiner et al. 1990). Maternity colonies of several hundred individuals are formed April through September in the same types of roosts described above (Zeiner et al. 1990). The young are left behind in the maternity roost and tended by a "nurse bat", while the female forages (Schmidly 1991). The young are capable of flight at 16 to 17 days (Schmidly 1991).

According to Pierson (Dixie Pierson, Bat Expert, personal communication 1995), the suspected cause of population declines of this species in Sonoma and Marin counties is loss of habitat. She adds that both forests and mines, which are important ecological resources for this species, are on the decline in Sonoma and Marin counties.

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Greater Western Mastiff Bat

The western mastiff bat (*Eumops perotis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the greater western mastiff bat is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

Historically, the mastiff bat in California was known to occur from the San Francisco Bay Area, southward. Currently, the distribution of this species is generally believed to be from Central California, southward. Records of this species occurring in Sonoma County have not been located; however, nearby occurrences of the closely related California mastiff bat in Lake County and Alameda County have been recorded (Williams 1986).

This species inhabits rugged, rocky canyon country composed primarily of granite or sandstone and may be found in many open areas including coniferous and deciduous woodlands, grasslands, and urban areas (Zeiner et al. 1990). This bat is a crevice roosting species that utilizes natural formations, as well as man-made structures (Schmidly 1991). Its size and long, narrow wings make taking flight difficult. Thus, high roost sites with at least a three meter unobstructed drop are required for launching into flight (Schmidly 1991). Typical roost sites are rock crevices or attics of houses. This species of bat may be found roosting alone or in small inter specific groups of less than one hundred (Schmidly 1991). Males and females can be found in the same roost year round (Schmidly 1991). The greater western mastiff bat is non-migratory, but shows daily movements between alternating day time roost sites (Howell 1920; Kruttsch 1955). These bats forage on flying insects at high altitudes and are known to range over a wide area. Foraging takes place all night long. Therefore, it is thought that they do not utilize night roosts (Schmidly 1991).

Although ground dwelling insects have been found in the stomachs of some individuals, the western mastiff bat diet consists mainly of moths. Since these bats can not take off from the ground, ground foraging is unlikely. Schmidly (1991) speculates that these insects may be gleaned from canyon walls.

Mating occurs in early spring. Most births probably occur in June and July with one to two offspring per female (Schmidly 1991).

Historical records of this species indicate that the population is in a decline. This may strongly be attributed to the fact that this bat is extremely sensitive to disturbance. Reasons for the decline are many and include habitat loss, pesticide use, roost site disturbance, and intentional extermination. It has been suggested that more information needs to be collected on mastiff bat numbers and roost sites throughout California to better develop an effective management plan (Williams 1986).

According to Pierson (Dixie Pierson, Bat Expert, personal communication 1995), the suspected cause of population declines of this species in Sonoma and Marin counties is loss of habitat. She adds that both forests and mines, which are important ecological resources for this species, are on the decline in Sonoma and Marin counties.

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Long-eared Myotis

The long-eared myotis (*Myotis evotis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the long-eared myotis is no longer considered a federal candidate species. The species is not listed by the State of California.

Considered relatively uncommon throughout most of its range, the long-eared myotis is generally believed to be widely distributed in California. This bat occurs along the entire California coast, within the Sierra Nevada and Cascade Mountain ranges as well as in Northeastern California's Great Basin region (Zeiner et al. 1990). Additional locational information from the California Department of Fish and Game is not available. However, this bat is expected to occur in the area of Sonoma and Marin counties (Dixie Pierson, Bat Expert, personal communication 1995).

Although woodlands and forests are preferred, the long-eared myotis can be found in nearly all brush, woodland, and forest habitats from sea level to 2,700 meters. This species can be found singularly or in small groups roosting primarily in crevices. Many natural and man-made structures are used for roosting including buildings, spaces under bark, and snags. This species emerges late in the evening, and mainly utilizes caves as night roosts. The long-eared myotis hibernates locally during winter throughout its range, but little else is known about its winter habits (Zeiner et al. 1990).

The diet of the long-eared myotis consists primarily of beetles, moths, and spiders caught either in flight, gleaned from foliage, or occasionally taken from the ground. Foraging is typically accomplished by slowly flying or hovering over water, in open areas, or along habitat edges (Zeiner et al. 1990).

Maternity colonies numbering between 12 and 30 individuals have been found in the same types of roosts described above. Mating probably occurs in the fall. A single young is born between May through July, with a peak in June. These young are usually flying by early August (Zeiner et al. 1990).

According to Pierson (Dixie Pierson, Bat Expert, personal communication 1995), the suspected cause of population decline of this species in Sonoma and Marin counties is loss of habitat. She adds that both forests and mines are important

ecological resources for this species and are diminishing in Sonoma and Marin counties.

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Long-legged Myotis

The long-legged myotis (*Myotis volans*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the long-legged myotis is no longer considered a federal candidate species. The species is not listed by the State of California.

The long-legged myotis is widespread throughout most of California. This bat occurs along the California coast from Oregon to Mexico and throughout the Sierra Nevada and Cascade Mountain ranges. Limited populations also occur in the Providence and Granite Mountains in the Mojave Desert (Zeiner et al. 1990). Additional location information from the California Department of Fish and Game is not available. However, this bat is expected to occur in the area of Sonoma and Marin counties (Dixie Pierson, Bat Expert, personal communication 1995).

This species is most commonly found in woodland and forest habitats (Zeiner et al. 1990), specifically oak and juniper woodlands (Barbour and Davis 1969) above 1200 meters. However, it can also be seen foraging over chaparral, coastal scrub, Great Basin scrub, and early successional stages of woodlands and forests (Zeiner et al. 1990).

Trees are the most important day roost sites, although the long-legged myotis will roost in rock crevices, buildings, under tree bark, in snags, mines and caves. Mines and caves are used for night roosting only (Barbour and Davis 1969). This species is often found in large colonies (Zeiner et al. 1990). Although the species

is cold tolerant, it does hibernate and make short movements to suitable hibernacula (Zeiner et al. 1990).

The long-legged myotis emerges at or shortly after dusk to forage over water and open habitat (Zeiner et al. 1990). With a flight pattern described as slow, foraging takes place at a height of about three to five meters (Barbour and Davis 1969). The diet consists primarily of moths captured by echolocation (Zeiner et al. 1990).

Maternity colonies of several hundred individuals can be formed under tree bark or in hollow trees, and less often in crevices or buildings (Zeiner et al. 1990). Mating occurs in the fall with births occurring in June and July. By mid-July, the young begin to fly (Zeiner et al. 1990).

According to Pierson (Dixie Pierson, Bat Expert, personal communication 1995), the suspected cause of population declines of this species in Sonoma and Marin counties is loss of habitat. She adds that both forests and mines, which are important ecological resources for this species, are on the decline in Sonoma and Marin counties.

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Pacific Western Big-eared Bat

The Pacific western big-eared bat (*Plecotus townsendii townsendii*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Pacific western big-eared bat is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The Pacific western big-eared bat occupies the humid coastal regions of Northern and Central California (Williams 1986). This species can be found in a variety of habitats including conifer and broad-leaf forests, oak and conifer woodlands, arid

grasslands and deserts, and high elevation forests and meadows (Williams 1986). No records of this bat occurring in Sonoma County have been documented.

This is a cavity roosting species, utilizing caves, mines, tunnels, buildings or other human-made structures (Zeiner et al. 1990). Separate sites may be used for night, day, hibernation, or maternity roosts. Males and females occupy separate summer roost sites (Schmidly 1991). Maternity roosts are located in warmer areas of this bat's range. Hibernation occurs during winter throughout the range of the Pacific western big-eared bat.

The diet of Pacific western big-eared bat consists of small moths, beetles and a variety of soft-bodied insects. This prey is located with echolocation and is either taken in flight or gleaned off of foliage (Zeiner et al. 1990).

Mating occurs from November to February within the winter roosts areas (Schmidly 1991). Females form a maternity colony where a single young is born in late May to early June. The young cling to their mothers during the day and are left behind in the roost at night while the female forages. At two months of age, the young are weaned and the maternity colonies begin to break up (Schmidly 1991).

Little specific information is available on population trends of Pacific western big-eared bat, although a marked decline in numbers appears to have occurred over the last 40 years (Williams 1986). Pearson et al. (1952) postulated that there was an increase in numbers prior to the 1950s due to increased roosting sites available in human-made structures. In recent years, populations of Pacific western big-eared bats seem to have declined in numbers in most areas of the United States (Barbour and Davis 1969; Humphrey and Kunz 1976; Williams 1986). Due to the sensitivity of nursery colonies to disturbance, human activity at summer roosting sites is of particular concern.

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Pallid Bat

The pallid bat (*Antrozous pallidus*) is listed as a species of special concern by the CDFG (1994).

Pallid bats are found in a large area from central Mexico to southern British Columbia in North America, and occurring throughout most of California (Jameson and Peters 1988). This species is associated with lowland deserts and semi-arid lands at elevations below 6,000 feet in the southwest. Desert scrub and pine and oak forests in regions with rocky outcrops are the preferred habitats for this species. Night or foraging roosts are maintained separately from day roosts. Highway bridges, mines, open buildings, porches, and rock shelters with easy access and clear flight paths are utilized as night roosts. Day roosts are usually in buildings and rock crevices where the bats can remain hidden. Caves, hollow trees, and mines are other areas that may be utilized as day roost sites. Pallid bats can typically be found in colonies of up to 100 individuals. During the reproductive season (April through October), the sexes are segregated, with adult females and young forming maternity colonies in the spring and summer (Barbour and Davis 1969).

The feeding habits of the pallid bat are unique among North American bats, as the vast majority of their prey are taken off of the ground as opposed to from the air. Typical prey items found in the pallid bat's diet include grasshoppers, ground beetles, Jerusalem crickets, June beetles, and scorpions (Barbour and Davis 1969).

The principal threat to the pallid bat in California is disturbance of roost sites. In some areas, disturbance of bat roost sites has led to complete abandonment of traditional roost sites (Barbour and Davis 1969). Nursery and hibernating roosts are particularly vulnerable as they are critical to the survival of pallid bat populations.

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Point Reyes Jumping Mouse

The Point Reyes jumping mouse (*Zapus trinotatus orarius*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Point Reyes jumping mouse is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The Point Reyes jumping mouse is confined to a small area of the Point Reyes peninsula in Marin County (Williams 1986). The preferred habitat of this species is upland bunch grass marshes, which is a restrictive habitat type. Grass seeds in these areas are the primary diet of this species, but fruit and insects will also be consumed (Williams 1986).

Reasons for the scarceness of the Point Reyes jumping mouse are not fully understood, but probably include degradation of already limited habitat through grazing and development. Grazing and trampling of the habitat by cattle has ceased, but the affect of foraging by introduced axis deer and fallow deer continues. This is an impact that needs to be further assessed.

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Point Reyes Mountain Beaver

The Point Reyes mountain beaver (*Aplodontia rufa phaea*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Point Reyes mountain beaver is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

The range and habitat requirements of the Point Reyes mountain beaver are very restricted. It is known to inhabit an area of approximately 110 square miles in the Point Reyes area of Marin County (Williams 1986). This species occurs primarily in riparian areas where it excavates burrows under low, dense vegetation. Most foraging and other activities occur at night, within 24 meters from the burrow entrance (Zeiner et al. 1990). The diet of Point Reyes mountain beaver consists of the vegetative parts of shrubs, grasses and trees (Zeiner et al. 1990).

Mating occurs from December through March with a peak of activity in February. One litter is produced each year with one to five young being born from February through June; however, most births occur from March through May (Zeiner et al. 1990).

Very little specific information on the population trends of this species exists. The potential impacts of human development and the introduction of axis and fallow deer on the population and habitat of the Point Reyes mountain beaver should be assessed (Williams 1986).

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Ringtail

The Ringtail (*Bassariscus astutus*) is listed as a fully-protected species by the CDFG (1994).

Excluding the San Joaquin Valley and the northeastern corner of California, the ringtail occurs throughout California (Burt and Grossenheider 1980) from below sea level to at least 2,400 meters (Williams 1986). The preferred habitat is riparian areas with sufficient foliage and rocky outcroppings which are used for foraging and den sites. Foraging takes place on the ground around rocks and in trees, usually around water. Ringtail is primarily carnivorous with a diet consisting of rodents, rabbits, birds, eggs, reptiles, invertebrates, fruits, nuts, and some carrion (Zeiner et al. 1990). Den sites for ringtail seem to be the principal habitat requirement and are found among boulders or in hollows of trees, logs, and in abandoned buildings (Burt and Grossenheider 1980).

A single litter of one to five young is typically born between May and June (Zeiner et al. 1990). The young disperse in August or September (Burt and Grossenheider 1980). Ringtail are typically found in pairs and may be partially colonial (Burt and Grossenheider 1980)

According to Williams (1986), urbanization in the San Francisco Bay Area and the coastal basins of Southern California, as well as the loss and overall degradation of riparian communities throughout California has lead to the depletion and extirpation of some ringtail populations. Williams (1986) also notes that there is no evidence of threats to any of the ringtail subspecies over a broad area.

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Salt Marsh Harvest Mouse

The salt marsh harvest mouse (*Reithrodontomys raviventris*) is listed as a federally endangered species by the USFWS and a state endangered species by the CDFG (1996).

The salt marsh harvest mouse is found only in saline emergent wetlands of the San Francisco Bay Area and its tributaries. *R. r. halicoetes* is the northern subspecies and is found on the Marin Peninsula, through Petaluma, Napa, and Suisun Bay marshes, and in northern Contra Costa County (Zeiner et al. 1990).

Pickleweed is a major habitat component for the salt marsh harvest mouse. The diet of this species consists of leaves, seeds, and stems of plants in salt marshes. Most of the year, pickleweed and salt grass are the primary forage; however, fresh green grasses are preferred in winter. Pickleweed is utilized for cover and its value as cover increases with density and depth. Additionally, cover comprised of non-submerged, salt-tolerant vegetation is essential for escape during high tides. Instead of constructing burrows, a nest of grasses and sedges is constructed above ground (Zeiner et al. 1990).

The salt marsh harvest mouse has a rather lengthy breeding season that lasts from May to November. One litter of approximately four young is produced each year (Zeiner et al. 1990).

Commercial and residential development around San Francisco Bay, which results in the loss of pickleweed habitat, is the primary reason for the endangered status of this species. More specific reasons for the loss of pickleweed is decreased salinity brought on by increased sewage flows into San Francisco Bay (Wondolleck et al. 1976; Shellhammer 1977), as well as filling, diking, and subsistence farming (Shellhammer 1982).

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Salt Marsh Wandering Shrew

The salt marsh wandering shrew (*Sorex vagrans halicoetes*) was listed as a category 1 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the salt marsh wandering shrew is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

Salt marsh wandering shrew occur in tidal marshes that provide cover made up of driftwood and other debris scattered among dense pickleweed. This species can usually be found about six to eight feet above sea level, and in lower lying reaches of marshes, as long as these areas are not regularly inundated by water. The pickleweed and debris provides moisture and cover for invertebrates which make up its diet. Nests made of plant parts are also constructed in these areas (Williams 1986).

Many of the salt water marshes of the San Francisco Bay have been lost due to human development. Because of their use of very limited areas of marshes, salt marsh wandering shrew have experienced severe population declines. Johnston and Rudd (1957) placed this species at 10 percent of the marshes small mammal community, less abundant than the saltmarsh harvest mouse. It has been suggested that studies on the effects of further development be undertaken to determine the impact to this species. In addition, measures that would enhance the remaining salt marsh wandering shrew habitat should be investigated (Williams 1986).

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San Pablo Vole

The San Pablo vole (*Microtus californicus sanpabloensis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the San Pablo vole is no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

This species historically occurred in about 2,400 acres of salt marsh habitat between Giant and Point Isabel in Contra Costa County (Western Biological Services Company 1986). The remaining vole populations occur in three widely isolated fragments of the marsh and associated grassland and riparian habitats totaling 578 acres (Western Biological Services Company 1986). These marshes represent about 80% of the remaining habitat of this species.

Potential threats to the San Pablo vole include flood control projects, as well as commercial and residential development.

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Suisun Ornate Shrew

The Suisun ornate shrew (*Sorex ornatus sinuosus*) was listed as a category 1 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Suisun ornate shrew is

no longer considered a federal candidate species. It is listed as a species of special concern by the CDFG (1994).

Once considered a separate species, this subspecies of ornate shrew is found only around San Pablo and Suisun Bays where its habitat requirements can be met (Williams 1986). Specific locations of this species include the Petaluma River and Sonoma Creek near San Pablo Bay (Williams 1986). The low, dense cover of pickleweed is the preferred, yet restrictive habitat. The diet of this nocturnal insectivore is comprised of insects, worms and other invertebrates. Nests are made in shrubs and burrows where the female gives birth to around six young. Births occur from February through October with litters being produced several times a year (Zeiner et al. 1990).

Commercial and residential development around San Francisco Bay, which results in the loss of pickleweed habitat, is the primary reason for the endangered status of this species. More specific reasons for the loss of pickleweed is decreased salinity brought on by increased sewage flows into San Francisco Bay (Wondolleck et al. 1976; Shellhammer` 1977), as well as filling, diking, and subsistence farming (Shellhammer 1982).

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Yuma Myotis

The Yuma myotis (*Myotis yumanensis*) was listed as a category 2 candidate species (Federal Register 59(219): 58982-59028 [1994]) by the USFWS. Due to recent changes in the USFWS candidate species list (Federal Register 61(40): 7457-7463 and 7595-7613 [1996]), the Yuma myotis is no longer considered a federal candidate species. The species is not listed by the State of California.

The Yuma myotis is found in a wide variety of habitats throughout California, although it is uncommon in the Mojave and Colorado Desert regions (except for mountain ranges bordering the Colorado River Valley) (Zeiner et al. 1990). Preferred habitats include open forests and woodlands with associated water bodies, ranging from sea level to 11,000 feet in elevation (uncommon to rare above 8,000 feet) (Zeiner et al. 1990).

Distribution of the Yuma myotis is strongly dependent upon bodies of water, which the species utilizes as foraging sites and sources of drinking water. This particular species of bat has a relatively poor urine-concentrating ability and consequently, needs to drink frequently (Zeiner et al. 1990). Yuma myotis typically feed on a wide variety of small flying insects (moths, midges, flies, termites, ants, and caddisflies) (Zeiner et al. 1990). The Yuma myotis utilizes buildings, mines, caves, and crevices, as well as abandoned swallow nests and bridges (underside) for both roost sites and maternity colony sites (Zeiner et al. 1990).

Mating occurs in early spring. Most births probably occur in June and July with one to two offspring per female (Schmidly 1991). A single litter of one is produced yearly (Zeiner et al. 1990).

According to Pierson (Dixie Pierson, Bat Expert, personal communication 1995), the suspected cause of population declines of this species in Sonoma and Marin counties is loss of habitat. She adds that both forests and mines, which are important ecological resources for this species, are on the decline in Sonoma and Marin counties.

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