



United States Department of the Interior

Fish and Wildlife Service
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Memorandum

To: Superintendent, Point Reyes National Seashore, National Park Service, Point Reyes, California

From: *for* Acting Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Formal Consultation on the Grazing Permit Renewal Program, Point Reyes National Seashore and the Golden Gate National Recreation Area, Marin County, California

September 25, 2002

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This is in response to your July 12, 2001, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the Grazing Permit Renewal Program (grazing program), Point Reyes National Seashore (PRNS) and the Golden Gate National Recreation Area (GGNRA), Marin County, California. This document represents the Service's biological opinion on the effects of the action on the endangered Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*) (silverspot), endangered Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), endangered Sonoma spineflower (*Chorizanthe valida*) (spineflower), endangered Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*) (paintbrush), endangered beach layia (*Layia carnosa*), endangered Tidestrom's lupine (*Lupinus tidestromii*), threatened Marin dwarf flax (*Hesperolinon congestum*) (dwarf flax), threatened California red-legged frog (*Rana aurora draytonii*) (red-legged frog), threatened Pacific Coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) (western snowy plover), and designated critical habitat for the California red-legged frog. This biological opinion is issued pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act).

This biological opinion is based on your July 12, 2001, letter, to the Service; *Biological Assessment on the Renewal of Livestock Grazing Permits in Point Reyes National Seashore and the North District of Golden Gate National Recreation Area, Marin County, California* (BA) dated July 12, 2001, that was prepared by the U. S. National Park Service (NPS); *Point Reyes National Seashore Threatened and Endangered Species Locations as of 2001*, undated, that was prepared by the U. S. National Park Service; a letter from Don Neubacher of Point Reyes National Seashore to the Service dated April 30, 2002; a site visit to Point Reyes National Seashore by Chris Nagano, Catherine Hibbard, and Peter Epanchin of my staff; a telephone conversation between Sara Allen of your staff and Chris Nagano on June 20, 2002; an electronic

message from Mark Homrighausen of your staff to Chris Nagano dated June 20, 20002; an electronic mail message from Don Neubacher to Chris Nagano dated June 24, 2002; an electronic mail message from Mark Homrighausen to Chris Nagano dated June 24, 2002; an electronic mail message from Mark Homrighausen to Chris Nagano dated June 25, 2002; a letter from Don Neubacher to Chris Nagano dated September 24, 2002; and other information available to the Service. A complete administrative record of this consultation is on file in our office.

On December 7, 1999, the Service published the final designation of critical habitat for the Pacific coast population of the western snowy plover (**Federal Register** 64:68508-68544). Critical habitat for this species is not located within the action area of the proposed project, and therefore, will not be discussed in this biological opinion.

The NPS has determined that the proposed project is not likely to adversely affect the Sonoma alopecurus, Sonoma spineflower, Tiburon paintbrush, beach layia, Tidestrom's lupine, northern spotted owl (*Strix occidentalis caurina*), California freshwater shrimp (*Syncaris pacifica*), and Myrtle's silverspot butterfly. The NPS determined that the proposed project is likely to adversely affect the Pacific Coast population of the western snowy plover and the California red-legged frog. The Service does not concur with the NPS determination of not likely to adversely affect for the Sonoma alopecurus, Sonoma spineflower, Tiburon paintbrush, beach layia, Tidestrom's lupine, northern spotted owl, and Myrtle's silverspot butterfly.

According to the BA and other information available to the Service, the ranches involved in the grazing program are separated from Lagunitas Creek by ungrazed areas so that the creek is bordered by substantial riparian vegetation borders. Areas along Olema Creek where endangered California freshwater shrimp have been found and areas that may have suitable habitat are fenced off from livestock access. Therefore, the Service concurs with the determination by the NPS that the project is not likely to adversely affect the endangered California freshwater shrimp.

The NPS has determined that the proposed grazing program is not likely to adversely affect the threatened northern spotted owl because the animal occurs in coniferous areas that are outside the area under ranching permits (Homrighausen *in litt.* 2002). Based on this information, the Service concurs with your determination that the project is not likely to adversely affect the threatened northern spotted owl.

The NPS made a determined that the proposed grazing program is not likely to adversely affect the threatened Central California steelhead (*Oncorhynchus mykiss*) and the threatened California coast coho salmon (*Oncorhynchus kisutch*). Concurrence on the project's effects on these listed salmonids should be sought from the National Marine Fisheries Service.

Consultation History

This consultation represents a summary of correspondence between the Service and the project National Park Service (NPS). The NPS requested initiation of formal consultation on July 12,

2001. On November 6, 2001, Service staff met with NPS staff for a site visit. Additionally, we have corresponded via electronic mail, telephone conversations, and facsimile.

BIOLOGICAL OPINION

Description of the Proposed Action

It is our understanding the proposed action is the proposed renewal of livestock grazing permits for areas managed by the U. S. National Park Service at Point Reyes National Seashore and the north district of Golden Gate National Recreation Area. Livestock grazing would continue on 21,875 acres (8852.7 ha) of grazing land within the jurisdiction of these two parks.

Approximately 25 historic ranches operate on these lands under special use permits (SUP) or reservation of possession (ROP). ROP's were created as a condition of the establishment of Point Reyes National Seashore and Golden Gate National Recreation Area. Habitats and existing condition are described in the BA. Ranching agreements are subject to renewal or review every five years (one year in sensitive areas), allowing Point Reyes National Seashore to modify ranching operations where harm to natural resources is taking place. Grazing permits renewal perpetuates historic ranching operations on some lands acquired by the NPS. Most of the ROPs will expire in the coming decade. When ROPs expire, the NPS may authorize continued operations under a SUP. Altogether, approximately 3500 cattle, 20 sheep, and an unspecified number of horses would be allowed to graze on a year-round basis under the ROPs and SUPs.

Of the lands open to grazing, 27% of those located within Point Reyes National Seashore and 41% of those located within Golden Gate National Recreation Area are considered unsuitable for grazing due to topography and vegetation. Cattle stocking on grazing lands within Point Reyes National Seashore is 6.7 acres (2.7 ha) per animal unit (AU) whereas grazing on Golden Gate National Recreation Area lands is 7.5 acres (3.03 ha) per AU. One AU is equivalent to one cow or a cow-calf pair together. The standard residual dry matter at Point Reyes National Seashore is 544 kg (1,200 pounds) per acre (1,344 kg/ha (2,964 lb/ha)).

Six of the Point Reyes National Seashore ranches are dairies, two units are authorized for horses only, one unit is designated for sheep grazing, one unit is cultivated, and the remaining units are used for beef production. Approximately two-thirds of the livestock on Point Reyes National Seashore-administered lands (*i.e.*, Point Reyes National Seashore and the north district of Golden Gate National Recreation Area) are on dairies.

Milk cows are kept close to dairy headquarters. They produce large quantities of manure waste that must be managed to avoid pollution of nearby streams through excessive nutrient loading. Small pastures where cows are held between milking are typically scraped and the manure is stockpiled. On most dairies cows are kept in barns through winter. The barns, milking parlors, and travel corridors between them are cleaned by washing manure into holding ponds, where the manure slurry is stored during the wet season. During the dry season stored manure from the dairies is spread as fertilizer on rangelands and silage fields. Dairies dispose of accumulated

manure by spreading it on fields from trucks or pumping it through pipes which drain waste onto fields. Distribution pipes are moved periodically to dispense manure evenly across the uplands. Waste disposal occurs in the uplands to prevent nutrients from reaching creeks. In some cases, waste is plowed into fields in the fall prior to planting silage crops.

Five permittees are authorized to raise grass crops on approximately 1,200 acres (485 ha) to provide silage for feeding their livestock. Non-native grasses, such as ryegrass (*Lolium spp.*) and oatgrass (*Avena spp.*) are typically planted. Permittees who raise silage are required to leave adequate crop residues to protect the soil from erosion.

Proposed Conservation Measures

Myrtle's silverspot butterfly

Distribution mapping of larval host and nectar plants will begin in spring 2002. A master's thesis project which includes monitoring the response of these plants to different grazing regimes is currently being developed. Current monitoring of tule elk (*Cervis elaphus nannoides*) effects on plant species composition, which may also provide information on response of Myrtle's silverspot butterfly host plants to grazing, will be continued.

An assessment will be made of cattle impacts on back dune habitat within pastures in the North Beach area to determine if these habitats are adequately protected. Adverse impacts will be addressed through reduction in cattle numbers, change in grazing regime, or relocation of fencing where necessary.

Impacts of heavy cattle use of pastures immediately south of the Tule Elk Reserve that may limit movement of Myrtle's silverspot butterflies to suitable habitat south will be reduced. A number of approaches to modifying grazing in this area are currently under consideration, including reducing the number of cattle in the pasture or fencing them out of highly impacted areas.

Sonoma alopecurus

Grazing in pastures that support Sonoma alopecurus will be seasonally restricted during the flowering season to increase chances of population expansion. On H Ranch, seasonal protection of flowering alopecurus with electric fencing was initiated in 2001. In 2002, plantings to establish the species in five sites near the known occurrences will be initiated. Exclosures will be used to regulate cattle access to test the effectiveness of seasonal grazing in establishing this species.

Sonoma spineflower

Grazed spineflower populations established on G and F Ranches will be monitored to ensure establishment and maintenance of populations is successful.

Tiburon paintbrush and Marin dwarf flax

Annual monitoring of Tiburon paintbrush and Marin dwarf flax populations will continue and assessments of grazing impacts on these species will be made.

Beach layia and Tidestrom's lupine

Protection of these species will involve continued exclusion of cattle and vehicles from most dune habitat and removal of invasive exotic dune species, especially from the most intact native dune plant communities around Abbott's Lagoon.

Western snowy plover

In cooperation with ranchers, Point Reyes National Seashore will explore methods to reduce feeding opportunities for common ravens (*Corvus corax*) at ranches and dairies. Raven access to cattle feed could be limited by covering or removing feed troughs or placing them in structures, and ensuring that ravens do not have access to stored grain. Cattle afterbirths could be made unavailable to ravens by moving calving indoors or finding ways to insure that afterbirths are disposed of quickly. Point Reyes National Seashore will allow no increase in silage production and will return silage fields to permanent pasture where possible.

California red-legged frog

A survey of wetlands within Point Reyes National Seashore currently underway will provide information for development of a comprehensive management and protection plan for Point Reyes National Seashore wetlands. The plan will include protection of seasonal upland habitats and travel corridors currently impacted by cattle.

Ongoing research on red-legged frog populations at Point Reyes National Seashore will continue via collaborative efforts of Point Reyes National Seashore and U.S. Geological Survey staff.

Status of the Species

Sonoma alopecurus

Sonoma alopecurus was federally listed as endangered on October 22, 1997 (62 FR 5579). Sonoma alopecurus is a tufted perennial in the grass family (Poaceae) that reaches 30 to 75 centimeters (12 to 30 in) in height. The stems are mostly erect and either straight or weakly bent near the base. The leaf blades are up to 7.5 mm (0.3 in) wide. The panicle is 2.5 to 9.0 cm (1.0 to 3.5 in) long and 4 to 8 mm (0.1 to 0.3 in) wide. The spikelets are usually tinged violet-gray near the tip. The awn is straight, and exceeds the lemma body by 1.0 to 2.5 mm (0.04 to 0.1 in). This variety is distinguished from *A. aequalis* var. *aequalis* by a more robust, upright appearance,

generally wider panicle, violet-gray tinged spikelets, and longer awn (Rubtzoff 1961; W. Crins, Ontario Ministry of Natural Resources, *in litt.* 1993). *Sonoma alopecurus* flowers from May to July. This species, like other grasses, is primarily wind-pollinated. No information is available on its reproductive biology.

Sonoma alopecurus is known from 16 populations. The historical range was approximately 48 km (30 mi), reaching north from Point Reyes Peninsula to Guerneville and east to Cunningham Marsh. The species is currently known from only eight naturally occurring populations, three in Sonoma County and five in Marin County. Although fewer sites are now present, the range of the species has changed little. The three sites in Sonoma County are privately owned. Of the five sites on the Point Reyes National Seashore, four are federally owned and one is located on a private inholding within the National Seashore (CNDDDB 1998). One Point Reyes National Seashore population was previously thought to be the result of seeds washed down from an reintroduced population, but it is now considered a natural population (V. Norris, *in litt.* 1995; Robert Soost, CNPS, Marin Chapter, *in litt.* 1996). The elevation range of the species is from 6 to 210 m (20 to 680 ft).

The species is found in riparian stream communities both in the stream channel and along the wet banks between 6 and 210 m (20 and 680 ft) in elevation. At Point Reyes National Seashore the plants are found in running water flowing from freshwater marsh through dunes and in a marshy area along the edge of a lagoon. Common associates on Point Reyes National Seashore are *Potentilla anserina* spp. *pacifica*, *Mimulus guttatus*, *Hydrocotyle ranunculoides*, *Holcus lanatus*, water parsley (*Oenanthe sarmentosa*), umbrella sedge (*Cyperus* sp.), rushes (*Juncus* sp.), manna grass (*Glyceria occidentalis*) and *Gnaphalium* sp., *Veronica* sp.. Populations of this species are declining due to competition from nonnative plant species, trampling and grazing by cattle, and low regeneration. The species is also threatened by inadequate regulatory mechanisms. *Sonoma alopecurus* suffers from competition from aggressive emergent wetland species, including rushes (*Juncus* spp.) and sedges (*Cyperus* spp.) at two locations. These wetland plants have nearly extirpated the species from those sites (V. Norris, *in litt.* 1993; CNDDDB 1998). Additionally, the species is not readily propagated. Two attempts to reintroduce the species from seed to suitable habitat within its range have failed. Naturally occurring floods also may be an ongoing threat. One reintroduction failed due to a flash flood in 1993 (V. Norris, pers. comm. 1993).

Both grazing and exclusion from grazing can adversely affect the species. All populations of *Sonoma alopecurus* are grazed by cattle (CNDDDB 1998). Of the four occurrences at Point Reyes National Seashore all occur within grazed units. As stated in the biological assessment, two of the occurrences are located along fences separating grazed and ungrazed areas, growing only on the grazed sides of the fences. One population on the Point Reyes National Seashore was fenced in 1987 to stop cattle from overgrazing (V. Norris, *in litt.* 1993); however, subsequent invasion by sedges and blackberry within the enclosure resulted in the disappearance of the plants by 1990. Fowler and Fellers (1985) state that grazing has been a serious threat to *Sonoma alopecurus* occurrences located on the Point Reyes National Seashore.

Establishment of new populations from seed collected from occurrence number 14 on Point Reyes National Seashore has been attempted four times. Three attempts were made on Point Reyes National Seashore: 1) downstream from Occurrence 14; 2) in the swale above Abbott's Lagoon (near Occurrence 18); and 3) along a stream near the nursery at Point Reyes National Seashore headquarters in Bear Valley. A fourth attempt off-site was made at the East Bay Botanic Garden in Tilden Park, Berkeley also with seed from Occurrence 14. None of these attempts were successful. The Marin chapter of the California Native Plant Society (CNPS) has also made other efforts to conserve the species on Point Reyes National Seashore. Occurrence 14 was fenced in 1987 to prevent trampling by cattle. A subsequent lush growth of mostly native riparian plants and some introduced grasses, occurred and appeared to crowd out the Sonoma alopecurus. Experimentation with partial opening of the enclosure did not result in enough grazing to reduce the competing vegetation. The fence was partially breached in 1990 and 14 plants were found the following year. Keeping the gate open for the next entire growing season (1995) also did not result in adequate grazing. The fence has not been consistently breached since 1990 and no plants have been found at the site through 1996, the year the site was last surveyed (R. Soost, *in litt.* 1998). Point Reyes National Seashore recently acquired the AT&T tract, a private inholding within the boundaries of the park, which supports the largest occurrence of Sonoma alopecurus.

Sonoma spineflower

The spineflower was federally listed as endangered on June 22, 1992 (57 FR 27848). A detailed account of the taxonomy, ecology, and biology of the species is presented in the *Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly* (Service 1998). The spineflower is a herbaceous annual in the buckwheat family (Polygonaceae). It grows up to one foot tall and has highly branched slender soft-hairy stems. The small (< 2.54-cm (< 1-inch)) leaves are egg-shaped, with the widest part at the tip of the leaf. Flowers bloom from June to August. Conspicuous spiny red and white bracts (stiff scaly or leaf-like appendages) are associated with the flowers, and are clustered at the ends of stems in spiny masses. The inconspicuous flowers are less than 8.4 mm (1/3 inch) long and have six white to rose petal-like appendages which are unequal in size.

The species occurs on sandy substrates, where seedlings establish in areas that are relatively free from other competing native species. It is unknown if the species develops a seed bank. Seed dispersal is facilitated by spines, which attach the seed to passing wildlife. The spineflower is very similar in overall appearance to the endangered Howell's spineflower (*Chorizanthe howellii*), which grows in coastal dunes north of Fort Bragg in Mendocino County, and is closely related to the threatened Monterey spineflower (*C. pungens* var. *pungens*), which grows from the Monterey Peninsula to Santa Cruz County, and the Ben Lomond spineflower (*C. p.* var. *hartwegiana*), which grows in Santa Cruz County.

The only extant population is in the Lunny pasture by Abbott's Lagoon in Point Reyes National Seashore. The population occurs exclusively in the sandy coastal prairie soils at an elevation of

about 12 m (40 feet). The population fluctuates annually, but distribution has remained local, covering around 300,000 square feet (6.89 ac (2.78 ha)). It is estimated that from 10,000 to 30,000 individual plants grow in any given year. The historic range may have included Sonoma County as well as Marin. As stated in the biological assessment Point Reyes National Seashore has made efforts to assist in the recovery of the spineflower. In 1998, seed sown in one of three 2 x 2 m (6.5 x 6.5 ft) plots located near the existing population, and has expanded beyond the seeded plot. In 1999, another attempt was made to reintroduce a population at F Ranch, near a historic occurrence. As of 2001, the seeded area continued to support a population of 182 plants.

The rarity of the spineflower makes it exceptionally vulnerable to anthropogenic factors, stochastic events, and invasive species encroachment. As stated in the biological assessment, the spineflower occurs among several unofficial ranch roads where plants could be run-over or be subjected to dumping of fill material. Davis (1992) as cited in the biological assessment concluded, from his research on grazing effects on the spineflower, that "grazing on competitive, non-native plants apparently had a significant positive influence on *C. valida*."

Tidestrom's lupine

Tidestrom's lupine was federally listed as endangered on June 22, 1992 (57 FR 27848). A detailed account of the taxonomy, ecology, and biology of the species is presented in the *Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly* (Service 1998). Tidestrom's lupine, also known as clover lupine, is a member of the pea family (Fabaceae). It is a low (30.5 cm (< 1 foot)), prostrate perennial herb which occurs only on sand dunes of the central California coast. The fan shaped leaves have 3-5 narrow leaflets, each less than 1 inch long. The stems and leaves have short hairs. The yellow roots are distinctive. The small (1.27 cm (< ½ inch)) blue to lavender flowers are in whorls at the end of stems, and are pollinated by bees.

Bright yellow roots, prostrate habit, small leaflets and dense hairs on the foliage distinguish clover lupine from lupines of coastal dunes (e.g. *Lupinus variicolor*, *L. littoralis*, *L. chamissonis*, *L. arboreus*). Some botanists distinguish between Pt. Reyes clover lupine (*L. tidestromii* var. *layneae*) and Tidestrom's lupine (*L. tidestromii* var. *tidestromii*). The *Jepson Manual*, the standard reference on the higher plants of California, treats Tidestrom's lupine as a single, variable species, called Tidestrom's lupine (Hickman 1993).

Fruits are pea-like pods containing 5-8 seeds bean-like seeds with blackish spots. The large seeds have a hard seed coat; and related lupine species (e.g. *L. arboreus*) are known to have long-lived seed banks, therefore, it is likely that Tidestrom's lupine also has a persistent seed bank. As such, viable populations in the form of an extant seed bank may occur at some sites where it is not recorded or is considered extirpated. Seeds are probably dispersed by explosive dehiscence (bursting of the seed pods) and rolling, or rarely by tidal erosion and deposition.

Tidestrom's lupine occurs from sea level to 7.62 m (25 feet) on partially stabilized coastal dunes from the Monterey Peninsula in Monterey County northward to the Pt. Reyes Peninsula in Marin County. There is an isolated colony on the south bank of the Russian River near its mouth in Sonoma County. The southernmost population is located at Pebble Beach in Monterey County. Several of the occurrences on the Monterey Peninsula are on remnant dunes in the yards of private residences. At Point Reyes National Seashore, the species is known from seven locations. According to the biological assessment, recent population estimates in 2000 indicated that one population did not support any individuals. Three of the seven occurrences are within grazed pastures. Six occurrences are threatened by European beachgrass (*Ammophila arenaria*) and iceplant (*Carpobrotus edulis*). Point Reyes National Seashore is currently working to reduce these threats by implementing a dune restoration project near Abbott's lagoon (Service file 1-1-01-I-2896).

Other threats to the species include loss of habitat due to development, trampling by hikers and equestrians, and livestock grazing. Some major populations at Point Reyes National Seashore, Asilomar State Park and Pebble Beach are protected by land use restrictions.

Tiburon paintbrush

The paintbrush was federally listed as endangered in 1995 (60 FR 6671, Service 1995). A detailed account of the taxonomy, ecology, and biology of the species is presented in the *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (Service 1998). The paintbrush is a semi-woody perennial of the snapdragon family (Scrophulariaceae). It has erect, branched stems 30 to 61 cm (1 to 2 feet) tall and a sparse covering of soft, spreading hairs. The lance-shaped leaves have one to two pairs of narrow lobes. Flowers bloom from April to June. The conspicuous floral bracts are yellowish and sometimes red-tipped. Flowers are yellow to red and 1.8 to 2 cm (0.7 to 0.8 inch) in length. The unbranched hairs and the lack of glands below the inflorescence distinguish this species from others.

The paintbrush is a root parasite on other flowering plant species. The primary advantage of the parasitic attachment in *Castilleja* and related plants is reportedly an increased water and nutrient supply. Though the parasitic relationship is not obligate (hemiparasitic), benefits to species of *Castilleja* from the parasitic habit are manifested in increased vigor with more branching, greater height, and earlier flowering (Service 1998).

The paintbrush occurs in serpentine grassland (Fiedler and Leidy 1987; CNDDDB1996). Flowering occurs from April to June (Munz and Keck 1959). Reproductive biology is not well known, although the species may be pollinated by bees, moths, butterflies, or hummingbirds (L. Heckard, *in litt.*, 1989; M. Wetherwax, pers. comm. Jun. 2001; N. McCarten pers. comm. Jul. 2001). Seeds are shed in June and July, and the species dies back to its woody base in July and August. New growth from the woody base begins in December or January. Seeds may remain dormant in the soil for several years. Seed germination occurs in January or February and seems to be induced by leaching and low temperatures (Martin 1989).

Tiburon paintbrush has never been widespread. Six of the eight populations occur in Marin and Napa counties. The Golden Gate National Recreation Area population covers approximately 11 acres (4.45 ha) on Nicasio Ridge. A portion of the population occurs on adjacent private ranch lands.

Beach layia

Beach layia was federally listed as endangered on June 22, 1992 (57 FR 27848). A detailed account of the taxonomy, ecology, and biology of the species is presented in the *Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly* (Service 1998). Beach layia (*Layia carnosus*) is a 2.5 to 10.2 cm (1 to 4-inch) tall, prostrate (sometimes ascending), fleshy annual herb in the aster family (Asteraceae). It has lance-shaped to elliptic toothed or lobed leaves arranged alternately on the glandular but non-scented stems. Plants begin as small rosettes after they germinate following winter or fall rains, but soon develop dominant lateral shoots.

Flowering heads (capitula) develop at the end of each shoot beginning in mid-spring, depending on temperatures and soil moisture, and continuing as late as early summer. Small plants in dry, nutrient-poor dune blowouts or deflation surfaces may support as few as one or two flower heads, but large plants may develop near the drained edges of dune ponds or slacks and support more than one hundred flower heads.

Beach layia tends to occur where dune vegetation cover is sparse within mostly stabilized dunes, and is seldom found among or under continuously dense dune vegetation, e.g. European beachgrass (*Ammophila arenaria*), mature dune scrub, large stands of dune lupines (*L. arboreus*, *L. chamissonis*, *L. variicolor*), or highly active dunes. It may co-occur with common annual dune herbs such as beach primrose (*Camissonia cheiranthifolia*) and coastal cats-eye (*Cryptantha leiocarpa*) in vegetation gaps and dune blowouts. Beach layia may have at least a short-lived seed bank, and may occur as dormant seed banks in otherwise unsuitable vegetation. Seed dispersal occurs by wind during summer or whenever fruiting plants get old.

Beach layia is at times locally abundant where it occurs, but its distribution is sparse along the central and northern California coast. It occurs in large, partially active and mobile dune systems in Humboldt, Marin (Point Reyes National Seashore), and Monterey counties; it was known historically from Santa Barbara County, and there are questionable records from the City of San Francisco. Several large populations occur in protected dune fields, including ones at Point Reyes in Marin County, Lanphere-Christensen Dune Preserve in Arcata and Humboldt counties, and Manila dunes in Eureka and Humboldt counties.

Even within preserved areas, populations are prone to local extinction because of rapid changes in dune vegetation and dune stability, and spread of invasive nonnative dune vegetation, especially European beachgrass and ice plant (*Carprobrotus edulis*). High turnover of small populations may occur within major populations. Because of the potential for wind-dispersed

seeds to establish new pioneer colonies, outlier populations may be expected to occur infrequently outside areas of historic occurrence. There are large annual fluctuations in the apparent size and distribution of populations of beach layia. The distribution of visible vegetative or reproductive plants in any given year is not a definitive indicator of the extent of the population and habitat in the long term. As stated in the biological assessment, five of the thirteen occurrences of beach layia at Point Reyes National Seashore are located in pastures. Twelve of the occurrences were considered to be imperiled by the presence of European beachgrass and ice plant.

Marin dwarf flax

Dwarf flax was federally listed as threatened in 1995 (60 FR 6671). A detailed account of the taxonomy, ecology, and biology of the dwarf flax is presented in the *Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area* (Service 1998).

Dwarf flax is an annual herb that occurs on serpentine soils from Marin County south to San Mateo County. Within Marin County, it is known to occur on the Tiburon Peninsula, Carson Ridge, Mt. Burdell Open Space, Big Rock, and Big Rock Ranch, and the Golden Gate National Recreation Area. Currently, there are 20 known populations of dwarf flax throughout the range of the species, 12 of which occur in Marin County. Dwarf flax flowers from May to July, and is pollinated by insects such as bee flies and pollen beetles. Late rains may provide the most suitable growing conditions for dwarf flax.

A variety of activities have contributed to the decline of dwarf flax. These include, but are not limited to development, recreation, trampling, and competition with native and non-native species such as barbed goatgrass (*Aegilops triuncialis*). Little is known of the species' tolerance to grazing or soil disturbance. However, it is possible that dwarf flax may benefit from some levels of grazing and soil disturbance, considering the coexistence of the dwarf flax with other species, such as harvest brodiaea (*Brodiaea elegans*) and Mariposa lily (*Calochortus* sp.), which are known to benefit from disturbance.

Within Golden Gate National Recreation Area, dwarf flax is known from six occurrences, all located along Nicasio Ridge. All of these occurrences are on lands subject to grazing. Three of these ranches (Cheda, McIssac, and Zanardi) are currently authorized as ROP's which will expire between 2005 and 2009.

Myrtle's silverspot butterfly

Myrtle's silverspot butterfly was federally listed as endangered on June 22, 1992 (57 FR 27848). A detailed account of the taxonomy, ecology, and biology of the species is presented in the *Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly* (Service 1998). The Myrtle's silverspot butterfly is one of four related coastal subspecies of *Speyeria zerene* that

occur from Washington to California: the threatened Oregon silverspot (*Speyeria zerene hippolyta*), endangered Behrens' silverspot (*Speyeria zerene behrensii*), gloriol silverspot (*Speyeria zerene gloriosa*) and endangered Myrtle's silverspot. Myrtle's silverspot butterfly is confined to the north-central coast of California. All three listed silverspots occupy restricted habitat types close to the coast, and have been seriously impacted by human activities.

The Myrtle's silverspot butterfly inhabits coastal dunes, coastal prairie, and coastal scrub at elevations ranging from sea level to 300 meters (1,000 feet), and as far as 5 km (3 miles) inland (Launer *et al.* 1992). The adult butterflies prefer areas protected from onshore winds, but can be observed in exposed areas when winds are calm.

Critical factors in the distribution of the Myrtle's silverspot butterfly include presence of the presumed larval host plant, *Viola adunca* (western dog violet), and availability of nectar sources for adults. Although alternate larval host plants have neither been confirmed nor ruled out for the Myrtle's silverspot, other subspecies of *Speyeria zerene* and other species of *Speyeria* can feed on more than one species in the genus *Viola*. Seeds of *Viola* are often dispersed by ants. Violets sometimes bear self-pollinating flowers, and are also cross-pollinated by insects. The butterfly has been observed obtaining nectar from non-native species such as bull thistle (*Cirsium vulgare*) and rarely Italian thistle (*Carduus pycnocephalus*). In dune scrub habitat, these butterflies seek nectar from several native species such as gum plant (*Grindelia* sp.), western pennyroyal (*Monardella undulata*), yellow sand verbena (*Abronia latifolia*), seaside daisy (*Erigeron glaucus*), and mule ears (*Wyethia* sp.). Other flowers might serve as good nectar sources for the opportunistic adults, such as brownie thistle (*Cirsium quercetorum*) and groundsel (*Senecio* sp.). The related Oregon silverspot has been observed to visit yarrow (*Achillea millefolium*), goldenrod (*Solidago* sp.), beach aster (*Aster chilensis*), rough cat's-ear (*Hypochaeris radicata*), and pearly everlasting (*Anaphalis margaritacea*).

Adult female Myrtle's silverspot butterflies lay their eggs singly on or near dried leaves and stems of violets. Within a few weeks after the eggs are laid, the larvae (caterpillars) hatch, feed on the lining of the egg, crawl a short distance into the surrounding foliage or litter, and spin a silk pad on which they spend the summer, fall, and winter. The period of inactivity is a resting state called diapause, during which no feeding occurs. The larvae may be able to extend their diapause for more than one year. Upon termination of diapause in the spring, the caterpillar finds a nearby violet and begins feeding. Feeding is difficult to observe, and apparently occurs at dusk and possibly at night. The larval feeding stage lasts about 7–10 weeks, after which the larvae form their pupal chamber out of leaves spun together with silk. The adult butterfly emerges from the pupa after about two weeks. Emergence typically occurs from mid-June to mid-July.

The flight season for Myrtle's silverspot butterfly adults extends from mid-June to early October (Launer *et al.* 1992), during this time period they mate, lay eggs, and die. Adult activity is closely tied to weather conditions: they are active during calm weather and inactive during windy periods. Both sexes are good flyers and can travel kilometers in search of nectar, mates, or violets. Following the flight season, eggs and active larvae are present for an additional week or

two in the fall, and the incompletely protected larvae diapause during the winter. The larvae resume activity and begin feeding at some point during the spring that varies depending on the weather.

Historically, Myrtle's silverspot butterfly was recorded from the north-central coast of California, including San Mateo County as far south as Pescadero in 1950, north to the south side of the mouth of the Russian River in Sonoma County. By the late 1970s, populations of Myrtle's silverspot butterfly south of the Golden Gate Bridge were believed to be extirpated and extant populations were known only from Marin County at the Point Reyes National Seashore. In 1990, an additional population was discovered at a site on Tomales Bay in northernmost coastal Marin County, on property proposed for a golf resort and residential development. The proposal for the golf course was withdrawn and later replaced with a proposal for low density residential development and open space. In 1991, this site was estimated to support between 2,500 and 5,000 adult Myrtle's silverspot butterflies. The size of two apparently separate populations in Point Reyes National Seashore were estimated at less than 5,000 individuals and several hundred individuals, respectively, in 1993. No trends over time are discernable in the limited population data. In summary, this butterfly is currently known from three occurrences with a probable total of fewer than 10,000 individuals.

The listing of the Myrtle's silverspot was based on its extirpation from the southern third of its historical range, south of the Golden Gate Bridge, and adverse effects of urban development, invasive non-native vegetation, livestock grazing, and other human influences throughout its range. Myrtle's silverspot butterfly occurs in separate populations whose long-term persistence likely depends upon movement between populations. Habitat degradation resulting in the loss of intervening populations, larval food plants, and adult nectar sources may make movements between populations more difficult. Illegal collection also is a threat to this species. Specimens of Myrtle's silverspot butterfly are known to have been illegally collected in Point Reyes National Seashore. Illegal collection of adults is likely to continue at a level that is difficult to quantify. Substantial areas of habitat and potential habitat for Myrtle's silverspot receive long-term protection in the Point Reyes National Seashore.

California red-legged frog

The California red-legged frog was federally listed as threatened on May 23, 1996, (61 **FR** 25813). Please refer to the final rule and the Recovery Plan for the California red-legged frog (Service 2002) for additional information on this species. This species is the largest native frog in the western United States (Wright and Wright 1949), ranging from 4 to 13 centimeters (1.5 to 5.1 inches) in length (Stebbins 1985). The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 1985), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 14 to 80 millimeters (0.6 to 3.1 inches) in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

California red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on the surface of the water (Hayes and Miyamoto 1984). California red-legged frogs breed from November through March with earlier breeding records occurring in southern localities (Storer 1925). Individuals occurring in coastal drainages are active year-round (Jennings *et al.* 1992), whereas those found in interior sites are normally less active during the cold season.

Adult California red-legged frogs prefer dense, shrubby or emergent riparian vegetation closely associated with deep (>0.7 meters [2.3 feet]), still, or slow-moving water (Hayes and Jennings 1988). However, frogs also have been found in ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. The largest densities of California red-legged frogs currently are associated with deep pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). California red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek sheltering habitat. Sheltering habitat for California red-legged frogs is potentially all aquatic, riparian, and upland areas within the range of the species and includes any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay ricks may also be used. Incised stream channels with portions narrower than 46 centimeters (18 inches) and depths greater than 46 centimeters (18 inches) may also provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival. During winter rain events, juvenile and adult California red-legged frogs are known to disperse up to 1-2 kilometers (0.54-1.08 miles) (Rathbun and Holland, unpublished data, cited in Rathbun *et al.* 1991). Dispersing frogs in northern Santa Cruz County traveled distances from 0.4 kilometer (0.25 mile) to more than 3 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger, unpublished data).

Egg masses contain about 2,000 to 5,000 moderate sized (2.0 to 2.8 millimeters [0.08 to 0.11 inches] in diameter), dark reddish brown eggs and are typically attached to vertical emergent vegetation, such as bulrushes (*Scirpus* spp.) or cattails (Jennings *et al.* 1992). California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Eggs hatch in 6 to 14 days (Jennings 1988). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992); eggs exposed to salinity levels greater than 4.5 parts per thousand result in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3.5 to 7 months after hatching (Storer 1925, Wright and Wright 1949, Jennings and Hayes 1990). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925, Jennings and Hayes 1985). California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations of California red-legged frogs fluctuate from year to year. When conditions are favorable California

red-legged frogs can experience extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, California red-legged frogs may temporarily disappear from an area when conditions are stressful (e.g., drought).

The diet of California red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items. Vertebrates, such as Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*), represented over half the prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. Feeding activity probably occurs along the shoreline and on the surface of the water (Hayes and Tennant 1985). Larvae likely eat algae (Jennings *et al.* 1992).

Several researchers in central California have noted the decline and eventual disappearance of California red-legged frog populations once bullfrogs became established at the same site (L. Hunt, in litt. 1993, S. Barry, in litt. 1992, S. Sweet, in litt. 1993). This has been attributed to both predation and competition. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult northern red-legged frogs as well. In addition to predation, bullfrogs may have a competitive advantage over California red-legged frogs; bullfrogs are larger, possess more generalized food habits (Bury and Whelan 1984), have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977), and larvae are unpalatable to predatory fish (Kruse and Francis 1977). In addition to competition, bullfrogs also interfere with California red-legged frog reproduction. Both California and northern red-legged frogs have been observed in amplexus with (mounted on) both male and female bullfrogs (Jennings and Hayes 1990, Twedt 1993, M. Jennings, in litt. 1993, R. Stebbins in litt. 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also impacted California red-legged frogs. In a survey by H.T. Harvey and Associates (1997), it was determined that California red-legged frogs were historically found throughout Santa Clara County, however they have been essentially extirpated from the urbanized lowland areas of the county. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks red-legged frog dispersal, and the introduction of predatory fishes and bullfrogs. This report further identifies the conversion and isolation of perennial pool habitats resulting from urbanization as an ongoing impact to California red-legged frogs.

California red-legged frogs have been extirpated or nearly extirpated from over 70 percent of their former range. Historically, this species was found throughout the Central Valley and Sierra Nevada foothills. As of 1996, California red-legged frogs have been documented in approximately 240 streams or drainages from 23 counties, primarily in central coastal California. Monterey, San Luis Obispo, and Santa Barbara counties support the largest extent of currently

occupied habitat. The most secure aggregations of California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack non-native predators. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990, Twedt 1993), red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifastacus leniusculus*), and several species of warm water fish including sunfish (*Lepomis* spp.), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish (*Gambusia affinis*) (L. Hunt, in litt. 1993, S. Barry, in litt. 1992, S. Sweet, in litt. 1993). Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range.

The historic range of the red-legged frog extended coastally from the vicinity of Point Reyes National Seashore, Marin County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985; Hayes and Krempels 1986). Red-legged frogs were historically documented with 46 counties but the taxon now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2000). Red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the central coast. Within the remaining distribution of the species, only isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CNDDDB 2002).

The recovery plan for the California red-legged frog identifies eight recovery units. Each recovery unit reflects areas with similar conservation needs. The strategy for recovery of California red-legged frogs includes promoting and protecting populations that are geographically distributed in a manner that allows for the continued existence of viable metapopulations. The establishment of these recovery units is based on the recovery team's determination that various regional areas of the species' range are essential to its overall survival and recovery because these units will ensure that the strategy for recovery of the species will be implemented. The draft recovery plan specifies that the status of the California red-legged frog should be considered within the smaller scale of recovery units as opposed to the overall range of the species because these units reflect areas with similar conservation needs. Furthermore, this strategy will promote and protect the continued existence of viable metapopulations. These recovery units are delineated by major watershed boundaries, as defined by U.S. Geological Survey hydrologic units and California Department of Fish and Game's Ichthyological Provinces, and the limits of the range of the California red-legged frog. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas

that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

The grazing program is located within the proposed North San Francisco Bay/North Coast recovery unit which includes portions of watersheds at Point Reyes National Seashore and Golden Gate National Recreation Area. Within this recovery unit, red-legged frogs are threatened primarily by water management and diversions, non-native species, livestock, and urbanization. Populations of red-legged frogs in this region are relatively robust where habitat is available. Red-legged frogs have been observed extensively within the boundaries of grazed and ungrazed lands within Point Reyes National Seashore and Golden Gate National Recreation Area. More than 120 breeding sites with an estimated adult population of several thousand frogs have been located at Point Reyes National Seashore (Feller and Guscio 2002). Most of the breeding sites are artificial stock ponds constructed on lands that have been grazed for 150 years.

California Red-Legged Frog Critical Habitat

Critical habitat for the California red-legged frog was designated on March 13, 2001 (66 FR 14626). Please refer to the Final Rule for additional information on the critical habitat designation. In determining which areas to designate as critical habitat, the Service considers those physical and biological features (primary constituent elements) that are essential to the conservation of the species, and that may require special management considerations and protection (50 CFR §424.14).

The Service is required to list the known primary constituent elements together with the critical habitat description. Such physical and biological features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Due to the complex life history and dispersal capabilities of the red-legged frog, and the dynamic nature of the environments in which they are found, the primary constituent elements described below are found throughout the watersheds that are designated as critical habitat. Special management, such as habitat rehabilitation efforts (e.g., removal of nonnative predators), may be necessary in the area designated. Critical habitat for red-legged frogs provides for breeding and nonbreeding habitats and for dispersal between these habitats, as well as allowing for expansion of frog populations vital to the recovery of the subspecies. Critical habitat includes: (a) essential aquatic habitat; (b) associated uplands; and (c) dispersal habitat connecting essential aquatic habitat.

Aquatic habitat is essential for providing space, food, and cover, necessary to sustain all life stages of red-legged frogs. It consists of virtually all low-gradient fresh water bodies, including natural and man-made (e.g., stock) ponds, backwaters within streams and creeks, marshes,

lagoons, and dune ponds, except deep lacustrine water habitat (*e.g.*, deep lakes and reservoirs 50 acres or larger in size) inhabited by nonnative predators. The subspecies requires a permanent water source to ensure that aquatic habitat is available year-round. Permanent water sources can include, but are not limited to, ponds, perennial creeks, permanent plunge pools within intermittent creeks, seeps, and springs. Aquatic habitat used for breeding usually has a minimum deep water depth of 20 inches, and maintains water during the entire tadpole rearing season (at least March through July). During periods of drought, or less-than-average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but because they support breeding in wetter years these sites would still be considered essential breeding habitat. Ponds that support a small population of red-legged frogs, but are not surrounded by suitable upland habitat, or are cut off from other breeding ponds or permanent water sources by impassable dispersal barriers, do not have the primary constituent elements for red-legged frog critical habitat.

To be a primary constituent element for red-legged frog critical habitat, the aquatic components within the designated boundaries must include two or more breeding sites (as defined above) located within 1.25 miles of each other; at least one of the breeding sites must also be a permanent water source; or, the aquatic component can consist of two or more seasonal breeding sites with a permanent nonbreeding water source located within 1.25 miles of each breeding site. Red-legged frogs have been documented to travel 2.25 miles in a virtual straight line migration from nonbreeding to breeding habitats (66 **FR** 14626). In addition, breeding sites must be connected by dispersal habitat connecting essential aquatic habitat, described below.

Associated upland and riparian habitat is essential to maintain red-legged frog populations associated with essential aquatic habitat. The associated uplands and riparian habitat provide food and shelter sites for red-legged frogs, and assist in maintaining the integrity of aquatic sites by protecting them from disturbance and supporting the normal functions of the aquatic habitat. Key conditions include the timing, duration, and extent of water moving within the system, filtering capacity, and maintaining the habitat to favor red-legged frogs and discourage the colonization of nonnative species such as bullfrogs. Essential upland habitat consists of all upland areas within 300 feet, or no further than the watershed boundary, of the edge of the ordinary high-water mark of essential aquatic habitat (66 **FR** 14626).

Essential dispersal habitat provides connectivity among red-legged frog breeding habitat (and associated upland) patches. While frogs can pass many obstacles, and do not require a particular type of habitat for dispersal, the habitat connecting essential breeding locations and other aquatic habitat must be free of barriers (*e.g.*, a physical or biological feature that prevents frogs from dispersing beyond the feature) and at least 300 feet wide. Essential dispersal habitat consists of all upland and wetland habitat free of barriers that connects two or more patches of essential breeding habitat within 1.25 miles of one another. Dispersal barriers include heavily traveled roads (an average of 30 cars per hour from 10:00 p.m. to 4:00 a.m.) that possess no bridges or culverts; moderate to high density urban or industrial developments; and large reservoirs more

than 50 acres in size. Agricultural lands such as row crops, orchards, vineyards, and pastures do not constitute barriers to red-legged frog dispersal.

Point Reyes National Seashore and Golden Gate National Recreation Area occur within the Point Reyes Unit (Unit 12), which consists of watersheds within and adjacent to Bolinas Lagoon, Point Reyes, and Tomales Bay in Marin and Sonoma counties. This unit encompasses approximately 81,168 hectares (200,572 ac); 44 percent is managed by the NPS, California Department of Parks and Recreation, and the Marin Municipal Water District, and 56 percent is privately owned. Unit 12 is known to be occupied by several populations of the California red-legged frog. Essential breeding habitat is dispersed throughout the unit. This unit contains one of the largest known populations of the California red-legged frog.

Western Snowy Plover

The Pacific coast population of the western snowy plover was federally listed as threatened on March 5, 1993, (58 FR 12864). Critical habitat for the Pacific coast population of the western snowy plover was designated on December 7, 1999 (64 FR 68508), however, no critical habitat is designated within the grazed lands at Point Reyes National Seashore or Golden Gate National Recreation Area. A draft recovery plan for this species was issued in May 2001.

The western snowy plover is a small, pale, colored shorebird with dark patches on either side of the upper breast. The Pacific coast population breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. Other less common nesting habitat includes salt pans, coastal dredge spoil disposal sites, dry salt ponds, salt pond levees (Widrig 1980; Wilson 1980; Page and Stenzel 1981), and riverine gravel bars. Sand spits, dune-backed beaches, unvegetated beach strands, open areas around estuaries, and beaches at river mouths are the preferred coastal habitats for nesting (Stenzel *et al.* 1981; Wilson 1980).

Western snowy plovers breed in loose colonies with the number of adults at coastal breeding sites ranging from 2-318 (Page and Stenzel 1981; Oregon Department of Fish and Wildlife 1994). On the Pacific coast, larger concentrations of breeding birds occur in the south than in the north, suggesting that the center of the western snowy plovers' coastal distribution lies closer to the southern boundary of California (Page and Stenzel 1981).

Nest sites typically occur in flat, open areas with sandy or saline substrates; vegetation and driftwood are usually sparse or absent (Widrig 1980; Wilson 1980; Stenzel *et al.* 1981). The majority of western snowy plovers are site-faithful, returning to the same breeding site in subsequent breeding seasons (Warriner *et al.* 1986).

The breeding season of the western snowy plover extends from March 1 through September 14. Both sexes incubate the eggs. Western snowy plover chicks are precocial, leaving the nest within hours after hatching to search for food. Fledging requires an average of 31 days (Warriner *et al.*

1986). Western snowy plovers will renest after loss of a clutch or brood or successful hatching of a nest; re-nesting may occur at the same colony site (Wilson 1980; Warriner *et al.* 1986).

Western snowy plovers forage on invertebrates in wet sand and amongst debris within the intertidal zone; in dry, sandy areas above the high tide; on salt pans; spoil sites; and along the edges of salt marshes and salt ponds.

The western snowy plover is threatened by human disturbance, predation, inclement weather, and encroachment of European beachgrass and iceplant. Some breeding areas have been encroached upon by urban development. According to the biological assessment, western snowy plovers are known to winter at Drake's Estero, Abbott's Lagoon, Limantour Spit, and the Great Beach. Nesting is known to occur at the Great Beach, Drake's Beach, Limantour Spit, North Beach parking area, Kehoe Beach, and the Western edge of Abbott's Lagoon.

Effects of the Proposed Action

Sonoma alopecurus, Sonoma spineflower, beach layia, Tidestrom's lupine, Tiburon paintbrush, and Marin dwarf flax

Grazing activities in moderation within habitats for Sonoma alopecurus, the spineflower, beach layia, Tidestrom's lupine, Tiburon paintbrush, and Marin dwarf flax may be both adverse and beneficial in moderation. Specifically, grazing activities may result in trampling of individual plants, soil compaction, consumption, erosion, and impacts which may influence presence of invasive species. Trampling may reduce the plant's reproductive output by breaking immature inflorescence before fruit ripening. Alternatively, trampling may scarify seed present in the soil which would be beneficial to recruitment into the population. Soil compaction may affect the plant's rhizosphere, minimizing the uptake of nutrients. Additionally, soil compaction may reduce the ability for seeds to germinate. Overgrazing of foliage could limit the plant's ability to photosynthesize, which could result in death or diminished reproductive output. Consumption of inflorescence or seed could reduce the genetic variability of plants within a given population and could decrease the overall reproductive output of the individual plant. However, grazing may reduce competition from more abundant or invasive species. Erosion may result in burial of seed or individual plants, thus reducing the genetic variability of the population. Although seed banks may persist over time, germination of seeds may be subject to stochastic events which may occur over geologic time (such as shifting dunes).

Excessive feces and urine deposition within or adjacent to areas inhabited by the Sonoma alopecurus, the spineflower, beach layia, Tidestrom's lupine, Tiburon paintbrush, and Marin dwarf flax may alter habitat conditions by fertilizing the nutrient poor soils, thereby making colonization by invasive species easier, which could ultimately out-compete the paintbrush and/or dwarf flax. Alteration of the habitat conditions through deposition of nitrogen derivatives may also lead to the extirpation of the paintbrush and dwarf flax from the site due to their adaptation to survive only on serpentine soils.

Anthropogenic effects on these species include maintenance of ranch roads, vehicular traffic and remote feeding within or adjacent to habitat for these species. Grading activities could remove or destroy plants or result in burial of plants and/or seed. Vehicular traffic could destroy plants and/or impair their ability to reproduce. Remote feeding may concentrate cattle within habitat and result in excessive trampling or degradation of habitat.

Myrtle's silverspot butterfly

Grazing activities within the habitat of the Myrtle's silverspot butterfly may result in trampling of eggs, larvae, and adults. Additionally, grazing within the habitat may result in destruction of host or nectar plants via consumption, trampling, soil compaction, erosion, and other deleterious effects. Conversely, grazing activities may assist in habitat maintenance by removing competitive vegetation and minimizing vegetative cover which could improve the ability of Myrtle's silverspot butterfly to detect host and nectar plants. The presence of cattle in dune areas does little to control the spread of invasive species such as ice plant and European beach grass. Point Reyes National Seashore has minimized the effects of grazing at some ranches by restricting access to dune habitats. However, cattle may be damaging Myrtle's silverspot butterfly habitat and limiting population expansion south of the Tule Elk Reserve (Launer *et al.* 1998, as cited in the biological assessment).

Anthropogenic effects on the Myrtle's silverspot butterfly include maintenance of ranch roads and vehicular traffic in Myrtle's silverspot butterfly habitat. Specifically, excessive dust from road grading or from routine vehicular traffic may prevent respiration of the early stages through clogged spiracles. Additionally, these activities may result in individuals being injured or killed resultant from collisions with moving equipment or being run over. Dust may also affect the host and nectar plants by inhibiting their ability to photosynthesize, and thus cause the plant to die or minimize its rate of development. Further, dust could interfere with the plants reproductive activity by coating reproductive parts with an impenetrable layer of film, thus inhibiting reproductive success or reducing the availability of nectar for butterflies to forage on.

California red-legged frog

In general, grazing activities at Point Reyes National Seashore and Golden Gate National Recreation Area are compatible with sustaining red-legged frog populations and habitat suitability. However, red-legged frogs may be killed or injured by livestock that may crush them in both aquatic and upland habitats. Livestock activity in stockpools or streams may mobilize sediments or contribute to erosion or deposition of sediments. If heavy sedimentation occurs in pools where red-legged frogs breed, it is possible that red-legged frog egg masses will suffocate from being buried under sediments. Heavy loss of sediments from the streambed may result in down-cutting of channels which could further degrade the stability of banks, and functions of the riparian ecosystem. Additionally, degradation of riparian habitat and functions may result in the colonization of exotic predators such as bullfrogs. Colonization by exotic predator populations

could result in the loss of red-legged frog breeding sites at Point Reyes National Seashore and Golden Gate National Recreation Area.

Excessive urine and fecal matter deposited by equine and other domestic animals may flow into the tributaries and stockpond. Nutrient loading associated with such runoff may result in alteration of pH, dissolved oxygen, excessive nitrogen, or pathogens which may adversely affect all lifestages of red-legged frogs.

Routine unregulated maintenance of stockponds may result in killing or injuring red-legged frogs which may be present during grading, mowing, and other related activities. Furthermore, any clearing of vegetation (*i.e.*, mowing, grubbing, *etc.*) may result in harm, harassment, or killing of red-legged frogs. In addition, vehicular use of ranch roads and maintenance of ranch roads may result in mortality or injury of red-legged frogs which may disperse across such roads.

California red-legged frog critical habitat

There will be disturbance to critical habitat in the sense that some stock ponds used as breeding habitat will be disturbed. However, these effects are anticipated to be temporary and relatively short term in duration.

Western snowy plover

Grazing activities within the habitat of the western snowy plover may adversely affect the animal via trampling individuals or crushing eggs. Presence of cattle within nesting areas may result in nest failure due to western snowy plovers being flushed from their nests for extended periods of time. For the most part, Point Reyes National Seashore has minimized the likelihood of such impacts by installing exclusion fencing in suitable habitat areas.

An increase in the number of ravens as result of ranching activities likely could lead to higher levels of predation on western snowy plovers by these corvids. Ravens are known predators of western snowy plover chicks and eggs (Roth *et al.* 1999). Ongoing research at Point Reyes National Seashore has documented the interrelationship between ranching activities and ravens. Specifically, ravens opportunistically feed upon left over grains, afterbirths, carcasses, and organisms killed or injured during silage harvest.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The proposed project will contribute to the local and range-wide trend of habitat loss, fragmentation, and degradation, which are the principal causes of the decline of the species addressed in this biological opinion

Land adjacent to and in the vicinity of Point Reyes National Seashore and the Golden Gate National Recreation Area are owned by the California Department of Parks and Recreation, been purchased by non-profit groups for conservation purposes, or are otherwise unlikely to be converted to large scale developments. The Audubon Canyon Ranch includes an inholding on Bolinas Lagoon that connects the Golden Gate National Recreation Area to lands adjoining it. Other Audubon Canyon Ranch holdings on Tomales Bay protect undeveloped Bay frontage adjoining State Park lands. The Vedanta Society holds a 2,143 acre parcel in the Olema Valley bounded by National Parks lands.

In 1971, the Marin County Supervisors enacted A-60 zoning (one house per 60 acres) for much of western Marin County, significantly limiting the development of agricultural properties. This zoning covers extensive areas of private lands adjoining public park and watersheds, including San Geronimo Valley, Nicasio Valley, and the northwestern portion of the County. Since 1971, zoning for the west Marin Planning Area has been elaborated to include a variety of zoning densities in areas adjacent to established towns, with minimum lot sizes ranging from one unit per acre to one unit per 60 acres. The County's Local Coastal Program provides additional protection for streams, lagoons, Tomales Bay, and wetlands. The integrity of ranch and other agricultural lands is addressed in the agricultural element of the Countywide plan.

Agricultural lands in west Marin County have been and continue to be at risk of being broken up into large residential lots. The Marin Agricultural Land Trust has been acquiring development rights to agricultural land since 1980. At present, this non-profit organization holds the rights for over 30,000 acres on 43 ranches in western Marin County.

The application of pesticides, herbicides, or fertilizers could degrade surface water quality in wetlands, including creeks and streams. Water quality may become impaired when pesticides/fertilizers or sediment enters the proposed project from the surrounding residential area.

Urban development results in increased numbers of pets. Both feral and domestic cats (*Felis catus*) and dogs (*Canis domesticus*) prey on aquatic and riparian species such as the California red-legged frog and California tiger salamanders. People exploring creeks can harass, collect, and kill California red-legged frogs. Many flood control projects replace natural streams with engineered channels and isolate them from their natural floodplains, disrupting natural hydrologic processes and degrading stream habitat. Flood channel maintenance often requires the removal of emergent aquatic and riparian vegetation, making these channels less suitable for California red-legged frogs.

Non-native species that prey upon, or compete with, California red-legged frogs continue to be released into the environment. Releases are likely to increase with an increasing number of people living in an area. Bullfrogs, goldfish (*Carassius auratus*), mosquitofish (*Gambusia affinis*), and warm water game fish species are all expected to continue to persist in the wild and

degrade the quality of California red-legged frog habitat. The introduced animals may also act as disease vectors and impact threatened/endangered species.

Conclusion

After reviewing the current status of the Myrtle's silverspot butterfly, Sonoma alopecurus, Sonoma spineflower, Tiburon paintbrush, beach layia, Tidestrom's lupine, Marin dwarf flax, California red-legged frog, and the Pacific Coast population of the western snowy plover, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of these nine species. The proposed grazing program, as described in the BA at Point Reyes National Seashore and the north district of the Golden Gate National Recreation Area is not likely to destroy or adversely modify designated California red-legged frog critical habitat. Although critical habitat has been designated for the western snowy plover, none is located within the action area; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for removal or reduction to possession of endangered and threatened plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the NPS so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The NPS has a continuing duty to regulate the activity covered by this incidental take statement. If the NPS (1) fails to require the permittees to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to

retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount of Extent of Take

The Service anticipates incidental take of Myrtle's silverspot butterfly, western snowy plover, and the California red-legged frog will be difficult to detect or quantify because of: the elusive nature of these species, relative size, and cryptic coloration which make the finding of a dead specimen unlikely. In addition, losses of these three species may be masked by seasonal fluctuations in numbers. Therefore, the Service is quantifying incidental take in terms of the number of animals, or the number of acres that are inhabited by these species. Conservation measures proposed by the NPS and described above in the Description of the Proposed Action will substantially reduce, but do not eliminate, the potential for incidental taking of these species. The Service, therefore, anticipates the following levels of take as a result of the proposed project.

Upon implementation of the reasonable and prudent measures, take in the form of injury, death, harm, and harassment of Myrtle's silverspot butterfly, the Pacific coast population of the western snowy plover, and the California red-legged frog on 29,000 acres (11,736 ha) of habitat as described in the BA will become exempt from the prohibitions described under section 9 of the Act for direct and indirect effects associated with the grazing program for a period of five (5) years after issuance or renewal of each Special Use Permits or lease and for each five year period following establishment of an ROP until its expiration.

Incidental take of Myrtle's silverspot butterfly, western snowy plover, and red-legged frog is expected in the form of:

1. Harassment of all California red-legged frogs and injury or death of one (1) California red-legged frog for each 5-year Special Use Permit, lease, or ROP.
2. Harassment, injury, or death of one (1) western snowy plover inhabiting the action area and the B, C, E, G, I, H, or L Ranch as a result of raven predation.
3. Harassment to all Myrtle's silverspot butterflies inhabiting 13, 510 acres on the B, C, D, E, F, G, I, J, N, and the Home Ranch resulting from the grazing program.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the Myrtle's silverspot butterfly, western snowy plover, and red-legged frog in this opinion or result in destruction or adverse modification of critical habitat for the red-legged frog.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the effect of take on the western snowy plover, California red-legged frog, and Myrtle's silverspot butterfly:

1. Minimize the potential for harm, harassment, injury, or mortality of Myrtle's silverspot butterfly and red-legged frog.
2. Minimize the effect of the grazing program to the western snowy plover.
3. Minimize the effects of temporal and permanent loss or degradation of habitat for the Myrtle's silverspot butterfly, western snowy plover, and red-legged frog by habitat protection and enhancement.

Terms and Conditions

To be exempt from the prohibitions of Section 9 of the Act, NPS shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. The following Terms and Conditions will implement Reasonable and Prudent Measure number one:
 - a. The proposed project will be implemented as described in this biological opinion and associated documents, except as modified by these terms and conditions.
 - b. An education program for the permittees shall be conducted prior to the issuance of the grazing permits. The program shall consist of a brief presentation by a person(s) knowledgeable in the Myrtle's silverspot butterfly, western snowy plover, and the California red-legged frog. The program shall include the following: a description of these three species and their ecology, and habitat needs; an explanation of the status of these species and their protection under the Act; and an explanation of the measures being taken to reduce effects to these species during the grazing program. The education may be conducted in an informal manner (e.g., ranger and permittee in a rural setting).
2. The following Terms and Conditions will implement Reasonable and Prudent Measure number two:
 - a. The proposed project will be implemented as described in this biological opinion and associated documents, except as modified by these terms and conditions.

- b. The NPS shall limit raven access to cattle feeds as described in the BA. Where possible, the NPS or the permittees shall cover or remove cattle feeding troughs. Waste grain around troughs shall be cleaned up after the cattle have finished feeding.
 - c. The NPS or the permittees shall dispose of cattle afterbirths as quickly as possible, or calving shall be moved indoors so the afterbirth is not available to ravens, as described in the BA.
 - d. As described in the BA, the NPS or the permittees shall ensure that cattle carcasses are picked up quickly and disposed of outside of Point Reyes National Seashore.
 - e. As described in the BA, the NPS or the permittees shall ensure that ravens do not have access to stored grain or to garbage disposal areas.
 - f. The NPS or the permittees shall maintain fences along beach frontage in good repair to prevent cattle trespass on to the beaches. Damaged fence segments shall be repaired within twenty-four (24) hours of discovery.
 - g. The NPS, shall, where appropriate, implement a controlled taste aversion program for ravens if it appears that these corvids are preying on western snowy plovers.
3. The following Terms and Conditions will implement Reasonable and Prudent Measure number three:
- a. The proposed project will be implemented as described in this biological opinion and associated documents, except as modified by these terms and conditions.
 - b. The NPS shall ensure that the placement of new feed racks, salt licks, corrals, or other associated structures is at least 300 feet from suitable red-legged frog aquatic habitat.
 - c. To minimize erosion, soil compaction, and encourage riparian functions, aquatic features shall be regularly monitored by Point Reyes National Seashore/Golden Gate National Recreation Area staff to determine if fencing or other remedial measures is appropriate to minimize adverse effects to riparian habitat.
 - d. As described in the BA, the NPS shall develop and implement a management plan for wetlands with the Point Reyes National Seashore.
 - e. Based on communications with experts on the California red-legged frog, the NPS shall conduct research to increase understanding of cattle-frog interactions.

Reporting Requirements

As part of reporting requirements for all federally listed species within Point Reyes National Seashore, the Service must be notified within 24 hours of the finding of any injured or dead Myrtle's silverspot butterfly, western snowy plover, or red-legged frog, or any unanticipated damage to these species' habitats associated with the ranching activities. Notification must include the date, time, and precise location of the specimen/incident, and any other pertinent information. The Service contact person is the Chief, Endangered Species Division in the Sacramento Fish and Wildlife Office, at (916) 414-6620. Any dead or injured specimens will be deposited with the Service's Division of Law Enforcement, 2800 Cottage Way, Room W-2928, Sacramento, California 95825, telephone (916) 414-6660.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to implement recovery actions, to help implement recovery plans, to develop information, or otherwise further the purposes of the Act.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. We propose the following conservation recommendations:

1. The NPS should continue monitoring for the Sonoma spineflower at the Linny Ranch (G Ranch), and based on this information immediately modify the grazing program, as appropriate, to conserve the species.
2. The NPS should continue monitoring for the Marin dwarf flax and Tiburon paintbrush, and based on this information immediately modify the grazing program, as appropriate, to conserve these species
3. The NPS should continue monitoring for the Sonoma alopecurus, beach layia, and Tidestrom's lupine, and based on this information immediately modify the grazing program, as appropriate, to conserve these species
4. The Service recommends the NPS implement the appropriate actions described in the *Recovery Plan for the California red-legged frog (Rana aurora draytonii)* (Service 2002).
5. The Service recommends the NPS implement the appropriate actions described in the *Recovery Plan for Seven Coastal Plants and the Myrtle's Silverspot Butterfly* (Service 1998).

6. The NPS should use appropriate locally collected California native plants to restore or enhance native species diversity and ecosystem functions at Point Reyes National Seashore and Golden Gate National Recreation Area.
7. The NPS should continue to work with the U.S. Geological Survey monitoring the status of California red-legged frog at Point Reyes National Seashore and Golden Gate National Recreation Area.
8. The NPS should continue to have their law enforcement rangers monitor Point Reyes National Seashore for collectors capturing the endangered Myrtle's silverspot butterfly without appropriate permits.

REINITIATION STATEMENT

This concludes formal consultation on the Grazing Permit Renewal Program at Point Reyes National Seashore and Golden Gate National Recreation Area. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the National Park Service shall not issue authorizations under this biological opinion.

If you have any questions regarding this biological opinion, please contact Chris Nagano, Deputy Chief of our Endangered Species Division at the letterhead address or at 916/414-6600.

Enclosures

cc:

ARD-ES, Portland, OR

USNPS, GGNRA, San Francisco, CA (Attn: Ranger N. Hornor)

USNPS, GGNRA, San Francisco, CA (Attn: Ranger D. Hatch)

USNPS, GGNRA, San Francisco, CA (Attn: Ranger D. Fong)

Superintendent

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CDFG, Yountville, CA (Attn: Carl Wilcox)

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