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United States Department of the Interior

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May 12, 2008

Memorandum

To: Superintendent, Point Reyes National Seashore, U.S. National Park Service, Point Reyes Station, California (Attn: Ranger John DiGregoria)

From: fn Acting Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California *Chf Wagoner*

Subject: Biological Opinion on the Kehoe Spring Development Project at Point Reyes National Seashore, Marin County, California

This is in response to your March 26, 2008, request for consultation with the U.S. Fish and Wildlife Service (Service) on the Kehoe Spring Development Project at Point Reyes National Seashore in Marin County, California. Your letter was received by this Field Office on March 27, 2008. This document represents the Service's review of the effects of the project on the endangered Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*) and the threatened California red-legged frog (*Rana aurora draytonii*). This biological opinion is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*)(Act).

Consultation History

- March 27, 2008 The Service received the request for formal consultation from the U.S. National Park Service in a letter dated March 26, 2008.
- March 28, 2008 The Service sent an electronic mail message to the U.S. National Park Service requesting additional information on the proposed project.
- March 28, 2008 The U.S. National Park Service sent the Service an electronic mail message providing the requested information.
- March 29, 2008 The U.S. National Park Service sent the Service an electronic mail message providing further information on the proposed project.

- May 11, 2008 The Service sent the draft biological opinion for the proposed project to the U.S. National Park Service.
- May 11, 2008 The Service received comments on the draft biological opinion for the proposed project from the U.S. National Park Service.

BIOLOGICAL OPINION

Description of the Proposed Action

The Kehoe Spring Development Project will prevent cattle access to three degraded springs at the J Ranch 6150 Pierce Point Road, which is located east of Pierce Point Road, approximately one-quarter mile from the entrance to the Tomales Point Elk Reserve at Point Reyes National Seashore in Marin County, California, provide an alternate water source (watering area) for the associated cattle, and allow for the revegetation and stabilization of the area around the three springs and an eroded trailing system leading to the springs and abandoned stock pond. The J Ranch is at the northern end of the Point Reyes National Seashore and is operated by the Kehoe family. The action area encompasses the northern 75 acres in the northwestern corner of a 275 acre pasture within the historic J Ranch.

The spring development project includes three springs (northern, southern, and eastern) on steep slopes that comprise the headwaters of an unnamed stream that drains directly to Tomales Bay. The northern and southern springs drain to a historic stock pond that has a failed dam where sediment concentrates from extensive cattle trailing. The northern spring is heavily trampled but has high vegetative cover of native wetland grasses and forbs, including western manna grass (*Glyceria occidentalis*) and water pennywort (*Hydrocotyle ranunculoides*). This area appears to be slumping with seams where the slump is pulling away from the hillside. The southern spring is stable with an overstory of native shrubs, such as wax-myrtle (*Myrica californica*) and salmonberry (*Rubus spectabilis*), and some emergent vegetation. This area has numerous springs emerging from the hillside. The springs are impacted with many cattle trails and areas denuded of vegetation. The eastern spring is a small area that is the most stable, has high vegetative cover, and has the least animal impact. Shrubs such as huckleberry (*Vaccinium ovatum*) and elderberry (*Sambucus* spp.) surround the eastern spring. western dog violet (*Viola adunca*) is present in some of the pasture area surrounding the springs.

A bore hole will be drilled horizontally into the hillside of the northern spring to a depth of up to 100 feet until the spring source is reached. Material extracted from the bore hole will be placed on a tarp adjacent to the drill and disposed of in the upland area. The drill hole will be cased around a pipe which will connect to the pipeline leading to the watering area. Approximately 800 ft. of polyethylene pipe will be used for a gravity fed line from the spring to a 400 gallon water trough/pad placed on the new watering area east of the springs. The pipe will be placed above ground inside the fence, and underground in a trench outside the fence. The gully and slip area of the northern most spring will be planted with appropriate woody vegetation. The trailing area will be seeded with native grass species. Approximately 1990 feet of fence will be installed around the spring/slip area and eroded trailing area. Project construction will occur between May

1, 2008 and June 15, 2008. Planting and seeding will occur during November and December 2007, following fall rains.

Conservation Measures

The U.S. National Park Service will implement the following conservation measures to avoid and minimize the effects to the California red-legged frog and Myrtle's silverspot butterfly:

1. Staging areas will be clearly delineated in the field by U.S. National Park Service staff. All staging will occur within the designated staging areas.
2. The perimeters of project impact areas that overlap with the distribution of larval host plant of Myrtle's silverspot butterfly will be clearly delineated in the field by U.S. National Park Service staff.
3. Should any California red-legged frogs be observed, activities will cease until the animal is removed and relocated to an appropriate aquatic or upland outside of the construction zone by a qualified or permitted biologist.

For the California red-legged frog, a qualified biologist means any person who has completed at least four years of university training in wildlife biology or a related sciences, has demonstrated experience with handling of amphibians, and has demonstrated field experience in the identification and life history of this threatened species.

4. Monitoring of western dog violet will occur within and outside of exclosures to determine whether removing grazing from areas historically grazed that contain western dog violet affect the distribution and abundance of western dog violet.
5. All workers on site will be educated about Myrtle's silverspot butterfly and the California red-legged frog, their habitat, distribution, and life cycle. A component of the education will be where sensitive areas are on-site and how to work within and around these sensitive areas. This training will also identify boundaries of construction zones and identify proper disposal of construction debris and the proper response to fluid spills.
6. No automobiles will be driven within 20 feet of areas delineated as Myrtle's silverspot butterfly larval host plant.
7. Because dusk and dawn are often the times when California red-legged frogs are most actively foraging and dispersing, all construction activities should cease one half hour before sunset and should not begin prior to one half hour before sunrise.
8. Nets or bare hands may be used to capture California red-legged frogs. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and

relocating animals. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys or handling of California red-legged frogs, Service-approved biologists will follow the Declining Amphibian Populations Task Force's *Code of Practice*. Service-approved biologists will limit the duration of handling and captivity of California red-legged frogs. While in captivity, individuals of these species shall be kept in a cool, moist, aerated environment, such as a bucket containing a damp sponge. Containers used for holding or transporting adults of these species shall not contain any standing water.

9. If erosion control materials are used, only tightly woven fiber netting or non-binded materials (e.g., rice straw) shall be used for erosion control or other purposes at the project site to ensure that the California red-legged frog does not get trapped. No plastic mono-filament matting shall be used for erosion control.

Environmental Base/Status of the Species

California Red-legged Frog

The California red-legged frog was listed as a threatened species on May 23, 1996 (Service 1996). The final rule and the *Recovery Plan for the California Red-Legged Frog (Rana aurora draytonii)* (Service 2002) contain information on this listed species.

This species is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). 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 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 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).

The California red-legged frog has 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). This animal breeds 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.

The historic range of the California red-legged frog extended coastally from the vicinity of Elk Creek in Mendocino County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). This amphibian was historically documented with 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). The California red-legged frog is 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 (California Department of Fish and Game 2004).

Adult California red-legged frogs prefer dense, shrubby or emergent riparian vegetation closely associated with deep (>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). Individuals disperse upstream and downstream of their breeding habitat to forage and seek sheltering habitat.

During other parts of the year habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer (Fellers 2005). According to Fellers (2005), this includes coyote bush (*Baccharis pilularis*), California blackberry (*Rubus ursinus*) thickets, and root masses associated with willow (*Salix* species) and California bay trees (*Umbellularis californica*). Sometimes the non-breeding habitat used by the California red-legged frog is extremely limited in size, for example, a 6-foot wide coyote bush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005). Sheltering habitat for 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 and depths greater than than 18 inches also may 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.

Red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adult frogs are often associated with permanent bodies of water. Some frogs remain at breeding sites all year while others disperse. Dispersal distances are typically less than 0.5 mile, with records of a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005). Dispersing frogs in northern Santa Cruz County traveled distances from 0.25 miles to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003). Fellers and Kleeman (2007) and Bulger *et al.* (2003) found that California red-legged frog migration corridors can be less “pristine” (e.g., closely grazed fields, plowed agricultural lands) than breeding or non-breeding habitats. Bulger *et al.* (2003) observed that this listed ranid did not avoid or prefer any landscape feature or vegetation type. They tracked individuals that crossed agricultural land, including recently tilled fields and areas with mature crops. The threats facing migrating California red-legged frogs during their movements include being run over by vehicles on roads (Gibbs 1998; Vos and Chardon 1998), degradation of habitat (Vos and Stumpel 1995; Findlay and Houlahan 1997; Gibbs 1998),

predation (Gibbs 1998), and dessication (Rothermel and Semlistch 2002; Mazerolle and Desrochers 2003).

Egg masses contain about 2,000 to 5,000 moderate sized (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). 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 results 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 the California red-legged frog fluctuates from year to year. When conditions are favorable this species 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, red-legged frogs may temporarily disappear from an area when conditions are stressful (e.g., drought).

The diet of the California red-legged frog is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items. Vertebrates, such as Pacific tree frogs (*Pseudacris 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). The diet of red-legged frogs apparently has not been studied, but their diet probably is similar to other ranid frogs that feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b).

Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs (*Rana aurora aurora*) 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 red-legged frog throughout its range.

Several researchers in central California have noted the decline and eventual disappearance of the populations of the California red-legged frog 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 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 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). Thus bullfrogs may be 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 the species. 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.

Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frog infected with an iridovirus, which also was presented in sympatric three-spined sticklebacks (*Gasterosteus aculeatus*) in northwestern California. Ingles (1932a, 1932b, and 1933 cited in Fellers 2005) reported four species of trematodes from red-legged frogs, but he later synonymized two of them.

The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002). 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 survival and recovery. The status of the red-legged frog will be considered within the smaller scale of recovery units as opposed to the overall range. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the 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 the California red-legged frog.

At Point Reyes National Seashore and the Golden Gate National Recreation Area, a number of significant proactive efforts to conserve the California red-legged frogs have been undertaken since it was listed as a threatened species. The U.S. National Park Service initiated and has continued a bullfrog reduction program within watersheds where bullfrogs and the listed frog co-occur. In 2003, a stockpond in Tennessee Valley in Marin County (Service file 1-1-02-F-0219) that supported a large breeding population of bullfrogs was removed. The U.S. National Park Service is continuing manual bullfrog removal efforts within the watershed to maintain existing bullfrog population at low levels. In San Mateo County, the U.S. National Park Service completed a water structure modification in 2001 to enhance existing listed ranid breeding habitat at Milagra Ridge (Service file 1-1-00-I-3115). In 2004, the breeding habitat for the

California red-legged frog was completed at Mori Point (Service file 1-1-05-F-0063). Currently, at Point Reyes National Seashore, the U.S. National Park Service is working on wetland restoration elements within the Rodeo Lagoon watershed that may provide additional breeding and rearing habitat for the threatened amphibian. The Kehoe Dairy Freestall Barn Additions and New Manure Holding Pond Project (Service file 1-1-04-F-0214) improved the water quality at a manure pond. The Coastal Watershed Restoration and Drakes Estero Road Crossing Improvement Project (Service file 1-1-06-F-0178) restored and enhanced a number of creeks for the California red-legged frog and listed salmonid fishes,

The action area is located within the 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, California red-legged frogs are threatened primarily by water management and diversions, non-native species, livestock, and urbanization. Populations of the California red-legged frog in this region are relatively robust where habitat is available. California red-legged frogs have been observed extensively within the boundaries of grazed and ungrazed lands within Point Reyes National Seashore and the northern portion of the Golden Gate National Recreation Area. A number of created breeding ponds within Point Reyes National Seashore and Golden Gate National Recreation Area are at risk due to deteriorating dams.

Creation of stock ponds and other small impoundments on ranches over the past 100 years has likely resulted in increased numbers and an expansion in range for the California red-legged frog in the Point Reyes National Seashore (Fellers 2007). Frogs appear to move readily between these ponds during periods when the ground is moist, which is prolonged on the foggy Point Reyes National Seashore peninsula. Numerous wet swales, seasonal springs, and ephemeral pools provide dispersed travel and feeding habitats. In the Golden Gate National Recreation Area, riparian habitat along creeks provides corridors for travel along the Olema Valley and its tributaries.

There are numerous recent sightings of the California red-legged frog throughout Point Reyes National Seashore, including in and adjacent to the action area (California Department of Fish and Game 2008a, 2008b; biological assessment). The action area contains non-breeding habitat for the threatened amphibian. Adult California red-legged frogs are highly mobile and may move considerable distances from their breeding ponds. The action area contains components that can be used by this listed amphibian for feeding, resting, movement corridors, and other essential behaviors. Therefore, the Service believes that the California red-legged frog is reasonably certain to occur within the action area because of the biology and ecology of the animal, the presence of suitable habitat in and adjacent to the action area, as well as the recent observations of this listed species.

Myrtle's Silverspot Butterfly

Myrtle's silverspot butterfly was listed as an endangered species in 1992 (Service 1992). 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).

This butterfly is one of four related coastal subspecies of *Speyeria zerene* that occur from Washington to California: the glorious silverspot (*Speyeria zerene gloriosa*), threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*), endangered Behrens' silverspot butterfly (*Speyeria zerene behrensii*), and Myrtle's silverspot butterfly. All three listed silverspot butterflies occupy restricted habitat types close to the coast, and have been seriously impacted by human activities.

Myrtle's silverspot butterfly inhabits coastal dunes, coastal prairie, and coastal scrub at elevations ranging from sea level to 1000 feet, and as far as 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 Myrtle's silverspot butterfly include presence of the presumed larval host plant, 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 butterfly, other subspecies of *Speyeria zerene* and other species of silverspot butterflies 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. Adult Myrtle's silverspot butterflies have been observed nectaring on 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 flowering plants that might serve as good nectar sources for the opportunistic adults, such as brownie thistle (*Cirsium quercetorum*) and groundsel (*Senecio* sp.). The related threatened Oregon silverspot butterfly has been observed to visit yarrow (*Achillea millefolium*), goldenrod (*Solidago* sp.), beach aster (*Aster chilensis*), the non-native rough cat's-ear (*Hypochaeris radicata*), and pearly everlasting (*Anaphalis margaritacea*).

Female Myrtle's silverspot butterflies lay their eggs singly on or near dried leaves and stems of violets. Within a few days 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 time the animals do not feed. 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 may be difficult to observe, and occurs at dusk and possibly at night. The larval feeding stage lasts about 7–10 weeks, after which the larvae form their pupae within a chamber they make with leaves spun together with silk. The adult butterfly emerges from the pupa after about a few weeks or possibly months.

The flight season for Myrtle's silverspot butterfly 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 then the larvae then enter their diapause. The larvae resume activity and begin feeding at some point during the spring that varies depending on the weather.

Butterflies are poikilothermic (cold blooded) and they cannot regulate their body temperatures internally (Clench 1964; Opler and Krizek 1984). In general, butterflies can not fly when air temperatures drop below 60.8 degrees Fahrenheit; air temperatures higher than 100.4 degrees Fahrenheit in combination with high humidity, are unsuitable for most species (Opler and Krizek 1984). Butterflies use a variety of behavioral actions to raise their body temperature including changing the wing and body orientation to the sun, elevating or depressing their abdomen, perching at different heights or locations, changing the height of their flight, and moving in or out of the shade (Opler and Krizek 1984; Kingsolver 1985). The dark coloration of Myrtle's silverspot butterfly may be a thermal adaptation to the fog belt that occurs at Point Reyes National Seashore, because dark objects absorb more sunlight than light objects. Wing color and darker colors at the bases of the wings, such as that possessed by Myrtle's silverspot butterfly, may play an important role in the efficiency of basking for thermoregulation (Kingsolver 1985).

Adult Myrtle's silverspot butterflies feed on flower nectar to acquire carbohydrates and amino acids. Nectar availability is correlated with adult longevity and egg production in females of many butterfly species (Murphy *et al.* 1983; Opler and Krizek 1984), but this relationship has not yet been investigated in Myrtle's silverspot butterfly.

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 vicinity of Black Point in northern Sonoma County. By the late 1970s, populations of silverspot south of the Golden Gate Bridge were believed to be extinct 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 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 at the same site. This site was estimated to support between 2,500 and 5,000 adult Myrtle silverspot butterflies in 1991. 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 animal currently is known from three occurrences with a probable total of fewer than 10,000 individuals. Population sizes of the species can be expected to fluctuate widely.

The listing of the Myrtle's silverspot butterfly 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 may depend 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 is also a threat to

Myrtle's silverspot butterfly. Specimens of this animal 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 are protected in the Point Reyes National Seashore and the northern unit of the Golden Gate National Recreation Area.

Due to the lack of historic data previous to the 1990's, it is not known if Myrtle's silverspot butterfly has declined at Point Reyes National Seashore. While surveys of the two populations during the period 1993-1997 found that the Tule Elk Reserve population remained stable and the central Point Reyes population declined sharply, such variation is well within that normally found in *Speyeria* species (Service 1998).

Following discovery of a population near the Estero de San Antonio in the early 1990's, field surveys were conducted by the Center for Conservation Biology at Stanford University. Two additional apparently separate populations in Point Reyes National Seashore were located and fieldwork was done to estimate populations sizes. One population, centered on North Beach, extended from Abbotts Lagoon to South Beach and east to Drakes Estero and Drakes Beach. The highest numbers were found along the dune-scrub interface in the back dune area of the central peninsula on F and G ranches and the AT&T property, and on the bluffs on either side of the Drakes Beach visitor center. The population was estimated to number in the low thousands in 1993. More recent survey work in 1997 put the population estimate at 50-200 individuals, with no Myrtle's silverspot butterflies being found in portions of the 1993 range. The other population was found on the Tule Elk Reserve, with small numbers on the adjacent J Ranch. In 1993, the number of individuals in this population was estimated to be in the mid-hundreds. The 1997 survey of this northern Point Reyes population gave a population estimate of 250-500 (Laurer *et al.* 1998).

The number of Myrtle's silverspot butterfly in the area outside of park lands around the Estero de San Antonio were estimated at 2,000-5,000 individuals in 1991. Other nearby areas with potentially suitable habitat were not surveyed. Together with those found at Point Reyes, estimated numbers for the three known populations of the species total less than 10,000 individuals (Service 1998). Eight ranches are within the current identified habitat area of this animal. Four ranches in the North Beach population area have dune habitat (C, E, F, and G ranches), with the others comprised of upland grassland habitats. The section of J Ranch bordering the Tule Elk Reserve spans Tomales Point and includes grasslands and shrub areas.

The action area is wholly within mapped habitat for Myrtle's silverspot butterfly. No surveys were conducted within the action area for the species. The population of western dog violet in the project area was mapped using GPS. The action area is extremely windy and supports large populations of western dog violet; the presence of Myrtle's silverspot butterfly was assumed by the U.S. National Park Service.

There are recent sightings of Myrtle's silverspot butterfly within the Point Reyes National Seashore, although suitable habitat elsewhere at this National Park and possibly the Golden Gate National Recreation Area (California Department of Fish and Game 2008a, 2008b; biological

assessment). In addition, the adults are highly mobile and, like other silverspot butterflies, may fly considerable distances (Nagano pers. obs). Suitable habitat is found in and adjacent to the action area. Areas of containing larvae and adult food sources exist within the action area. The action area contains components that can be used by Myrtle's silverspot butterfly for feeding, resting, mating, movement corridors, and other essential behaviors. Therefore, the Service believes that Myrtle's silvespot butterfly is reasonably certain to occur within the action area because of the biology and ecology of the animal, the presence of suitable food sources and habitat in and adjacent to the action area, as well as the recent observations of this listed species.

Effects of the Proposed Action

The Kehoe Spring Development Project will restore habitat for the California red-legged frog and Myrtle's silverspot butterfly. The long term indirect effects to the California red-legged frog will be beneficial because the removal of cattle from three springs and the upper drainage of a tributary to Tomales Bay will result in improved water quality. However, the proposed action may injure, kill, harm, and harass individuals of these two listed species due to activities that will temporally disturb or eliminate habitat of the animals. The proposed action would (1) result in effects to 75 acres of California red-legged frog and Myrtle's silverspot butterfly habitat, however, the majority of this work either will restore degraded habitat or it will be temporary in nature; (2) result in the injury and death of an unknown number of California red-legged frogs and Myrtle's silverspot butterflies; (4) result in construction-related harassment in the action area; (5) temporally impede the dispersal of California red-legged frogs through the sites while the activities are in progress; and (6) temporally increase the likelihood of predation of the California red-legged frogs.

Harassment, injury or mortality may result from crushing, trapping, or otherwise damaging individuals that may be located within aquatic or adjacent upland habitats in the project area due to vegetation removal, excavation, grading, use of vehicles or motorized equipment that could crush individuals, crew movement, debris placement, and maintenance activities which may include vehicles, motorized equipment, vegetation removal, and/or minor earth moving. Work activities, including noise and vibration, may harass frogs by causing them to leave the work area; this disturbance may increase the potential for predation, desiccation, or strike by vehicles along Muir Woods Road or the Panoramic Highway. Behavioral disturbance may result in an energetic expense that could reduce individual fitness. The pre-construction surveys, and relocation of individuals from the project area likely will avoid and reduce potential for short-term effects on the California red-legged frog. Direct mortality or injury to individuals may still occur during construction activities, and as a result of relocation of individuals. Any relocation of this listed species has some associated risk to individuals, including stress, disease transmission, injury, or death. Stress at sites where relocated California red-legged frogs are released may occur due to competition, lack of familiarity, and increased potential for predation. Despite these effects, relocation efforts are expected to minimize project effects by removing them from areas where they may have an increased chance of injury or mortality from construction actions.

The loss of habitat as result of the proposed project will not isolate habitat patches and/or create barriers to the dispersal and gene flow of the California red-legged frog, in fact, the trail

decommissioning and restoration will benefit the species. Movements and dispersal corridors between breeding ponds and upland habitat are critical to the animal's population dynamics, particularly because the species currently persists as metapopulations with multiple disjunct population centers. Movement and dispersal corridors likely are important for alleviating overcrowding during years when California red-legged frog abundance is high, and also they are important for facilitating the recolonization of areas where the animals have been extirpated. Movement between population centers maintains gene flow and reduces genetic isolation. Genetically isolated populations are at greater risk of deleterious genetic effects such as inbreeding, genetic drift, and founder effects.

Temporary effects are project activities that temporarily remove one or more essential components of the habitat of a listed species, but can be restored to pre-project conditions of equal or greater habitat value. In order for the effects to be considered temporary, the affected habitat of the listed species must be totally restored within one season. Ground disturbance resulting from the proposed project includes grading, excavating, and fill. Ground disturbance has potential to cause injury and mortality to individual California red-legged frogs occupying the action area.

The construction activities could result in the introduction of chemical contaminants to the sites. Contaminants could be introduced in several ways. Vehicle exhaust emissions can include hazardous substances which may concentrate in soils along roads. Heavy metals such as lead, aluminum, iron, cadmium, copper, manganese, titanium, nickel, zinc, and boron are all emitted in vehicle exhaust (Trombulak and Frissell 2000). Concentrations of organic pollutants (e.g., Dioxins and polychlorinated biphenyls) are higher in soils along roads (Benfenati *et al.* 1992). Ozone levels are higher in the air near roads (Trombulak and Frissell 2000). Vehicles may leak hazardous substances such as motor oil and antifreeze. Although the quantity leaked by a given vehicle may be minute, these substances can accumulate on roads or work areas and then get washed into the adjacent environment by runoff during rain storms. An immense variety of substances could be introduced during accidental spills of materials. Such spills can result from small containers falling off passing vehicles, or from accidents resulting in whole loads being spilled. Large spills may be partially or completely mitigated by clean-up efforts, depending on the substance.

The California red-legged frog if it uses areas adjacent to the work areas could be exposed to any contaminants that are present at the site. Exposure pathways could include inhalation, dermal contact, direct ingestion, ingestion of contaminated soil or plants, or consumption of contaminated prey. Exposure to contaminants could cause short- or long-term morbidity, possibly resulting in reduced productivity or mortality. Carcinogenic substances could cause genetic damage resulting in sterility, reduced productivity, or reduced fitness among progeny. Contaminants also may have the same effect on prey species. This could result in reduced prey abundance and diminished local carrying capacity. The effects of contaminants may be difficult to detect. Morbidity or mortality likely would occur after the animals had left the contaminated site, and more subtle effects such as genetic damage could only be detected through intensive study and monitoring.

Preconstruction surveys for California red-legged frogs and relocating individuals may reduce injury or mortality. Stress, injury and mortality may occur as a result of improper handling, storage, and transport of individuals. Although survivorship for translocated California red-legged frogs has not been determined, survivorship of translocated wildlife, in general, are lower because of intraspecific competition, lack of familiarity with the availability of potential breeding, feeding, and sheltering habitats, and increased risk of predation. However, the use of qualified biologists to capture and handle the California red-legged frogs, and the relatively short distance the captured animals will be transported, will reduce the harassment, injury, or death of the animals.

Construction equipment that has been used in different areas and with different species of amphibians including the California red-legged frog may transmit diseases by introducing contaminated soil and other material on the equipment. The chance of a disease being introduced into a new area is greater today than in the past due to the increasing occurrences of disease throughout amphibian populations in California and the United States. It is possible that chytrid fungus may exacerbate the effects of other diseases on amphibians or increase the sensitivity of the amphibian to environmental changes (e.g., water pH) that reduce normal immune response capabilities (Bosch *et al.* 2000).

California red-legged frogs may be killed by predators attracted to the work sites. If water that is impounded during or after work activities creates favorable habitat for non-native predators, such as bullfrogs or crayfish, California red-legged frogs may incur abnormally high rates of predation. Additionally, when the listed species is concentrated in a small area at unusually high densities, native predators such as great blue herons (*Ardea herodias*), great egrets (*A. alba*), opossums (*Didelphis virginiana*), and raccoons (*Procyon lotor*) opportunistically may feed on them. Trash left during or after project activities could attract predators to work sites, which could, in turn, prey on California red-legged frogs. For example, raccoons are attracted to trash and also prey opportunistically on the amphibian. This potential effect can be reduced or avoided by careful control of waste products at all work sites.

California red-legged frogs moving away from disturbed areas may be driven into the open where they are more susceptible to injury or mortality due to human foot traffic, vehicles, other project activities, and predators. In addition, displaced frogs may be forced into competition for food and living space with animals in adjacent areas.

Fencing out three springs will likely benefit the California red-legged frog that use the springs during dispersal. With cattle removed from three springs, the probability of trampling within the fenced area will be significantly reduced. The proposed action will not affect the dispersal of the California red-legged frog.

Myrtle's silverspot butterfly

Adverse effects to Myrtle's silverspot butterfly could occur during construction of the new fence line and installation of pipeline through areas supporting western dog violet. While installing the fence line and buried pipeline; trampling, burying, or crushing caterpillars could

occur. The caterpillars are small and the vegetation surrounding each western dog violet can be too dense to detect caterpillars. This inability to detect caterpillars prevents any form of site survey or capture and hold of caterpillars during construction. Potential direct effects will be minimized by delineating work corridors through the larger patches of vegetation that support western dog violet. All work will occur within the delineated corridors. No automobiles will be driven within patches of vegetation that support western dog violet.

The removal of livestock grazing pressure from patches of vegetation supporting western dog violet could result in a reduction in the abundance and distribution of this plant. This in turn could result in a reduction in available habitat for the early stages of Myrtle's silverspot butterfly. To gain an understanding of the effects of removing livestock grazing from the area around the three springs, U.S. National Park Service staff will be collaborating with Washington University, to study the abundance and distribution of western dog violet inside the enclosure and in adjacent grazed pasture.

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.

Land adjacent to and in the vicinity of Point Reyes National Seashore and the northern unit of 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 and 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. 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, mosquitofish, 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 the threatened amphibian.

The global average temperature has risen by approximately 0.6 degrees centigrade during the 20th Century (International Panel on Climate Change 2001, 2007; Adger *et al* 2007). There is an international scientific consensus that most of the warming observed has been caused by human activities (International Panel on Climate Change 2001, 2007; Adger *et al.* 2007), and that it is “very likely” that it is largely due to increasing concentrations of greenhouse gases (carbon dioxide, methane, nitrous oxide, and others) in the global atmosphere from burning fossil fuels and other human activities (Cayan *et al.* 2005, EPA Global Warming webpage <http://yosemite.epa.gov>; Adger *et al.* 2007). Eleven of the twelve years between 1995 and 2006 rank among the twelve warmest years since global temperatures began in 1850 (Adger *et al.* 2007). The warming trend over the last fifty years is nearly twice that for the last 100 years (Adger *et al.* 2007). Looking forward, under a high emissions scenario, the International Panel on Climate Change estimates that global temperatures will rise another four degrees centigrade by the end of this Century; even under a low emissions growth scenario, the International Panel on Climate Change estimates that the global temperature will go up another 1.8 degrees centigrade (International Panel on Climate Change 2001). The increase in global average temperatures affects certain areas more than others. The western United States, in general, is experiencing more warming than the rest of the Nation, with the 11 western states averaging 1.7 degrees Fahrenheit warmer temperatures than this region’s average over the 20th Century (Saunders *et al.* 2008). California, in particular, will suffer significant consequences as a result of global warming (California Climate Action Team 2006). In California, reduced snowpack will cause more winter flooding and summer drought, as well as higher temperatures in lakes and coastal areas. The incidence of wildfires in the Golden State also will increase and the amount of increase is highly dependent upon the extent of global warming. No less certain than the fact of global warming itself is the fact that global warming, unchecked, will harm biodiversity generally and cause the extinction of large numbers of species. If the global mean temperatures exceed a warming of two to three

degrees centigrade above pre-industrial levels, twenty to thirty percent of plant and animal species will face an increasingly high risk of extinction (International Panel on Climate Change 2001, 2007). The mechanisms by which global warming may push already imperiled species closer or over the edge of extinction are multiple. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (International Panel on Climate Change 2001, 2007; California Climate Action Team 2006; Lenihan *et al.* 2003). Extreme events, in turn may cause mass mortality of individuals and significantly contribute to determining which species will remain or occur in natural habitats. As the global climate warms, terrestrial habitats are moving northward and upward, but in the future, range contractions are more likely than simple northward or upslope shifts. Ongoing global climate change (Anonymous 2007; Inkley *et al.* 2004; Adger *et al.* 2007; Kanter 2007) likely imperils the California red-legged frog and the resources necessary for its survival. Since climate change threatens to disrupt annual weather patterns, it may result in a loss of their habitats and/or prey, and/or increased numbers of their predators, parasites, and diseases. Where populations are isolated, a changing climate may result in local extinction, with range shifts precluded by lack of habitat.

Conclusion

After reviewing the current status of Myrtle's Silverspot butterfly, California red-legged frog, 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 Kehoe Spring Development Project at Point Reyes National Seashore in Marin County, California, as proposed, is not likely to jeopardize the continued existence of these two listed species. The action area is not located within designated critical habitat for the California red-legged frog; therefore, none will be affected by the proposed project. Critical habitat for Myrtle's silverspot butterfly has not been proposed or designated; therefore, none will be affected by the proposed project.

INCIDENTAL TAKE STATEMENT

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 U.S. National Park Service that they become binding conditions of any contract, grant, or permit issued to a contractor or applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The U.S. National Park Service has a continuing duty to regulate the activity covered by this incidental take statement. If the U.S. National Park Service (1) fails to adhere to the terms and conditions of the incidental take statement in this biological opinion, 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 or Extent of Take

The Service anticipates incidental take of the California red-legged frog will be difficult to detect or quantify because it is unlikely an injured or dead specimen will be found due to the elusive nature of this species, its size, and cryptic appearance. However, the level of incidental take of this animal can be anticipated by the effects to cover, foraging, and breeding habitat.

Conservation measures proposed by the U.S. National Park Service in the biological assessment, and described in the *Description of the Proposed Action* in this biological opinion will substantially reduce, but do not eliminate, the potential for incidental take of this listed species. The Service, therefore, anticipates incidental take of the California red-legged frog will result from the proposed project. Upon implementation of the reasonable and prudent measures, all California red-legged frogs inhabiting 75 acres will be subject to incidental take in the form of harm, harassment and capture; and one (1) California red-legged frog will be subject to incidental take in the form of death or injury.

The Service anticipates incidental take of Myrtle's silverspot butterfly will be difficult to detect or quantify because it is unlikely an injured or dead specimen will be found due to the elusive and cryptic nature of the early stages of this species (eggs, larvae, pupae), and their small size. However, the level of incidental take of this animal can be anticipated by the effects to cover, foraging, and breeding habitat. Conservation measures proposed by the U.S. National Park Service in the biological assessment, and described in the *Description of the Proposed Action* in this biological opinion will substantially reduce, but do not eliminate, the potential for incidental take of this listed species. The Service, therefore, anticipates incidental take of Myrtle's silverspot butterfly will result from the proposed project. Upon implementation of the reasonable and prudent measures, all individuals of Myrtle's silverspot butterfly inhabiting 75 acres will be subject to incidental take in the form of harm, harassment, capture, injury and mortality.

Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed action described above for Myrtle's silverspot butterfly and the California red-legged frog will become exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to Myrtle's silverspot butterfly and the California red-legged frog or result in destruction or adverse

modification designated or proposed critical habitat for either of these listed species.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the effect of take on Myrtle's silverspot butterfly and the California red-legged frog:

Minimize the potential for harm, harassment, capture, injury, or mortality of Myrtle's silverspot butterfly and the California red-legged frog.

Terms and Conditions

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

The following terms and conditions will implement the Reasonable and Prudent Measure described above:

1. The conservation measures in the proposed project shall be implemented as described in the biological assessment, and the *Project Description* of this biological opinion.
2. If a California red-legged frog(s) are observed in the restoration or construction areas, a qualified or permitted biologist shall capture it and move the animal(s) to an appropriate aquatic or upland location outside of the work area.
3. An education program for the field personnel involved with the proposed project shall be conducted prior to the initiation of ground breaking. The program shall consist of a brief presentation by a person(s) knowledgeable in Myrtle's silverspot butterfly and the California red-legged frog. The program shall include the following: a description of these species and their ecology and habitat needs; an explanation of their legal status and protection under the Act; and an explanation of the measures being taken to avoid or reduce effects to them during the project. The education program may be conducted in an informal manner (e.g., ranger and field personnel in a rural setting).
4. Plastic mono-filament netting (erosion control matting) or similar material shall not be used for erosion control or other purposes at the project site because California red-legged frogs may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding.
5. If requested, during or upon completion of construction activities, the on-site biologist, and/or a representative from the U.S. National Park Service shall accompany Service personnel on an on-site inspection of the project site(s) to

review project effects to Myrtle's silverspot butterfly and the California red-legged frog and their habitats.

6. The U.S. National Park Service shall ensure compliance with the *Reporting Requirements* of this biological opinion.

Reporting Requirements

Injured California red-legged frogs must be cared for by a licensed veterinarian or other qualified person such as the on-site biologist; dead individuals of the California red-legged frog and/or Myrtle's silverspot butterfly must be placed in a sealed plastic bag with the date, time, location of discovery, and the name of the person who found the animal; the carcass should be kept in a freezer; and held in a secure location. The Service and the California Department of Fish and Game must be notified within one (1) working day of the discovery of death or injury to a California red-legged frog and or Myrtle's silverspot butterfly that occurs due to project related activities or is observed at the project. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are Chris Nagano, Deputy Assistant Field Supervisor, Endangered Species Program at the Sacramento Fish and Wildlife Office (916/414-6600), and Scott Heard, Resident Agent-in-Charge of the Service's Law Enforcement Division at telephone 916/414-6660. The California Department of Fish and Game contact is Scott Wilson at telephone 707/944-5563

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 benefiting listed species or their habitats, we request notification of the implementation of any of the conservation recommendations. We propose the following conservation recommendations:

1. The U.S. National Park Service should only use locally collected native plant species in their restoration and enhancement projects to avoid adverse effects to associated invertebrate herbivores (Longcore *et al.* 1997).
2. The Service recommends the U.S. National Park Service implement the appropriate actions described in the *Recovery Plan for the California red-legged frog (Rana aurora draytonii)*.

3. The U.S. National Park Service should continue to encourage or require the use of appropriate species of locally collected California native plants in the restoration or enhancement of native species diversity and ecosystem functions at Point Reyes National Seashore and Golden Gate National Recreation Area.
4. The law enforcement rangers of the U.S. National Park should continue their vigilance for individuals who collect the endangered Myrtle's silverspot butterfly, other listed and rare butterflies without authorization on National Park Service lands. Illegal collection of butterflies has been documented by the Service to have occurred at Point Reyes National Seashore and Fort Baker (Cavallo Point) at the Golden Gate National Recreation Area.

REINITIATION STATEMENT

This concludes formal consultation on the Kehoe Spring Development Project at Point Reyes National Seashore in Marin County, California. 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.

If you have any questions regarding this biological opinion on the Kehoe Spring Development Project, please contact Chris Nagano, Deputy Assistant Field Supervisor of our Endangered Species Program at the letterhead address, e-mail (Chris_Nagano@fws.gov), or at telephone 916/414-6600.

cc:

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