United States Department of the Interior

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In Reply Refer To:
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April 28, 2010

Memorandum

To: Park Superintendent, Point Reyes National Seashore, Point Reyes Station, California (Attention: John DiGregoria)

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

Subject: Biological Opinion for the Chicken Operation at Point Reyes National Seashore in Marin County, California

This is in response to your February 11, 2010, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Chicken Operation at Point Reyes National Seashore in Marin County, California. Your request was received in this office via an electronic mail message on February 16, 2010. At issue are the potential effects of the project on the threatened California red-legged frog (*Rana aurora draytonii*) and its designated critical habitat, and the endangered Myrtle's silverspot butterfly (*Speyeria zerene mrytleae*). This document represents the Service's biological opinion on the effects of the proposed action on this listed species. It is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*)(Act).

This biological opinion is based on: (1) letter from the National Park to the Service dated February 11, 2010, that was received on February 16, 2010; (2) *Biological Assessment for Chicken Operation at Point Reyes National Seashore Marin County, California* dated February 11, 2010 (biological assessment) that was prepared by the National Park Service; (3) meeting between the National Park Service and the Service on January 27, 2010; (4) electronic mail message from the Service to the National Park Service dated February 19, 2010; (5) electronic mail message from the National Park Service to the Service dated February23, 2010; (6) *Point Reyes National Seashore Threatened and Endangered Species Locations as of 2001*, undated, that was prepared by the National Park Service; (7) *Final Report Red-legged Frog Surveys at Proposed Stream and Geomorphic Restoration Sites Point Reyes National Seashore* dated May 15, 2002, that was prepared by the U.S. Geological Survey; and (8) other information available to the Service.

We have determined the proposed project is not likely to adversely affect the endangered Myrtle's silverspot butterfly due to a lack of the larval foodplant, violets (*Viola adunca*) in the action area. Several flowering plant species that are used by the adults for nectar are present in

the action area, however, the loss of these individual plants and the chicken raising activities are anticipated to have insignificant or discountable effects on this listed animal. The proposed action area is located within the designated critical habitat for the California red-legged frog, however, the nature of the effects of the project on the Primary Constituent Elements are not anticipated to result in adverse modification or destruction.

Consultation History

January 27, 2010	The National Park Service and the Service had a meeting about the proposed project.
February 11, 2010	The Service received the request for formal consultation from the National Park Service.
February 19, 2010	The Service requested additional information from the National Park Service via electronic mail.
February 23, 2010	The Service received an electronic mail message from the National Park Service containing additional information on the proposed project.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed project consists of a free-range chicken (*Gallus gallus*) egg and meat production operation to the D. Rogers Ranch, an area permitted for grazing cattle. D. Rogers Ranch is located at the Point Reyes National Seashore in Marin County, California. The chickens will be raised and free to roam on pasture land. Aside from what the pasture insects, seeds, grass, etc., the birds find, they will be provided with grains, mineral mix, oyster shell, meat scraps and fresh spring water. This supplemental feed will be placed in feeding troughs inside the pasture shelters. The eggs and chickens will be processed at the farm and packaged for immediate sale. The chicken processing facility will be operated under the State of California's 20,000-bird exemption.

The action area encompasses the 382 acre D. Rogers Ranch, which is located at 16484 Sir Francis Drake Boulevard. The chicken operation will include the basin up to the highest point that huts can be placed and still be out of the viewshed of visitors traveling on Sir Francis Drake Boulevard. The basin drains from north to south with two stock ponds in the eastern drainage. Schooner Creek enters the ranch along the southern boundary just southwest of the driveway entrance and drains into the saltmarsh of Schooners Bay 3,000 feet downstream.

The vegetation in the action area is a mixture of native and non-native grasses with high concentrations of non-native thistle and patches of shrubs particularly along the northern slopes of the hills. The eastern drainage starts as an emergent marsh in the swale between two hills.

The emergent marsh continues downstream to a stock pond. The stock pond drains into another emergent marsh/swale with no defined channel. The water formed a small channel several hundred feet before entering a second stock pond. The stream flows through an incised channel with headcutting and steep bank. The top of bank and some bank slopes are vegetated with native woody species and non-native Himalayan blackberry (*Rubus discolor*). The stream continues through an incised channel to the saltmarsh at the head of Schooner Bay.

The western drainage starts as an emergent marsh in the swale between two hills. The lower half of the drainage is an incised channel with some bank slumping and minimal headcutting. The banks are predominantly vegetated with grasses and rushes with few scatter Coyote brush (*Baccharis pilularis*). The upper half of the stream flows through an emergent marsh with a shallow defined channel. During high flow, water spreads out into the emergent marsh.
When less than 100 chickens are processed for meat processing will occur within the old milking parlor on the ranch. The wastewater will flow into the barn floor drain system and directly into the old manure pond on site. All feathers and guts will be disposed of off ranch. When greater than 100 chickens are processed for meat, processing will occur at a U.S. Department of Agriculture approved facility in Stockton, California.

Two types of pasture shelters will be utilized for the project:

1) The first type is a dark green hoop house affixed to a wood framed and screened floor, approximately 12feet wide by 24 feet long. These eight shelters are on wooden skids and house between 200-300 birds per house. These shelters are moved approximately 24 feet daily to a new location across the pasture. The frequent movement allows the birds access to fresh pasture, evenly spreads the birds droppings across the pasture as fertilizer, allows the chickens access to fresh cattle (*Bos bos*) parasites, such as flies, to consume, and allows access to cattle dung piles that the chickens will re-assimilate into the soil by scratching, spreading, and fragmenting. Chickens in these huts typically stay within 50 feet of the hut and may range out to 100 feet.

2) The second type of shelter is a 12 feet x 12 feet x 2 feet high, floorless shelter with screened sides and top. These 25 seasonal (March through November) shelters house approximately 50-60 birds each and are moved twice daily to a fresh 12 feet x 12 feet piece of pasture. This design allows a more concentrated fertilization of droppings and is ideal for breeds of birds that do not roam. The chickens at these huts will always be within the shelter.

The total birds on pasture ranges seasonally from 1,800 birds in the winter months to 2,900 in the summer. Supplemental feed is purchased for the entire flock at a rate of approximately ¼ pound per bird per day. The supplemental feed is stored in a covered silo on the ranch. This soy and corn feed is converted by the chicken into fertilizer for the pastures.

Conservation Measures

The following avoidance and minimization measures will be implemented by the National Park Service to reduce project-related effects on listed species:

1. The perimeters of project impact areas will be clearly delineated in the field by the National Park Service.

2. Only the seasonal floorless huts will be placed within 300 feet of the eastern drainage and associated ponds during the mid-June through September juvenile dispersal period of the California red-legged frog. The floorless broiler chicken huts will be placed no closer than 150 feet of the eastern drainage and associated ponds during juvenile dispersal.

3. Ranch hands working with the chickens in the field will be educated about California red-legged frog.

4. If juvenile dispersal is evident, e.g., many small frogs hopping around, no motor vehicles will enter the area

5. The California red-legged frog in the project area will be monitored annually. The absence of the California red-legged frog from the action area will initiate review and modification of the chicken operation.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the action area includes all lands within the D. Rogers Ranch and associated areas at the Point Reyes National Seashore in Marin County, California.

Analytical Framework for the Jeopardy Analysis

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this Biological Opinion relies on four components: (1) the *Status of the Species and Environmental Baseline*, which evaluates the California red-legged frog range-wide conditions, the factors responsible for those conditions, and their survival and recovery needs; and evaluates the condition of this listed species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of these this animal; (2) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on this species; and (3) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on it.

In accordance with policy and regulation, this jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the California red-legged frog current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of this species in the wild.

The jeopardy analysis in this Biological Opinion places an emphasis on consideration of the range-wide survival and recovery of the California red-legged frog, and the role of the action area in the survival and recovery of this listed species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Status of the California Red-legged Frog and Environmental Baseline

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

This threatened 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, while 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 lighter centers (Stebbins 2003) and dorsolateral folds are prominent on the back. The larvae (tadpoles) range from 0.6 inch 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, allowing 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.

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). The species historically was documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties. This represents a loss of 70 percent of its former range (Service 2002). California 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. This listed amphibian 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, animals 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* species) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). The species disperses upstream and downstream of their breeding habitat to forage and seek sheltering habitat.

California red-legged frogs also can be found in disturbed areas such as channelized creeks and drainage ditches in urban and agricultural areas. An adult recently was observed in a shallow isolated pool on North Slough Creek in the American Canyon area of Napa County (Christine Gaber/PG&E personal communication with Chris Nagano/Service on October 22, 2008). This frog location was surrounded by vineyard development. Another adult was observed under debris in an unpaved parking lot in a heavily industrial area of Burlingame (Patrick Kobernus communication with Michelle Havens on October 16, 2008). This Burlingame frog was likely utilizing a nearby drainage ditch. The California Department of Transportation also has discovered California red-legged frog adults, tadpoles, and egg masses within a storm drainage system within a major cloverleaf intersection of Millbrae Avenue and State Route 101 in a heavily developed area of San Mateo County (Caltrans 2007). The species has the potential to persist in disturbed areas as long as they provide at least one or more of their life history requirements.

According to Feller and Kleeman (2007), non-breeding dry season habitat for the California red-legged frog includes several characteristics: 1) sufficient moisture to allow the frogs to survive throughout the non-breeding season that may be up to 11 months long ; 2) sufficient cover to moderate temperatures during the warmest and coldest times of the year; and 3) protection (e.g., deep pools in a stream, or complex cover such as root masses or thick vegetation) from predators such as hawks and owls, herons, and small carnivores.

During other parts of the year, habitat for the California red-legged frog 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 can include vegetated areas with coyote bush, California blackberry thickets (*Rubus ursinus*), and root masses associated with willow (*Salix* species) and California bay trees. Sometimes the non-breeding habitat used by California red-legged frogs is extremely limited in size. For example, non-breeding animals have been found in a 6-foot wide coyote bush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005). Sheltering habitat 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 stacks may also be used. Incised stream channels with portions narrower and depths greater 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 population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults 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 mile 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* species) 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 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 fluctuate from year to year. When conditions are favorable, the animal 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, however, Hayes and Tennant (1985) found invertebrates to be the most common food items. According to their data, vertebrates, such as Pacific tree frogs and California mice (*Peromyscus californicus*) represent 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. The diet of the tadpoles of the California red-legged frog is not well studied, but its diet likely 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 red-legged frogs 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* species), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish (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.

Several researchers in central California have noted the decline and eventual disappearance of California red-legged frog populations once bullfrogs (*Rana catesbeiana*) 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 predation, competition, and reproduction interference. 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. Bullfrogs also may have a competitive advantage over both species of red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Further more, larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with red-legged frog reproduction. Both California red-legged frogs and northern red-legged frogs have been observed in amplexus (mounted on) with 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 red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also adversely affected this species. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and American bullfrogs. The conversion and isolation of perennial pool habitats resulting from urbanization is an ongoing impact to the threatened amphibian.

The California red-legged frog may be susceptible to many of the same pathogens, fungi, water mold, bacteria, and viruses have been known to adversely affect tiger salamanders or other amphibians. As with the threatened California tiger salamander (*Ambystoma californiense*), Chytridiomycosis and ranaviruses may be a particular developing concern for California red-legged frog populations. Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also 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 that parasitize California red-legged frogs. Nonnative species, such as bullfrogs and nonnative tiger salamanders, are both located within the range of the California red-legged frog and have been identified as potential carriers of these diseases and parasites. Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e. contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in California red-legged frogs being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small, fragmented remaining breeding sites, the many stresses on these sites due to habitat losses and alterations, translocation of infected animals, and the many other potential disease-enhancing anthropogenic changes which have occurred both inside and outside the species' range.

The recovery plan for the California red-legged frog identified 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 California red-legged frog is 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 California red-legged frog. The goal of the draft 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 red-legged frog densities that are relatively free of exotic species such as the American bullfrog. 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. The Chicken Operation at Point Reyes National Seashore is within Recovery Unit 3 (North Coast and North San Francisco Bay) (Service 2002). The action area falls within Core Area #13 (Point Reyes Peninsula) of that Recovery Unit (Service 2002). The conservation needs for the Point Reyes Peninsula core area are: (1) protecting existing populations from current and future urbanization; (2) create and manage alternative breeding habitats; and (3) protecting dispersal corridors.

The proposed project is located within the North San Francisco Bay/North Coast recovery unit, which includes portions of watersheds at Point Reyes National Seashore. In addition, the proposed project is within the Point Reyes Peninsula core area. This core area represents one of the largest populations of red-legged frogs within this Recovery Unit. Within this recovery unit, California red-legged frogs are threatened primarily by water management and diversions, predation and competition from 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 throughout Marin County.

There are 12 California red-legged frog occurrences within a one mile radius of the proposed project (National Park Service undated; biological assessment). The species has been recorded within the action area (biological assessment). Upland habitat suitable for foraging and movement are present within the action area. Therefore, the Service has determined it is reasonable to conclude the red-legged frog inhabits the proposed action area, based on the biology and ecology of the species, the presence of suitable upland habitat, the presence of nearby breeding habitat, as well as numerous observations of the species in the immediate vicinity of the proposed project

Effects of the Proposed Action

The proposed Chicken Operation at Point Reyes National Seashore could have adverse effects on the threatened California red-legged frog through mortality, capture, injury, harassment, and harm of individual subadults and adults. The proposed project likely will result in incidental take to this species on 382 acres at the D. Rogers Ranch.

Young juvenile California red-legged frogs dispersing from the stock ponds in the action area may move into or through areas where chickens are foraging. Foraging chickens could peck at and/or eat the dispersing juvenile frogs. Moving the chicken huts using motor vehicles likely will result in adverse effects to California red-legged frogs dispersing into and from the uplands around the ponds.

There is a likelihood of direct injury or mortality to the California red-legged frog from injury or death due to pet dogs owned by poultry raising personnel and ranch hands, injury or death due to predators attracted to food or trash at the site, and harassment from noise and vibration. Disturbance from chicken raising activities may also cause individuals to move into or across areas of unsuitable habitat where they may be prone to higher rates of mortality from vehicles and predation.

Poultry raising personnel, ranch hands, and other workers from different areas may transmit diseases by introducing contaminated 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.* 2001).

Indirect effects could result from chicken waste washing into the stock ponds and tributaries on site. California red-legged frogs could be adverse if a heavy precipitation event occurs when the huts are located near the drainages, residual dry matter levels are low, and little water is discharging from the ponds. Early rains on dry soil with reduced cover of live plants and residual dry matter results in the majority of storm water flowing overland picking up soil, nutrients, and chicken feces and transporting them to the stock pond and drainages on the ranch. Because chickens will be concentrated in the area, the potential for nutrients and feces to be transported by the overland flow is high. Research conducted on the northern red-legged frog in

Oregon suggests that high nitrite concentrations for an extended period of time (7-15 days) can have adverse affects on red-legged frogs (Marco *et. al.* 1999). Frog larvae behavior was found to have been impaired with increased exposure time and/or concentrations and that continued exposure to high levels of nitrates resulted in death.

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 project are not considered in this section, because they require separate consultation pursuant to section 7 of the Act.

From 1995 to 2020, the human population is projected to increase by 18 percent for the San Francisco Bay hydrologic region (California Department of Water Resources 1998). According to the California Department of Forestry, from 2000 to 2020, the human population in the Bay Area region is expected to grow by 29 percent (5.3 million people to 6.8 million people), and by 60 percent from 2000 to 2040 (5.3 million people to 8.4 million people) (California Department of Finance 1998). Point Reyes National Seashore is a popular site for hiking, picnicking, and other passive forms of recreation. Therefore, the number of human visitors will increase with concomitant adverse effects on the California red-legged frog, including exotic species, stepped on and crushed by humans, and poaching.

Land adjacent to and in the vicinity of proposed project is expected to remain part of the Point Reyes National Seashore. Additional lands near this National Park are owned by the California Department of Parks and Recreation and others have 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 acres 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 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.

Diseases may pose a significant threat though their specific effects on the California red-legged frog are not known. Pathogens, fungi, water mold, bacteria, and viruses have been known to adversely affect other amphibians. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat to the California red-legged frog because these diseases have been found to adversely affect other amphibians, including the red-legged frog and the threatened California tiger salamander (*Ambystoma californiense*) (Davidson *et al.* 2003; Lips *et al.* 2003). Non-native species, such as bullfrogs, have been identified as potential carriers of many diseases (Garner *et al.* 2006). Human activities can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e. contaminated boots or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in this listed species being more susceptible to the effects of disease. Disease will likely become a growing threat because of the relatively small and fragmented remaining California red-legged frog breeding sites, the many stresses on these sites due to habitat losses and alterations, and the many other potential disease-enhancing anthropogenic changes that have occurred both inside and outside the species' range.

Non-native species that prey upon, or compete with the California red-legged frog continue to be introduced. Releases are likely to increase with an increasing number of people living in an area. Bullfrogs (*Rana catesbeiana*), goldfish, mosquitofish, and warm water game fish species are all expected to continue to persist in the wild and degrade the quality of the habitat of the listed amphibian and the introduction of non-native flora continue to threaten many populations of listed plants.

Urban development results in increased numbers of pets. Both feral and domestic cats (*Felis catus*) and dogs (*Canis lupus familiaris*) prey on aquatic and riparian species including the California red-legged frog. People exploring creeks, wetlands, and associated uplands at Point Reyes National Seashore may harass, collect, and kill this listed species.

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 measurement of 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 its habitats, 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 the California red-legged frog, its environmental baseline in the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Chicken Operation at Point Reyes National Seashore in Marino County, California, as proposed, is not likely to jeopardize the continued existence of this threatened amphibian.

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 National Park Service so that they become binding conditions of any grant or permit issued to any applicant or permittee in order for the exemption in section 7(o)(2) to apply. The National Park Service has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the National Park Service (1) fails to require the applicant or permittee 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 or Extent of Take

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect because when the animals are not in their breeding ponds, they inhabit the burrows of ground squirrels or other rodents root wads, or other sites, they may be difficult to locate due to their cryptic appearance and behavior; the subadult and adult animals may be located a distance from the breeding ponds; the movements occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size and/or will be quickly consumed by the chickens. Losses of this species also may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in water regime at their breeding ponds, or additional environmental disturbances. Due to the difficulty in quantifying the number of this threatened amphibian that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as all individuals of the California red-legged frogs inhabiting or utilizing 382 acres at D. Rogers Ranch. The incidental take is expected to be in the form of capture, harm, and harassment to subadult and adult California red-legged frogs from habitat loss/degradation, capture and relocation. The Service anticipates that four (4) subadult and adult California red-legged frogs will be injured or killed by the proposed project.

Upon implementation of the following reasonable and prudent measures incidental take associated with the proposed action described above for 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 for the California red-legged frog is not likely to jeopardize the continued existence of this species.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the effects of take on listed species:

1. Minimize the potential for harm harassment, injury, and mortality to California red-legged frogs resulting from project related activities.

2. The National Park Service shall ensure their compliance with this biological opinion.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the National Park Service must ensure that they comply with the following terms and conditions, which implement the reasonable and prudent measures described above and in the programmatic biological opinion. These terms and conditions are non-discretionary.

1. To implement Reasonable and Prudent Measure one (1), the National Park Service shall ensure the following:

   a. The National Park Service shall implement the conservation measures as described in the biological assessment, and the Project Description of this biological opinion.

   b. An education program for the field personnel involved with the Chicken Operation Project shall be conducted prior to the initiation of field activities. The program shall consist of a brief presentation by a person(s) knowledgeable in the California red-legged frog and other appropriate listed species. The program shall include the following: a description of these species and their ecology, and habitat needs; an explanation of their legal status and their protection under the Act; and an explanation of the measures being taken to avoid or reduce effects to this species during the project. The education may be conducted in an informal manner (e.g., ranger and field personnel in a rural setting).

   c. If a California red-legged frog, is observed on the project site, and if, the on-site biologist determines the animal is in danger, all work in the area shall be halted and the amphibian shall either be allowed to leave of its own volition or it may be moved to a safe location within walking distance of the location where it was found. The translocated animal will be monitored by the Service-approved biologist until it has been determined that it is not imperiled by predators or other dangers.

2. To implement Reasonable and Prudent Measure two (2), the National Park Service shall ensure the following:

   a. The National Park Service shall comply with the *Reporting Requirements* of this biological opinion.

Reporting Requirements

Injured California red-legged frogs shall be cared for by a licensed veterinarian or other qualified person such as the on-site biologist; dead individuals 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 will be notified within one (1) working day of the discovery of death or injury to a California red-legged frog that occurs due to project related activities or is observed at the project site. Notification will include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a U.S. Geological Survey 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, Chief, Endangered Species Division of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600, and Dan Crum, Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 414-6660. The California Department of Fish and Game contact is Mr. Scott Wilson at telephone (707) 944-5563.

The National Park Service shall submit a post-project compliance report prepared by the Service-approved biologist to the Sacramento Fish and Wildlife Office within forty (40) working days following completion of the Chicken Operation or within twenty (20) working days of any break in construction activity lasting more than forty (40) working days. This report shall detail (i) dates that construction occurred; (ii) pertinent information concerning the success of the project in meeting compensation and other conservation measures; (iii) an explanation of failure to meet such measures, if any; (iv) known project effects on the California red-legged frog, if any; (v) occurrences of incidental take; (vi) documentation of employee environmental education; and (vii) other pertinent information. The reports shall be addressed to the Chief of the Endangered Species Division at the Sacramento Fish and Wildlife Office.

The National Park Service or the permittee shall report to the Service any information about take or suspected take of listed wildlife species not authorized by this biological opinion. The National Park Service or the permittee must notify the Service via email and telephone within twenty-four (24) hours of receiving such information. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. The individual animal shall be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are Chris Nagano, Chief, Endangered Species Division, Sacramento Fish and Wildlife Office at (916) 414-6600,

and Dan Crum, Resident Agent-in-Charge of the Service's Law Enforcement Division at (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 that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

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

1. The National Park Service should implement the appropriate actions described in the *Recovery Plan for the California red-legged frog (Rana aurora draytonii)* (2002a).

3 The 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 National Park Service should continue their vigilance for individuals who collect the endangered Myrtle's silverspot butterfly, and 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.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of these recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the proposed Chicken Operation at Point reyes National Seashore in Marin County, California. As provided in 50 CFR § 402.16 and in the terms and conditions of this biological opinion, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (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 biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological 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, any operations causing such take must cease pending reinitiation.

If you have questions concerning this opinion on the proposed Chicken operation at point Reyes National Seashore in Marin County, California, please contact our Endangered Species Division, at the letterhead address or at telephone 916 414-6600.

cc:
Scott Wilson, R. Fitzgerald, California Department of Fish and Game, Yountville, California

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