United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Ecological Services
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
2022-0079978-S7-001

April 24, 2023

Frances Malamud-Roam
Project Manager, Regulatory Division
U.S. Army Corps of Engineers
450 Golden Gate Avenue, 4th Floor
San Francisco, California 94102

Subject: Reinitiation of the Biological Opinion on the Boronda Road Congestion Relief Project, Monterey County, California (Corps File No. SPN ~~SPL~~-2017-00402)

Dear Frances Malamud-Roam:

This document transmits the U.S. Fish and Wildlife Service's (Service) reinitiated biological opinion based on our review of the U.S. Army Corps of Engineers' (Corps) proposed issuance of a permit, pursuant to section 404 of the Clean Water Act, to the City of Salinas Public Works Department (City). The Corps proposes to authorize the City to widen road areas that would result in the relocation of an existing drainage ditch. The purpose of this reinitiation is to update the project description (phase 3 is no longer part of the project), and mitigation of the effects of the project. At issue are the project's effects on the federally threatened California red-legged frog (*Rana draytonii*) and the California tiger salamander (*Ambystoma californiense*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.).

We have based this reinitiated biological opinion on information that accompanied your original request for consultation, including the Habitat Assessment Report (EMC Planning Group Inc. 2020), and information received on September 8 and 21, 2022.

Consultation History

We received your original request for formal consultation on April 22, 2021 and completed the biological opinion on January 4, 2022. We received your request for reinitiation of formal consultation on September 8, 2022. We received sufficient information to initiate consultation on September 21, 2022.

On November 30, 2022, we met with the Corps, California Department of Fish and Wildlife (CDFW), and City to discuss the possibility of a consistency determination from CDFW based on the Service's reinitiated biological opinion.

On January 12, 2023, you requested to review a draft of the reinitiated biological opinion. You also granted permission for CDFW to review the draft.

On February 6, 2023, we provided the draft of the reinitiated biological opinion to the Corps and CDFW for their review. We received comments on the draft biological opinion from CDFW on February 22, 2023.

On March 30, 2023, you agreed to May 3, 2023 as the due date for the reinitiated biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Corps proposes to authorize the City of Salinas' Boronda Road Congestion Relief Project. The City plans to widen East Boronda Road from Dartmouth Way to approximately 1,300 feet east of Natividad Road, from two lanes to four lanes, including roundabouts at major intersections. The widening would occur along the northern edge of the existing road in areas that are under active agricultural cultivation. The City would relocate an existing drainage ditch, which currently extends from east of Dartmouth Way to west of Natividad Road, approximately 100 feet to the north to accommodate the road widening. The project will result in 40.06 acres of disturbance, of which 16.11 acres are currently developed paved roadways.

The City would widen the road in two phases. Phase 1 would include widening East Boronda Road from east of Dartmouth Way to approximately 1,200 feet east of McKinnon Street, including construction of a new roundabout at the intersection. It would require relocating an agricultural drainage ditch 100 feet north. Phase 1 would result in 2.36 acres of permanent impacts, and 3.17 acres of temporary impacts to undeveloped land. Phase 2 would be partitioned into phase 2a and phase 2b. Phase 2a would include widening Boronda Road from 1,200 feet east of McKinnon Street to 900 feet east of El Dorado Drive, including a roundabout at the intersection with El Dorado Drive. Phase 2a would result in 3.17 acres of permanent impacts and 5.24 acres of temporary impacts to undeveloped land. Phase 2b would include the widening of Boronda Road from 900 feet east of El Dorado Drive to 1,300 feet east of Natividad Road, including a roundabout at the intersection with Natividad Road. Phase 2b would result in 4.85 acres of permanent impacts and 5.16 acres of temporary impacts to undeveloped land.

The applicant would stage equipment and materials along both sides of McKinnon Street north of the intersection with East Boronda Road. The stockpiled construction materials within staging areas would include excavated soils, aggregate base, pipes, rebar, and signs. The City also proposes to create bike and shoulder lanes, bus pullouts, and sidewalks, which include cut and fill, and asphalt work. Lastly, landscaping would include planting of native and noninvasive plants. Construction for this project would continue intermittently until 2026.

Conservation Measures

The Corps and the City propose to implement the following measures to minimize effects to California red-legged frogs and California tiger salamanders:

1. At least 80 days prior to project activities, the City will submit to the California Department of Fish and Wildlife (CDFW) the name, qualifications, business address, contact information, and references with contact information of the biologist(s) (and designated monitor(s), if applicable) who will conduct activities for California tiger salamander specified in the following measures. The City will ensure that the biologist(s) are knowledgeable and experienced in the biology, natural history, and collecting and handling of California tiger salamander, as well as excavating burrows and crevices to minimize mortality and monitoring construction activities. The City has the option of using designated monitors to assist the biologist(s) in compliance monitoring under direction or supervision of the biologist(s). The City will ensure that the designated monitor(s) are knowledgeable and experienced in the biology and natural history of California tiger salamander, and monitoring construction activities. Designated monitor responsibilities will be restricted to a specific set of measures, specified by the City at the time their qualifications are submitted for review. Following CDFW approval of the biologist(s) and designated monitor(s), the City will submit the qualifications, business address, contact information, references with contact information, and documentation of CDFW approval of the biologist(s) to the Service for approval. No project activities will begin until the City has received written approval from the Service and CDFW that the project biologist(s) are approved to conduct the work for California tiger salamander. The City will obtain written approval from the Service and CDFW if the biologist(s) or designated monitor(s) must be changed (EMC Planning Group Inc. 2020, pp 4-2 through 4-5).

2. At least 30 days prior to ground disturbance, the City will submit to the Service the name, qualifications, business address, contact information, and references with contact information of the biologist(s) who will conduct activities for California red-legged frog specified in the following measures. No project activities will begin until the City has received written approval from the Service that the project biologist(s) are approved to conduct the work. The City will obtain written approval from the Service if the biologist(s) must be changed.

3. The Service-approved (and CDFW-approved) biologist(s) for California tiger salamander will prepare a Mortality Reduction and Relocation Plan in consultation with CDFW for California tiger salamander and submit it to CDFW for review and approval a minimum of 30 days prior to the beginning of project activities. The Mortality Reduction and Relocation Plan for California tiger salamander will include, but not be limited to, a map of all areas where project activities will occur (hereafter project areas) and a discussion of the portion(s) on the map which represent potential upland habitat; identification of the areas on the map within 1.3 miles of known or potential breeding habitat for California tiger salamander; detailed survey,

excavation, capture, handling, and relocation methods; identification of relocation areas; and identification of a wildlife rehabilitation center or veterinary facility capable of treating injured wild amphibians. Project activities may not proceed until the Mortality Reduction and Relocation Plan for California tiger salamander is approved in writing by CDFW. The City will provide a courtesy copy of the approved plan to the Service. The designated monitor(s) are prohibited from capturing and handling California tiger salamander (and California red-legged frog) unless specifically approved in writing by the Service and under the direct supervision of the Service-approved (and CDFW-approved) biologist(s) for California tiger salamander (or the Service-approved biologist(s) for California red-legged frog). Any proposed changes to the CDFW-approved Mortality Reduction and Relocation Plan for California tiger salamander will be submitted in writing to CDFW and approved by CDFW in writing prior to implementation of any proposed modifications to the Mortality Reduction and Relocation Plan for California tiger salamander. The City will provide a courtesy copy of any CDFW-approved changes to the Mortality Reduction and Relocation Plan for California tiger salamander to the Service.

4. The Service-approved biologist(s) will supervise the implementation of all species protection measures. Construction personnel will attend a training session regarding the protection measures, as described below:

    a. Before construction activities begin, the Service-approved biologist(s) will conduct a worker environmental awareness training session for all construction personnel. The training will include a description of protected biological resources, species descriptions and habitat requirements, and general measures being implemented to protect sensitive resources during construction. Informational handouts with photographs clearly illustrating species appearances will be used in the training session.

    b. Training topics will include special-status species that may be present during the project, including California red-legged frog and California tiger salamander.

    c. The training session will include information regarding steps to take if a special status species is observed, including contact information for the biological monitoring staff and measures to protect species during construction. All new construction personnel will undergo this mandatory worker environmental awareness training when they begin working on the project. Training will occur prior to the start of construction and periodically as needed if new construction personnel begin work on the project. The City will provide interpretation for all non-English speaking construction personnel. Upon completion of the training, construction personnel will sign a form stating that they attended the training and understand all species protection measures.

The training will be repeated at least once annually for long-term or permanent employees that will be conducting project activities.

5. The Service-approved biologist(s) and designated monitor(s) will maintain construction-monitoring documentation onsite in either hard copy or digital format throughout the construction period, which will include a copy of this biological opinion and a list of signatures of all construction personnel who have successfully completed the worker environmental awareness training. The City will ensure a copy of the construction-monitoring documentation is available for review.

6. The Service-approved biologist(s) and designated monitor(s) will have the authority to halt work that may affect listed amphibians at any time to prevent take of California red-legged frogs or California tiger salamanders. Work will re-commence only when authorized by the Service-approved biologist(s).

7. No more than 14 calendar days prior to initiating project activities within the project area, the Service-approved biologist(s) for California tiger salamander will survey the project area for California tiger salamanders. These surveys will provide 100 percent visual coverage (including burrow and crevice openings) within the project area as well as a 50-foot buffer zone around the project area, with the exception that areas outside of the City's access or control need not be surveyed. If California tiger salamanders are found, the Service-approved biologist(s) for California tiger salamander will relocate them in accordance with the CDFW-approved Mortality Reduction and Relocation Plan for California tiger salamander. The City will provide the survey results to CDFW in a written report prior to the beginning of project activities and will provide a courtesy copy of this written report to the Service.

8. During pre-activity clearance surveys (Measure #7), the Service-approved biologist(s) for California tiger salamander will flag all animal burrows and crevices suitable for California tiger salamander occupancy within the project area and a 50-foot buffer outside the project area, unless the buffer area is outside of City control. An avoidance buffer of 50 feet or greater around animal burrows or crevices will be maintained regardless of whether the burrow or crevice is in the project area or solely within the project area's 50-foot buffer zone. Flagged burrows or crevices which occur within 630 meters of known or potential breeding habitat, and which cannot be avoided by at least 50 feet will be fully excavated (Measure #9).

9. Prior to initiating ground-disturbing project activities within the project area, animal burrows and crevices identified during the pre-activity clearance surveys (Measure #7) and flagged (Measure #8) within 630 meters of known or potential California tiger salamander breeding habitat as identified in the CDFW-approved Mortality Reduction and Relocation Plan for California tiger salamander, and which cannot be fully avoided by at least 50 feet, will be fully excavated. Applicable burrows and crevices may be excavated by hand or in a manner otherwise approved by the Service in accordance with the CDFW-approved Mortality Reduction and Relocation Plan for

California tiger salamander. Burrow and crevice excavation will occur under the direct supervision of the Service-approved biologist(s) for California tiger salamander. Animal burrows and crevices identified outside of the project area, but within the project area's 50-foot buffer zone, will be similarly excavated if they lie within 50 feet of ground-disturbing project activities occurring within the project area. Burrows and crevices outside of the City's access or control do not need to be excavated. The Service-approved biologist(s) for California tiger salamander will relocate any live California tiger salamander discovered during burrow and crevice excavation in accordance with the CDFW-approved Mortality Reduction and Relocation Plan for California tiger salamander. Excavation will occur no more than 14 days after the completion of the pre-activity clearance surveys.

10. A Service-approved biologist will survey the project site no more than 48 hours before the onset of work activities. If any California red-legged frogs are found and these individuals are likely to be killed or injured by work activities, the approved biologist will be allowed sufficient time to move them from the site before work begins. The Service-approved biologist will relocate the California red-legged frogs the shortest distance possible to a location that contains suitable habitat and that will not be affected by activities associated with the proposed project. The relocation site should be in the same drainage to the extent practicable. The project proponent will coordinate with the Service on the relocation site prior to the capture of any California red-legged frogs.

11. A Service-approved biologist will be present at the work site until all California red-legged frogs have been relocated out of harm's way, workers have been instructed, and disturbance of habitat has been completed. After this time, the City may designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist will ensure that this monitor receives the training outlined in measure 4 above and in the identification of California red-legged frogs. If the monitor or the Service-approved biologist recommends that work be stopped because California red-legged frogs would be affected in a manner not anticipated by the City or the Service during review of the proposed action, they will notify a project supervisor immediately. The project supervisor will either resolve the situation by eliminating the adverse effect immediately or require that all actions causing these effects be halted. If work is stopped, the Service will be notified as soon as possible.

    Prior to the initiation of project activities and following surveying (Measure #7), flagging (Measure #8), and excavating burrows and crevices (Measure #9), the City will fence access routes and the project perimeter to prevent California red-legged frogs or California tiger salamanders from entering areas where project activities occur. The exclusion fence will consist of a 3-foot wall of 0.25-inch mesh. The exclusion fence will be installed under the direct supervision of the Service-approved (and CDFW-approved) biologist(s) for California tiger salamander and begin no later than 48 hours after the burrow and crevice excavation and relocation activities, where applicable, are complete. The City will also avoid animal burrows and crevices by 50 feet during the installation of the exclusion fence in accordance with Measures #7, #8,

and #9. The exclusion fence will be supported sufficiently to maintain its integrity under all conditions, such as wind and heavy rain, for the duration that it is in place. The Service-approved biologist(s) or designated monitor(s) will inspect the fence weekly for holes and tears that could allow frogs or salamanders to pass. Holes or tears will be repaired within 24 hours of discovery. The fence and the site will be inspected after significant rain events to ensure that no frogs or salamanders are sheltering along the fence or attempting to walk around it. If California red-legged frogs or California tiger salamanders are observed, the Service-approved biologist(s) will contact the Service immediately to determine the best course of action. At a minimum, all project activities within 100 feet of the animal will cease until it leaves the project area. The City will remove exclusion fencing immediately upon completion of project activities in the fenced project area.

12. The Service-approved biologist(s) will be present on-site daily until pre-activity clearance surveys (Measure #7), flagging (Measure #8), burrow excavation and relocation (Measure #9), exclusion fence installation (Measure #12), worker environmental awareness training (Measure #4), and all initial ground disturbance activities are complete. The Service-approved biologist(s) will be on site for the duration of the day when these project activities occur and conduct at least daily compliance inspections. During periods of inactivity and after clearing, grubbing, and initial ground disturbance are complete, the Service-approved biologist(s) and/or designated monitor(s) will conduct at least weekly compliance inspections. Compliance inspections will include minimizing incidental take of California tiger salamander and California red-legged frog; preventing unlawful take of California tiger salamander and California red-legged frog; checking for compliance with all measures of this biological opinion; checking all exclusion zones; and ensuring that signs, stakes, and fencing are intact, and that project activities are only occurring in the project area. The Service-approved biologist(s) and designated monitor(s) will conduct biological construction monitoring in all project areas with potential to impact California red-legged frogs or California tiger salamanders. The Service-approved biologist(s) and designated monitor(s) will prepare written observation and inspection records for each day they are on site, summarizing oversight activities and compliance inspections, observations of California tiger salamander and their sign, survey results, and monitoring activities.

13. The Service-approved biologist(s) for California tiger salamander will maintain a record of California tiger salamanders handled and all documented observations of California tiger salamander. This information will include for each animal: (1) date, time, and location (Global Positioning System coordinates and maps) of capture or observation as well as release, if applicable; (2) the name of the party that identified the California tiger salamander; (3) circumstances of the incident; (4) the general condition and health, noting all visible conditions including gait and behavior, ectoparasites, injuries, etc.; (5) any diagnostic markings, sex, age (juvenile or adult); (6) actions undertaken; (7) habitat description; and (8) ambient temperature when handled and released or observed. The Service-approved biologist(s) for California

tiger salamander will also submit this information to the California Natural Diversity Database. The Service-approved biologist(s) for California tiger salamander will prepare a relocation summary and include it in the biological monitoring reports.

14. Within active construction zones that are fenced, workers will check for wildlife under vehicles and equipment before they are moved. Workers will thoroughly inspect all construction pipes, culverts, or other similar structures with a diameter of one inch or greater that are stored for one or more overnight periods for California tiger salamander and California red-legged frog before the object is subsequently moved, buried, or capped. Workers will check all excavated steep-walled holes or trenches greater than one foot deep for trapped animals. To prevent inadvertent entrapment of California tiger salamander or California red-legged frog, all open trenches, holes, sumps, and other excavations with sidewalls steeper than a 1:1 (45 degree) slope will have an escape ramp of earth or a non-slip material with a less than 1:1 (45 degree) slope. At the end of each workday, construction personnel will ensure all trenches, holes, sumps, or other excavations with sidewalls steeper than a 1:1 (45 degree) slope of any depth are covered with barrier material (e.g., hardware cloth) such that animals are unable to dig or squeeze under the barrier and become entrapped. The outer two feet of excavation cover will conform to solid ground so that gaps do not occur between the cover and the ground, and the excavation cover will be secured with soil staples or by similar means to prevent gaps. Construction personnel will also thoroughly inspect all open trenches, holes, sumps, or other excavations for California tiger salamander and California red-legged frog before they are backfilled. If California red-legged frogs or California tiger salamanders are observed within an active construction zone, the Service-approved biologist(s) will be notified immediately and all work within 100 feet of the individual animal will be halted and all equipment turned off until the Service-approved biologist(s) have captured and relocated the California red-legged frog from the project area or the Service-approved biologist(s) have captured and relocated the California tiger salamander from the project area. The California red-legged frog or California tiger salamander will be relocated to an approved off-site location according to the CDFW-approved Mortality Reduction and Relocation Plan for California tiger salamander or at the direction of the Service-approved biologist(s) for California red-legged frog. The City will notify the Corps and the Service and halt construction if California red-legged frog eggs or tadpoles, or California tiger salamanders eggs or larva are detected during pre-construction surveys or project activities.

15. Initial site clearing and grading will be conducted and completed only during the dry season, from April 15 to November 15. The Service-approved biologist(s) and the City will monitor the National Weather Service 72-hour forecast for the project area at the following web address: www.weather.gov. During rainfall events or when a 50 percent or greater chance of rainfall is predicted within 72 hours, the City will cease all project activities in the project area where initial ground disturbance (vegetation removal, grading, grubbing, and excavation) has yet to occur until the rainfall ceases and a zero percent chance of rain is forecast. Project activities may continue during

rainfall events or when a 50 percent or greater chance of rain is forecast within portions of the project area that have already undergone pre-activity clearance surveys (Measure #7), flagging (Measure #8), and burrow excavation (Measure #9), and which are surrounded by exclusion fence that has been properly maintained and is in good repair.

16. The City will appropriately protect stockpiles to prevent soil erosion. The City will stockpile and stage all materials and equipment in a manner that discourages California tiger salamander or California red-legged frog use. In all locations, the City will not place bundled or loose materials directly on the ground. These materials will be elevated to discourage use by California tiger salamander and California red-legged frog. The City will not place materials outside of exclusion fencing.

17. A designated representative will be appointed by the City who will be the contact for any employee who may inadvertently kill or injure a special-status species or find one dead, injured, or trapped, in addition to the Service-approved biologist(s). The designated representative will be legally responsible to notify the Service-approved biologist(s) and the Service immediately in the event that take of any special-status wildlife species occurs. The designated representative will be identified during the Employee Education Program and his or her contact information will be provided to the Service.

18. The designated representative or the Service-approved biologist(s) will compile daily observation and inspection records into quarterly biological monitoring reports. Quarterly biological monitoring reports will include a summary of all pre-activity surveys and compliance monitoring conducted during the previous quarter; the project activities that occurred during the previous quarter; and an accounting of the number of acres that have been permanently and temporarily disturbed by the project within the project area, both for the prior quarter, and the total since issuance of the biological opinion, if applicable. Quarterly biological monitoring reports will be submitted to the City providing documentation that these measures have been implemented. These reports will be used to help inform the reporting requirement per this biological opinion.

19. Due to the potential for wildlife entanglement, the contractor will avoid the use of monofilament netting in erosion control materials (fiber rolls and blankets).

20. All food-related and other trash will be disposed of in animal-proof containers and removed from the project area at least once a week during the construction period or more often if trash is attracting avian or mammalian predators. Construction personnel will not feed or otherwise attract wildlife to the area.

21. The Service-approved biologist(s) will remove non-native aquatic animals such as bullfrogs and crayfish which may prey on California red-legged frogs and other native species whenever these are detected during surveys.

22. The City will send quarterly biological monitoring reports, as detailed in Measures #14 and #19, to CDFW by January 30, April 30, July 30, and October 30 with a courtesy copy to the Service. The City will send a courtesy copy of the annual report, as detailed in the Reporting Requirements of the biological opinion (see pages 29-30) to CDFW. The annual report for the biological opinion may suffice for the January 30 quarterly report to CDFW so long as the report covers the months of October-December of the previous year. Additionally, in the event that a dead or injured California tiger salamander is found during project activities, the City will send a courtesy copy of the notification, as described in the incidental take statement of this biological opinion (page 30) to CDFW. All reports sent to CDFW should be sent to the following address: R4CESA@wildlife.ca.gov.

Mitigation for Loss of Habitat

The City will compensate for the permanent loss of upland California red-legged frog and California tiger salamander habitat. The City will purchase credits from Sparling Ranch Conservation Bank at a minimum 2:1 ratio of area preserved to area impacted. The City will secure compensatory mitigation for each phase of the project in advance of beginning each phase. Prior to Phase 1, the City will purchase 4.72 credits; prior to Phase 2a, the City will purchase 6.34 credits; and prior to Phase 2b, the City will purchase 9.7 credits. The City will submit to the Service and CDFW a copy of the Bill of Sale(s) and Payment Receipt prior to each phase of the project.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the rangewide condition of the California tiger salamander and the California red-legged frog, the factors responsible for that condition, and their survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the California tiger salamander and the California red-legged frog in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the California tiger salamander and the California red-legged frog; (3) the Effects of the Action, which determines all consequences to the California tiger salamander and the California red-legged frog caused by the proposed action that are reasonably certain to occur; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities,

that are reasonably certain to occur in the action area, on the California tiger salamander and the California red-legged frog.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the California tiger salamander and the California red-legged frog, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the California tiger salamander and the California red-legged frog in the wild by reducing the reproduction, numbers, and distribution of those species.

STATUS OF THE SPECIES

California Red-legged Frog

Legal Status

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 Federal Register (FR) 25813). Revised critical habitat for the California red-legged frog was designated on March 17, 2010 (75 FR 12816, Service 2010). The Service issued a recovery plan for the species on May 28, 2002 (Service 2002).

Natural History

California red-legged frogs use a variety of habitat types ranging from sea level to approximately 5,000 feet elevation, including aquatic systems, riparian, and upland habitats. Individual California red-legged frogs may use the environment in varying ways, for example, an individual may complete their entire life cycle in a particular habitat without using other components (i.e., a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary). However, populations appear to persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (greater than 1.6 feet) still or slow-moving water; the largest summer densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Hayes and Jennings 1988, p. 147).

California red-legged frogs can breed in both natural and anthropogenic aquatic habitats; tadpoles, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, deep riverine pools and backwaters within streams and creeks, dune ponds, lagoons, estuaries, and artificial impoundments such as stock ponds. Important factors influencing the suitability of aquatic breeding sites are the general lack of invasive aquatic predators, sufficient hydro-period, percent emergent vegetation, and topography. Accessibility to upland sheltering habitat is essential for the survival of California red-legged frogs within a watershed and can be a factor limiting population numbers and distribution.

California red-legged frogs are “irruptive” breeders where their breeding capacity is highly dependent on local environmental conditions, specifically the availability of cool water for egg deposition and larval maturation (Jennings and Hayes 1994, p. 62). California red-legged frogs breed from November to May and breeding activity typically begins earlier at southern coastal than northern coastal localities (Storer 1925, p. 2; Alvarez et al. 2013, pp. 547–548). Breeding may start as late as March or April in Sierra Nevada localities, due to low temperatures at these sites in January and February (Tatarian 2008, p. 16). Breeding in southern California localities may start as late as April, as exemplified in Matilija Canyon following the 2017 Thomas Fire (Patrick Lieske, U.S. Forest Service, in litt. 2021). High water flows in the winter and spring also can delay breeding in streams and rivers (Fellers et al. 2001, p. 157).

Female California red-legged frogs lay only one egg mass in a breeding year and each egg mass contains between 300 to 4,000 eggs (Storer 1925, p. 240). Frogs typically deposit egg masses in relatively willow water (approximately 1.6 to 2 feet deep) on emergent vegetation within 4 feet of shore (Storer 1925, p. 239, Jennings and Hayes 1994, p. 64). However, the species can deposit eggs on a wide variety of substrates including boulders and cobbled substrate and submerged tips of overhanging branches, and egg masses have been documented 39 feet from shore and in water up to 10.5 feet deep (Alvarez et al. 2013, pp. 544-545; Wilcox et al. 2017, p. 68). California red-legged frog tadpoles hatch from egg masses after 6 to14 days (Storer 1925, p. 241). Tadpole development and growth rates are variable and likely temperature dependent (Fellers 2005, pp. 552-554). Occasionally, tadpoles may overwinter and then metamorphose the following spring, a phenomenon so far observed in Santa Clara, Marin, Contra Costa, and San Luis Obispo Counties (Fellers et al. 2001, entire). The juvenile California red-legged frog life stage is defined as the time after an individual undergoes metamorphosis (when they lose their tails and become small froglets) which typically occurs four to five months after hatching and it spans to when an individual is able to breed (Storer 1925, p. 241; Wright and Wright 1949, p. 422). On average, the juvenile life stage is from about five months of age to three years in California red-legged frogs. Immediately after metamorphosis, juveniles shelter near their natal pond. However, some juveniles may disperse in the fall to nearby moist uplands or different aquatic habitat to avoid predation by larger, older frogs. Hayes and Tennant (1985, p. 604) found juveniles to seek prey diurnally and nocturnally, whereas adults were largely nocturnal.

During periods of wet weather, starting with the first rains of fall, some individual California red-legged frogs may make long-distance overland excursions through upland habitats to reach breeding sites. In Santa Cruz County, Bulger et al. (2003, p. 90) found marked California red-legged frogs moving up to 1.74 miles through upland habitats, via point-to-point, straight-line migrations without regard to topography, rather than following riparian corridors. Most of these overland movements occurred at night and took up to 2 months. Similarly, in San Luis Obispo County, Rathbun and Schneider (2001, p. 1302) documented the movement of a male California red-legged frog between two ponds that were 1.78 miles apart in less than 32 days; however, most California red-legged frogs in the Bulger et al. (2003, p. 93) study were non-migrating frogs and always remained within 426 feet of their aquatic site of residence (half of the frogs always stayed within 82 feet of water). Rathbun et al. (1993, p. 15) radio-tracked three California red-legged frogs near the coast in San Luis Obispo County at various times between

July and January; these frogs also stayed close to water and never strayed more than 85 feet into upland vegetation. Scott (2002, p. 2) radio-tracked nine California red-legged frogs in East Las Virgenes Creek in Ventura County from January to June 2001, which remained relatively sedentary as well; the longest within-channel movement was 280 feet and the farthest movement away from the stream was 30 feet.

After breeding, California red-legged frogs often disperse from their breeding habitat to forage and seek suitable dry-season habitat. Cover within dry-season aquatic habitat could include boulders, downed trees, and logs; agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hayricks, and industrial debris. California red-legged frogs use small mammal burrows and moist leaf litter (Rathbun et al. 1993, p. 15; Jennings and Hayes 1994, p. 64); incised stream channels with portions narrower and deeper than 18 inches may also provide habitat (Service 2002, p. 14). This type of dispersal and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on the year-to-year variations in climate and habitat suitability and varying requisites per life stage.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 feet, riparian shrubbery, and emergent vegetation (Jennings and Hayes 1994, p. 64), California red-legged frogs appear to be absent from numerous locations in its historical range where these elements are well represented. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be changes in faunal composition of aquatic ecosystems (i.e., the introduction of invasive predators and competitors) and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, invasive plants, parasites, and diseases.

Rangewide Status

The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Storer 1925, p. 235; Jennings and Hayes 1985, p. 95; Shaffer et al. 2004, p. 2673). The California red-legged frog has sustained a 70 percent reduction in its geographic range because of several factors acting singly or in combination (Davidson et al. 2001, p. 465).

Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, pp. 99-100; Hayes and Jennings 1988, p. 152). Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog, catfish (*Ictalurus* spp.), bass

(*Micropterus* spp.), mosquito fish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus*). Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

Recovery

The 2002 final recovery plan for the California red-legged frog (Service 2002) states that the goal of recovery efforts is to reduce threats and improve the population status of the California red-legged frog sufficiently to warrant delisting. The recovery plan describes a strategy for delisting, which includes: (1) protecting known populations and reestablishing historical populations; (2) protecting suitable habitat, corridors, and core areas; (3) developing and implementing management plans for preserved habitat, occupied watersheds, and core areas; (4) developing land use guidelines; (5) gathering biological and ecological data necessary for conservation of the species; (6) monitoring existing populations and conducting surveys for new populations; and (7) establishing an outreach program. The California red-legged frog will be considered for delisting when:

1. Suitable habitats within all core areas are protected and/or managed for California red-legged frogs in perpetuity, and the ecological integrity of these areas is not threatened by adverse anthropogenic habitat modification (including indirect effects of upstream/downstream land uses).

2. Existing populations throughout the range are stable (i.e., reproductive rates allow for long-term viability without human intervention). Population status will be documented through establishment and implementation of a scientifically acceptable population monitoring program for at least a 15-year period, which is approximately 4 to 5 generations of the California red-legged frog. This 15-year period should coincide with an average precipitation cycle.

3. Populations are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite fluctuations in the status of individual populations (i.e., when populations are stable or increasing at each core area).

4. The species is successfully reestablished in portions of its historical range such that at least one reestablished population is stable/increasing at each core area where California red-legged frog are currently absent.

5. The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for California red-legged frogs.

The recovery plan identifies eight recovery units based on the assumption that various regional areas of the species' range are essential to its survival and recovery. The recovery 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 correspond to 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 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 support long-term viability within existing populations. This management strategy allows 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.

California tiger salamander

Legal Status

The Service recognizes three distinct population segments (DPS) of the California tiger salamander: one in Sonoma County; one in northern Santa Barbara County; and one in central California. On September 21, 2000, the Service listed the Santa Barbara County distinct population segment of the California tiger salamander as endangered (65 FR 57241). On March 19, 2003, the Service listed the Sonoma County distinct population segment of the California tiger salamander as endangered (68 FR 13497). On August 4, 2004, the Service published a final rule listing the California tiger salamander as threatened range-wide, including the previously identified Sonoma and Santa Barbara distinct population segments (69 FR 47212). On August 19, 2005, U.S. District Judge William Alsup vacated the Service's downlisting of the Sonoma and Santa Barbara populations from endangered to threatened. Thus, the Sonoma and Santa Barbara populations are listed as endangered, and the central California population is listed as threatened.

Life History

The California tiger salamander is a large and stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 8.2 inches, with males generally averaging about 8 inches total length, and females averaging about 6.8 inches in total length. For both sexes, the average snout-to-vent length is approximately 3.6 inches (65 FR 57241). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), larger tails, and larger overall size (Trenham 1998, p. 74).

California tiger salamanders spend the majority of their lives in upland habitats and cannot persist without them. The upland component of California tiger salamander habitat typically

consists of grassland savannah, but also includes scrub or chaparral habitats (Shaffer et al. 1993, (50 CFR 47216). Juvenile and adult California tiger salamanders spend the dry summer and fall months of the year in the burrows of small mammals, such as California ground squirrels (*Otospermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925, p. 70; Trenham 1998, p. 46).

Burrow habitat created by ground squirrels and utilized by California tiger salamanders suggests a commensal relationship between the two species (Loredo et al. 1996, p. 284). Movement of California tiger salamanders within and among burrow systems continues for at least several months after juveniles and adults leave the ponds (Trenham 2001, p. 369). California tiger salamanders cannot dig their own burrows, and as a result, their presence is associated with burrowing mammals. Active ground-burrowing rodent populations likely sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time (69 FR 47212, p. 32). Loredo et al. (1996, p. 284) found that California ground squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, the mammals.

Breeding

Adults enter breeding ponds during fall and winter rains, typically from October through February (Trenham et al. 2000, p. 369). Males migrate to the breeding ponds before females (Loredo and Van Vuren 1996, p. 895). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996, pp. 897-899).

Females attach their eggs singly or, in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris in the water (Storer 1925, p. 66; Twitty 1941, pp. 1-4). In ponds with little or no vegetation, females may attach eggs to objects, such as rocks and boards on the bottom. In drought years, the seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994, pp. 159-164). The eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging in size from 0.5 to 0.6 inch in total length (65 FR 57241). The larvae are aquatic. Each is yellowish gray in color and has a broad, plump head; large, feathery external gills; and broad dorsal fins that extend well onto its back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (Anderson 1968, pp. 273-284). Larger larvae have been known to consume smaller tadpoles of tree frogs (*Pseudacris* spp.) and California red-legged frogs (*Rana draytonii*). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems.

The larval stage of the California tiger salamander usually lasts 3 to 6 months, because most seasonal ponds and pools dry up during the summer (Petranka 1998, p. 48). Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage (Wilbur and Collins 1973, pp. 1305-1314). Larvae collected near Stockton in the Central Valley during April varied from 1.9 to 2.3 inches in length (Storer 1925, p. 85). Feaver (1971, p. 51) found that larvae metamorphosed and left the breeding pools 60 to 74 days after the eggs

had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988, p. 189). The larvae perish if a site dries before they complete metamorphosis. Pechmann et al. (2001) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians, including tiger salamanders (50 CFR 47215).

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Shaffer et al. 1993 p. 5) before settling in their selected upland sites for the dry, hot summer months. While most California tiger salamanders rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during upland migrations (Loredo et al. 1996, p. 284). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998, p. 18). Emergence from upland habitat in hot, dry weather occasionally results in mass mortality of juveniles (Holland 1990, p. 219).

Lifetime reproductive success for California tiger salamanders is typically low. Less than 50 percent breed more than once (Trenham 2000, p. 365). In part, this is due to the extended length of time it takes for California tiger salamanders to reach sexual maturity; most do not breed until 4 or 5 years of age. Combined with low survivorship of metamorphs (in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998, p. iv), low reproductive success limits California tiger salamander populations. Because of this low recruitment, isolated subpopulations can decline greatly from unusual, randomly occurring natural events as well as from human-caused factors that reduce breeding success and individual survival. Based on metapopulation theory (Hanski and Gilpin 1991), factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for dispersing individuals to replenish the population further threaten the survival of a local population.

Rangewide Status

The central California tiger salamander is endemic to the grassland community found in California's Central Valley, the surrounding foothills, and coastal valleys (Fisher and Shaffer 1996, p. 1390). The distribution of breeding locations of this species, and the other two distinct populations, does not naturally overlap with that of any other species of tiger salamander (Petranka 1998, p. 47; Stebbins 2003, p. 469).

California tiger salamanders have been found in upland habitats various distances from aquatic breeding habitats. During a mark and recapture study in the Upper Carmel River Valley in Monterey County, Trenham et al. (2000, p. 3526) observed California tiger salamanders dispersing up to 2,200 feet between breeding ponds between years. In research at Olcott Lake in Solano County, Trenham and Shaffer (2005, p. 1160) captured California tiger salamanders in traps installed 1,312 feet from the breeding pond. In a trapping study in Contra Costa County (Orloff 2011, p. 266), most California tiger salamanders were trapped at least 2,600 feet

from the nearest breeding pond and some were captured as far as 7,200 feet from the nearest breeding pond.

Historically, natural ephemeral vernal pools were the primary breeding habitats for California tiger salamanders (Trenham 2001, p. 3). However, with the conversion and loss of many vernal pools through farmland conversion and urban and suburban development, ephemeral and permanent ponds that have been created for livestock watering are now frequently used by the species (Robins and Vollmar 2002, p. 406).

The California tiger salamander is threatened primarily by the destruction, degradation, and fragmentation of upland and aquatic habitats, primarily resulting from the conversion of these habitats by urban, commercial, and intensive agricultural activities. Additional threats to the species include hybridization with introduced nonnative barred tiger salamanders (*A. tigrinum mavortium*), destructive rodent-control techniques (e.g., deep-ripping of burrow areas, use of fumigants), reduced survival due to the presence of mosquitofish (*Gambusia affinis*) (Leyse and Lawler 2000, p. 76), and mortality on roads due to vehicles. Disease, particularly chytridiomycosis and ranaviruses, and the spread of disease by nonnative amphibians, are discussed in the listing rule as additional threats to the species.

We do not have data regarding the absolute number of California tiger salamanders due to the fact that they spend most of their lives underground. Virtually nothing is known concerning the historical abundance of the species. At one study site in Monterey County, Trenham et al. (2000, p. 369) found the number of breeding adults visiting a pond varied from 57 to 244 individuals. A Contra Costa County breeding site, approximately 124 miles north of the Trenham et al. (2000) study site in Monterey County, showed a similar pattern of variation, suggesting that such fluctuations are typical (Loredo and Van Vuren 1996, p. 896). At the local landscape level, nearby breeding ponds can vary by at least an order of magnitude in the number of individuals visiting a pond, and these differences appear to be stable across years (Trenham et al. 2001).

Recovery

The strategy of the Recovery Plan for the Central California Distinct Population Segment of the California Tiger Salamander (Service 2017, p. iv) focuses on alleviating the threat of habitat loss and fragmentation in order to increase population resiliency (ensure each population is sufficiently large to withstand stochastic events), redundancy (ensure a sufficient number of populations to provide a margin of safety for the species to withstand catastrophic events), and representation (conserve the breadth of the genetic makeup of the species to conserve its adaptive capabilities). Recovery of this species can be achieved by addressing the conservation of remaining aquatic and upland habitat that provides essential connectivity, reduces fragmentation, and sufficiently buffers against encroaching development and intensive agricultural land uses.

Appropriate management of these areas will also reduce mortality by addressing non-habitat related threats, including those from non-native and hybrid tiger salamanders, other non-native

species, contaminants, disease, and road mortality. Research and monitoring should be undertaken to determine the extent of known threats, identify new threats, and reduce threats to the extent possible.

The recovery strategy is intended to establish healthy, self-sustaining populations of Central California tiger salamanders through the protection and management of upland and aquatic breeding habitat, as well as the restoration of aquatic breeding habitat where necessary. It also ensures habitat management and monitoring and the conducting of research. Due to shifting conditions in the ecosystem (e.g., invasive species, unforeseen disease, climate change, and effects from future development and conversion to agriculture), the Service anticipates the need to adapt actions that implement this strategy over time. The recovery strategy ensures that the genetic diversity of the Central California tiger salamander is preserved throughout the DPS to allow adaptation to local environments, maintenance of evolutionary potential for adaptation to future stresses, and reduction in the potential for genetic drift and inbreeding to result in inbreeding depression.

The range of the Central California tiger salamander has been classified into four recovery units (Service 2017, p. II-1). These recovery units are not regulatory in nature; the boundaries of the recovery units do not identify individual properties that require protection, but they are described solely to facilitate recovery and management decisions. The recovery units represent both the potential extent of Central California tiger salamander habitat within the species' range and the biologically (genetically) distinct areas where recovery actions should take place that will eliminate or ameliorate threats. All recovery units must be recovered to achieve recovery of the DPS.

The four recovery units have been further subdivided into Management Units. These subdivisions of recovery units are areas that might require different management, that might be managed by different entities, or that might encompass different populations. In the recovery plan, the management units are primarily administrative in that they serve to organize the recovery units into separate and approximately equal areas that will assist in managing the implementation of the recovery actions.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) (50 CFR 402.02) define the environmental baseline as "the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present effects of all Federal, State, or private actions and other human activities in the action area, the anticipated effects of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the effect of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline."

Action Area

The implementing regulations for section 7(a)(2) of the Act (50 CFR 402.02) define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area for this biological opinion includes all areas disturbed by project activities of phase 1, phase 2a, and phase 2b, as shown in the Project Habitat Impacts (City 2022). The action area occurs within an approximately 40.06-acre area and includes all adjacent uplands within a 500-foot buffer of jurisdictional waters of the U.S. in the immediate vicinity that may be directly or indirectly affected by implementation of the project.

Habitat Characteristics of the Action Area

The action area contains 0.12 acre of agricultural and roadside drainage ditches. These ditches are regularly mechanically disturbed, and possibly sprayed with herbicide. In the ditches near culverts at McKinnon Street and near McKinnon School, some aquatic vegetation was present during surveys, but the vegetation is regularly removed. The ditches provide moist refugia for California red-legged frogs and California tiger salamanders, but do not provide potential breeding habitat, because they lack a natural hydroperiod or ponding, contain only flowing agricultural runoff, and are regularly disturbed to remove vegetation. There are small mammal burrows along the drainage ditches which may provide aestivation or sheltering habitat. Several burrows are present near the McKinnon Street intake culvert, as well as along East Boronda Road to the west of Natividad Road. The action area contains active farmland which constitutes low-quality upland habitat for the California red-legged frog and California tiger salamander. In most areas within the action area, only sparse ruderal vegetation such as non-native cheeseweed (*Malva parviflora*), flax-leaved horseweed (*Erigeron bonariensis*), purslane (*Portulaca oleracea*), and bur-clover (*Medicago polymorpha*) occurs. The remaining portion of the action area is paved road bordered by a dense urban area to the south and does not provide habitat for the listed amphibians.

Previous Consultations in the Action Area

To our knowledge there have been no previous consultations in the action area.

Condition (Status) of the Species in the Action Area

<u>California Red-legged Frog and California Tiger Salamander</u>

Neither California red-legged frogs nor California tiger salamanders have been observed within the action area. However, biologists observed six occurrences of California tiger salamanders within 3.1 miles of the action area, some of which contain salamanders that are hybridized with nonnative salamanders (CNDDB 2021). Within one mile of the action area, biologists observed one California red-legged frog in 2021 (CNDDB 2021) and eight California red-legged frog adults and one metamorph between 2002 and 2004 (EMC Planning Group Inc. 2020). Due to the proximity of these observations, it is possible for California red-legged frogs and California

tiger salamanders to be present in the action area. Both species may disperse through the action area or use the drainage ditches as wet refugia. Both species may use the small mammal burrows for shelter, and California tiger salamanders may use the burrows for aestivation.

Recovery

California Red-legged Frog

The action area is within the Diablo Range and Salinas Valley Recovery Unit, described in the recovery plan for the California red-legged frog (Service 2002, 49 pp.). Threats to California red-legged frogs in the Diablo Range and Salinas Valley Recovery Unit include agriculture, livestock, mining, non-native species, recreation, urbanization, and water management activities and structures including diversions and reservoirs. The species' recovery status at the time the recovery plan was published was listed as medium.

California Tiger Salamander

The action area is within the Central Coast Range Recovery Unit. Some habitat protection has occurred within this recovery unit; however, most populations are not protected and have not been monitored for population status, trends, and threats. The primary threat to populations within this recovery unit is hybridization with nonnative tiger salamanders. Maintaining the native genetic integrity of central California tiger salamanders within this recovery unit is a priority.

EFFECTS OF THE ACTION

The implementing regulations for section 7(a)(2) define effects of the action as "all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action" (50 CFR 402.02).

Effects of the Proposed Action on the California Red-legged Frog and California Tiger Salamander

Project activities would directly affect California red-legged frogs and California tiger salamanders within the action area. However, effects to California red-legged frogs and California tiger salamanders would be reduced with the implementation of the proposed conservation measures. Injury or mortality could occur from animals being crushed by heavy equipment, vehicles, debris, and worker foot traffic and from activities such as the relocation of the existing agricultural ditch, construction of new drainage ditches and culverts, and filling of the existing ditches with clean material and removal of old culverts. Adults and juvenile California red-legged frogs and California tiger salamanders could become trapped and die in

upland sheltering habitat or be exposed to predators if burrows or other refugia are crushed or covered. Preconstruction surveys, capture and relocation of individuals before work commences would help minimize these effects. Hand removal of emergent aquatic vegetation to reduce cover prior to the onset of work should also lower the likelihood of the presence of California red-legged frogs and California tiger salamanders during project activities.

California tiger salamanders could be injured or killed during burrow and crevice excavation. Injury or mortality could occur from salamanders being crushed by equipment or collapsed burrows. However, having the assistance of Service-approved biologists with experience in burrow excavation do this work will minimize the effects of burrow excavation.

California red-legged frogs and California tiger salamanders may also be injured or killed by capture and relocation. They could be crushed by equipment or personnel, mishandled, subjected to physiological stress such as being held out of the water, exposed to pathogens or contaminants, or released into unsuitable habitat. However, the assistance of Service-approved biologists to do this work will minimize the effects of capture and relocation.

Long segments of exclusion fence may hinder the movements of dispersing California tiger salamanders and California red-legged frogs, and they may remain along the fence. This may expose them to predators or desiccation, leading to injury or mortality. The effects of the exclusion fence will be reduced by regular surveys of the exclusion fence by Service-approved biologists and designated monitors.

Uninformed workers have the potential to adversely affect California red-legged frogs and California tiger salamanders by killing, injuring or disturbing individuals. The potential for this to occur would be reduced by educating workers on the presence and protected status of these species and the measures that are being implemented to protect them during project activities. The use of flagging to demarcate project areas would further reduce these potential effects by preventing workers from encroaching into environmentally sensitive upland or aquatic habitats.

Removal of sediment and emergent vegetation from waterways may have indirect effects on water quality in the action area downstream of the project area. Implementing best management practices to control erosion and sedimentation, and locating equipment and materials outside of wetted areas, would reduce these effects. These effects will be further minimized by the Corps' and the City's implementation of measures to prevent suspended sediment from moving downstream.

California red-legged frogs and California tiger salamanders may experience a disruption of normal behavioral patterns from worker foot traffic and activities and their associated noise and vibration. This disruption could cause individuals to leave or avoid suitable habitat and may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles. Pre-construction surveys, conducting activities in the dry season, and relocation of individuals prior to project activities would limit these effects.

California red-legged frogs and California tiger salamanders could become trapped and die in excavated or backfilled ditches and trenches. Covering ditches and trenches each night to prevent entrapment of California red-legged frogs and California tiger salamanders should minimize this effect. Domestic animals, including pets, could disturb, injure or kill California red-legged frogs and California tiger salamanders if allowed at construction sites. Improperly impounding water may attract California red-legged frogs and California tiger salamanders, which could be injured or killed if additional water is added or removed.

Stockpiles of removed sediment and erosion control materials stored onsite can attract California red-legged frogs and California tiger salamanders seeking upland refugia, and lead to injury or death if individuals become entrapped or are present when these materials are moved. Surrounding active construction sites with exclusion fencing would reduce these effects. Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade aquatic or upland habitat to the extent where California red-legged frogs and California tiger salamanders are injured or killed. The potential for this effect to occur would be reduced by informing workers of the importance of preventing hazardous materials from entering the environment, locating staging and fueling areas away from aquatic habitat, and by having an effective spill response plan and materials in place in the action area.

Trash left during or after project activities could attract predators to the action area, which could in turn prey upon California red-legged frogs and California tiger salamanders. For example, raccoons (*Procyon lotor*) and feral cats (*Felis catus*) are attracted to trash and prey opportunistically on the California red-legged frogs and California tiger salamanders (Service 2002, p. 66). We expect this potential effect would be reduced or avoided by the control of waste products at all work sites.

The proposed project would relocate the 0.12-acre drainage that serves as non-breeding aquatic habitat. The ditch would be permanently moved 100 feet north, and the acreage of the ditch would be maintained at 0.12 acre (J. Walther, EMC Planning Group, pers. comm. 2023).

Therefore, it is likely it would continue to provide moist refugia for California red-legged frogs and California tiger salamanders, but the water flow or volume may be different from before the project, and the aquatic vegetation would be removed. It is possible that aquatic vegetation may grow in the new segment of drainage ditch over time, providing refugia for amphibians.

The project would impact low-quality upland habitat for the California red-legged frog and California tiger salamander. The project would temporarily impact 13.57 acres of low-quality upland habitat. The upland habitat is made up of active farmland, and it would return to active farmland after the project. Therefore, amphibians would experience a temporary loss of dispersal habitat and shelter availability due to the project. The project would permanently impact 10.38 acres of low-quality upland habitat that amphibians may use for dispersal or shelter. The City will mitigate for the permanent loss of habitat by purchasing upland habitat credits at Sparling Ranch Conservation Bank for California red-legged frog and California

tiger salamander at a 2:1 ratio of area preserved to area impacted for permanent impacts. The credits will conserve habitat that is of higher quality than the habitat that is permanently lost due to the project.

Effects on Recovery

California Red-legged Frog and California Tiger Salamander

We anticipate that effects on recovery of the California red-legged frog and California tiger salamander from the proposed project would be minimal with implementation of the conservation measures. The project would result in a minor increase in urbanization, which is a threat for California red-legged frog in the Diablo Range and Salinas Valley Recovery Unit. The project would not increase the threat of hybridization with nonnative salamanders, which is the main threat for California tiger salamanders in the Central Coast Range Recovery Unit. The project would not preclude the Service's ability to implement recovery actions in these recovery units.

Although the proposed project would temporarily impact 13.57 acres and permanently impact 10.38 acres of low-quality upland habitat, we expect the project to contribute to the recovery of both species over the long term. The City will mitigate for permanent impacts at a 2:1 ratio of acres conserved to acres impacted. This will result in approximately 20.76 acres of upland habitat conserved for California red-legged frogs and California tiger salamanders. The City will purchase credits at Sparling Ranch Conservation Bank, providing compensation with habitat that is higher quality than the habitat permanently lost from the project.

Summary of Effects

California Red-legged Frog and California Tiger Salamander

Project activities would adversely affect California red-legged frogs and California tiger salamanders. The proposed project would affect juvenile and adult life stages of the California red-legged frog and California tiger salamander if present in the action area, given the proximity of project areas to documented occurrences, presence of upland and dispersal habitat in the action area, and potential overlap of some project activities with periods when frogs and salamanders may be active. However, the Corps and the City proposed avoidance and minimization measures that would reduce project effects. Based on these factors we anticipate that few California red-legged frogs and California tiger salamanders are likely to be injured or killed during project activities, and that the project will not appreciably affect the recovery of both species.

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. We do not consider future Federal actions that are unrelated to the proposed action in this section because

they require separate consultation pursuant to section 7 of the Act. We are not aware of any non-Federal actions that are reasonably certain to occur in the action area.

CONCLUSION

The regulatory definition of "to jeopardize the continued existence of the species" focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the California red-legged frog and California tiger salamander statuses as the basis to assess the overall effect of the proposed action on these species.

California red-legged frog and California tiger salamander

Reproduction

The action area does not contain potential breeding habitat, and therefore we do not expect the proposed action to impact eggs, larva, or tadpoles. The Corps and the City propose to conduct initial site clearing and grading only during the dry season, which will minimize effects to dispersing individuals seeking breeding opportunities. Therefore, we conclude that the proposed project activities would not reduce the reproduction of California red-legged frog and California tiger salamander locally or rangewide.

Numbers

In the Effects of the Action section of this biological opinion, we state that some injury or mortality of California red-legged frog and California tiger salamander could occur during project activities, or as a result of capturing and relocating California red-legged frogs and California tiger salamanders. We expect such injury and mortality to be very infrequent, primarily due to the minimization measures implemented by the City. Therefore, we expect that loss of individuals, if any, would not appreciably reduce the species' numbers locally or rangewide.

Distribution

Project activities would permanently reduce upland habitat for California red-legged frogs and California tiger salamanders. However, these impacts are a small portion of the habitat available in the local vicinity and an even smaller proportion of the habitat available in the species' geographic range. We expect that over time, any individuals displaced by project activities would recolonize areas of temporary disturbance. Despite any habitat alterations that may result from the project activities, the California red-legged frog and California tiger salamander would still occupy the aquatic features within the one-mile project buffer. We do not expect the Corps' proposed activities to reduce the species' distribution because the California red-legged frog and California tiger salamander would occupy its current geographic

distribution. Thus, we conclude that the proposed action would not appreciably reduce the distribution of California red-legged frog and California tiger salamander locally or rangewide.

Recovery

As described in the Effects of the Action section, the proposed project has been designed to minimize effects to California red-legged frog and California tiger salamander by implementing a suite of conservation measures, including mitigation for the loss of habitat. We have determined that the effects to California red-legged frog and California tiger salamander and their habitat would not be substantial on either a local or rangewide basis. Therefore, the proposed action would not appreciably diminish the species' likelihood of recovery.

Conclusion for California Red-legged Frog and California Tiger Salamander

After reviewing the current status of the California red-legged frog and California tiger salamander, the environmental baseline for the action area, the effects of the proposed project and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of both the California red-legged frog and California tiger salamander because:

1. The project would not appreciably reduce reproduction of either of the species either locally or rangewide.

2. The project would affect a very small number of individuals and would not appreciably reduce numbers of either of the species at the local level or rangewide.

3. The project would not appreciably reduce either species' distribution either locally or rangewide.

4. The project would not cause any effects that would preclude our ability to recover either of the species locally or within its range.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential 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 the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

This incidental take statement is based upon the proposed action occurring as described in the accompanying biological opinion. Take of listed species in accordance with this incidental take statement is exempted under section 7(o)(2) of the Act. The Corps must ensure that the applicant implements the proposed action as described in this biological opinion and undertake the non-discretionary measures described below; otherwise, the exemption provided under section 7(o)(2) of the Act may lapse. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps: (1) fails to assume and implement the terms and conditions, or (2) fails to require the City to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the City and Corps must report the progress of its action and the impact on the species to the Service as specified in this incidental take statement (50 CFR 402.14(i)(3)).

AMOUNT OR EXTENT OF TAKE

We anticipate that some California red-legged frogs and California tiger salamanders could be taken as a result of the proposed action. We expect the incidental take to be in the form of capture during relocation activities, and in the form of injury or death if individuals are accidentally injured or killed during capture and relocation, or cannot be collected for relocation and remain in project areas.

We cannot quantify the precise number of California red-legged frogs and California tiger salamanders that may be taken as a result of the Corps' proposed action because species move over time; for example, animals may enter or leave the action area after the time of pre-activity surveys. California red-legged frogs and California tiger salamanders may be difficult to detect due to their cryptic nature, small body size, and low mobility. California red-legged frogs and California tiger salamanders also may be difficult to detect due to their use of aquatic habitats, underground burrows, or dense cover. Animals injured or killed during relocation efforts are likely to be observed; however, mortality from other sources, including the indirect effects of relocation (e.g., inability to find food in a new location) or displacement from the action area, would be difficult to observe. Finding a dead or injured California red-legged frog and California tiger salamander may also be unlikely due to their small size, cryptic coloration and potential to be quickly scavenged. The protective measures proposed by the Corps and the City are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of California red-legged frogs and California tiger salamanders that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects of the Action sections of this biological opinion indicate that adverse effects to California red-legged frog and California tiger salamander would likely be low given the nature of the proposed activities, and we, therefore, anticipate that take of California red-legged frog and California tiger salamander would also be low. We also recognize that for every California red-legged frog and California tiger salamander found dead or injured, other individuals may be killed or injured that are not detected, so when we

determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, if three (3) adults or juveniles of California tiger salamander are found dead or injured, or are killed or injured during capture and relocation, the Corps must contact our office immediately to reinitiate formal consultation.

Furthermore, if three (3) adults or juveniles of the California red-legged frog are found dead or injured, or are killed or injured during capture and relocation, the Corps must contact our office immediately to reinitiate formal consultation.

Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9.

REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary and must be undertaken by the Corps or made binding conditions of the permit issued to the City, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the City to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the effect of incidental take, the Corps or the City must report the progress of the action and its effect on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)]. The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the effects of the incidental take of California red-legged frog and California tiger salamander:

1. The Corps must communicate with the City on future maintenance activities and implement specific project activity restrictions.

2. Biologists must be authorized by the Service before they implement conservation measures for the California red-legged frog and California tiger salamander, including but not limited to conducting surveys, excavating burrows, and capturing and relocating individuals.

3. The Service must be notified of the initiation of the project activities and provide access to the project site upon request.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures

described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

    a. The Corps will inform the City that future maintenance activities, including vegetation maintenance consisting of mechanical removal and herbicide application that may affect California red-legged frogs and California tiger salamanders and require fill-discharge within the waters of the U.S., will require the Corps to complete a section 7 consultation with the Service. If there is no Federal nexus, the Corps will advise the applicant to contact the Service directly to consult under section 10(a)(1)(B) of the Act.

    b. The Corps and the City will not impound water in a manner that may attract California red-legged frogs.

2. The following term and condition implements reasonable and prudent measure 2:

    a. The Corps or the City must request our approval of any biologists that they, the applicant, or their contractors employ to conduct project activities associated with the California red-legged frog or California tiger salamander pursuant to this biological opinion. Such requests must include the Service's reference number of 2022-0079978-S7-001 and be communicated by electronic mail via fw8venturasection7@fws.gov at least 30 days prior to any such activities being conducted. Please be advised that possession of a 10(a)(1)(A) recovery permit for the California tiger salamander or California red-legged frog does not substitute for the implementation of this measure. Authorization of Service-approved biologists is valid for this project only.

3. The following terms and conditions implement reasonable and prudent measure 3:

    a. The City must provide the Service access to the action area to survey and inspect project activities upon request.

    b. The Corps or City must notify the Ventura Fish and Wildlife Office via electronic mail (fw8venturasection7@fws.gov) prior to conducting project activities pursuant to this biological opinion and include the Service's reference number of 2022-0079978-S7-001 in the electronic mail.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the Corps must report the progress of the action and its effect on the species to the Service as specified in this incidental take statement. The Corps must submit a post-construction report for each phase of the project within 90 days of completing construction activities, which must include all monitoring reports and results. The City and

parties contracted by the City may prepare the post-construction report on behalf of the Corps, but the Corps must review the report to ensure compliance with the requirements of this biological opinion prior to submitting the report to the Service. The report should include the Service's reference number of 2022-0079978-S7-001 and be sent to fw8venturasection7@fws.gov. The report must describe project activities conducted under this biological opinion, including conservation measures described in the proposed action, and discuss any problems that were encountered in implementing conservation measures or terms and conditions and any other pertinent information. The report must also document all effects to California red-legged frogs and California tiger salamanders, including the following information:

The report must document the number of California red-legged frogs and California tiger salamanders observed, captured and relocated during the project, and the number killed or injured during project activities, if any; the dates and times of capture, mortality, or injury; specific locations and circumstances of capture, mortality, or injury; approximate size and life stage of individuals; and a description and map of relocation sites.

Furthermore, the Corps must, by January 30 following each year the authorization is in effect, provide an annual summary of these post-construction reports describing the activities that occur and their effects on covered species. The report must include confirmation that credits were purchased from Sparling Ranch Conservation Bank, such as a copy of the Bill of Sale(s) and Payment Receipt as described on pages 10 and 23-24 of this biological opinion. The report should include the Service's reference number of 2022-0079978-S7-001 and should be sent to fw8venturasection7@fws.gov. The Corps must report all observations of federally listed species to the California Department of Fish and Wildlife for inclusion in the California Natural Diversity Database.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured California red-legged frog or California tiger salamander, initial notification within 3 working days of its finding must be made by in writing to the Ventura Fish and Wildlife Office (fw8venturasection7@fws.gov). The report must include the Service's reference number for the biological opinion, date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

The Corps or the City must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The Corps or the City must transport injured animals to a qualified veterinarian. Should any treated California red-legged frog or California tiger salamander survive, the Corps or the City must contact the Service regarding the final disposition of the animal(s). The remains of any California red-legged frogs and California tiger salamanders must be placed with the Santa Barbara Natural History Museum, contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93105; (805) 682-4711, extension 321. The Corps or the City should make arrangements with

the Museum regarding proper disposition of potential museum specimens prior to the commencement of project activities. In the case of take or suspected take of listed species not exempted in this biological opinion, the Ventura Fish and Wildlife Office must be notified within 24 hours.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The conservation recommendations below are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information and can be used by the Corps to fulfill their 7(a)(1) obligations.

1. We recommend that dead California red-legged frogs and California tiger salamanders found in the action area be tested for amphibian disease.

2. For the purpose of investigating hybridization, we recommend that dead California tiger salamanders undergo genetic analysis, given that 30 hybrid larvae were recorded in nearby ponds.

3. The Corps should investigate the efficacy of capturing and moving of California red-legged frogs and California tiger salamanders to determine the extent that this minimization measure reduces adverse effects of project activities on the species. As part of this, information on repeat capture and behavior of individuals post-movement should be noted.

4. As a Federal agency, the Corps should promote the conservation of all federally listed species per section 7(a)1 of the Act. Mitigation that is intended to offset take of listed species or the loss of their habitat should not only offset the effects of the proposed action, but promote the recovery of listed species. We are available to assist you with expanding mitigation opportunities or developing conservation actions. You also can use the Service's recovery plans and 5-year reviews, as guidance, where we outline actions needed to promote conservation of listed species. The Act defines "conservation" as "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary."

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in your request dated September 8, 2022. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where

discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Danielle Clearwater of my staff by electronic mail at danielle_clearwater@fws.gov.

Sincerely,

STEPHEN HENRY Digitally signed by STEPHEN HENRY
Date: 2023.04.24 15:58:14 -07'00'

Stephen P. Henry
Field Supervisor

Enclosure

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The Declining Amphibian Populations Task Force Fieldwork Code of Practice

A. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse cleaned items with sterilized (e.g., boiled or treated) water before leaving each work site.

B. Boots, nets, traps, and other types of equipment used in the aquatic environment should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond. wetland, or riparian area.

C. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or "base camp" Elsewhere, when washing-machine facilities are available, remove nets from poles and wash in a protective mesh laundry bag with bleach on the "delicates" cycle.

D. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable gloves[1] and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean them as directed above and store separately at the end of each field day.

E. When amphibians are collected, ensure that animals from different sites are kept separately and take great care to avoid indirect contact (e.g., via handling, reuse of containers) between them or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected and disposable husbandry equipment.

F. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

G. Used cleaning materials and fluids should be disposed of safely and, if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK. E-mail: DAPTF@open.ac.uk Fax: +44 (0) 1908-654167

[1] Latex gloves should not be used. They are toxic to amphibians. Use vinyl or nitrile disposable gloves instead.