APPENDIX R:

CONSULTATION WITH THE U.S. FISH AND WILDLIFE SERVICE

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
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Sacramento, California 95825-1846

In Reply Refer to:
FF08ESMF00-
2015-F-0201

MAR 11 2015

Memorandum

To: Park Superintendent, Sequoia and Kings Canyon National Parks, National Park Service, California (~~Attn:~~ Nancy Hendricks)

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

Subject: Biological Opinion on the Wilderness Stewardship Plan in Sequoia and Kings Canyon National Parks for the Endangered Mountain Yellow-legged Frog, Endangered Sierra Nevada Yellow-legged Frog, and the Threatened Yosemite Toad

This is in response to your June 30, 2014, request for formal consultation with the U. S. Fish and Wildlife Service (Service) on the Wilderness Stewardship Plan in Sequoia and Kings Canyon National Parks in California. At issue are the adverse effects on the endangered Northern Distinct Population Segment of the mountain yellow-legged frog (*Rana muscosa*), endangered Sierra Nevada yellow-legged frog (*Rana sierrae*), and the threatened Yosemite toad (*Anaxyrus canorus*). Your letter was received by the Service on June 30, 2014. This biological opinion is issued under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

Many of the published peer-reviewed papers and unpublished reports on the Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog were issued prior to the analysis and taxonomic reclassification by Vredenburg *et al.* (2007). These two species have undergone elevation of subspecies and other changes in their systematics and taxonomy; possess similar morphologies, behaviors, biologies, and ecologies; and within this programmatic biological opinion when the information applies to both animals, they will be collectively referred to as "mountain yellow-legged frog."

The Service concurs with the National Park Service's determination that the proposed project may affect, but is not likely to adversely affect the endangered Sierra Nevada Distinct Population Segment of the bighorn sheep (*Ovis canadensis*) and the proposed threatened Western Distinct Population Segment of the Pacific fisher (*Martes penanti*). The Wilderness Stewardship Plan includes the following measures for the bighorn sheep: 1) New Class 1 trails will be constructed in a manner that minimizes opportunities for people to approach bighorn from above or constructed completely outside of bighorn habitat. Limiting human approaches from above would be beneficial because bighorn generally run uphill when alarmed. 2.) Increased educational efforts cautioning Park staff and visitors not to approach bighorn will be increased; and 3) Helicopter use in bighorn sheep habitat will be scheduled to avoid sensitive periods (e.g. lambing season) and would avoid flying low or landing within one mile of bighorn sheep. This concurrence is based on the determination that the activities that comprise this project will have insignificant or discountable effects on these two animals.

This biological opinion is based on: (1) letter from the National Park Service to the Service dated April 17, 2014, and attached information (Biological Assessment); (2) *Sequoia and Kings Canyon National Parks California Wilderness Stewardship Plan and Draft Environmental Impact Statement Volumes 1 and 2* dated June 2014, that was issued by the National Park Service (Plan); (3) *Status of the Mountain Yellow-legged Frog, Yosemite Toad and Pacific Chorus Frog in the Sierra Nevada, CA* prepared by the U.S. Forest Service; and (4) other information available to the Service.

During emergency activities such as wildfire suppression, the National Park Service should initiate emergency consultation in accordance with the section 7 implementation regulations as outlined in 50 CFR § 402. The Service considers the protection of firefighters and other personnel to be of paramount importance.

Consultation History

2011-2015	The National Park Service and the Service discussed the proposed project in several telephone, email, and in-person meetings.
October 15, 2014	The Service and the National Park Service discussed the proposed project on the telephone, including the project description, conservation measures, bighorn sheep, Pacific fisher, and the section 7 process.
March 3, 2015	The Service and the National Park Service discussed the bighorn sheep on the telephone.
March 6, 2015	The Service and the National Park Service discussed the project description on the telephone.
March 10, 2015	The Service and the National Park Service discussed the conservation measures on the telephone.

BIOLOGICAL OPINION

Description of the Proposed Action

Sequoia National Park and Kings Canyon National Park (Park) are administered as a single 865,964 acre unit of the National Park Service (Figure 1). The two National Parks are located on the western slope of the Sierra Nevada in east-central California from the low western foothills at approximately 1400 feet to the summit of 14,500 foot Mount Whitney. Two wilderness areas are located within SEKI, including the Sequoia-Kings Canyon Wilderness and John Krebs Wilderness. These wilderness areas, along with proposed wilderness which under policy is managed as wilderness, encompass approximately 97percent of the Parks. The entirety of Sequoia and Kings Canyon

National Parks is within Tulare and Fresno counties in California. Eleven additional peaks over 14,000 feet are located along the eastern boundaries. A wide variety of habitats occur across the elevation gradient including chaparral- and oak-dominated communities in the foothills, mixed conifer and giant sequoia groves at mid-elevations, red fir and lodgepole pine forests in the subalpine zone, and alpine lakes surrounded by granite peaks at the highest elevations

The goal of the Wilderness Stewardship Plan is to encourage wilderness use and minimize restrictions while preserving wilderness character. The Wilderness Stewardship Plan will provide management direction for two designated wilderness areas, several potential wilderness additions, and an area of proposed wilderness. The total designated wilderness in Sequoia and Kings Canyon National Parks is 808,078 acres, approximately 93.3 percent of the Parks' total of 865,964 acres. In addition, because the southern end of the Hockett Plateau (approximately 29,500 acres) remains proposed wilderness, it is managed as wilderness. The Parks also contain several designated potential wilderness additions, including the area around the Pear Lake Ski Hut and Bearpaw Meadow High Sierra Camp. These would become wilderness when and if the non-conforming activities (e.g., commercial enterprise) and/or facilities are removed. Altogether, designated and proposed wilderness areas comprise nearly 97 percent of the total acreage of Sequoia and Kings Canyon National Parks. Wilderness Acreages in Sequoia and Kings Canyon National Parks:

There are eleven elements that comprise the Wilderness Stewardship Plan:

1. Visitor-use Levels: The Wilderness Stewardship Plan will retain existing types and levels of use that would be allowed in wilderness in an attempt to provide opportunities and access for appropriate wilderness experiences. Limited and targeted controls would be applied only in those areas where levels and types of use may be leading to some localized degradation of wilderness character. The overnight visitor capacity would be set at 134,000 Visitor Use Days. Ten-year average overnight use would be limited to 108,000–114,000 Visitor Use Days/year. To ensure that there are opportunities for solitude, the Parks would adopt a measure of the number of people encountered per hour (EPH) on trails and would take action based on established standards. The standards would vary depending on the desired condition of solitude in a given area. For this measure, each trail would be assigned to one of four encounter-rate standards: very high use (primarily Mount Whitney and day-use areas), high use (generally Class 3 trails, with some exceptions), moderate use (generally Class 2 trails, with some exceptions), and low use (generally Class 1 trails, with some exceptions).

   Daily trailhead quotas would not change at this time, with the possibility of some future quota reductions in specific targeted areas. Areas to be monitored for continued acceptable levels of use that may require a future trailhead quota change include Bishop Pass (Dusy Basin), Bubbs Creek (Rae Lakes Loop), Cottonwood Lakes / New Army Pass (Mount Whitney and Mount Langley), Cottonwood Pass (Mount Whitney), Lamarck Col (Darwin Canyon), HST (from Crescent Meadow and Wolverton), Lakes Trail (Emerald and Pear lakes), Sawtooth Trail (Monarch Lakes), and Woods Creek (Rae Lakes Loop).

   Visitors entering Park wilderness via trailheads managed by Sequoia-Kings Canyon National Parks on the west side of the Parks would be subject to established quotas regardless of whether they were traveling as private individuals or groups, or with support from commercial service providers. Quotas could only be exceeded on rare occasions through a formal request to, and approval by, the superintendent.

Those visitors entering the Parks' wilderness via trailheads managed by the Forest Service on the east side of the Parks are subject to the trailhead quotas of Inyo National Forest. Most of these quotas are "combined" (i.e., one quota for both private and commercially supported users), and some are "split" (i.e., separate quotas for private users and commercially supported users). Visitors also enter the Parks' wilderness from more distant Yosemite National Park and Forest Service managed trailheads (e.g., Sierra and Sequoia National Forests), some of which have quotas and some of which do not. These visitors are subject to the entry policies of the agency issuing the permits at the trailhead.

Current destination quotas at Emerald and Pear lakes would continue to apply. Additional destination quotas may be added to protect wilderness character at specific locations such as Bearpaw Meadow, Dusy Basin, Guitar Lake, Hamilton Lake, Monarch Lakes, Rae Lakes, and other areas.

No day-use permits or quotas would be implemented at this time but they may be considered in the future in popular areas to achieve desired conditions.

The National Park Service would continue to work with the Forest Service to manage and improve the quota and permitting systems (e.g., adjust the Mount Whitney exit quota), to add trailheads currently not included in the quota system (e.g., Tehipite Valley and Kern River), and on other relevant cooperative cross-boundary wilderness-management issues.

2. Trails: Most of the approximately 650 miles of wilderness trails in Sequoia and Kings Canyon National Parks are already designated and constructed. A few existing trail segments are inadequately constructed to support projected use and will be target for further development. Some trails are more developed than projected use patterns require, and they will be maintained to a lower development class. A few trails will be designated hiking-only where there are threats to sensitive resources or visitor safety issues. Where the designated unmaintained routes listed in the 1986 Stock Use Meadow Monitoring Plan are still passable to stock, and where stock travel does not pose undue threats to natural and cultural resources they would be designated as Class 1 trails and targeted for appropriate construction and maintenance.

3. Campfires: Recreational campfires would be allowed in the foothill and montane forest areas where adequate wood supplies exist. To protect downed wood resources, campfires would be prohibited in most of the high-elevation forests and woodlands. In areas where available wood could be burned without unduly depleting ground fuels or consuming paleo resources, variances could be established for specific areas above these elevations in the future. In addition, site-specific prohibitions would be implemented where downed wood resources cannot sustain campfires, including: Hamilton Lakes, Mineral King Valley, Pinto Lake, and Redwood Canyon. Recreational campfires will be allowed up to 10,000 feet in the San Joaquin, Kern, and Kings River drainages, and up to 9,000 feet in the Kaweah and Tule River drainages. The proposed action allows recreational campfires in 395,710 acres of the 837,806 acres of wilderness in the Parks (47percent of the wilderness).

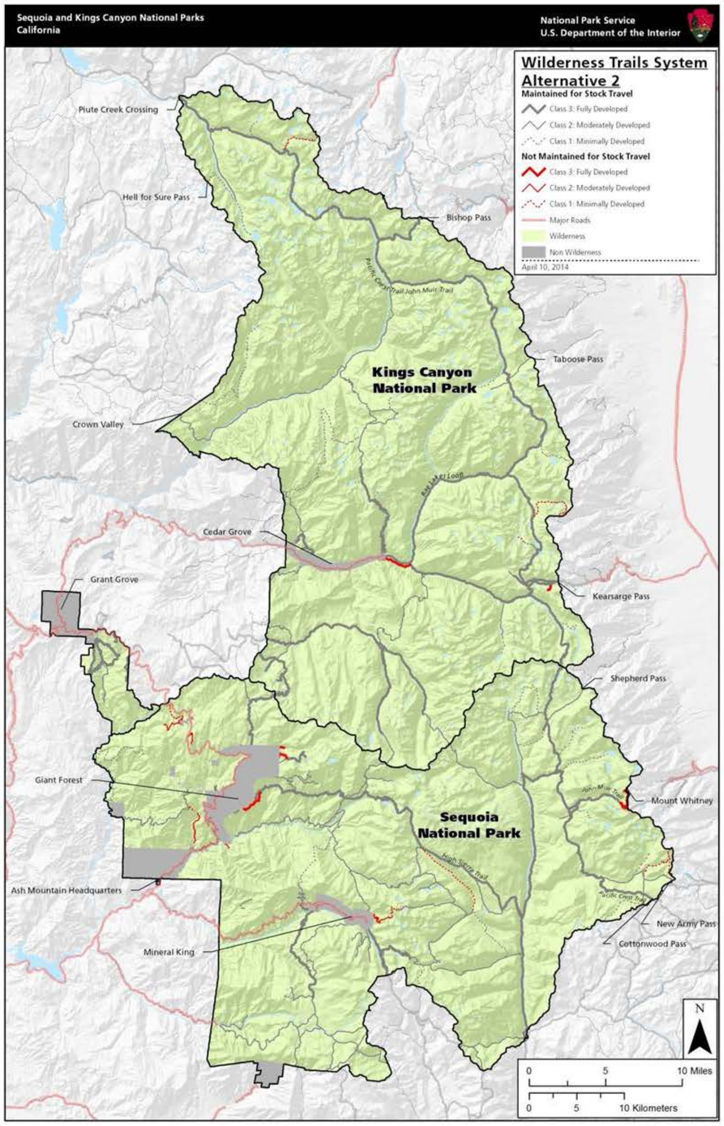

Figure 1: Wilderness Trail System at Sequoia and Kings Canyon National Parks. The trails are constructed and currently in use.

4. Food Storage: Portable containers would be required for overnight use at North Dome, Dusy Basin, Rae Lakes Loop and Rock Creek areas, and may be required in other areas in the future in response to increased incidents. In areas where portable containers are not required, counterbalance hanging would be allowed.

   Food-storage boxes would be retained at the most popular areas and new ones would be considered for areas meeting criteria for placement (e.g., Rae Lakes Loop and HST). Criteria for retention or placement include proximity to trailheads, area visitation levels, quality of bear habitat, and frequency and severity of historic incidents. Where criteria are not met, the undeveloped quality of wilderness character would be improved by removing food-storage boxes. In the future, additional food-storage boxes may be installed in response to site-specific issues or incidents.

   The Wilderness Stewardship Plan will retain 48 of the existing 86 food-storage boxes, and 25 would be removed. An additional 13 food-storage boxes would be considered for removal. Prior to removal of the additional 13, the Park would test the areas by temporarily locking food-storage boxes and/or by establishing a container requirement for visitors. If the testing is successful, the food-storage boxes would be removed. There may be additional food-storage boxes located in wilderness that have not been documented.

5. Human-waste Management: Cat-holes will be required where there are no privies or toilets. Requirements to pack out used toilet paper will be retained. Pack-out waste kits will be recommended for use in popular areas or where privies or restrooms are not feasible (e.g., lack of suitable soils, archeological concerns, or other resource concerns). Pack-out waste kits may be required in specific areas to minimize the need for privies and restrooms.

   Existing privies and restrooms will be evaluated and when they are beyond reasonable repair, or if they are located in unsuitable locations (low-use, close-in areas, where soils allow for cat-holes), they will be removed. The remaining privies would be retained and maintained. New privies will be considered for a few popular day-use areas where other methods have proved unsuccessful.

   Ten public-use privies will be retained, including Bearpaw Meadow (2), Crabtree, Franklin Lake, Kern Hot Spring, Monarch Lake, Paradise Valley (2), Roaring River, and Woods Creek Crossing. Seven public-use privies would be removed including privies in the Bearpaw Meadow area, Hockett, Middle Paradise, Sphinx, Roaring River (2) and Upper Funston areas. One public-use privy will be added at Rock Creek Crossing.

   Three additional public-use privies may be removed at Eagle Lake, Mosquito Lake, and Twin Lakes, but only after pack-out waste kits prove successful in the test areas. The public-use restroom buildings at Emerald and Pear lakes may be removed in the future if maintenance of the facility becomes cost prohibitive or if repairs or renovations are not cost efficient.

   The National Park Service will consider future implementation of new technologies for human-waste management as they are developed. The use of new technologies may require site-specific planning and compliance. Some technologies may require visitors to be more self-sufficient.

6. Party Size: The Wilderness Stewardship Plan includes party-size limits for people and stock. These limits are based on three numbers: the total number of people, the total number of stock, and the combined total of people and stock. The party-size limits differ for on-trail and off-trail travel. The total number of people allowed per party will be the same for hikers and stock users and is limited primarily to protect opportunities for solitude. The total number of stock allowed per party is limited primarily to protect the natural quality of wilderness in campsites, stock tie areas, and off-trail travel areas. The combined total of people and stock allowed in a party may be lower than the sum of the maximum allowed numbers of people and stock; it is limited primarily to protect opportunities for solitude and to control impacts from very large groups on the natural quality at camps.

   The maximum party sizes for Day Rides is 20 people, 20 stock, with a combined maximum of 40; On-Trail is 15 people, 20 stock, with a combined maximum of 28; and Off-Trail is 12 people, 12 stock, with a combined maximum of 14.

   The Wilderness Stewardship Plan keeps the current maximum numbers of people and stock for on-trail travel, but reduces the combined party size. Lower party-size limits are set for off-trail travel to preserve opportunities for solitude and to discourage development of informal trails. The combined party size for stock plus people is reduced to prevent impacts on solitude by the largest stock parties. Party-size limits for hikers would apply to boaters.

7. Camping/Campsites and Night Limits: Camping will be allowed in specific areas close to the front country (e.g., Colony Mill Trail, Don Cecil Trail, and North Dome) to allow a greater diversity of recreational opportunities where risks to resources are low. One or more universally accessible campsites will be constructed closer to a trailhead (e.g., near the confluence of Bubbs Creek and the South Fork Kings River), designed to meet wilderness standards.

   The locations of established stock camps will be identified and the National Park Service would recommend their use. In specific popular areas, stock users may be required to camp in designated stock camps. These areas may include Woods Creek Crossing, Rock Creek Crossing, and Big Pete Meadow. If an area is designated as a required stock camping site/area, backpacker camping will be prohibited. Criteria used for establishing stock-only campsites will include the areas' historic visitation by both backpackers and stock users.

   a. First Allowable Campsite: Camping is prohibited on these trails prior to the listed first-camp locations.

   b. Length of Stay/Night Limits for All Campers (stock-supported and backpackers): Campers will be limited to stays of 14 consecutive nights at a single location, 25 total nights per trip, and 75 total nights per year.

c. Designated Campsites: The use of designated campsites/camp areas will be mandatory in areas where past visitation has impacted resources, including Emerald and Pear lakes, Lower Paradise Valley, and Bearpaw Meadow. There will no longer be designated campsites in Middle and Upper Paradise Valley. Additional designated camp areas may be established in areas where concentrated use and limited campsites could create a risk of rapidly increasing physical or social campsite impacts. Areas to be monitored for a potential future change include Dusy Basin, Guitar Lake, Kearsarge Lakes Basin, Middle and Upper Rae Lakes, and Woods Creek Crossing. Designation of campsites or areas will require site-specific analysis to address issues such as hazard trees and archeological resources. The campsites at Upper and Lower Funston Meadows will no longer be designated for use by stock users only.

d. Campsite Condition Standards: The measure of campsite condition will be adopted to ensure that the number of campsites and their condition does not exceed standards. The metric of aggregate campsite impacts or Weighted Value per Campable Mile, will be used to measure campsite condition. Each area of the Park will be assigned to one of three levels of a campsite condition standard based on desired conditions: high use, moderate use, or low use. These areas, or subzones, are based on long-established wilderness travel zones, each of which is comprised of several subzones. The metric will be calculated at the subzone level. Each subzone has a specified Weighted Value per Campable Mile that serves as a standard. Under the proposed action, the standard will be 1000 for high use subzones, 500 for moderate use subzones, and 250 for low use subzones. A monitoring plan will be developed to establish protocols and schedule monitoring frequencies to ensure that subzones remain within their applied standard.

Under the standards developed for the proposed action, two subzones (83-1 Guitar Lake and 86-1 Kern Hot Spring) will be out of standard in the higher use category, and one subzone (80-3 Shepherd Pass Lake) would be out of standard in the moderate category. All other subzones will be within standard.

8. Stock Use: Visitors will have opportunities to travel with stock (horses, mules, burros, and llamas), from day rides to multi-day trips, in a manner that ensures the protection of wilderness character. Access and grazing will be managed to protect resources, provide other types of primitive recreation, and reduce conflict of user groups. The number of meadows available to grazing will be reduced.

a. On-trail: Visitors traveling with stock will continue to have access to most maintained trails in the Parks (650 of 691 miles). Stock parties will be allowed to travel up to 0.5 mile from trails in areas where they are allowed to camp. In areas open to day-use only, stock parties will be allowed to travel up to 100 yards from trails.

Approximately 530 miles of maintained trails will be open to camping with stock. Some trails will be open to stock parties for travel only, some would be open to camping for walking parties with burros and llamas but limited to travel only for parties with horses or mules, and some will be closed to stock travel entirely for reasons including visitor safety, resource protection, and/or popular day-use by hikers.

b. Off-trail: Stock parties will continue to be allowed to travel up to 0.5 mile from trails to reach camps. Travel more than 0.5 mile from maintained trails will continue to be allowed in four areas of the Parks: on the Hockett Plateau, on the Monarch Divide, in the Roaring River drainage, and along the western side of the Kern River watershed south from the Chagoopa Plateau.

c. Stock Grazing: Grazing will be managed to maximize protection of resources while allowing visitors traveling with stock continued access to forage. Grazing generally will be allowed in areas open to camping with stock (within 0.5 mile of maintained trails open to overnight stock use or in off-trail travel areas). Grazing will not be allowed in those areas open to stock travel only.

Grazing will be managed and informed by the results of the Stock Use and Meadow Monitoring and Management Strategy. Traditional methods of adjusting use levels and patterns will continue to be employed when necessary, including: adjusting the number of nights a given party may graze an area; adjusting the number of stock per party that may graze an area; adjusting opening dates to reflect moisture conditions, which are designed to prevent unacceptable mechanical disturbance to surface soil and vegetation; and temporarily closing an area to stock access or grazing.

Estimated grazing capacities for wilderness meadows have been developed using a model of biomass production and forage consumption that takes into account the elevation, soil moisture, and condition of the meadow. These capacities will continue to be used to inform grazing management, and will be refined as additional information is acquired. The capacity of individual meadows and uplands to sustain grazing will continue to be informed by each meadow's vulnerability to erosion or change in hydrologic function, susceptibility to invasion by nonnative plants, habitat requirements of sensitive plants and animals, productivity and the ability to sustain herbage removal, and the requirements of unique ecological communities such as peat-accumulating wetlands. Site-specific grazing capacities will be refined on an ongoing basis to protect resource integrity and to protect the natural quality of wilderness in the face of a changing climate.

These capacities also reflect the logistical importance of key meadows and forage areas for stock travel in popular areas. The methodology for developing grazing capacities for all Park meadows open for grazing, including those identified as important for those traveling with stock, is provided in the Stock Use and Meadow Monitoring Strategy in the Wilderness Stewardship Plan.

Areas closed to grazing will remain open to camping by visitors traveling with stock, but visitors will be required to hold and feed their animals. Administrative grazing will be managed to limit impacts on public grazing. With rare exceptions, visitors are given preference for limited grazing resources.

California or Nevada certified weed-free forage (baled or loose hay, hay cubes, or straw bedding) will be required when using hay products as supplemental forage or bedding in frontcountry zones. Feed carried into wilderness will be limited to commercially processed pellets, rolled grains, or fermented hay (e.g., Chaffhaye™). These products have a high level of mechanical milling, heat treatment, and/or anaerobic fermentation that result in much lower seed viability.

Baled or loose hay and compressed hay cubes, which have little to no processing, will not be allowed in wilderness.

The monitoring system described in the Wilderness Stewardship Plan will be implemented to track use, document conditions, and provide information for preventing and mitigating impacts. This monitoring program takes into account variation in annual climate, the characteristics of specific forage areas, and the inherent abilities of different species to withstand grazing and trampling pressure. Monitoring of species composition will continue in five pairs of grazed and ungrazed meadows on a five-year rotation, and repeat photography points would be updated as time and resources allow. Monitoring of residual biomass and bare ground, initiated in 1993, will continue to be implemented and the results used to inform decisions regarding grazing management. The National Park Service will continue to support research to further understand the effects of grazing on Sierran ecosystems, and to modify management of grazing and monitoring protocols as new information becomes available.

The meadows closed to grazing for scientific and social value by the 1986 Stock Use and Meadow Monitoring Plan will remain closed to grazing. The meadows closed to grazing due to high levels of visitation and resource concerns by the Stock Use and Meadow Monitoring Plan will remain closed with the exception of Tom Sears Meadow, which will be reopened to grazing.

The following additional locations which are otherwise open to overnight use will be closed to grazing due to high levels of visitation and resource concerns: Crabtree Lakes (closed to stock access and grazing above existing camp west of lowest lake), Darwin Meadow proper, Forester Lake Meadow, Guyot Creek Meadows (expanding the existing closure to the meadows east of the trail), Kern Hot Spring Meadow, Kettle Dome (Randle Corral) Meadows, Lake South America loop, Mineral King basin, Summit Lake Meadow, Upper LeConte Canyon above 10,000 feet in elevation, and Whitney Creek drainage above the Crabtree Ranger Station. Meadows associated with areas or trails closed to stock will be closed to grazing.

Recognizing that the opportunity to observe and experience ungrazed meadows is of value to many Park visitors, the following meadows along popular travel routes which are otherwise open to camping by stock will be closed to grazing: Bighorn Plateau and the meadow 0.6 mile south of Bighorn Plateau; Chagoopa Plateau #3 Meadow; Darwin Meadow; Grouse Meadow; Lower Crabtree Meadow; and Taboose Pass Meadow. These meadow closures will make it possible for visitors traveling along the JMT and HST to experience at least one ungrazed meadow in each drainage through which the trails pass. McClure Meadow will be closed to grazing until Evolution and Colby Meadows reach capacity.

Bubbs Creek below Junction Meadow, Evolution Lake to Muir Pass, Kern Headwaters, and Woods Lake Basin will be open to grazing by walking parties with burros or llamas, and closed to grazing by parties with horses or mules

Lower Whitney Creek (Strawberry) Meadow, Lower Soldier Lake Meadow, and Upper Vidette Meadow will be open to grazing by private parties only.

Hockett Pasture, JR Pasture, Kern Ranger Station Pastures, Lackey Pasture, and Upper Redwood Meadow will be open to administrative use and grazing only.

9. Administrative Structures: Administrative structures and developments will be the minimum necessary for the administration of wilderness, and similar to current conditions.

   a. The following ranger stations will be retained in their current locations: Crabtree, Hockett Meadow, Kern Canyon, LeConte Canyon, Little Five Lakes, McClure Meadow, Pear Lake, Rae Lakes, Roaring River, Rock Creek, Tyndall Creek

   b. The patrol cabins at Quinn, Redwood Meadow, and Simpson Meadow will be retained.

   c. Three ranger stations may be relocated, modified, considered for conversion, or replaced: Bench Lake tent platform may be moved to a more suitable location for patrol functions. Bearpaw Meadow Ranger Station will be removed and reconstructed to better meet the area's historic character. The Monarch tent platform will be converted to an administrative camp and the footprint would be reduced.

   d. Other Administrative Structures: Use of the Redwood Canyon Cabin by researchers will continue to be authorized.

   e. Administrative Pastures: Existing administrative pastures and associated structures will be retained (Hockett Meadow, Kern, Redwood Meadow, and Roaring River) in their current locale and within their current footprint.

   f. Crew Camps: Existing trail crew camps will be retained, but the number of long-term wood-storage boxes in each camp will be reduced to one. Other project crew camps for the administration of wilderness will be established as needed on a case-by-case basis with no equipment left on-site after project completion.

10. Front country Facilities to Support Wilderness Access and Use: Front country facilities that support activities in wilderness will encourage and/or facilitate visitor use and enjoyment of wilderness. Commercial service providers will be permitted to use some front country facilities, but other facilities will only be used by non-commercial or administrative entities.

    a. Kings Canyon National Park

       i. Cedar Grove Pack Station: The Cedar Grove Pack Station will continue to be operated under concession authority based on a contractual relationship with National Park Service with approved use types and levels. Stock camping sites will be developed at the Cedar Grove Pack Station primarily for private users. Holding pen/corral space, hitch rail(s), adequate Parking and turnaround space for stock trailers, campfire pit, picnic tables, restrooms, food-storage boxes, and water supply will be installed.

    b. Sequoia National Park

       i. Middle Fork Kaweah Trailhead: At the Middle Fork Kaweah Trailhead the National Park Service will provide improved Parking and turnaround space for stock trailers and a hitch rail; no other stock amenities will be provided. Commercial service providers will be allowed to use this trailhead. No camping for stock or backpackers will be allowed.

ii. Mineral King Area: The Atwell Mill Campground will be adapted to accommodate stock camping in two or three sites. Facilities may include a holding pen, hitch rail(s), table, campfire pit, picnic table, and stock trailer Parking. The sites will be maintained through an agreement between the National Park Service and a cooperating partner. Commercial service providers will be allowed to use the Atwell/Hockett trailhead.

There will be no concessions operations at the Mineral King Pack Station. Existing facilities at Mineral King administrative corrals in east Mineral King Valley will continue to be used for the Parks' administrative purposes at the existing location or at a new location to reduce and minimize environmental impacts on wetlands and water quality. Existing stock facilities may be modified to allow for short-term public camping or staging and/or short-term camping by Commercial Use Authorization holders. Modifications to the site to provide for use by private individuals and/or Commercial Use Authorization holders will include adequate Parking and turnaround space for stock trailers, a small corral, water, a picnic table, and a vault toilet or restroom. These facilities will provide for stock camping for private parties (1 to 2 sites, one- or two-night limit). The site will be maintained through an agreement between the National Park Service and a cooperating partner.

iii. North Fork Kaweah Trailhead: At the North Fork Kaweah Trailhead improved Parking and turnaround space for stock trailers and additional hitch rail(s) will be provided. Commercial service providers will be allowed to use this trailhead and controlled through conditions of a permit. The area will be maintained through an agreement between the National Park Service and a cooperating partner. No camping for stock or backpackers will be allowed.

iv. South Fork Kaweah Campground and Trailhead: The South Fork Kaweah Trailhead will be modified to improve Parking and turnaround space for stock trailers at the trailhead, and a hitching post would be provided. Use primarily will be for private users, with limited commercial use by Commercial Use Authorization holders (managed via permit conditions) and administrative users. The site will be maintained through an agreement between the National Park Service and a cooperating partner.

v. Wolverton Area (trailheads and administrative corrals): The facilities in the Wolverton area will continue to be used for the Parks' administrative purposes. The Wolverton facilities may be modified to provide for stock camping for private parties and short-term staging for commercial service providers. Facilities such as adequate Parking and turnaround space for stock trailers, corral, hitch rail(s), picnic table(s), and campfire pit will be considered. Restrooms and a water supply exist currently at the Wolverton site. The site may be maintained through an agreement between the National Park Service and private partners.

11. Commercial Services in Wilderness: Specific wilderness activities have been determined to necessitate support from commercial services consist of backing packing and hiking, stock trips, including riding, packing, day rides, and overnight camping with stock, overnight camping with gear hauling support (stock spot, and stock and porter dunnage), oversnow travel (ski and snowshoe touring and winter overnight camping), climbing and mountaineering (summer and winter), fishing, river running, and photography.

The commercial services in the Wilderness Stewardship plan are similar to current conditions. However, the levels and types of commercial services that will be allowed will be specifically limited in the Mount Whitney Management Area, which is an area of approximately 27, 200 acres around Mount Whitney within Sequoia National Park. The Bearpaw Meadow High Sierra Camp will continue to be operated at near its current level of 1,700 use days by a Park concessioner. The Pear Lake Ski Hut will continue to be operated at near its current level of 1,500 use days during the winter months as a ski hut by a cooperating association under a cooperative agreement.

Conservation Measures

The National Park Service proposes to avoid and minimize effects to the mountain yellow-legged frog and the Yosemite toad by implementing the following measures:

1. Existing trails that go through or near meadows used by the Yosemite toad will be rerouted away from those meadows, when possible.

2. National Park staff and visitors will be educated about how to avoid impacting the Yosemite toad and encouraged to exercise caution when they encounter these animals.

3. Monitoring will be used to determine if effects of visitor use on the Yosemite toad or its habitat is approaching unacceptable levels. Visitor use will be adjusted in Yosemite toad habitat to prevent or mitigate degradation.

4. Existing trails that run immediately adjacent to waters used by the mountain yellow-legged frog will be rerouted away from these areas, when possible.

5. New Class 1 trails will be designed to avoid running immediately adjacent to waters used by the mountain yellow-legged frog.

6. The National Park Service will educate hikers and stock users about the status and importance of the mountain yellow-legged frog, the National Park Service's efforts to restore and conserve them, and encourage exercising caution when they encounter the animal.

7. If monitoring detects habitats used by the mountain yellow-legged frog are being degraded due to overuse from stock grazing and/or hiker use and stock traffic, visitor use restrictions will be changed to prevent or mitigate degradation, when possible.

8. Off-trail travel will be limited near certain mountain yellow-legged frog populations to reduce the potential of trampling, when possible.

9. Management actions that will be taken to return campsites in out-of-standard areas to within standard include: increased education to the public in specific areas; increased ranger patrols to achieve compliance; rehabilitation of impacted areas, site-specific actions such as modifying sites to render them uninviting to camping or implementation of site specific short- or long-term closures to camping; changing group size, night limit, or campfire restrictions; reduction of commercial visitor services in out-of-standard areas; and changing trailhead quotas.

10. Management actions that will be taken to return out-of-standard trail encounters to within standard include: increased education to the public in specific areas; changing group size, night limit, or campfire restrictions; reduction of commercial visitor services in out-of-standard areas; changing trailhead quotas; require day-use or special-management-area permits; and implementation of cross-boundary actions with the U.S. Forest Service.

11. National Park Service staff will comply with food storage, garbage disposal requirements, and the proper treatment of human waste at all times.

12. Proposed trail realignments in designated critical habitats will require review by National Park Service biologists or ecologists.

13. Projects will avoid in-stream work when possible. If in-stream work is required, activities will be coordinated with National Park Service hydrologists and compliance specialists.

14. When new raised causeways are required to prevent increasing trail associated resource impacts or to provide adequate trail footing, these causeways will be constructed so as to minimize the effects on natural hydrologic processes, in consultation with a National Park Service hydrologist.

15. A monitoring system is employed to track use, document conditions, and provide information for preventing and mitigating impacts from pack stock grazing. The monitoring program takes into account variation in annual climate, the characteristics of specific forage areas, and the inherent abilities of different species to withstand grazing and trampling pressure. The strategy for managing stock use is designed to prevent significant impacts to meadows through implementation of multiple complementary monitoring protocols and a suite of adaptive management tools. Taken together, the complementary elements of the management program at SEKI—monitoring, which includes residual biomass and bare ground, stock use, species composition, repeat photography, and regularly scheduled site visits; an opening date system based on moisture, soil, and vegetation conditions; management tools including the ability to rest meadows when needed, as well as adjust use levels through controls on party size and length of stay; and ongoing research into meadow function and the effects of grazing on meadow ecology—is designed to protect meadows by preventing, minimizing and/or mitigating impacts.

10\. The National Park Service has the authority to adjust the number of nights a given party may graze an area; adjust the number of stock per party that may graze an area; adjust opening dates to reflect moisture conditions to prevent unacceptable mechanical disturbance to surface soil and vegetation; and temporarily close an area to stock access or grazing.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the action area includes all lands including stock grazing and holding areas, approximately 477 miles of trails, and associated activities and infrastructure within the 808, 078 acres designated as Wilderness in Sequoia and Kings Canyon National Parks.

Status of the Species and Environmental Baseline

Sierra Nevada Yellow-legged Frog and Northern Distinct Population Segment of the Mountain Yellow-legged Frog

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog were both listed as endangered species on April 29, 2014, under the Endangered Species Act of 1973, as amended (Service 2014a).

The mountain yellow-legged frog was originally described as a subspecies of the foothill yellow-legged frog (*Rana boylii*). Populations in the Sierra Nevada were considered to be subspecies *sierrae*, and populations inhabiting three mountain ranges in southern California were thought to represent subspecies *muscosa*. Later analysis of additional morphological data indicated what was considered R. *boylii sierrae* and R. *boylii muscosa* were instead more likely to be subspecies of *Rana muscosa* (Zweifel 1955). Later, Macey *et al.* (2001) conducted a phylogenetic analysis of mitochondrial deoxyribonucleic acid (DNA) sequences of the mountain yellow-legged frog and concluded the species consisted of two major genetic lineages comprised of three distinct groups in the Sierra Nevada, and a fourth distinct group in the mountains of southern California.
Based on mitochondrial DNA, morphological information, and acoustic studies, Vredenburg *et al.* (2007) concluded the mountain yellow-legged frog in the Sierra Nevada consists of two distinct species - *Rana muscosa* and R. *sierrae*.

Rana sierrae, or the Sierra Nevada yellow-legged frog, is endemic to the northern and central Sierra Nevada and adjacent Nevada ranging from north of the Feather River including the Plumas and southern edge of the Lassen National Forests, south to the Monarch Divide on the west side of the Sierra Nevada crest in the Sierra National Forest, and near Independence Creek on the east side of the Sierra Nevada crest in the Inyo National Forest. In the Sierra Nevada, *Rana muscosa* ranges from the Monarch Divide south to Dunlap and Taylor meadows in the Sequoia National Forest (California Department of Fish and Wildlife 2011; Vredenburg *et al.* 2007). R. *muscosa* also occurs as a Distinct Population Segment in the Transverse and Peninsular Ranges in southern California, where it is listed as an endangered species. In the Sierra Nevada, the taxon ranges in elevation from approximately 4,500 feet to more than 12,000 feet (Vredenburg *et al.* 2005). However, the distribution of the Northern Distinct Population Segment of the mountain yellow-legged frog appears to extend below 4,500 feet in elevation at higher latitudes; for example, on the Plumas National Forest (USFS 2014). Eight-percent of the observations on the Plumas National Forest are below 4,500 feet elevation; of which, thirty-one of the observations were between 3,500 and 4,500 feet in elevation. Figure 2 provide the distribution of the Sierra amphibians within the Park.

Physical Description

The body length (snout to vent) of the adult mountain yellow-legged frog ranges from 1.5 to 3.25 inches (Dodd 2013b; Stebbins and McGinnis 2012; Lanoo 2005; Green *et al.* 2014; Jennings and Hayes 1994; Vredenburg *et al.* 2005; Wright and Wright 1949; Stebbins 1951; Zweifel 1955). Females average larger than males, and males have a swollen, darkened thumb base. Dorsal (upper) coloration in adults is variable, exhibiting a mix of brown and yellow, but also gray, red, or green-brown, and usually a pattern of dark spots. These spots may be large (0.25 inch) with a few, smaller and more numerous spots, or a mixture of both. Irregular lichen- or moss-like patches may also be present on the dorsal surface. The belly and undersurfaces of the hind limbs of the mountain yellow-legged frog are yellow or orange colored, and this pigmentation may extend forward from the abdomen to the forelimbs. The adults may produce a distinctive mink or garlic-like odor when disturbed (Wright and Wright 1949; Stebbins 2003). Although these two species lack vocal sacs, they can vocalize in or out of water, producing what has been described as a flat clicking sound (Zweifel 1955; Stebbins 2003). Mountain yellow-legged frogs have smoother skin, generally with heavier spotting and mottling dorsally, darker toe tips (Zweifel 1955), and more opaque ventral coloration (Stebbins 2003) than the foothill yellow-legged frog, which is a conspecific species in some portions of the Sierra Nevada.

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog can be distinguished from each other physically by the ratio of the lower leg (fibulotibia) length to snout vent length (Vredenburg *et al.* 2007). Typically, this ratio is greater than or equal to 0.55 for the northern Distinct Population Segment of the mountain yellow-legged frog and less than 0.55 for the Sierra Nevada yellow-legged frog. In addition, adult Northern Distinct Population Segment of the mountain yellow-legged frog generally has longer limbs than Sierra Nevada yellow-legged frogs.

Mountain yellow-legged frogs deposit their eggs in globular clumps, which are often somewhat flattened and roughly 1 to 2 inches in diameter (Stebbins 2003; Lannoo 2005; Vredenburg *et al.* 2005). When the eggs are close to hatching, egg mass volume averages 78 cubic inches (Pope 1999). An egg has three firm, jelly-like, transparent envelopes surrounding a grey-tan or black vitelline capsule or egg yolk (Wright and Wright 1949). The clutch size varies from 15 to 350 eggs per egg mass (Livezey and Wright 1945; Vredenburg *et al.* 2005). The development of the egg is temperature dependent. In laboratory breeding experiments, eggs took from 18 to 21 days at temperatures of 41 to 56 degrees Fahrenheit to hatch after being laid (Zweifel 1955).

Mountain yellow-legged frog tadpoles generally are mottled brown on the dorsal side with a faintly yellow venter or underside (Zweifel 1955; Stebbins 2003; Vredenburg *et al.* 2005). Their total length may reach a maximum of 2.8 inches, the body is flattened, and the tail musculature is wide at 1 inch or more before tapering into a rounded tip (Wright and Wright 1949). The mouth has a maximum of eight labial tooth rows (Stebbins 2003).

Current Range and Distribution

Since the mountain yellow-legged frog observations made by Grinnell and Storer (1924), a number of researchers have reported disappearances of these two listed amphibian species from significant portions of their historical ranges in the Sierra Nevada (Hayes and Jennings 1986; Bradford 1989; Bradford *et al.* 1994; Jennings and Hayes 1994; Stebbins and Cohen 1995; Drost and Fellers 1996; Knapp and Matthews 2000a; Vredenburg *et al.* 2005; Martin 1992; Heller 1960; Jenkins 1994).

The current distribution of the mountain yellow-legged frog is primarily restricted to publicly managed lands within National Forests and National Parks at high elevations in the Sierra Nevada. National Forests with extant populations include the Plumas National Forest, Lassen National Forest, Tahoe National Forest, Humboldt-Toiyabe National Forest, Lake Tahoe Basin Management Unit, Eldorado National Forest, Stanislaus National Forest, Sierra National Forest, Sequoia National Forest, and Inyo National Forest. National Parks with extant populations of mountain yellow-legged frogs include Yosemite National Park, and Sequoia and Kings Canyon National Parks

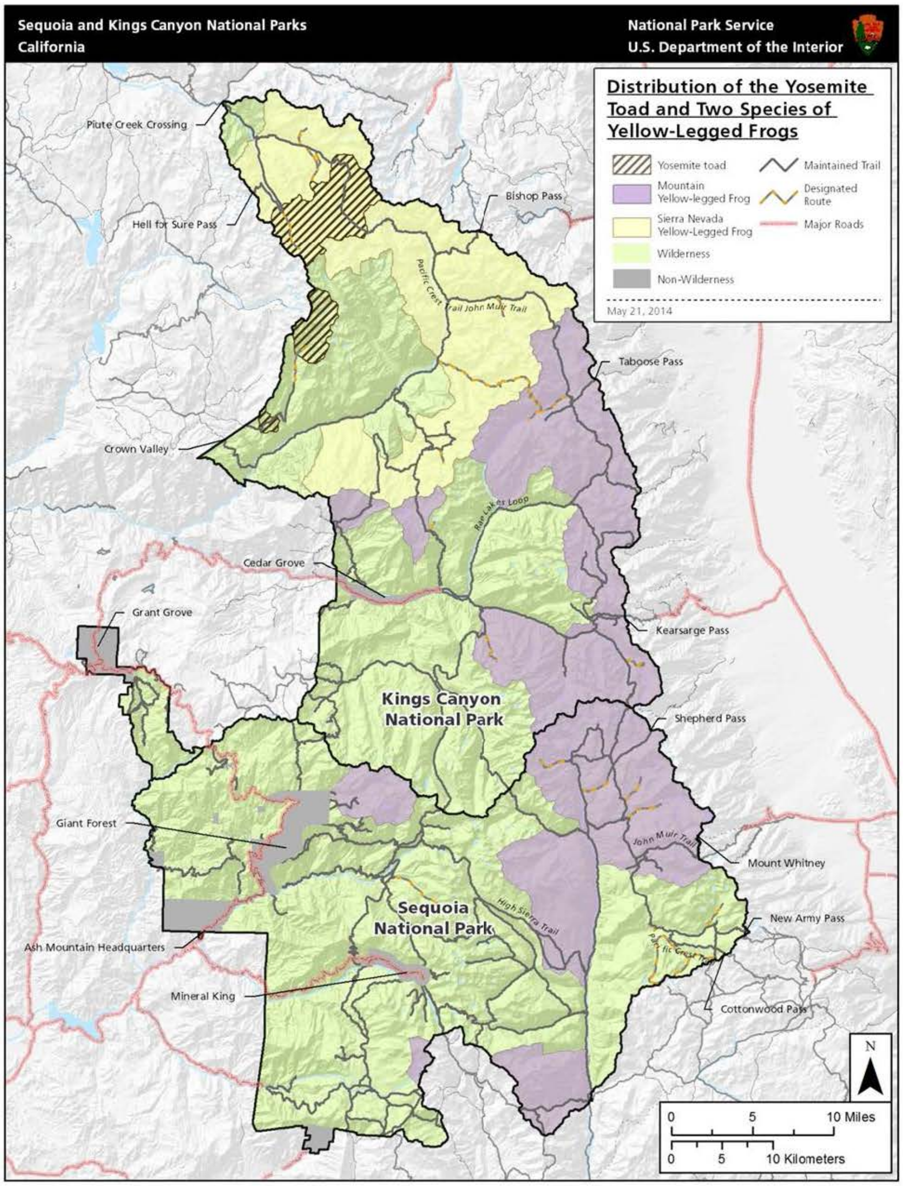

Figure2: Distribution of the Mountain Yellow-legged Frog and Yosemite Toad in Sequoia and Kings Canyon National Parks

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The number of known occupied sites, such as lakes, ponds, meadows, and streams, are estimated to be around 1,245 sites for the Sierra Nevada mountain yellow-legged frog and 12 sites for the Northern Distinct Population Segment of the mountain yellow-legged frog (Service 2014). There are important caveats to these estimates of the number of occupied sites. First, in some cases multiple observations may have been counted for a specific site. Second, not all aquatic habitats have been surveyed, and given the complexity of aquatic habitats, definitions of sites vary among scientists and land managers. Third, more surveys for these species have occurred in lake habitats. Than in other habitats. Finally, these numbers do not necessarily represent populations; a single population may occupy multiple sites.

Habitat and Life History

The mountain yellow-legged frog currently and historically inhabited lakes, ponds, marshes, tarns, meadows, and streams, largely in areas that were glaciated during the Pleistocene at elevations ranging from 4,500 feet to 12,000 feet (California Department of Fish and Wildlife 2014a, 2014b; Zweifel 1955). The two listed amphibian species are highly aquatic (Stebbins 1951; Mullally and Cunningham 1956; Bradford *et al.* 1993). Adults typically are found sitting on rocks along the shoreline, usually where there is little or no vegetation (Mullally and Cunningham 1956). Mountain Yellow-Legged Frog (*Rana sierra and R. muscosa* northern DPS) yellow-legged frogs may use a variety of shoreline habitats, both tadpoles and adults are less common at shorelines that drop abruptly to a depth of 2 feet than at open shorelines that gently slope up to shallow waters of only 2 to 3 inches in depth (Mullally and Cunningham 1956; Jennings and Hayes 1994).

The mountain yellow-legged frog is most abundant in high-elevation lakes and slow-moving portions of streams (Vredenburg *et al.* 2005; Zweifel 1955; Lannoo 2005; Mullally and Cunningham 1956). The borders of alpine ponds, lakes, and meadow streams above the tree line used by the two listed frogs are frequently grassy or muddy. The frog uses different aquatic habitats in various parts of its range, likely because of differences in availability. For example, the species is often found in streams in the northern and southernmost parts of its range where lakes are less common. At lower elevations within their historical ranges, they animals are known to be associated with rocky streambeds and wet meadows surrounded by coniferous forest (Vredenburg *et al.* 2005; Zweifel 1955; Zeiner *et al.* 1988). Adults use streams that vary from high-gradient channels replete with pools, rapids, and small waterfalls to reaches with marshy edges and sod banks (Brown *et al.* 2014; Zweifel 1955. Aquatic substrates vary from bedrock to fine sand, rubble consisting of rock fragments, and boulders (Zweifel 1955). Mountain yellow-legged frogs appear absent from the smallest creeks, possibly because these creeks have insufficient depth for adequate refuge and overwintering habitat (Jennings and Hayes 1994). Stream-dwelling yellow-legged frogs on the Plumas National Forest have been found in first order headwater streams to second order streams (Brown *et al.* 2014).

In the central and southern Sierra, the mountain yellow-legged frog breeds most commonly in permanent, deep lakes (Knapp and Matthews 2000a; Knapp *et al.* 2000b). In Yosemite National Park, occupancy was associated with deep water, elevation, absence of fish, and meadow vegetation on shorelines (Knapp 2005a). Adult mountain yellow-legged frogs breed in the shallows of ponds or in inlet streams (Vredenburg *et al.* 2005). Breeding has been observed in relatively shallow sites (< 1 foot) that dry frequently, but successful recruitment will only occur in water bodies that hold water for the duration of the 2-3 year larval period, even if only a small fraction of water remains (Lacan *et al.* 2008). They emerge from overwintering sites immediately following snowmelt, and will move over ice to reach breeding sites (Pope 1999; Vredenburg *et al.* 2005). The females deposit their eggs underwater in clusters, which they attach to rocks, gravel, or vegetation, or under banks (Wright and Wright 1949; Stebbins 1951; Zweifel 1955; Pope 1999).

In lakes in the John Muir Wilderness and Kings Canyon National Park, the presence of tadpoles was associated with deep water depths, elevation, the absence of trout, higher proportions of silt, and degree of lake isolation (Knapp *et al.* 2000b). Frogs also breed less commonly in streams and meadows (Zweifel 1955). The larvae take two to three years to metamorphose into subadults (Bradford 1983; Zweifel 1955) and their deep water habitat protects them from freezing to death in the winter (Bradford 1983; Knapp *et al.* 2000b; Knapp 2005a). Habitat models, based on broad scale sampling throughout Yosemite National Park and portions of the John Muir Wilderness and Kings Canyon National Park, indicate that the probability of occupancy by mountain yellow-legged tadpoles increased as maximum lake depth increased from 0 to 13 feet or 16 feet and then remained relatively constant at greater depths (Knapp *et al.* 2000; Knapp 2005a). Desiccation of tadpoles in habitats that dry out during the summer was an important cause of mortality, and little evidence was found of winterkill in shallow water habitats (Lacan *et al.* 2008; Bradford 1983).

Bradford (1983) found that mountain yellow-legged frog die-offs sometimes result from oxygen depletion during winter in lakes less than 13 feet in depth. However, tadpoles may survive for months in nearly anoxic conditions in shallow lakes that are frozen to the bottom. Populations of mountain yellow-legged frogs have overwintered in lakes less than 5 feet deep that are assumed to have frozen to the bottom, and healthy frogs emerged the following July (Pope and Matthews 2001; Pope 1999). Radio telemetry indicated that the animals were utilizing rock crevices, holes, and ledges near shore, where water depths ranged from 0.7 foot to 5 feet (Pope and Matthews 2001). The granite surrounding these overwintering habitats probably insulates mountain yellow-legged frogs from extreme winter temperatures, provided there is an adequate supply of oxygen (Pope and Matthews 2001). In lakes and ponds that do not freeze to the bottom in winter, they may overwinter in the shelter of bedrock crevices as a behavioral response to the presence of introduced trout (Vredenburg *et al.* 2005).

Mountain yellow-legged frog tadpoles maintain a relatively high body temperature by selecting warmer microhabitats (Bradford 1984). During winter, tadpoles remain in warmer water below the thermocline, the transition layer between thermally stratified water. After spring overturn (thaw and thermal mixing of the water), they behaviorally modulate their body temperature by moving to shallow, near shore water when warmer days raise surface water temperatures. The tadpoles select the warmest temperature environments within an alpine lake, often using shallow shorelines during the day and moving offshore in the evening as surface temperatures cool (Bradford 1984). Warmer waters are conducive to faster development. During winter, tadpoles remain in warmer water below the thermocline, the transition layer between thermally stratified water. Tadpoles may take more than 1 year to mature (Wright and Wright 1949), and often require 2 to 4 years, to reach the metamorphosis stage in which they transform from tadpoles to frogs, depending on local climate conditions and site-specific variables (Bradford 1983; Bradford *et al.* 1993; Knapp and Matthews 2000b; Vredenburg *et al.* 2005).

The time required to reach reproductive maturity in mountain yellow-legged frogs is thought to vary between 3 and 4 years post-metamorphosis (Vredenburg *et al.* 2005; Zweifel 1955). Based on this, given the amount of time a tadpole takes to reach metamorphosis, it may take 5 to 8 years for a mountain yellow-legged frog to begin reproducing. Adults are long lived with a maximum recorded age of 14 years (Vredenburg *et al.* 2005). Under normal circumstances, adult survivorship from year to year is very high (Pope 1999).

After breeding, adults may disperse into a larger variety of aquatic habitats (Pope and Matthews 2001). They appear to use a restricted set of lakes that provide suitable microhabitats for breeding and overwintering, then disperse into a greater number of sites during the summer months for feeding (Pope and Matthews 2001; Matthews and Preisler 2010; Pope and Matthews 2001; Wengert 2000). Frogs commonly are found basking in open areas near cover and water (Grinnell and Storer 1924; Mullally and Cunningham 1956; Storer 1925). Mullally and Cunningham (1956) found individuals more commonly along shallow, rocky shorelines often interspersed with vegetation rather than areas with large boulders from talus slope or sandy unprotected shorelines. The animals use a variety of cover including vegetation, logs, and partially submerged trees. Different habitats are used seasonally. Individuals select undercut banks and willows in August and rocky habitats in September and October (Pope and Matthews 2001). Similar to tadpoles, the adults and subadults seek warmer water, and Bradford (1984) found the abundance of frogs within a lake was significantly associated with warmer water. During the late afternoon and evening, mountain yellow-legged frogs move to offshore waters that are less subject to night cooling (Bradford 1984).

Mountain yellow-legged frog's display strong site fidelity and may return to the same overwintering and summer habitats from year to year (Pope 1999). In aquatic habitats of high mountain lakes, adults typically move only a few hundred yards (Pope and Matthews 2001; Pope 1999). In one telemetry study in lentic habitats, mountain yellow-legged frogs typically moved a few hundred feet during the active season (Brown *et al.* 2014; Pope and Matthews 2001). Distances greater than 0.621 mile have been recorded which included overland travel (Pope and Matthews 2001; Vredenburg *et al.* 2005). Moreover, given Barrowclough's (1978) caution that without extraordinary effort, population movement distances are consistently underestimated, the limited available data undoubtedly underestimate the movement patterns and capabilities of mountain yellow-legged frogs. At the scale of distances between lakes in many high Sierra basins, the data indicate that the species are capable of recolonizing other water bodies on a local scale. However, more studies of dispersal and movement will be necessary to elucidate their seasonal movements.

Adult mountain yellow-legged frogs move between breeding, feeding, or non-breeding active season, and overwintering habitats during the course of the year (Pope 1999a; Matthews and Preisler 2010). Adults sometimes travel over ice or snow to reach preferred breeding locations early in the season without apparent ill effects (Pope 1999a; Vrendenburg *et al.* 2005). Mullally and Cunningham (1956) stated that the animal avoids crossing dry ground over short distances, but individuals have been recorded moving overland for distances of 217 feet to 1312 feet (Pope and Matthews 2001; Vredenburg *et al.* 2005). However, the physical conditions under which the movements occurred are unclear. Movement of adults between habitats used in their seasonal rounds may be a function of the relative proximity of habitats that can fulfill their seasonal requirements, such as breeding, foraging, or overwintering; if all habitats that adults need are close to each other, seasonal movements may not be as great (Brown *et al.* 2014). In this context, trout occupancy in selected water bodies may force mountain yellow-legged frogs to move greater distances to fulfill their habitat requirements.

Status and Threats

The mountain yellow-legged frog is imperiled by a variety of factors, especially invasive trout, chytrid fungus, and global climate change (Bradford 1989, 1991; Bradford *et al.* 1998; 1994; Drost and Fellers 1996; Lannoo 2005; Moyle *et al.* 1996; Knapp and Matthews 2000a; Armstrong and Knapp 2004; Knapp 2005a, 2005b; Finlay and Vrendenburg 2000; Knapp *et al* 2007; Lacan *et al.* 2008; California Department of Fish and Wildlife 2011; Bradford *et al.* 2011).

Demographic data on historical populations of mountain yellow-legged frogs are anecdotal and limited. Essentially, no data actually precede the fish-planting era in the high mountain lakes and streams; the earliest recorded plantings date from the mid-1800s (Knapp 2005a). Nevertheless, mountain yellow-legged frog data from the earliest 20th Century dates available describe them as having been abundant in aquatic habitats in the high Sierra Nevada. Grinnell and Storer (1924) reported that it [=Sierra Nevada yellow-legged frog] was "…the commonest amphibians in most parts of the Yosemite section. Its total range is…less than that of the Pacific tree-toad [=Pacific tree frog]; but it numbers, especially at the higher altitudes, far exceed those of the smaller species. This frog is the species most likely to come to the attention of fishermen and others who may walk along the banks of Sierran streams and lakes." They also reported that "Certain of the lakes in the higher parts of the Yosemite contain large numbers of yellow-legged frogs in …tadpole and adult conditions" (Grinnell and Storer 1924).

The decline of the mountain yellow-legged frog was first recorded in the 1970's when large populations were reduced in size to near extirpation (Bradford 1991). Subsequent surveys of formerly occupied sites found few remaining populations (Bradford *et al.* 1994; Drost and Fellers 1996). Between 1988 and 1991, Bradford *et al.* (1994) resurveyed sites historically known to support mountain yellow-legged frogs, based on surveys from 1955 to 1979. Animals were not detected at 27 historical sites on the Kaweah River; they were observed at 52 percent of the historical sites within Sequoia and Kings Canyon National Parks, and at 12.5 percent of the historical sites outside of these two protected locations. When the Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog are combined for the purpose of analysis, into one species, the mountain yellow-legged frog, for this resurvey effort detected them at 19.4 percent of historical sites (Bradford *et al.* 1994). Drost and Fellers (1996) repeated Grinnell and Storer's early 20th century surveys, and reported their presence at 2 of 14 historical sites. The two positive sightings consisted of a single tadpole at one site and a single adult female at the second. They located 17 additional sites with suitable mountain yellow-legged frog habitat, and detected three additional populations.

Davidson *et al.* (2002) reviewed 255 previously documented locations with mountain yellow-legged frog based on Jennings and Hayes (1994) throughout the historical range, and they concluded that 83 percent of these sites no longer support extant populations. Vredenburg *et al.* (2007) compared recent surveys from 1995 to 2004 with museum records of specimens collected between 1899 to 1994 and found that 93.3 percent of locations with historic records of the Sierra Nevada yellow-legged frog sites, and 95.2 percent of the sites with historic records of the Northern Distinct Population Segment of the mountain yellow-legged frog were extirpated. The California Department of Fish and Wildlife (2014a, 2014b) updated the Vredenburg *et al.* (2007) study utilizing historic locality records from museum specimens during the same time interval (1899–1994), and included updated recent locality information with additional survey data (1995–2010). These recent surveys failed to detect any extant frog populations within 0.63 mile of 220 of 318 localities with historic Sierra Nevada yellow-legged frog records and 94 of 109 localities with historic mountain yellow-legged frog records. Based on this study, the estimated loss from historic occurrences is 69 percent for the Sierra Nevada yellow-legged frog and 86 percent for the Northern Distinct Population Segment of the mountain yellow-legged frog.

In 2002, 302 water bodies known to have been occupied by the mountain yellow-legged frog and 744 sites where the species had not been detected were resurveyed between 1995 and 1997 (Knapp 2005a). Animals at 59 percent of the previously occupied sites, and 8 percent of previously unoccupied sites were recolonized (Knapp 2005a). These data suggest an extirpation rate five to six times higher than the colonization rate within this study area. The documented extirpations appeared to have occurred non-randomly across the landscape, typically spatially clumped, and included the disappearance of all or nearly all of the mountain yellow-legged frog populations in a watershed (Knapp 2005a). The California Department of Fish and Wildlife (2014a, 2014b) assessed data from sites where multiple surveys were completed since 1995 at least 5 years apart. The Sierra Nevada yellow-legged frog was not detected at 45 percent of sites where they previously had been confirmed, and the mountain yellow-legged frog including the endangered Southern Distinct Population Segment, was not detected at 81 percent of the historically occupied sites. These data combined with the Forest Service's monitoring data suggest that declines continued into the 1990s.

The Forest Service conducted bioregional monitoring for the mountain yellow-legged frog on National Forest lands within the species' range in the Sierra Nevada as part of their Sierra Nevada Amphibian Monitoring Program (Brown *et al.* 2014). This monitoring effort provided scientifically-based estimates for statistical comparisons of occupancy and relative abundance across 5-year monitoring cycles based on a sample of 208 watersheds (Brown *et al.* 2014). The results of this monitoring, from 2002-2009, found mountain yellow-legged frog breeding activity in 4 percent of watersheds rangewide, and the species has declined in both distribution and abundance. Evidence of breeding was found in only 47 percent of watersheds where the animal had been found relatively recently (1990-2001), and in only 2 percent of watersheds where the species had last been observed prior to 1990. Moreover, relative abundances were low; only an estimated 9 percent of occupied watersheds were large, numbering more than 100 frogs or 500 tadpoles, and more than half of the watersheds (57 percent) had fewer than 20 animals (>10 tadpoles and >10 adults or subadults) (Brown *et al.* 2014).

The introduction of trout to historically fish-free lakes in the Sierra Nevada reduced the distribution and abundance of the Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog (Bradford 1989; Knapp and Matthews 2000a; Knapp 2005a). Prior to the mid-Nineteenth Century, almost all lakes and associated streams in the Sierra Nevada above 6000 feet were fishless (Moyle *et al.* 1996). As a result of 150 years of fish stocking throughout the region, however, all watersheds now contain as many as five non-native trout species (USFS 2013b). Currently, these areas may be functioning as population sinks for the mountain yellow-legged frog because the fish are either self-sustaining or their reintroduction to waterways and waterbodies imperils the amphibians.

The biological and ecological characteristics of the mountain yellow-legged frog make it especially vulnerable to predation and subsequent extirpation by introduced trout (Bradford 1989; Bradford *et al.* 1998; Finlay and Vredenburg 2007; Knapp and Matthews 2000a; Knapp *et al.* 2001). First, adult mountain yellow-legged frogs are highly aquatic and inhabit alpine lakes, most of which now contain trout. Second, in contrast to the tadpoles of other Sierra Nevada frog species that complete their metamorphosis to their terrestrial stage in a single summer, mountain yellow-legged frog larvae generally require at least two years to complete metamorphosis. This overwintering requirement restricts successful breeding and development to permanent water bodies that typically are deeper than six feet, however, they may be subject to predation by introduced trout in these locations (Brown *et al.* 2014; Bradford 1983; Knapp and Matthews 2000a; Mullally and Cunningham 1956). And third, by excluding the mountain yellow-legged frog from deep lakes, trout increase the isolation of the remaining populations of these amphibians.

In 2000, the California Department of Fish and Wildlife declared that no waters would be approved for fish stocking in which the mountain yellow-legged frog were present or where the presence of this animal was unknown due to a lack of recent surveys (California Department of Fish and Wildlife 2011). Based on an assessment of the status and distribution of the amphibian and the impacts on it from fisheries. The California Department of Fish and Wildlife reduced the number of high elevation Sierra Nevada waters stocked by 77 percent (California Department of Fish and Wildlife 2011). This was due in part to efforts to eliminate stocking of waters in the immediate vicinity of mountain yellow-legged frog populations, but also because of the results of resource assessments that showed that many trout populations were self-sustaining and did not require stocking to persist (California Department of Fish and Wildlife 2011).

The National Park Service has removed exotic trout from a number of alpine lakes with the goal of restoring habitat for the mountain yellow-legged frog. The Service issued a biological opinion for this program in 2014 (Service 2014c).

Sequoia and Kings Canyon National Parks currently has an in-progress habitat restoration program that includes exotic trout eradication. In 2001, the National Park Service began to implement preliminary experimental restoration of mountain yellow-legged frog (National Park Service 2001, 2009A). The primary goal was to assess the feasibility of the use of gill nets and electrofishers to eradicate nonnative fish from low- to moderate-use individual lakes having short associated streams. From 2001-2013, the National Park Service had removed more than 50,200 fish from targeted lakes and streams. By 2013, fish were fully eradicated from 10 lakes and nearly eradicated from nine lakes. The final five waterbodies previously approved for nonnative fish eradication were initiated in 2012 and are expected to be completed by 2016-2017.

In nine of the lakes eradicated of fish, mountain yellow-legged frogs remained disease-free 3 years after trout removal. Average tadpole density in these nine lakes increased by 13-fold (from 0.8 to 10.1 per 10 m of shoreline; $P = 0.008$), while average ranid density increased by 14-fold (from 0.8 to 11.1 per 10 m of shoreline; $P = 0.004$). One lake showed an overall 49-fold increase from 0.9 to 43.9 individuals per 10 m of shoreline (NPS 2011B). Two of these populations (LeConte = Sierra Nevada yellow-legged frog; Spur = Northern Distinct Population Segment of the mountain yellow-legged frog) are now likely the largest in the entire range of each species.

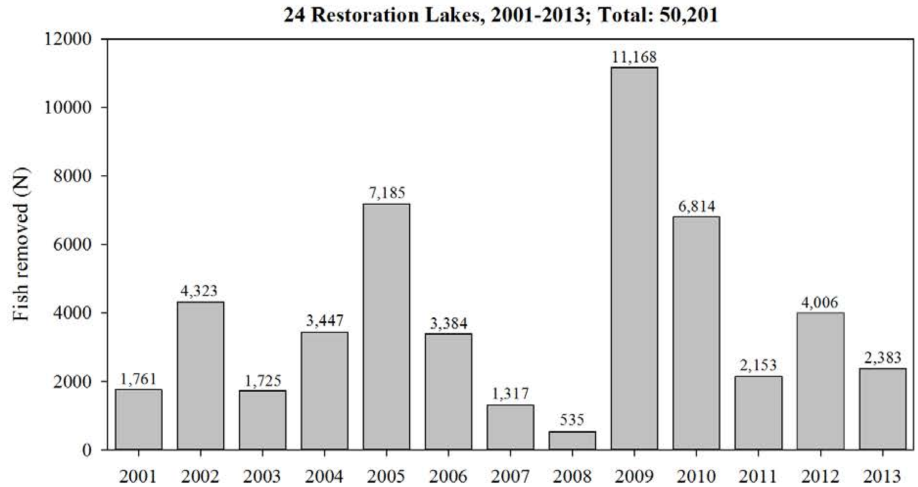

Figure 3: Total number of nonnative fish removed from a total of 24 fish removal lakes and adjacent streams in Sequoia and Kings Canyon National Parks, including nine lakes in Sixty Lake Basin, three lakes in Upper LeConte Canyon, three lakes in Upper Bubbs Creek, two lakes in Kern Point Basin, one lake in Pinchot Basin, two lakes in Upper Basin, and four lakes in Amphitheater Basin. From 2001 to 2013, a total of 50,201 nonnative fish were removed during 17,161 gill net set-and-pull events totaling 8,331,245 net hours, and 1,271 electrofishing events totaling 497 hours of output.

Another significant threat to the mountain yellow-legged frog is chytrid fungus (*Batrochytridium mycosis* = *Bd*). This fungus may have arrived in the Sierra Nevada in the 1960s or 1970s (Vredenburg *et al.* 2010) and is now present in most aquatic habitats in this bioregion. *Bd* is a waterborne fungus which is transmitted by a free-swimming zoospore that infects the keratinized tissue of amphibian skin (Berger *et al.* 1998). It disrupts critical skin functions such as osmoregulation (Voyles *et al.* 2007, 2009). Post-metamorphic frogs are most susceptible to the disease. It is responsible for amphibian declines and extinctions worldwide (Skerratt *et al.* 2007; Longcore *et al.* 1999; Mao *et al.* 1999). The chytrid fungus has contributed to widespread mountain yellow-legged frog declines throughout the Sierra Nevada (Briggs *et al.* 2010; Rachowicz *et al.* 2006; Vredenburg *et al.* 2010). Adults may shed *Bd* and persist with low levels of infection, but given their highly aquatic habitat requirements, likely are reinfected by tadpoles that can carry high infection loads (Briggs *et al.* 2010, Vredenburg *et al.*, 2010). Some populations appear to be persisting with chytrid at reduced abundances (Briggs *et al.* 2010). Research is underway to better understand the epidemiology of *Bd* in the mountain yellow-legged frog and to attempt to develop effective treatments (Stice and Briggs 2010; Vredenburg *et al.* 2010).

The majority of remaining mountain yellow-legged frog populations are small (Brown *et al.*, 2011) and many are isolated (Bradford *et al.* 1993; California Department of Fish and Wildlife 2011; Knapp *et al.* 2007). Small and isolated populations are vulnerable to stochastic events, such as severe weather or predation that can lead to their decline and extirpation (Shaffer 1981). Small populations also have increased chance of genetic drift and inbreeding, which can lead to losses in genetic variation (Service 2014a). The high degree of site fidelity also increases the vulnerability of small populations if frogs continue to return to habitats that are no longer suitable due to fish introductions or climate change. Given the few populations remaining in the Sierra Nevada, losses of even a few populations of the mountain yellow-legged frog may be significant.

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog occur within the action area as demonstrated by: (1) recent observations of the mountain yellow-legged frog in the action area; (2) the biology and ecology of the animals, especially the ability of individuals to move distances and their ability to spend the dry months of the year in upland habitats with suitable environmental conditions; and (3) the action area contains physical features that provide refuge, forage, and dispersal habitat for the amphibians.

Yosemite Toad.

The Yosemite toad was listed as a threatened species on April 29, 2014, under the Endangered Species Act of 1973, as amended (Service 2014a).

The Yosemite toad was originally described as *Bufo canorus* by Camp (1916), who gave it the common name of Yosemite Park toad. Grinnell and Storer (1924) referred to it as the Yosemite toad when they found the species' range extended beyond the boundaries of Yosemite National Park.

Frost *et al.* (2006) divided the paraphyletic genus *Bufo* into three genera, assigning the North American toads, including the Yosemite toad, to the genus *Anaxyrus.* Feder (1977) found the Yosemite toads are the most genetically distinct member of the *boreas* group based on samples from a limited geographic range. However, it hybridizes with western toads in the northern part of their range (Blair 1972; Karlstrom 1962; Morton and Sokolski 1978). Shaffer *et al.* (2000) analysed a segment of mitochondrial DNA from 372 individuals collected in Yosemite National Park and Sequoia-Kings Canyon National Parks. They found there are significant genetic differences in Yosemite toads between the two National Parks. The genetic divergence in individuals from regionally proximate populations was high, implying low rates of genetic exchange.
Physical Description

The Yosemite toad is a moderately sized amphibian, with the adults ranging in size from 1.2 inches to 2.8 inches from the tip of their snout to their urostyle, a bony structure at the posterior end of the spinal column (Karlstrom 1962; Dodd 2013a; Lannoo 2005). A thin mid-dorsal stripe is present in juveniles of both sexes. The stripe disappears or is reduced with age; this process takes place more quickly in males (Dodd 2013a; Lannoo 2005). The iris of the eye is dark brown with gold iridophores (Dodd 2013a). The large paratoid glands are rounded to slightly oval in shape.

Male Yosemite toads are smaller than the females, and they have less conspicuous warts (Stebbins 1951, 2003; Stebbins and McGinnis 2012; Dodd 2013a; Green *et al.* 2014; Lannoo 2005). Differences in coloration between males and females are more pronounced in this species than in any other North American frog or toad (Stebbins 1951). Females have black spots or blotches edged with white or cream set against a grey, tan, or brown background color (Jennings and Hayes 1994). Males have a nearly uniform dorsal coloration of yellow-green to olive drab to darker greenish brown (Dodd 2013a; Green *et al.* 2014; Lanoo 2005).

Current Range and Distribution

The Yosemite toad is restricted to the Sierra Nevada in California from the Blue Lakes region north of Ebbetts Pass in Alpine County to just south of Kaiser Pass in the Evolution Lake/Darwin Canyon area in Fresno County (Green *et al.* 2014; Dodd 2013a; Lannoo 2005; Stebbins and McGinnis 2012; Jennings and Hayes 1994; Liang *et al.* 2010; Liang and Stohlgren 2011). The species historically inhabits elevations ranging from 6,000 to 11,910 feet (Stebbins 2003; Stephens 2001).

Habitat and Life History

Terrestrial habitats utilized by Yosemite toad adults vary, particularly by elevation, and include forests, meadows, shrublands, rock outcrops, and talus. Mid-elevation meadows occur in yellow pine (mixed conifer) and lower edges of lodgepole-red fir forests. Meadows above 7,500 feet generally occur in lodgepole–red fir, subalpine and alpine ecosystems (USFS 2001b). Higher subalpine and alpine areas tend to be more open than lower elevation regions. Yosemite toads inhabit wet meadow habitats and lake shores surrounded by lodgepole or whitebark pines (Camp 1916; Dodd 2013a; Stebbins and McGinnis 2012; Lannoo 2005; Wang 2012). The species is most often found in areas with thick meadow vegetation or patches of low willows (Dodd 2013a; Mullally 1953). Liang (2010) observed Yosemite toads most frequently associated with, in order of preference: wet meadows, alpine-dwarf scrub, red fir, water, lodgepole pine, and subalpine conifer habitats.

The Yosemite toad generally is associated with meadows because these are the areas used as breeding habitat. After breeding, adults move into the surrounding uplands. Yosemite toads emerge at snowmelt to breed, generally May-June depending on location and snowpack, and are active above ground for approximately four months each year, reentering overwinter sites in the fall when the weather becomes cold (Kagarise Sherman and Morton 1993, Karlstrom 1962). Upon emergence, males form breeding choruses (Kagarise Sherman 1980, Kagarise Sherman and Morton 1984) and breeding takes place over a short period of time ranging from a few days to 2-4 weeks (Brown *et al.* 2012; Kagarise Sherman 1980; Sadinski 2004). Males usually remain at breeding areas for 1-2 weeks whereas females usually spawn within 1-2 days (Kagarise Sherman and Morton 1984). Eggs hatch in about 4-15 days, depending on ambient water temperatures. Tadpoles metamorphose in an average of 48–63 days and do not overwinter (Kagarise Sherman 1980; Karlstrom 1962).

Yosemite toads are found at both large and small sites (Liang 2010), indicating that this species is capable of successfully utilizing small habitat patches. Liang (2010) found that population persistence was greater at higher elevations, with an affinity for relatively flat sites with a southwesterly aspect. These areas receive higher solar radiation and are capable of sustaining hydric, seasonally ponded, and mesic breeding and rearing habitat. The Yosemite toad is more common in areas with less variation in mean annual temperature, or more temperate sites with less climate variation (Liang 2010).

The Yosemite toad is a late maturing, long-lived species. Females first breed when they are 4-6 years old and males at 3-5 years of age (Kagarise Sherman 1980). Estimates of apparent annual survival of adult males in six meadows ranged from 50 percent to 72 percent (Brown *et al.* 2012). Some females may live as long as 15 years and males up to 12 years (Kagarise Sherman and Morton 1984). Periodic years of high recruitment and high survival rates of adults maybe important for the long-term persistence of populations (Biek *et al.* 2002; Brown *et al.* 2012).

Yosemite toads likely are more nocturnally active than has previously been reported. They actively breed during the day, but a recent study found them to be equally active at night (Brown *et al.* 2009). Martin (2008) and Liang (2010) observed movement of adults both during the day and night, and they speculated that long distance movements occur during the hours of darkness.

The breeding habitat of the Yosemite toad include very shallow waters, most commonly in wet meadows, but also in lake edges, and slow-moving streams and sloughs (Kagarise Sherman 1980; Karlstrom and Livezey 1955; Karlstrom 1962; Martin 2008; Mullally 1953). On the Sierra National Forest, Liang (2010) observed breeding in both large and small meadows, indicating that this species is capable of successfully utilizing small habitat patches. Liang (2010) found breeding site occupancy was greater in seasonal waters in relatively flat sites facing a southwesterly direction with warmer water temperatures. Breeding sites were associated with higher elevations, less variable air temperatures, more precipitation in the warmest three months of the year, and less precipitation during the driest three months. Liang (2010) also noted that the species' distribution was related to a number of different factors rather than a small set of variables. In Yosemite National Park, Knapp (2005a) found high elevation and meadow shorelines were significantly correlated with occurrence. Roche *et al.* (2012a) found annual occupancy to be positively correlated with annual precipitation.

Late winter or early spring, male Yosemite toads exit their upland burrows before the females, and they spend more time in the breeding pools (Kagarise Sherman and Morton 1993). Most adult males appear to breed annually, whereas females may skip years between breeding (Kagarise Sherman 1980; Brown *et al.* 2012). Females have high lipid storage levels, and there may be a trade-off between its use to enhance overwinter survival and the energetic expense of breeding every year (Morton 1981). The Yosemite toad is a prolific breeder that lays many eggs immediately at snowmelt over a short period of time. The reproductive output of the females is relatively high with estimates that some individuals may lay from 1,100 to 2,000 eggs in a single season (Kagarise Sherman 1980; Karlstrom and Livezey 1955; Karlstrom 1962). Females may split their egg clutches within the same pool, or even between different pools, and eggs may be communally laid with other toads. Mortality of eggs and tadpoles caused by freezing or desiccation may be high in some years leading to low or no recruitment (Brown *et al.* 2012; Kagarise Sherman 1980; Sadinski 2004).

The characteristics of Yosemite toad breeding sites generally are associated with warm environments conducive to rapid development (Kagarise Sherman and Morton 1984; Karlstrom 1962). This includes hydroperiods of sufficient length for successful metamorphosis. The female Yosemite toads generally lay their eggs in very shallow, warm, and often ephemeral water at the edges of small pools or in flooded meadow vegetation, most commonly with no or low flow (Kagarise Sherman 1980; Mullally 1953; Sadinski 2004). The tadpoles are most commonly observed in shallow warmer water, and the will move from cooler to warmer locations within a breeding site (Mullally 1953; Karlstrom 1962; Kagarise Sherman and Morton 1984). The eggs are laid at depths ranging from 1.5 inches to 3 inches with a median depth of about 2.5 inches (Sadinski 2004; Kagarise Sherman 1980; Karlstrom 1962; Roche *et al.* 2012a).

After the breeding period, adults Yosemite toads disperse into meadows, ephemeral streams, seeps and springs, and uplands (Liang 2010; Martin 2008). One telemetry study on the Stanislaus National Forest found that they moved a maximum distance of 2,156 feet (Martin 2008), another study recorded an individual had moved 4,137 feet in the Sierra National Forest (Liang 2010), and Morton and Pereyra (2010) found animals 2,789 feet away from their breeding pools. Females are recorded to move further than males. In the telemetry study on the Sierra National Forest, the maximum distance travelled by females was 4,137 feet versus 2,838 feet by males, and the average distance travelled by females was twice that of males (Liang 2010). At Tioga Pass Meadows, 64 percent of females were in the furthest zone, 2,789 feet from the breeding pools, compared with only 4 percent of males. In contrast, 54 percent of males were found in the breeding meadows, compared with 19 percent of females (Morton and Pereyra 2010). Liang (2010) found that most long-distance travel was undertaken in the first 60 days after the breeding period, and individuals often stayed in the same location for several days or weeks. Adult females utilized different habitat than adult males during the non-breeding season (Morton and Pereyra 2010). Morton and Pereyra (2010) found that during late July and August, over 60 percent of Yosemite toads in upland rocky hillside habitat were adult females and less than 10 percent were adult males. In lowland meadow habitat near a breeding pond, 54 percent of the individuals were adult males and about 19 percent were adult females.

Overwintering habitat of the Yosemite toad may include rodent burrows, crevices under rocks and stumps, and root tangles at the base of willows (Davidson and Fellers 2005, Kagarise Sherman 1980, Martin 2008). Some metamorphs appear to overwinter their first year in the terrestrial meadow habitat adjacent to their rearing site and move to more distant terrestrial habitat during mid-summer of their second year (Kagarise Sherman and Morton 1993; Morton and Pereyra 2010).

Individual Yosemite toads show fidelity to breeding meadows and adult habitats (Brown *et al.* 2012; Kagarise Sherman and Morton 1984; Liang 2010). In Tioga Pass Meadows, most of the males and females returned to the same breeding sites (Kagarise Sherman and Morton 1984). During four years of a mark-recapture study, only three of 37 males moved to different meadows to breed, though males did move among breeding areas within meadows (Brown *et al.* 2012). In one radio telemetry study, individuals used the same upland nonbreeding areas and sometimes the same exact site for multiple years (Liang 2010).

The only long-term, site-specific population study of the Yosemite toads found a dramatic decline over 2 decades of monitoring. Kagarise Sherman and Morton (1993) studied the species at Tioga Pass Meadow from 1971 through 1991, with the most intensive monitoring between the years 1971 to 1982. A decline in the average number of males entering the breeding pools declined from 258 to 28 during the mid-1970s through 1982. During the same time period, the number of females varied between 45 and 100, but there was no apparent trend in number observed. During the 1980s, both males and females continued to decline, and breeding activity became sporadic. By 1991, only one male and two egg masses was found by Kagarise Sherman and Morton (1993). A similar population decline was recorded in local nonbreeding habitat.

Status and Threat

The Yosemite toad is imperiled by a variety of factors, especially damage or loss of habitat, global climate change, and chytrid fungus (Lannoo 2005; Martin 2008; Green *et al.* 2014 Davidson and Fellers 2005; Brown *et al.* 2011). The exact number of the remaining populations of the Yosemite toad is unknown, but the number of known occupied sites such as lakes, ponds, and meadows, streams is estimated to be around 740.

High meadow habitat quality in the western United States, and specifically the Sierra Nevada, has been degraded by various stressors over the last century (Vale 1987; Ratliff 1985). These various stressors have contributed to erosion and stream incision, leading to meadow dewatering and encroachment by invasive vegetation (Menke *et al.* 1996). The legacy of these impacts remains extant to this day in the ecosystems of the high Sierra Nevada (Vankat and Major 1978). Given the reliance of the Yosemite toad on these high meadow habitats for breeding, and early life history stage and adult survival, the various stressors likely have had an effect on the viability of their populations via the degradation of their habitat.

Since high meadows in the Sierra Nevada are dependent on their hydrologic setting, most meadow degradation is due fundamentally to hydrologic alterations. Montane meadows have been identified among the most vulnerable and impacted habitat types of the Sierra Nevada (Kattelmann and Embury 1996, U.S.Forest Service 2004). While impacts have varied depending on meadow hydrogeomorphic type (Weixelman *et al.* 2011), drying on meadow systems associated with streams where downcutting has occurred is one of the most significant forms of change that has occurred, primarily as a result of livestock overgrazing (Wagoner 1886; Ratliff 1985; Menke *et al.* 1996). Roads and historic logging practices have resulted in meadow degradation in the form of drying, stream incision and creation of headcuts (Service 2014b).

Livestock grazing was historically widespread in the Sierra Nevada and historically caused widespread degradation of meadows (Menke *et al.* 1996), such as those utilized by the Yosemite toad for breeding. Studies investigating the effects of livestock grazing on amphibians have found positive, negative, and no associations, though most were not conducted in alpine meadows (Adams *et al.* 2009; Bull and Hayes 2000; Burton *et al.* 2009; Ford *et al.* 2013; Jansen and Healey 2003; Knutsen *et al.* 2004; Roche *et al.* 2012a; Lind *et al.* 2011; McIlroy *et al.* 2013).

Until recently, the effect of chytrid to Yosemite toad population declines was relatively unknown. Although the animal is hypothetically susceptible due to their co-occurrence with the Northern Distinct Population Segment of the mountain yellow-legged frog and Sierra Nevada yellow-legged frog, the spread and growth of chytrid in the warmer pool habitats, occupied for a much shorter time relative to the frogs may render individuals less prone to epidemic outbreaks (Green and Kagarise, Sherman 2001; USFS *et al.* 2009). Fellers *et al.* (2007) documented the occurrence of chytrid infection of Yosemite toad in Yosemite National Park over at least a couple of decades, and populations of the animal persisted in spite of the continued presence of the pathogen. In a survey of 196 museum specimens, Dodge and Vredenburg (2012) reported the first presence of Bd infection in Yosemite toads beginning in 1961, with the pathogen becoming highly prevalent during the recorded declines of the late 1970s, before it peaked in the 1990s at 85 percent positive incidence. Dodge and Vrendenburg (2012) collected 1,266 swabs from live Yosemite toads between 2006 and 2011, and they found Bd infection intensities at 17–26 percent, with juvenile toads most affected. The results from these studies support the hypothesis that chytrid have played an important role in Yosemite toad population dynamics over the period of their recent recorded decline.

Fire likely plays a significant role in the evolution and maintenance of meadows utilised by the Yosemite toad in the Sierra Nevada. Under natural conditions, conifers are excluded from meadows by fire and saturated soils. Small fires thin and/or destroy encroaching conifers, while large fires are believed to determine the meadow-forest boundary (Vankat and Major 1978). Fire is thought to be important in maintaining open aquatic and riparian habitats for amphibians in some systems, and fire suppression may have thereby contributed to conifer encroachment on meadows (National Park Service 2010).

Trampling and collapse of rodent burrows by hikers, livestock, pack animals, pets, or vehicles may have led to direct injury or death of the Yosemite toad. Recreational activity also may harass individuals and disrupt their behavior (Karlstrom 1962). Recreational anglers may be the transport mechanism of introduced pathogens and parasites, and they have been observed using toads and tadpoles as bait (USFS *et al.* 2009). However, Kagarise Sherman and Morton (1993) did not find a relationship between the distance from the nearest road and the declines in Yosemite toad populations, suggesting that human activity was not the cause of decline.

Small and isolated populations are vulnerable to stochastic events that can lead to their decline and extirpation (Shaffer 1981). For example, small populations are more likely to be devastated by adverse environmental factors than large populations. Small populations also have increased chance of genetic drift and inbreeding that can lead to losses in genetic variation (Service 2014). A high degree of site fidelity also can increase the vulnerability of small populations if Yosemite toads continue to return to habitats that are no longer suitable due to, for example, meadow degradation or climate change. Finally, some management activities may not adversely affect Yosemite toad populations across their range, but potentially may have significant effects on specific populations. Losses of even a few populations may be important in a declining species, such as this animal.

The Yosemite toad occurs within the action area as demonstrated by: (1) recent observations of the species on Sequoia and Kings Canyon National Parks; (2) the biology and ecology of the animal, especially the ability of individuals to move, forage, and winter in uplands; and (3) the action area contains physical features that provide refuge, breeding, foraging, and dispersal habitat for the amphibian.

Effects of the Proposed Action

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

There are two primary means by which the mountain yellow-legged frog and the Yosemite toad have the potential to be adversely affected by the proposed action: 1) direct effects from encounters with people and stock; and 2) indirect effects from people and stock, including degradation of habitat due to trails and/or meadow use. The amount or intensity of use, concentration, and timing of visitors, and the visitor's mode of travel influence the potential for adverse effects of the listed amphibians. The Conservation Measures in the Project Description of this biological opinion will minimize but not eliminate the potential for take of the mountain yellow-legged frog and the Yosemite toad.

1. Direct Effects from Encounters with Human and Stock

   Humans and stock can directly adversely affect all life stages of the mountain yellow-legged frog and the Yosemite toad through capture, harassment, injury, and death. All three listed amphibian species use a variety of aquatic and upland habitats where they may be stepped on and crushed, harassed, injured, killed or they may be subject to capture and harassment by visitors. Use of trails by humans and stock, and establishment and operation of camp sites, and administrative facilities may result in mountain yellow-legged frog and Yosemite toad being stepped on or harassed. However, public education, re-routing or limiting access to areas inhabited by the mountain yellow-legged frog and Yosemite toad will minimize these effects. The only known mountain yellow-legged frog death caused by trampling by stock in Sequoia and Kings Canyon National Parks occurred in a meadow in Sixty Lake Basin (Brown *et al.* 2014). Stock access to this area has since been prohibited. Capture and harassment of these listed species by visitors likely will be a relatively random occurrence and is not anticipated to have a significant adverse effect.

Mountain yellow-legged frogs may be injured or killed by trampling and other movements by stock, or entrapment in deep hoof prints. Stock can step on all age classes while accessing water along streambanks, lakeshores, or meadows, or while foraging for riparian vegetation in these habitats which can result in injury or death. Although eggs are most vulnerable to trampling and disturbance, stock are not usually present during winter. Mountain yellow-legged frog tadpoles, subadults, and adults are relatively more mobile than Yosemite toads, and generally occur in habitats with more continuous and deeper water that provides more avenues for escape. Tadpoles will rapidly swim away to deeper water in lakes or stream channels. Adults and subadults will leap from the shoreline and submerge themselves under water to hide under stream banks or on the bottom of the lake or stream. However, all life stages commonly bask on shallow shorelines or on stream and lake banks, and are vulnerable to trampling by stock utilizing these occupied habitats to drink water, cross through habitats (e.g. streams), or forage on emergent or shoreline vegetation.

All life history stages of the mountain yellow-legged frog and the Yosemite toad may be captured and then released immediately or within a short period of time by humans, primarily children playing in streams and meadows, or exploring nature in adjacent habitats. However, the number of individuals captured likely will be low; and the amount injured or killed likely also will be low.

The mountain yellow-legged frog breeds in standing water during early summer immediately following snow melt (Stebbins and McGinnis 2012). This early summer breeding period corresponds to a time when people/stock access is both naturally limited due to lingering snow cover and wet ground conditions, and limited by the National Park Service by meadow opening dates. Thus, potential effects from trampling and/or disturbance of egg masses will be minimized.

Behaviors of the mountain yellow-legged frog that contribute to its exposure to potential effects from interactions with people and stock include periodic movements away from breeding habitat to forage at nearby aquatic habitats (Vredenburg *et al.* 2005). Individuals on shorelines in shallow water zones of meadows, creeks, or lakes, or migrating between waterbodies are at risk of being captured, harassed, injured, or killed. Mountain yellow-legged frogs sometimes congregate in large groups during the day, including tadpoles in warm, shallow water and subadults and adults bask on emergent shoreline vegetation, rocks, and logs (Rachowicz and Vredenburg 2004). After mountain yellow-legged frog eggs hatch during mid-summer, the tadpoles require 2-3 years until they metamorphose into more mobile subadults (Vredenburg *et al.* 2005). The long period of the early life history stages may increase their overall vulnerability to harassment, injury, and death.

However, given the relatively small number of populations near trails and the behaviors that mitigate the potential for adverse effects, the potential for trampling is highly unlikely to result in adverse effects at the population level. For example, the population in Upper LeConte Canyon has increased substantially over the past 12 years (National Park Service 2013A), even though there is a high-use trail nearby that brings numerous people and stock in close proximity to the species on an annual basis. Individual mountain yellow-legged frog in populations immediately adjacent or close to trails in the upper Funston, Bubbs, South Fork Woods, Dusy, Middle Fork Kings, and Evolution watersheds would be subject to potential harassment during encounters with hikers and stock during the summer months.

Yosemite toads may be injured or killed by trampling and other movements by humans and stock, entrapment in deep hoof prints or other disturbances. Humans and stock can step on adults, subadults, tadpoles, and egg masses while in aquatic and upland habitats, including ponds, streams, and rodent burrows, resulting in injury or death. Eggs and tadpoles are potentially at a higher risk of trampling since these stages have no or low mobility and are often found in very small shallow pools with few escape options. Encounters between Yosemite toads and hikers and/or stock have the potential to cause death or injury. Toads in shallow burrows have occasionally been crushed by livestock (Jennings 1996; Service 2002).

Adult and subadult Yosemite toads are vulnerable to the direct effects of humans and stock because they are poor hoppers with low mobility, have an immobilization response to threats, and thus cannot quickly move out of the way. Recent metamorphs are extremely small (< 1 inch) with very limited escape abilities. The risk of trampling of large numbers of metamorphs is highest if humans and stock are present during the metamorphosis period when the amphibians are concentrated in breeding areas; subadults disperse into meadows and uplands. Outside of the breeding period, adults and subadults generally are found in upland habitats or in meadows. The risk of coming in contact with stock for all life stages is highest in meadows or near the perimeter of meadows. In the Bull Creek Watershed on the Sierra National Forest, Liang (2010) monitored several adults who utilized rodent burrows within 75 feet of a meadow throughout the summer. During a 2-yearlong study at Tioga Pass Meadow, Morton and Pereyra (2010) found 58 percent of 654 adult and subadult toads in the meadow bottoms rather than in upland areas, although adult males comprised the largest component of this group. Females predominately were found in uplands away from meadows. The impacts from grazing on individuals in upland habitats currently are unknown. When disturbed while basking at the edge of rodent burrows, Yosemite toad adults and subadults tend to retreat a short distance into the burrow and come back up to the surface in a short amount of time, potentially increasing their risk of being stepped on by nearby stock. Trampling of rodent burrows used for seasonal or overwintering refuge potentially may crush or injure individuals or permanently trap them underground resulting in their death.

2. Indirect Effects from Humans and Stock

Humans and stock can adversely affect the mountain yellow-legged frog and Yosemite toad through indirect effects to their aquatic and upland habitats. The effects include soil compaction, erosion, altering hydrology, pollution of surface and ground water, reduction or elimination of vegetation used as cover or as a food source by prey, and collapse of rodent burrows used as amphibian habitat. Grazing in Yosemite toad habitat would continue in limited locations in Kings Canyon National Park, such as in the upper and lower Blue Canyon area. Seven populations of mountain yellow-legged frogs are located near trails (upper Funston, Bubbs, South Fork Woods, Dusy, Middle Fork Kings, and Evolution watersheds). The Stock

Use and Meadow Monitoring Strategy and implementation of visitor use restrictions if habitat degradation is detected, as described in the Conservation Measures of the Project Description in this biological opinion, will minimize but not eliminate these adverse effects.

Unattended campfires could result in wildfires that kill or injure the mountain yellow-legged frog and Yosemite toad, or damage or destroy their habitats. Human food and other unsecured trash at campsites or other areas may attract increased numbers of ravens, and other predators of the mountain yellow-legged frog and the Yosemite toad. However, education and campground patrols will minimize these adverse effects.

There are several studies that examined the effects of recreational pack stock grazing on alpine meadow habitat (Olson-Rutz *et al.* 1996a, 1996b, Cole *et al.* 2004). Olson-Rutz *et al.* (1996a, 1996b) found that decreased cover and increased bare soil were correlated with grazing intensity and duration. Pack stock camps in the Bob Marshall Wilderness of Montana exhibited large areas of bare ground, increased soil compaction, and slower rates of water infiltration (Cole and Fichtler 1983). A study which evaluated the impacts of a range of pack stock utilization rates on three upper montane and subalpine meadow vegetation types in Yosemite National Park described the relationship between utilization rates and impacts to meadow attributes (Cole *et al.* 2004). The authors fit linear models for the relationships between utilization and productivity, basal vegetation cover, and relative graminoid cover, with variation by vegetation type and number of years of grazing. In dry *Carex filifolia* vegetation, statistically significant relationships for productivity and basal vegetation cover were reported. In mesic *Calamagrostis muiriana* vegetation, statistically significant relationships for productivity, basal vegetation cover, and relative graminoid cover were reported; the relationship with bare ground was statistically significant, but had poor predictive ability. In mesic to hydric *Deschampsia cespitosa* vegetation, only the relationship for productivity was statistically significant. Low intensity grazing may have no detectable impact on species composition and bare ground in Sierra Nevada meadows (Hopkinson et al. 2012, Lee 2013). As grazing intensity increases, bare ground and productivity impacts may develop before changes to species composition (McClaran 2000, Cole et al. 2004). Interannual variation in snowpack may also interact with grazing intensity to determine impacts (Lee 2013). Grazing impacts occur within a growing season but may persist after grazing ends (Olson-Rutz 1996b, Cole *et al.* 2004). The utilization standards which would be used to determine maximum grazing levels range from 25 percent to 45 percent. Based on the work of Cole et al. 2004, these utilization rates would, on average, result in changes to the most heavily grazed portions of meadows relative to comparable ungrazed vegetation. In upper montane and subalpine meadows, maximum utilization rates would be set to limit decreases in productivity, basal vegetation cover, and relative graminoid cover to 18percent or less.

In addition, a recent study in Sequoia and Kings Canyon National Park, Klinger *et al.* (in prep.) found little evidence that packstock grazing had consistent effects on species composition or plant community structure in meadows. Variation in species composition was driven primarily by random variation among meadows and environmental variables, rather than the influence of grazing, and structure did not vary in a direction that would be expected if grazing were having negative impacts. There were no consistent patterns of lower plant cover, more bare ground, or lower diversity in areas grazed by packstock.

Stock or human biological waste could directly impair water quality for the three listed amphibians through bacterial contamination or increasing nutrient levels (EPA 1991; Derlet *et al.*

2006, 2008, 2010 in USFS 2012). Reduction in water quality may compromise their immune function by inducing stress thus making larvae more susceptible to pathogens (USFS 2012). Increased nutrient loading may result in delayed metamorphosis or reduced size at metamorphosis of amphibians (Gerlanc and Kaufman 2005 in USFS 2014). A delay in metamorphosis could make the tadpoles more vulnerable to mortality from mid-season desiccation, snowfall or freezing. A reduced size at metamorphosis could affect the fitness of individuals following metamorphosis and prior to overwintering (USFS 2014).

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. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Introduced trout are predators of the mountain yellow-legged frog, exclude them from deep alpine lake habitats, increase the isolation of remaining populations, and affect the associated aquatic communities (Bradford 1989; Bradford *et al.* 1993; Finlay and Vredenburg 2007; Knapp and Matthews 2000a, 2000b; Knapp *et al.* 2007; Bahls 1992). In 2010, the California Department of Fish and Wildlife (2011) completed the Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement (EIR), which included mitigation measures to reduce or eliminate impacts of hatchery operations and fish stocking on native species, including the mountain yellow-legged frog. A requirement of the EIR is all fish stocking funded by the Federal government that is conducted by the California Department of Fish and Wildlife must be evaluated using the Pre-stocking Evaluation Protocol. Because of stocking changes made in 2000, the EIR did not result in reductions by the State of California to benefit the mountain yellow-legged frog. In addition, the California Department of Fish and Wildlife may implement a Pre-stocking Evaluation Protocol when they have the authority to issue private stocking programs.

Chytrid fungus is an on-going threat to the three listed amphibians. This fungus may have arrived in the Sierra Nevada in the 1960s or 1970s (California Department of Fish and Wildlife 2011; Vredenburg *et al.* 2010) and is now present in most aquatic habitats in this bioregion. At present, few effective measures against chytrid exist, but the development of such interventions is the subject of intensive research (California Department of Fish and Wildlife 2011).

The average temperature in the United States has risen by approximately 1.5° Fahrenheit since 1895; more than 80 percent of this increase has occurred since 1980 (Adger *et al* 2007; Schiermeier 2012; Tollefson and Monarstersky 2012; Allen *et al.* 2013; Kadir *et al.* 2013; U.S. Global Research Program 2013; Hurteau *et al.* 2014; Melillo *et al.* 2014; Wright *et al.* 2013;). There is an international scientific consensus that most of the warming observed is the result of human activities (Adger *et al.* 2007; U.S. Global Change Research Program 2013; Merillo *et al.* 2014), and that it is due to increasing concentrations of greenhouse gases, including carbon dioxide, methane, and nitrous oxide, in the global atmosphere from burning fossil fuels and other human activities (Monastersky 2013; Adger *et al.* 2007). The temperatures in the United States will continue to rise, with the next few decades projected to see another 2°F to 4°F of warming in most areas. The amount of warming by the end of this Century is projected to closely correspond to the cumulative global emissions of greenhouse gases up to that time, ranging from 3°F to 10°F depending upon the level of emissions after the year 2050 (U.S. Global Change Research Program 2013). There are multiple mechanisms by which global warming may push already imperiled species closer to or over the edge of extinction. Global warming increases the frequency of extreme weather events, such as heat waves, droughts, and storms (California Climate Action Team 2006; U.S. Global Change Research Program 2013). As global temperatures continues to rise, habitats are moving northward and upward in elevation, others will be eliminated, but in the near future, range contractions or extinctions of some species are more likely than simple northward or upslope shifts and this may be especially pronounced for Sierra amphibians owing to habitat fragmentation and the relative lower dispersal ability of these species. Since climate change threatens to disrupt annual weather patterns, it will result in a loss of habitats, food, or increased numbers of predators, parasites, and diseases.

For the Sierra Nevada ecoregion, climate models predict that mean annual temperatures will increase by 3.2 to 4.3 °F by 2070, including warmer winters with earlier spring snowmelt and higher summer temperatures (Point Reyes Bird Observatory 2011). Additionally, mean annual rainfall is projected during this time period to decrease from the current average by some 3.6–13.3 inches (Point Reyes Bird Observatory 2011). However, projections have high uncertainty and one study predicts the opposite effect (Point Reyes Bird Observatory 2011). Snowpack is, by all projections, going to decrease dramatically following the temperature rise and increase in precipitation falling as rain (Point Reyes Bird Observatory 2011). Higher winter streamflows, earlier runoff, and reduced spring and summer streamflows are projected, with increasing severity in the Sierra Nevada (Point Reyes Bird Observatory 2011). Snow-dominated elevations from 6,560–9,190 feet will be the most sensitive to temperature increases (Point Reyes Bird Observatory 2011). Meadows fed by snowmelt may dry out or be more ephemeral during the non-winter months (Point Reyes Bird Observatory 2011).

The Yosemite toad has a short active season and it requires very shallow ephemeral water for reproduction (Kagarise Sherman and Morton 1984). The amount of water in the breeding ponds is dependent on the amount and timing of the spring snowpack. As snow melts in the spring, meadow breeding areas flood and pools fill with water, and then dry out during the course of the summer. Rapid desiccation of breeding sites can lead to low or no recruitment of the Yosemite toad (Kagarise Sherman 1980). Reductions in snowpack may result in less available surface water, fewer pools for Yosemite toad reproduction and development of early life history stages (Adger *et al.* 2007; McMenamin *et al.* 2008). Low snowpack also may contribute to increased conifer encroachment of meadow habitat (Service 2014). Rising temperatures and early snowmelt may influence the Yosemite toad's behavior, the timing of reproduction and other phenological events, the duration of tadpole development, and resulting effects on survivorship (Blaustein *et al.* 2010; Walls *et al.* 2013).

The Sierra Nevada yellow-legged frog and the Northern Distinct Population Segment of the mountain yellow-legged frog have short active seasons, overwinter in aquatic habitats for about nine months each year, and require perennial water for reproduction (Bradford 1983, Lacan *et al.* 2008; Pope and Matthews 2001; Zweifel 1955). Reduced snow pack and increased evapotranspiration may result in desiccation of breeding areas, which in turn, may reduce their breeding success (Lacan *et al.* 2008). Rising temperatures and early snowmelt may influence the timing of mountain yellow-legged frog reproduction; reduce the time available for tadpole development, and adversely affecting survivorship (Blaustein *et al.* 2010; Walls *et al.* 2013).

Global Climate Change is highly likely to adversely influence ground water transport, reduced persistence of surface water that leads to lower water levels available for eggs, tadpoles, breeding, and other life history stages of the Sierra Nevada yellow-legged frog, Northern Distinct Population

Segment of the mountain yellow-legged frog, and the Yosemite toad. Therefore, ongoing Global Climate Change is highly likely to imperil these three listed species and the resources, including the aquatic areas, necessary for their survival.

Conclusion

After reviewing the current status of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's conclusion that the project, as proposed, is not likely to jeopardize the continued existence of these listed species. The Service reached this conclusion because of the implementation of the conservation measures described in the Project Description of this biological opinion by the National Park Service.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be implemented by the National Park Service so that they become binding conditions of any grant or permit issued by the National Park Service as appropriate, in order for the exemption in section 7(o)(2) to apply. The National Park Service has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the National Park Service: (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document; and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the National Park Service must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service, therefore, anticipates incidental take will result from the proposed The Service anticipates that incidental take of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad will be difficult to detect because individuals may be difficult to locate due to their cryptic appearance and behavior;

subadults and adults may be located a distance from the streams, ponds, and lakes where they breed and develop; and the finding of an injured or dead individual is unlikely because of their relatively small body size. The conservation measures described above in the Project Description will substantially reduce, but do not eliminate, the potential for incidental taking of these three amphibians. Adverse effects to these animals also may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, or additional environmental disturbances. Upon implementation of reasonable and prudent measure, take of the Northern Distinct Population Segment of the mountain yellow-legged frog and the Sierra Nevada yellow-legged frog in the form of capture, harm, and harassment of all eggs, tadpoles, subadults, and/or adults inhabiting or utilizing 808,078 acres of wilderness at Sequoia and Kings Canyon National Parks for the duration of the project, or the injury, or death of three (3) egg masses, three (3) tadpoles, and three (3) subadults/adults for the duration of the project, will become exempt from the prohibitions described under section 9 of the Act. Upon implementation of reasonable and prudent measure, take of the Yosemite toad in the form of capture, harm, and harassment of all eggs, tadpoles, subadults, and/or adults inhabiting or utilizing 808,078 acres of wilderness at Sequoia and Kings Canyon National Parks for the duration of the project, or the injury, or death of three (3) egg masses, three (3) tadpoles, and three (3) subadults/adults for the duration of the project, will become exempt from the prohibitions described under section 9 of the Act. Therefore, reinitiation will be triggered if the amount of incidental take is exceeded by the National Park Service.

Effect of the Take

The Service has determined that the level of anticipated take is not likely to result in jeopardy to the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad.

Reasonable and Prudent Measure

1. The National Park Service shall minimize adverse effects to the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad by implementing the conservation measures included in this biological opinion and as modified by the following terms and conditions.

Term and Condition

To be exempt from the prohibitions of section 9 of the Act, the National Park Service must comply with the following terms and conditions, which implements the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. Camping by humans, and grazing and pasturing by stock shall be carefully managed, and in some areas prohibited, in meadows and other aquatic areas where the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad are breeding.

2. National Park Service staff and visitors shall be educated about how to avoid impacting the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad and encouraged to exercise caution when they encounter the animal.

3. The National Park Service shall provide the Service with a copy of the annual Stock Use and Meadow Monitoring field reports within ten (10) working days of completion.

4. The National Park Service shall provide the Service with a copy of any scientific or management report completed on the three listed amphibians and activities included in the Wilderness Stewardship Management Plan within ten (10) working days of issuance.

The reasonable and prudent measure, with its implementing terms and conditions, is designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take described for each species in the Amount or Extent of Take section is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The National Park Service must provide an explanation of the causes of the taking as soon as possible and review with the Service the need for possible modification of the reasonable and prudent measure.

Reporting Requirements

The Service must be notified as soon as possible if large numbers of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and/or the Yosemite toad are found injured, sick or dead (e.g., due to illness, chemicals, or other factors), foul play is suspected, or unauthorized take of any listed species is observed or suspected. For such incidents, notification should be made by a National Park Service biologist, National Park Service law enforcement ranger, or other qualified National Park Service personnel. We recognize that the activities in this project will occur in the back country a substantial distance from roads, telephones, and cellphone service for long periods of time, so the notification should be made as soon as practicable. The report of the incident should include the date(s), location(s), habitat description, photographs, maps, preserved specimens (if possible), and any other pertinent information. The Service contact is the Chief of the Endangered Species Division (Forest/Foothill) at the Sacramento Fish and Wildlife Office at (916) 414-6600.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and databases. The Service has the following recommendations:

1. The National Park Service should continue their efforts to eliminate non-native trout from within the ranges of the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad.

2. The National Park Service should assist the Service in implementing the Conservation Strategy, and when completed, the final recovery plan for the Northern Distinct Population Segment of the mountain yellow-legged frog, Sierra Nevada yellow-legged frog, and the Yosemite toad.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any of the conservation recommendations.

REINITIATION – CLOSING NOTICE

This concludes formal consultation on the Wilderness Stewardship Plan in Sequoia and Kings Canyon National Parks for the endangered Northern Distinct Population Segment of the mountain yellow-legged frog, endangered Sierra Nevada Yellow-legged Frog, and Yosemite toad. 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 maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions about this biological opinion, please contact Chris Nagano, Chief Endangered Species Forest/Foothill Division at the letterhead address, email (Chris_Nagano@fws.gov), or at telephone (916) 414-6600.

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